

# SCOTTISH HOSPITALS INQUIRY

## **Bundle of documents for Oral hearings commencing from 19 August 2024 in relation to the Queen Elizabeth University Hospital and the Royal Hospital for Children, Glasgow**

### **Bundle 9 - QEUH Cryptococcus Sub-Group Minutes**

This document may contain Protected Material within the terms of [Restriction Order 1](#) made by the Chair of the Scottish Hospitals Inquiry and dated 26 August 2021. Anyone in receipt of this document should familiarise themselves with the terms of that Restriction Order as regards the use that may be made of this material.

The terms of that restriction order are published on the Inquiry website.



## Table of Contents

1.	A39233720	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 14 February 2019	Page 5
2.	A39233718	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 22 February 2019	Page 12
3.	A39233719	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 01 March 2019	Page 16
4.	A39233714	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 12 March 2019	Page 19
5.	A39233766	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 22 March 2019	Page 25
6.	A39233760	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 03 April 2019	Page 30
7.	A39233769	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 10 April 2019	Page 34
8.	A39233765	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 26 April 2019	Page 39
9.	A39233761	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 09 May 2019	Page 45
10.	A39233762	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 22 May 2019	Page 49
11.	A39233848	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 06 June 2019	Page 54
12.	A39234210	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - Draft - 06 June 2019	Page 63
13.	A39233864	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 21 June 2019	Page 71

14.	A39233828	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 28 June 2019	Page 80
15.	A39233835	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 26 July 2019	Page 85
16.	A39233902	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 09 August 2019	Page 95
17.	A39233815	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 16 August 2019	Page 108
18.	A39234860	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - Draft - 16 August 2019	Page 120
19.	A39233891	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 23 August 2019	Page 130
20.	A39233919	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 02 February 2019	Page 141
21.	A39234867	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 02 September 2019	Page 152
22.	A39233930	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 16 September 2019	Page 163
23.	A39233878	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 24 September 2019	Page 176
24.	A39234701	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - Draft - 24 September 2019	Page 190
25.	A39234075	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 16 October 2019	Page 204
26.	A39234076	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 29 October 2019	Page 218
27.	A39234072	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 15 November 2019	Page 233
28.	A39234074	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 28 November 2019	Page 248
29.	A39233724	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - Draft - 18 December 2019	Page 255
30.	A39234070	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 18 December 2019	Page 261

31.	A39234077	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 09 January 2020	Page 268
32.	A39234079	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 26 February 2020	Page 275
33.	A39234581	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 26 November 2020	Page 286
34.	A39234212	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 10 December 2020	Page 290
35.	A39234198	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 17 December 2020	Page 294
36.	A39234858	IMT Expert Advisory Sub-Group Minutes - Cryptococcus - 14 January 2021	Page 303
37.	A39234207	IMT Expert Advisory Sub Group - Draft Terms of Reference	Page 304

## Cryptococcus IMT Expert Advisory Sub-Group

Thursday 14<sup>th</sup> February 2019

**Present:** Dr John Hood (chair), Darryl Conner, Colin Purdon, Ian Powrie, Dr Andrew Seaton, Mary Anne Kane, Sandra Devine, Eddie McLaughlan, Ann Lang (minutes)

**Teleconference:** Peter Hoffman, Annette Rankin

**Apologies:** Tom Steele

### Actions

#### 1. Welcome and Introductions

Dr Hood welcomed everyone to the meeting and introductions were made.

#### 2. Review of Terms of Reference for Group

The sub-group members agreed the draft Terms of Reference issued with the agenda.

The purpose of this group is to provide expert advice and evidence to the Incident Management Team on the current and any further hypotheses relating to the Cryptococcus Incident within QEUH/RHC.

[REDACTED] The causative organism is *Cryptococcus neoformans* which is usually harmless to the vast majority of people and rarely causes disease in humans. It is seen in HIV positive patients (with low CD4 counts) or severely immunocompromised patients e.g. haemato-oncology patients with neutropenia or solid organ transplants. It is caused by inhaling spores of *Cryptococcus neoformans*. These fungi are primarily found in soil and pigeon droppings.

[REDACTED]

See PAG note of 18 Dec 2018  
\*Added by JH in draft.

[REDACTED]

It was noted that both patients were not in protective isolation ie HEPA filtered air with room positively pressured (ie the air leaks out, not into room) as in a BMTU room.

[REDACTED] not received 'optimal' antifungal

He also knew that *Cryptococcus neoformans* can be a reactivation of a previously acquired *Cryptococcus neoformans* some time before and therefore it is not clear that this is a (QEUH) hospital acquired

\*John Hood felt that while possible that might be a reactivation... the available evidence (at present) suggests that these very unusual infections are:

1. Linked in both time and place
2. We have a clearly documented issue of pigeons around the hospital with pigeon droppings on roofs and in plant rooms in level 12
3. We are growing *Cryptococcus albidus* (a surrogate for *C. neoformans*) in the air of different wards of the hospital including in the wards these patients were in and in the plant rooms supplying them
4. at risk of fungal infections
5. in a HEPA filtered or positive pressure room i.e not in protective isolation
6. had optimal fungal prophylaxis for *Cryptococcus*.

In other words:

#### **Need to control the pigeon problem**

#### **Need to provide more adequate protective isolation rooms (HEPA filtered, under positive pressure) for at risk patients**

**\* Added by JH in draft – Andrew are you happy with what I think I said - points 1 to 6?**

I think there then was a discussion about who decides who goes into BMTU type room and what you do if an 'at risk' patient needs to be transferred to e.g. Radiology.

John Hood advised that it is the clinicians decision where to place patients and if patients have to move to another area they could wear a protective mask (PPE) so they continued to be protected (during the time that they are out of their protective environment)..

Ian Powrie informed that were in are served by different ventilation systems and on different plant rooms. The plant room for each tower has six air handling units per tower and pigeon droppings were found in some of the plant rooms.

### **3. Review of Hypotheses**

The following hypotheses of how the patients contracted *Cryptococcus* was discussed.

#### **A. Source of *Cryptococcus neoformans*: Pigeons via their faeces**

It was agreed that the pigeon droppings were likely to be the source whose spores then entered, directly or bypassed in some way, the ventilation system and were then inhaled by the patients concerned.

John Hood stated that *Cryptococcus neoformans* is very rarely grown from air samples and *Cryptococcus albidus* is taken as an indicator (if present) that *C. neoformans* is also likely to be in the pigeon faeces and therefore also likely to be in the air if *C.albidus* is present (PHE Mycology Lab, Bristol).

**Actions**

So far *C. albidus* has been present (often recurrently) in air sampling of Wards 4C, 6A, PICU [REDACTED] as well as QE1C, 7A, 7D and Plant rooms A, B and C. But not in other areas such as ITUs 3 & 4 and more importantly the HEPA filtered environment of the adult BMTU (4B) – suggesting that this environment housing the most at risk patients was indeed protective.

Peter Hoffman also advised that not all pigeon droppings are contaminated with *Cryptococcus neoformans*. In relation to maintenance staff transferring contamination on their shoes into the AHU, if pigeon droppings were trodden into the AHU the lighter particles that were capable of being entrained in the airflow would be entrained within minutes. Any larger particles too heavy to be entrained in the airflow would remain in place. Any contamination thus introduced would provide a brief bolus of contamination rather than a continuing source.

**Peter Hoffman****B. Possible route of cryptococcal spores to patients****B i. Via Plant Room air into AHUs**

See: GP Environmental report of 24/12/18

See: IMT minute of 20 Dec 2018 – re- Plant room inspections

\*Clear issues of evidence of pigeon ingress into some plant rooms and evidence of pigeon droppings in plant rooms – some worse than others. Plant Room D most obviously contaminated.

A contractor was brought in to clean and decontaminate the area and report any findings to Estates. On 24<sup>th</sup> December 2018 environmental reports of the plant room were received.

John Hood advised that level 12 plant rooms have four spurs and serves levels 4 to 11. He did comment that the 2nd and 3rd floor plant rooms did not seem to have the same degree of pigeon droppings as in Level 12.

\*John Hood asked Estates to provide documentation of the actions taken (so far) related to pigeon/pest control in the plant rooms, to include:  
When cleaned and decontaminated of pigeon faeces  
Evidence of regular inspections and cleaning  
Prevention of pigeon ingress – where breaches were and when corrected.

**Estates**

Colin Purdon reported that Pest Control are on site 7 days a week and he said that he will put a schedule together and send this to the group. Peter Hoffman advised that in regard to pest control - that vigilance should be maintained. Colin also advised that anti-bird spikes have been put in place to try and deter the birds and reduce the number of pigeons.

**CP**

John Hood stated that we need to confirm how the spores in the air of Level 12 plant rooms actually get into the air handling unit - this would have to be during filter change or bypass of filtration. So there should be records of AHU shutdowns and maintenance. John Hood requested an updated maintenance schedule and shutdowns for the various plant rooms.

**Estates**

Peter Hoffman asked if they had F7 filters installed and Ian Powrie confirmed this. Ian Powrie asked if the F7 filters are adequate for these areas and Peter Hoffman stated that patients with increased susceptibility should be in HEPA filtered positive pressure rooms. F7's do not have the same degree of fit quality assurance and air can bypass filtration.

**Actions**

Peter Hoffman asked if the AHUs (air handling units) have been constructed correctly with the final filter (F7) after the fan? If so then the AHU should be under positive pressure after the fan – this was confirmed. Ian Powrie replied that they carried out testing on the air handling units and no breach was identified and are all SHTM compliant. Peter Hoffman said although no filters may have been breached, the holders for the filters can have a gap between the filter and the air handling unit and recommended that these are checked. Ian Powrie said they smoke tested this on three units and they were satisfactory but said it was difficult to gain full access to the units as these would need to be dismantled. He said that the filters in the units are due to be serviced and this is when the checks could be carried out. Peter Hoffman suggested having something to hand to fill in any gaps that may be identified around the filters.

**Estates  
CP/DC**

Discussion then took place regarding F9 filters and if they would be better than the F7 filters that are already installed. Darryl Conner reported that he has done some work on this and it would mean the AHU would not be working as hard. He said the F7 filters have 93 pascals whereas the F9 filters are cartridge style and have 52 pascals.

The conclusion was that the F9 filters may have engineering benefits but no huge benefit for this particular patient group (as still not HEPAs).

Ian Powrie stated that they will do some work in Ward 2A to see the feasibility of installing HEPA filtration with sealed and positive pressure rooms.

**IP**

It was asked how many HEPA filtered, sealed positive pressure rooms do we have in QEUH and RHC. Advised that there are 4 rooms in paediatric BMTU and 4 PPVLS for less high risk patients. In adult BMT they all have positive pressure rooms.

***Needs confirmation of numbers of both Adult and Paediatric HEPA filtered and positive pressure rooms.***

**IP/CP****B ii. From Plant Rooms to patient rooms via the Void**

Possible ingress of dirty air from Plant rooms via the VOID containing various services eg from behind IPS panels etc. John Hood to check if void is positive to rooms/IPS panels (check with smoke test) and ? sealed with silicone.

Keep Estates informed.

Peter Hoffman commented that even if sealed it was unlikely to remain sealed – hence the importance of positive pressure rooms where air will leak out not in.

**C. General Incoming Air Source (via air intakes and through AHUs)**

**C i** - The group discussed if the plant room was **not** the source. John Hood said that the air intakes (particularly those serving level 12) may be being intermittently challenged by Cryptococcal spores in blocks A, B, C and D. He said that regular sampling is being carried out of both plant rooms and ward areas. Peter Hoffman stated that as BMT is served by block B so the HEPA filter is protecting this area, if the rooms are under positive pressure. Ian Powrie said this could be compared (air sampling) with the Ward 5B above or 7B below (as not HEPA filtered).



**Actions**

Peter also recommended taking a cubic meter of air outside the hospital and finding out what the fungal levels are outside the plant rooms near the air intakes. He said that he can send some photos of previous work he did regarding the difference between the air outside and the air inside.

**Peter  
Hoffman**

\*We also know that an F7 filter does not give the same degree of protection as a HEPA filter and note that it is prone to bypassing if not well fitted. Therefore one could postulate that there may be intermittently a significant number of spores entering in through the air intakes – some of which would pass through F7 filters any way.

**C ii Possible role of Helipad**

Another suggestion is the issue of the helipad as the pigeons are nesting there with clear evidence of droppings and perhaps when the helicopter lands there is a back draft of spores which is near to particularly level 12 air intakes – Plant room 121 serving area B.

Ian Powrie said this area is cleaned regularly but they are looking into this. He said they are talking to the University experts to see if they would be willing to do a project on this with regards to the wind and the ?back draft of spores (Computational Fluid Dynamics).

Peter Hoffman commented that CFD only as good as the assumptions fed into the model. He doubts that accurate assumptions will be possible, nor will all the variables be known.

Peter Hoffman suggested that there was likely to be significant dilution of any spores from both the wind and the helicopter down draft.

**Ciii Gruffalo Corridor/ Paediatric Radiology/ PICU****See IMT minute of 24<sup>th</sup> January 2019**

The outdoor areas and courtyards were discussed as the courtyard is near to the Gruffalo Corridor and PICU.

Issues concerning pigeons roosting and fouling a courtyard area (between Paediatric Imaging and Adult MRI) that contains air intakes for Plant room 22. Access into this area is also via the main children's waiting room for paediatric imaging (near the Gruffalo Corridor).

John Hood reported that the AHUs served by these intakes are:

- 22 AHU 21 – Pharmacy
- 22 AHU 16 – Theatre 5
- 22 AHU 15 - Theatre 6 RHC (ultraclean)
- 22 AHU 17 – Theatre 4 RHC
- 22 AHU 14 – Theatre 7 RHC (ultraclean)
- 22 AHU 20 – RHC Radiology
- 22 AHU 23 – 2<sup>nd</sup> Floor Medical Physics
- Plant Room 22 Fresh Air Supply

John Hood checked with Teresa Inkster and confirmed that none of the above areas had flagged any issues with Cryptococcus.

[REDACTED]

Colin Purdon informed us that any fouling has been removed and the area cleaned. All pigeons had been removed from this area and the area now has a netted enclosure.

#### **C iv PICU – new issue**

In Room CCW/050, C1 area John Hood reported that this room has gas cylinders in it. There appears to be 2 air inlets/outlets (passive) in this room directly to the outside – with no filters. This is a room in PICU near the Nurses Station Corridor which grew *Crypto albidus*. When air sampling was carried out fungi was identified and this is near to where the Cryptococcus was found in the corridor in PICU (on 21 Dec 2018).

Ian Powrie agreed to look at this area.

IP

#### **D. Contaminated Trolley Wheels from Patient Transfer from HELIPAD**

Contaminated trolley wheels were also considered as a possible issue as these can be contaminated with pigeon faeces and then perhaps transferred onto staff shoes. Peter Hoffman stated that this was unlikely to be an issue. John Hood pointed out that these trolleys from the helipad were used for the transfer of trauma patients in the main and **not** for immunocompromised patients. Mary Anne Kane reported that cleaning arrangements are in place for trolleys and they are going to trial tack mats to take the pigeon droppings off. There was a general feeling that TACK mats were unlikely to be of much value.

Eddie McLaughlan stated that when Ward 4B was created there was a suggestion that the lift well was positive pressure to Ward 4B and Peter Hoffman commented that the air in a lift shaft is likely to be the cleanest.

#### **E. Possible role of Roof Vegetation – part of pigeon control**

Estates will look at the possibility of the removal of roof vegetation. It was noted that this may not be feasible as it would likely affect roof drainage and concreting over these areas would have a significant effect on roof weight.

Estates

#### **4. Further Actions Required**

- Colin Purdon to put a schedule together on the work being carried out by Pest Control and document, the actions so far carried out as requested on page 3 of this minute.
- Estates (DC) to provide an updated maintenance log for the AHUs – particularly those in level 12 – to identify any AHU shut downs – from September 2018 to present.
- Estates to check if there is a gap between the F7 filter and the air handling units (i.e bypassing) and plug any gaps if present. As the filters in the units are due to be serviced this is when the checks could be carried out.
- Estates to clarify the number of Rooms (adult and paediatric) that are HEPA filtered, sealed and under positive pressure.

- Possible ingress of dirty air from Plant rooms via the VOID containing various services eg from IPS panels etc. John Hood to check if void is positive to rooms/IPS panels (check with smoke test) and if sealed with silicone. He will keep Estates informed.
- Carry out air sampling in 4B plus 5B/7B (JH)
- IP to look into computational fluid dynamics around helipad and AHU intakes.
- CP to update on any further issues around Paediatric Radiology Courtyard
- I Powrie to look at Room CCW/050, C1 (in PICU) as when air sampling was carried out fungi were identified. Looks like unfiltered air coming in from outside.
- Peter Hoffman to send some photos of previous work he did regarding the difference between the air outside and the air inside in relation to fungal levels.
- Estates to look at feasibility of removal of vegetation from the roofs.
- Ian Powrie to do some work in Ward 2A and will apply the HEPA filtration with sealed positively pressurised rooms and determine the feasibility and costs involved.

**5. AOCB**

Nil to update.

**6. Date and Time of Next Meeting**

The next meeting will be held on Friday 22<sup>nd</sup> February at 11.00am in Meeting Room OPD-016, Level 0, Royal Hospital for Sick Children.

## Cryptococcus IMT Expert Advisory Sub-Group

**Friday 22<sup>nd</sup> February 2019**

**Present:** Dr John Hood (chair), Tom Steele, Ian Powrie, Colin Purdon, Darryl Conner, Sandra Devine, Ann Lang (minutes)

**Teleconference:** Peter Hoffman, Eddie McLaughlan, Ian Storrar

**Apologies:** Annette Rankin

### 1. Welcome and Introductions

Dr Hood welcomed everyone to the meeting. Annette Rankin dialled in to the meeting but unfortunately had to give her apologies as she had urgent work to do for Scottish Government.

Andrew Seaton also emailed to say that although he found the initial meeting very useful and interesting he did not think he would have any meaningful further contribution to make to the technical discussions and will therefore not be attending any future meetings.

### 2. Minutes of Previous Meeting

Please see amended minute of meeting of 14 Feb 2019 for acceptance.

### 3. Matters Arising

#### Update on air testing

John Hood reported that there is an issue with the identification system (Maldi Tof) at GRI as this has broken down. No fungal isolates have been able to be identified since samples taken on 5<sup>th</sup> February 2019.

The last isolate of *Cryptococcus albidus* was from 29 January 2019. In the 12 samples taken from each of Wards 7A, 4C and 7D. John Hood stated that there were 1/2 samples positive in the corridor of 7A, 1/12 rooms positive in 7D and 1/12 rooms positive in 4C. However it looks like there is a general decrease in the isolation of *Cryptococcus albidus*.

Note by JH in draft.

**Correction** – the last isolations of *C. albidus* were in fact in 7A, taken on 31 Jan 2019 – 1/12 room samples and 1/2 corridor samples positive.

#### Plant room source

Peter Hoffman asked what interventions have been carried out since 29th January and the subsequent negative samples. Darryl Conner believed that the air handling units ('serving the affected areas') have not been opened since last September\*.

John Hood asked Darryl Conner to send a copy of the maintenance records for AHUs in Plant rooms on A, B, C & D serving levels 4 to 11 from September 2018 to the present.

DC

Discussion took place around the 'plant room' as the possible source. Peter Hoffman commented that the plant room could be the source if the spores are getting into the air handling unit after the final filter or bypassing filtration via gaps between or around the filters. It had previously been confirmed that the relative positions of the fan and final filter preclude ingress after the final filter, so air bypassing filtration remains a possibility. This is in addition to ingress of unfiltered air into rooms not under positive pressure (see JH statement below). Tom Steele advised that the first action taken was to smoke test and to verify that there was no infiltration. Peter Hoffman stated that it is difficult to look under the air handling units. Eddie McLaughlan advised that we know there is a one inch hole on the AHU intake damper actuator spigot on the suction side of the fan (before the primary [F4] and secondary [F7] filters and if the AHUs are not sealed then the plant room could be the source, if the bird droppings have been disturbed.

Ian Powrie said to note that the fouling in the plant room was of a low level and nobody would walk through this if going to the air handling units. Ian Powrie confirmed the pigeon source has been removed from the plant rooms and Colin Purdon reported that the area has been decontaminated with Bio-Rid which is a Pest Control sanitiser. Peter Hoffman asked if he could receive the data for this.

CP

Peter Hoffman stated that the point of control is the final filter and John Hood added that there also needs to be positive pressure in the room and the issue is that some 'at risk' patients were not in HEPA filtered, positive pressure rooms.

It was agreed that it is the clinician's decision to decide where patients should be placed and if they should be in a HEPA filtered, positive pressure room.

*Cryptococcus albidus*, (from the same source as *C neoformans* but more readily detected) was found in [REDACTED] the rooms [REDACTED]. They were [REDACTED] positive on air sampling on 9<sup>th</sup> Jan 2019 (6A room 5 and 4C room 68). John Hood said this cannot be ignored and noted that it had come in from different Plant Rooms (6A – PR 122 (AHU 4,5 &6) and 4C – PR 124 (AHU 4,5 &6) in different areas - A & C). Darryl Conner asked if prior to admission if [REDACTED] any symptoms. [REDACTED]

Sandra Devine commented that originally this group of patients (Adults) were not planned to be in QEUH but in the New Beatson top floor at GGH. However because there was no ICU on the GGH site they were subsequently transferred over to the QEUH.

John Hood reported that small numbers of fungi were found from sampling carried out in the HEPA filtered rooms in 4B (BMTU). He said that the reason for this could be that the BMTU does not have HEPA filtered air in the corridor but does have HEPA filtered air in the rooms. Ian Powrie advised that the corridor is not fitted with air supply grills. The air supply in the corridor is derived from the HEPA filtered positive pressure rooms.

John Hood said that the BMTU unit on the top floor of the New Beatson was all HEPA filtered rooms under positive pressure and with HEPA filtered air in the corridors and was of the equivalent the standard of a good American Unit,- but this comes with a cost.

\* Added by JH in draft: above much easier to do at the planning stage of a new Hospital, NOT as an afterthought – as in this case.

## Actions

On 24<sup>h</sup> January 2019 John Hood reported that wards 7A and 7D were sampled and all 14 samples, taken in each of the 2 wards, showed a growth of *Penicillium* spp.

Air sampling in ward 6A had been carried out in the patient rooms before the patients were transferred back from CDU (once the remedial work in the area had been carried out). Mobile HEPA filters were also deployed in that area. On 5<sup>th</sup> February 2019 54 of 56 samples taken showed fungi in them and the sampling was repeated on 12<sup>th</sup> February. Patients returned to the ward on 12<sup>th</sup> February 2019. There were two samples each taken from 27 rooms and two samples at the nurse's station. John Hood said that the machine (Maldi Tof) is not working at present to verify the identity of these fungi. Though they 'look like' *Exophiala*. The results of the sampling shows a range of 3 to 24 cfu of fungi per 500 litres of air. Peter Hoffman commented that he would expect this in the outdoor air and has, in his experience, not found much effect with the mobile HEPA filters. John Hood said that he will carry out more checks next week to see if the fungal counts are less. He noted that *Exophiala* is usually only a risk to Cystic Fibrosis (CF) patients. Ian Powrie asked if the chilled beams were cleaned prior to the patients moving back to the ward and this was confirmed that they had been.

JH

Other areas that were sampled included:-

- PICU on 8<sup>th</sup> February and 3 of the 14 samples showed fungi.
- Ward 1C on 8<sup>th</sup> February showed 3 out of 12 samples had fungi.
- Ward 7B was sampled on 12<sup>th</sup> February awaiting results.
- Plant rooms 121, 122, 123 and 124 were sampled on 12<sup>th</sup> February awaiting results.
- Corridors in Ward 4B and rooms in: 6A, 4C and 7D will be sampled this week.

#### 4. Further Actions Required

- Colin Purdon to forward the schedule and reports from Pest Control. CP
- Darryl Conner to send a copy of the maintenance records for AHUs in Plant rooms on A, B, C & D serving levels 4 to 11 from September 2018 to the present. DC
- Estates (to be witnessed by John Hood) to formally check if there are any gaps between the F7 filter and the air handling units. Peter Hoffman asked if the air handling units were of the same model and it was confirmed that they were the same type of units in Wards 6A and 4C. He suggested to check the units in the relevant areas and to look at other units not related to these patients but maybe start with those serving the less critical areas first (ie. NOT 6A or 4C). Ian Powrie suggested looking at PICU and 5B and said this work can start on either Tuesday or Wednesday of next week. He advised that they will take steps to seal the filter frame and perhaps bring in an expert to do this. Darryl Conner agreed to arrange for a professional sealant company to come in. It was also noted that there will need to be agreement with Teresa Inkster when the system can be shut down that serves 6A and 4C. Estates DC
- Ian Powrie to send information next week regarding the number of rooms that are HEPA filtered, sealed and under positive pressure. With regard to possible ingress of dirty air from the plant rooms John Hood checked with smoke test around the IPS panels in wards 6A and 4C last Friday. No air was identified coming into either the room or toilet area from the void around the IPS panels or the toilet. Ian Powrie commented that the risk of passage of air between the IPS panels and the room within generic wards was less, due to the lower differential pressure between them. JP

**Actions**

- All windows in the affected rooms (6A Rm5 and 4C Rm 68) have been physically checked but Estates to do further checks in rooms 4C 68, 69; 6A 5 and 6 as these are next to the affected rooms. This is to confirm that there is no ingress (directly) of air from the outside. **Estates CP**
- Ian Powrie to look into computational fluid dynamics around helipad and AHU intakes. He said that he contacted the university and they have put him in touch with somebody and he is waiting to hear back from them. **IP**
- Colin Purdon confirmed there were no further issues around Paediatric Radiology Courtyard. The area has been netted across the top of the courtyard. He agreed to send John Hood a note to confirm this. **CP**
- Estates looked at Room CCW/050, (██████████). When air sampling was carried out fungi were identified. This suggested that it was very likely that outside air will gain entry into this room via the vents to the outside/room. This is where the gas cylinder store is and there is little air flow. The SHTM states that gases should be in a ventilated area. Darryl Conner agreed to look at possible ways of mitigating this, to be both SHTM compliant and to prevent the ingress of unfiltered air. **DC**
- Peter Hoffman sent some photos of previous work he did regarding the difference between the air outside and the air inside in relation to fungal levels and John Hood will forward this to the group. **JH**
- The removal of vegetation from the roofs has not been started yet. Tom Steele advised that if this is removed another product might be heavier and this could affect the structure. Estates to ask a designer and structural engineer to consider a suitable alternative to go onto the roof on level 4. It was noted there is also vegetation in the children's area. **Estates**
- Ian Powrie is working on a review of RHC Ward 2A ventilation arrangements to introduce HEPA filtration with sealed positively pressurised rooms and to determine the feasibility and costs involved. John Hood said that Teresa Inkster is keen to see what the outcome is for Ward 2A so that this can be replicated in Ward 4C. Ian Powrie confirmed that consultancy support had been tendered to undertake the design and specification work. This will then go out to tender for the works to be carried out. **Estates**

5. **AOCB**  
Nil to update.

6. **Date and Time of Next Meeting**  
The next meeting will be held on Friday 1<sup>st</sup> March at 12.30pm or 1.00pm in Meeting Room OPD-016, Level 0, Royal Hospital for Sick Children.

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in OPDO-063 Seminar Room, Queen Elizabeth University Hospital

**Friday 1<sup>st</sup> March 2019**

**Present:** Dr John Hood (chair), Colin Purdon, Darryl Conner, Sandra Devine, Ann Lang (minutes)

**Teleconference:** Eddie McLaughlan

**Apologies:** Annette Rankin, Ian Powrie, Peter Hoffman, Tom Steele

#### Actions

#### 1. Welcome and Introductions

Dr Hood welcomed everyone to the meeting.

#### 2. Minutes of Meeting – 14<sup>th</sup> February 2019

The final copy of the minutes of 14<sup>th</sup> March 2019 were agreed with the exception of Andrew Seaton's comments as he has still to confirm that he is happy with the Minute.

#### 3. Minutes of Meeting – 22<sup>nd</sup> February 2019

Dr Hood had already incorporated the changes suggested by Peter Hoffman but had yet to incorporate those suggested by Ian Powrie, he would do this over the next few days. He would also incorporate any suggestions by those at today's meeting.

#### 4. Update on Air Testing

John Hood provided an update on the air testing.

6A: on 5<sup>th</sup> February 2019 54 of 56 samples taken showed fungi in them. These were confirmed as all being *Exophiala* spp. 27 out of the 56 samples also showed *Rhodotorula* spp.

The samples were repeated on 12<sup>th</sup> February 2019 in Ward 6A with 4 of the 60 samples showing *Exophiala* spp., 9/60 showed a growth of *Penicillium* spp. and 7/60 showed *Aspergillus* spp. 1/60 of the samples had a growth of *Cryptococcus uniguttulatus* (also associated with pigeon faeces). In 3/60 of the specimens mucoraceous fungi were identified.

This was despite mobile HEPA filters.



## Actions

John Hood commented that there were a wide variety of fungi in these air samples. This again suggests that F7 filters are not great either because they may be bypassing or simply not coping with the incoming air – but not HEPAs. Darryl Conner advised that 122, AHU 04, 122, AHU 05 and 122 AHU 06 serve Ward 6A.

Other areas that were sampled included:-

PICU on 8<sup>th</sup> February with 3/14 samples showing fungi.  
 13<sup>th</sup> February Plant Rooms 121,122,123,124 and 7B.  
 20<sup>th</sup> February sampling in 4B corridors and 6A.  
 21<sup>st</sup> February sampling was completed in Ward 7D and 4C.  
 27<sup>th</sup> February Wards 4C and 6A were re-sampled.

6A Outside Sampling 28<sup>th</sup> February 2019

Yesterday, 28<sup>th</sup> February 2019, 16 samples of 1,000 litres of outside air were taken from outside the Plant Rooms on Level 12, all the way round under the air intakes / extracts. Results are awaited.

**5. Update on Walk Round of Plant Rooms 28<sup>th</sup> February 2019**

All air handling units and areas on level 12 were visibly clean and John Hood confirmed there was no evidence of pigeon faeces.

He also confirmed that *Cryptococcus albidus* had not grown from any air sample since the end of January.

**6. Actions from 22<sup>nd</sup> February 2019**

- Colin Purdon has sent the information he has at the moment from Pest Control and once he receives the further update he will forward this to John Hood. **CP**
- Darryl Conner confirmed he has issued the maintenance schedule for the air handling units on level 12 to John Hood. John Hood requested a copy of the maintenance schedule for all of the AHUs on the lower levels as well. **DC**
- John Hood said that when looking at the timeline for the two patients who were infected with *Cryptococcus neoformans* that there was no evidence that any air handling units serving level 12 had been opened during this period.
- Estates reported that the filters (G4/F7) had been replaced in AHU 02 Plant Room 121 (serving Core D levels 8-11) four days ago. The intention was now to open this unit again next week (Thursday 7 March) in order to visualise whether these F7 filters had any evidence of air leaks around the filters and to seal them with silicone if required. This AHU was serving 'non critical' areas. Critical areas such as 4C and 6A would be done subsequently. Colin Purdon said that they will include their colleagues from GRI who will be carrying out the air testing on Thursday 7 March. Colin Purdon said that they do not require a professional sealant company to come in to seal the filter frame as this can be done in house. **Estates**
- Ian Powrie sent the information regarding the number of rooms that are HEPA filtered, sealed and under positive pressure.

**Actions**

- With regard to possible ingress of dirty air from the plant rooms John Hood stated that he will attempt to check behind the IPS panels in the wards above or below Wards 6A and 4C the week after next. **JH**
- Estates to check the windows in affected rooms (Room 5 in 6A and Room 68 in 4C). Colin Purdon reported that this is work in progress and he will be able to provide an update next week. **CP**
- Ian Powrie has engaged with a specialist to look at the fluid dynamics around the helipad and he is waiting on a start date for this. **IP**
- In relation to the Paediatric Radiology Courtyard and the netting for this Colin Purdon confirmed that he has sent John Hood photographs of the job. He said a small area of the insulation on the pipe work is to be replaced as this could not be cleaned.
- PICU – where gas cylinders are stored John Hood advised that he is waiting on the ID of the fungi. Discussions took place earlier with John Hood, Colin Purdon and Darryl Conner. Darryl Conner to look at possible ways to mitigate this so that we are compliant both with the SHTM and to prevent the ingress of unfiltered air. Darryl Conner reported that the contractor is on site today to measure up and suggest a contingency plan. **DC**

Actions Carried Forward

- The removal of vegetation from the roofs has not been started yet. Tom Steele advised that if this is removed another product might be heavier and this could affect the structure. Estates to ask a designer and structural engineer to consider a suitable alternative to go onto the roof on level 4. It was noted there is also vegetation in the children's area.
- Ian Powrie to do some work in Ward 2A and will apply the HEPA filtration with sealed positively pressurised rooms and determine the feasibility and costs involved. John Hood said that Teresa Inkster is keen to see what the outcome is for Ward 2A so that this can be replicated in Ward 4C. Ian Powrie confirmed that they will appoint consultants to undertake the design and specification work and this will then go out to tender for the works to be carried out.

**7. Further Actions Required**

John Hood said that he is waiting on the results becoming available.

**8. AOCB**

Nil to update.

**9. Date and Time of Next Meeting**

The next meeting will be held on Tuesday 12<sup>th</sup> March at 2.00pm in Meeting Room OPD0-063 OPD Seminar Room. Level 0, Queen Elizabeth University Hospital.

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in OPDO-063 Seminar Room, Queen Elizabeth University Hospital

**Tuesday 12<sup>th</sup> March 2019**

**Present:** Dr John Hood (chair), Darryl Conner, Ian Powrie, Ann Lang (minutes)

**Teleconference:** Eddie McLaughlan, Annette Rankin, Ian Storrar

**Apologies:** Sandra Devine, Peter Hoffman, Colin Purdon, Tom Steele

#### Actions

#### 1. Welcome and Introductions

Dr Hood welcomed everyone to the meeting.

#### 2. Minutes of Meeting – 22<sup>nd</sup> February 2019

The final copy of the minutes of 22<sup>nd</sup> February 2019 were agreed with the following amendment.

Page 3, 2<sup>nd</sup> para – should read “On 5<sup>th</sup> February 2019, 54 of 56 samples ....”

#### Minutes of Meeting – 1<sup>st</sup> March 2019

A copy of the minutes of 1<sup>st</sup> March 2019 were distributed with the agenda.

Dr Hood asked for the following amendment to be made to the minutes:-  
Page 1, item 4 – should read “6A: on 5<sup>th</sup> February 2019 54 of 56 samples ...”

He said if there are any further amendments to the minutes to please let him know.

#### 3. Update on Air Testing

John Hood provided an update on the air testing.

He reported that every week air testing is being carried out in the hospital, although it is taking a little time for the fungal results to become available.

On 28<sup>h</sup> February John Hood advised that they had carried out 16 samples of 1,000 litres each of outside air taken from outside the Plant Rooms on Level 12, all the way round under the air intakes / extracts. The final results are awaited.

\*Note in draft to add schematic from IP of outside sampling points on level 12.

The preliminary results showed all 16 were growing a number of different fungi including *black pigmented fungi* (which could be *Exophiala*. spp.) and the yeast *Rhodotorula* spp. The numbers of fungi in each 1000L sample at 22 degrees C has an average of 38 cfu/1000L. This showed quite a fungal load in the incoming air at that time. However no *Cryptococcus* has been identified in these cultures so far. He will discuss these results with Peter Hoffman when he returns.

JH

## Actions

Air sampling was carried out on Wards 5B and 4B. This in the belief that 4B (BMTU) was served from the air handling units (AHUs) on level 12 served by tower B. This was to compare the results from the HEPA filtered environment of 4B BMTU with F7 filtered air in 5B. Ian Powrie reported that he had discovered that 4B BMTU is actually served from Plant Room 31 in the lower level Plant Rooms. This perhaps negates comparing 4B with 5B. Eddie McLaughlan asked for clarification on how this was identified. Ian Powrie replied that at the time of the construction project there was a board decision to change the design to a high level modification for level 4 and this was modified so that BMT would have a separate ventilation system from the rest of the tower. This means that there is a completely separate air handling unit from PR 31 on Level 3 serving this ward.

John Hood confirmed that they will continue to do more air testing and he now has a more manageable spreadsheet detailing all of the testing data. He stated that over 1,000 air tests have been carried out since 5<sup>th</sup> December 2018.

From the air testing (with results so far available) John Hood reported that there have been 32 isolations of *Cryptococcus albidus* with the last one identified on 31<sup>st</sup> January 2019. One isolation of *Cryptococcus curvatus*, was identified in the Plant Room roof on 21<sup>st</sup> December 2018. On 12<sup>th</sup> February 2019 there was a growth of *Cryptococcus uniguttulatus* (which is also associated with pigeon faeces) from 6A Room 20.

John Hood provided an update (as of 12 March 2019) on the number of isolations of *Cryptococcus albidus*:-

Ward 6A – 8 isolations

Ward 7A – 10 isolations

No isolations have been identified in tower B (but we now know that Ward 4B is not related to the Plant Rooms on level 12)

7B first tested 13 Feb and final results not yet available.\*

4B and 5B tested on 6 March with no results as yet.\*

\*both added in draft by JH.

Ward 4C – 6 isolations

Ward 1C – 1 isolation

Ward 7D – 5 isolations

PICU – 2 isolations (RHC)

On 5 February 2019 in Ward 6A - 54 of 56 samples taken showed fungi in them. These were confirmed as being *Exophiala* with 27 of the 56 samples also showing *Rhodotorula*.

On 6 February 2019 Ward 4B (BMTU) 28 samples were taken and 15 of these were confirmed as *Exophiala*, in the patient rooms 2 to 4 cfu's, in the corridors 4 to 8 cfu's. **Although** the particle counts were satisfactory.

John Hood advised that the air testing will continue to be carried out quite frequently in Wards 6A and 4C.

## 4. Actions from 1 March 2019

## Actions

- Darryl Conner to provide John Hood with a copy of the maintenance schedule for all of the AHUs on the lower levels as well. DC
- Looking at the time line [REDACTED] confirmation was that there is no evidence that the relevant air handling units serving 6A and 4C on level 12 had been opened during this period.
- Estates reported that the filters (G4/F7) had been replaced in AHU 02 Plant Room 121 (serving Core D levels 8-11) four days ago. The intention was now to open this unit again next week (Thursday 7 March) in order to visualise whether these F7 filters had any evidence of air leaks around the filters and to seal them with silicone if required. After discussions between JH/IP/DC it was decided NOT to undertake the above plan but to follow the plan of action described below on Friday 8 March 2019.
- John Hood reported that last Friday (8 March) they (IP,DC and JH) looked at AHU 03 Plant Room 123 which serves Core D in order to visualise if the F7 filters had any evidence of air bypassing around the filters.

Ian Powrie stated that they looked at the damper actuator spigot on the AHU to see if air is being pulled in before the G4 filter. On smoke testing a very small amount of air was being drawn in around this spigot into the AHU. Eddie McLaughlan commented that although a 25mm opening was suggested for the spigot, it is actually 12mm. John Hood felt that the air entry around this spigot, being so little and also before the F7 filter, was most unlikely to be very significant. He stated that this puts the Plant Room source down the list of suspicion (even if only slightly). John Hood said that they had shut down the AHU and examined the F7 filter frame against the air handling unit carcass for gaps and removed two of the filter panels to shine a light around and there was no evidence of any gaps (at all).

In relation to the filter frame that is mounted to the deck Ian Powrie said that he looked at this and this unit had a plastic skin that was sealed on the off side of the filter. The top of the filter frame has compressible foam and used as a seal on top, with no gaps identified when light shone on it. The other side of the filter could be seen and it was confirmed that there were no filter gaps on the perimeter of the filters. Eddie McLaughlan asked if the filters were under positive pressure and Ian Powrie stated that when the unit is running F7 filters are under positive pressure. But when the units are switched off they get a back draft from the distal end of the duct. So the filter chamber is under positive pressure when the fan is switched off – for some time. Eddie McLaughlan commented that when the door is open there is a risk of drawing in spores. Ian Powrie informed that previously when they did a smoke test on the doors and seal there was no evidence of smoke being drawn in. John Hood commented that with the door opened (at the F7 filter) and filter panel (s) removed there was a noticeable movement of air from the AHU **out** of the door (quite obvious without a smoke test). John Hood commented that one of the original theories of how the cryptococcal spores might have got into the AHU from the plant room was that at the time of opening of the AHU door (with AHU switched off) to either visualise or to change the F7 filters, air from the plant room would be drawn into the duct work. The above suggested that an ingress of unfiltered air from the plant room into the AHU and into the duct (with some or all of the filters out) was probably an unlikely way of significant fungal spores getting from the plant room to the patients. Ian Powrie confirmed that the AHUs are producing (i.e drawing in from the outside unfiltered air) around 8,000 cubic metres of air in an hour.

## Actions

Peter Hoffman commented that people walking into the AHU units to change the filters would increase the risk of spores gaining entry into the AHU via their feet, if contaminated with any pigeon droppings on the plant room floor.

Estates

By the end of the week John Hood advised that they will look at the 3 AHUs supplying Ward 6A to see if there is any evidence of filter bypass. Ian Powrie reported that the reason this has not been done sooner is that they needed to get agreement from the ICT and clinicians to shut down the unit which will affect particularly the haemato-oncology patients in 6A. John Hood agreed to contact Teresa/Infection Control regarding this shut down. Darryl Conner suggested that we could deploy more mobile HEPA filters to 6A. John Hood also agreed that he will discuss with Teresa Inkster about arranging a future shut down of the AHUs serving Ward 4C.

JH

Quarterly inspections are carried out to ascertain if filters need to be changed and these were carried out in 122, AHUs 04, 05 and 06 in week beginning 16 September 2018. It was agreed that all three units should be checked to ensure the filters are properly sealed and in the condition that they should be in.

From the previous meeting Ian Powrie updated that they had an action to look at the manufacturer's view with regards to the sealing standard of the filter frame (of the F7) and how this is sealed and tested. He reported that the frame is sealed on the off side filter and is tested to a British Standard BSEN [11861886/2007](#). The F7 filter housing has a standard bypass acceptance test of 2% of the volume flow rate of the AHU volumetric flow (typically 8000 cu metres per hour) which is a bypass of 164 cubic metres per hour. But we believe that the manufacturer has tested these F7 filter frames to the F9 standard giving a 0.5% of the percentage air volume flow which would give a 41 cubic metre per hour bypass on this filter.

Therefore this is still quite a high volume of air bypass. Ian Powrie believes the installation is compliant. On looking at the SHTM Ian Powrie pointed out that this standard is not referred to in it. This suggests, the need perhaps, to review which air filters should be employed in 'non – critical areas' in healthcare facilities.

The conclusion from the above perhaps suggests that the volume of air being drawn into the system through a non HEPA filter from the external air is likely to be an issue, if not *the* issue and the likely source of the spores could well simply be from the 'unfiltered' external air going through a non- HEPA filter.

## Actions

- Ian Powrie has appointed a consultant to look at the fluid dynamics around the helipad and hopefully this will provide data regarding this. He said he met with the consultant today and they have asked for the flight path and the landing pattern for the helicopter and asked for variations of the flight path. They will do a simulation of different particle sizes and Ian said that he has asked them to use 0.1, 0.3, 0.5, 1 and 10 microns. The work should take approximately 3-4 weeks to complete.
- **PICU – Room CCW/050** - where gas cylinders are stored. Darryl explained that in order to mitigate the potential of any ingress of external air entering this space from the courtyard, Estates have agreed to a solution where :
  1. The high level air vent in the store is blocked off and fire sealed.
  2. The low level vent is fitted with an extract fan with a non return damper to ensure one way air flow.
  3. The entrance door is fitted with a fire rated door louvre to ensure air supply to the room from the corridor.

These modifications will change the rooms ventilation set up from a displacement regime to a negative regime while complying with the buildings fabric specification while not compromising the rooms intended application as a ventilated bottle store.

Now the air will pull through the store and out the building with no external air being pulled into the room mitigating any concern that external air will be drawn into the ward from this area.

- Ward 2A Ventilation Upgrade. Ian Powrie confirmed that the Consultancy Team have been appointed. Feasibility/Design schedule to commence week beginning 18 March. Expected to take 3 to 4 months to issue of tender.

#### Actions Carried Forward

- Colin Purdon has sent the information he has at the moment from Pest Control and once he receives the further update he will forward this to John Hood. **CP**
- With regard to possible ingress of dirty air from the plant rooms John Hood stated that he will attempt to check behind the IPS panels in the wards above or below Wards 6A and 4C in the near future. **JH**
- Estates to check the windows in affected rooms (Room 5 in 6A and Room 68 in 4C). Colin Purdon reported that this is work in progress and he will be able to provide an update. **CP**
- In relation to the Paediatric Radiology Courtyard and the netting for this Colin Purdon confirmed that he has sent John Hood photographs of the job. He said a small area of the insulation on the pipe work is to be replaced as this could not be cleaned. **CP**
- The removal of vegetation from the roofs has not been started yet. Tom Steele advised that if this is removed another product might be heavier and this could affect the structure. Estates to ask a designer and structural engineer to consider a suitable alternative to go onto the roof on level 4. It was noted there is also vegetation in the children's area. **TS**

#### **5. Further Actions Required**

- John Hood to discuss the results so far (and particularly those of the outside air testing carried out on 28 February) with Peter Hoffman.
- Darryl Conner to provide John Hood with a copy of the maintenance schedule for all of the AHUs on the lower levels.
- John Hood agreed to contact Infection Control regarding the proposed shut down (now scheduled for Friday 15 March\*) which will affect particularly 6A. Darryl Conner said we may need to deploy more HEPA filters in 6A during the shut down. This was agreed. \*added post meeting.
- John Hood said that he will contact Teresa Inkster about the same inspection and filter changes of the AHUs serving 4C, in the near future.

**Actions**

- Estates to check all three AHU units (122-04, 122-05 & 122-06) serving 6A to ensure that the filters are sealed and in the condition that they should be.
- Ian Powrie has appointed a consultant to look at the fluid dynamics around the helipad and will provide an update at the next meeting.

**8. AOCB**

Nil to update.

**9. Date and Time of Next Meeting**

The next meeting will be held on Friday 22<sup>nd</sup> March at 2.00pm in Conference Room GWS-009, Level 3, Royal Hospital for Children.



**Cryptococcus IMT Expert Advisory Sub-Group  
Notes of Meeting held in Conference Room GWS-009,  
Level 3, RHC**

**Friday 22<sup>nd</sup> March 2019**

**Present:** Dr John Hood (chair), Tom Steele (TS), Colin Purdon (CP), Calum MacLeod (minutes)

**Teleconference:** Peter Hoffman, Eddie McLaughlan, Ian Storrar

**Apologies:** Ian Powrie, Sandra Devine, Darryl Connor

**1. Welcome and Introductions**

Dr Hood welcomed everyone to the meeting with apologies received from the above mentioned.

**2. Minutes of Meeting – 1<sup>st</sup> March 2019**

The final copy of the minutes of 1<sup>st</sup> March 2019 were agreed.

**Minutes of Meeting – 12<sup>th</sup> March 2019**

The final copy of the minutes from 12<sup>th</sup> March were agreed with the following exceptions:

Page 3, 4<sup>h</sup> paragraph it should read - Eddie McLaughlan commented that although a 25mm opening was suggested for the spigot, it is actually 12mm.

Page 3, 6<sup>h</sup> paragraph – Peter Hoffman commented that people walking into the AHU units to change the filters would increase the risk of spores gaining entry into the AHU via their feet, if contaminated with any pigeon droppings on the plant room floor.

Page 4, 3<sup>rd</sup> paragraph should read – British standard BSEN 1886/2007.

**3. Update on Air Testing**

16 air samples of 1000 litres of air were taken from near the air intakes outside the plant rooms on 28 February 2019.

Results of these air samples are showing approximately 12/31 positive for *Aspergillus* (10 *Asp.fumigatus* and 2 *Asp.niger*); 3/31 mucoraceous fungi not yet identified; \*5/31 *Dematiaceous hyphomycete* – ‘Black fungus’ NOT *Exophiala* spp. ; \*2/31 *Lichthemia (Absidia) corymbifera* ; 30/31 *Penicillium* spp. ; 21/31 *Cladosporium* spp. ; 17/31 *Mycelia sterilia*

\*added by JH at Draft stage when results became available.

Most recent results from air samples taken on the 7<sup>th</sup> March around the air intakes from 122 and 124 plant rooms (serving 6A and 4C respectively) came back with mainly *Penicillium* spp. and *Aspergillus* spp. The outside air counts at 22degC were 67 and 19 cfu/500L respectively.

Comparing the growth from 7 air samples from rooms in 6A and 6 air samples from rooms in 4C (growth at 22degC) with their respective air samples from outside their air intakes (growth at 22degC) - there was on average of a 61 fold reduction in counts in 6A and a 16 fold reduction in counts in 4C.

(\* these figures added in draft stage by JH).

Peter Hoffman commented that the results confirm filtration (outside air to room air) were within expected levels for this type of ventilation. John Hood informed the group that the timing of the samples taken outside and inside were not instantaneous as they have to wait until the person moves back from the roof to the Ward to take the samples.

Tom Steele asked if we were to go to another hospital and take similar air samples would we anticipate to find these types and counts of fungi in their air samples? Peter Hoffman said you might but it is whatever nature happens to be providing that day. The air sampling results will vary for numerous reasons including the time of year, vegetation around the area and the prevailing weather conditions at the time including wind direction etc.

Tom Steele asked if we are getting higher counts of different fungi as we are sitting beside a large sewage works (with both large sludge tanks and trickling beds) and there is also a large landfill site in close proximity to the Hospital. It is not known if cryptococcus is associated with sewage it is more likely from exposure to dried pigeon faeces. Tom Steele requested if Public Health could contact Scottish Water (JH noted that his experience with Scottish Water in the early 1990's, at GRI during legionella issues, was not good and they were exceedingly defensive – added by JH in Draft) or Environmental Health to see if they have carried out their own air sampling of the sewage works in the past, and if so, would they allow us to see the results? If no air sampling has been carried out then Tom Steele asked if it would be worthwhile if we did our own air sampling down on the perimeter of the hospital adjacent to the sludge tanks to see what we grow. Peter Hoffman informed the group that if we were to do this then we would need to carry this out when the wind was blowing from the sewage works onto the hospital campus and also carry out the same test when the wind was blowing away from the hospital, so they can be compared. It was agreed that John Hood would ask Dr Iain Kennedy from Public Health to see if any air testing had been carried out in the past by Public Health/Environmental Health.

JH

Future air samples will be looking at specifically Ward 6A as the filters have now been changed from an F7 to an F9 filter and also 4C and 4B

JH

#### 4. Update On Actions

Darryl Connor has sent maintenance schedules to John Hood which showed no evidence that the AHUs serving the wards 6A, 4C and PICU was carried out while the patients were in the QEUH/RHC. John Hood has requested that these schedules are to be printed off in large print so that they can be read easier.

DC

The filter changes to AHUs 4/5/6 in Plant Room 122 (serving 6A, 7A, 5A & 4A) went ahead on 15<sup>th</sup> March. AHU 4 and 5 provide air to patient rooms whereas AHU 6 provides air to the corridor. It was agreed that AHU6 that provides air to the corridors was shut down first then AHU4 was shut down to enable filter changes. AHU4 was then started back up and then AHU 5 was shut down, the filter replaced and then turned back on. AHU6 was the last one to have the filter changed and last to be turned back on, this was so that 'dirtier air' was less likely to migrate from the corridor into any of the patient rooms. There were no reports of any disruption or other issues from the ward staff when this was carried out.

When inspecting the F7 filters in the AHU 4/5/6 no breaches were found on the filters *themselves*. However AHU4 had a small breach identified in the top left hand corner of the cassette/duct carcass (looking down the duct). After initial assessment Ian Powrie felt that it was about a 2% breach which isn't very large. Silicone was then used to seal all around the cassette/duct carcass of each of the new filters after they were fitted so there is a complete seal.

Air pressure dropped when the new filters were installed. Before the F9 was installed the air pressure for an F7 filter (dirty) was recorded at 75 Pascal's but after installation of F9 filter it dropped to 35 Pascal's. Peter Hoffman said that this drop in pressure seems very low and that the manufacturer should have a table showing what the pressure differential range should be. Colin Purdon will contact the manufacturer to find out what the pressure ranges should be and send them onto Peter Hoffman. John Hood pointed out that Darryl Conner was happy at the pressure drop and had been expecting this. Darryl Connor will be asked why the air pressure is so low and is this determinate to anything downstream of the air flow.

CP

DC

Particle counts after installation of the filters all came up the same showing that they are all working to the same degree. John Hood noted that AHU 5, initially the particle counts across the F9 were not as good as those for AHU 4 and 6. However on re-testing it was similar to the other two. It was felt that we had probably tested too soon after the filter change.

The gas cylinder storage room next to PICU where only oxygen canisters are stored is having its 'passive' vent filled in outside the room and replaced with an extractor fan on the wall switched to extract which will be on constantly. Peter Hoffman asked if the fan happens to stop working would anyone notice? Is there anyway of sealing the passive vent and not replacing with an extracting fan and extending the existing ventilation into the room? Colin Purdon will explore this with Darryl Connor.

CP/DC

#### 5. Actions from 12<sup>th</sup> March 2019

Ian Powrie to explain (at next Meeting) para 2 page 4 of minute of Meeting of 12 March regarding the standard bypass testing of F7 and F9 filters with respect to the British Standard BSEN 1886.2007.

IP

Ventilation upgrade within Ward 2A, RHC. This project has been passed over to capital planning to get some pace around designing and procurement. Peter Hoffman emphasised the need for solid ceilings in this critical area. A false ceiling adds a level of instability to the pressure control (positive pressure) of such a room, and such pressure control is crucial (along with HEPA filtration of the air).

IP

Colin Purdon has sent the pest control information onto John Hood.

John Hood will attempt to check behind the IPS panels in the wards above or below Ward 6A & 4C to see if any possible ingress of dirty air within that void area.

JH

A close detailed check has taken place in Room 68/69 in Ward 4C. Both rooms showed no sign of air ingress although there was a small piece of mastic missing from the inside of the window. This was not felt to be significant. Still awaiting to gain access to room 5, ward 6A to carry this out. Once all identified rooms have been visually checked Colin will forward on a report to the group.

CP

Colin Purdon confirmed that the Paediatric radiology courtyard has been cleaned with netting put up to stop any further birds from roosting within that area.

The removal of vegetation from the roofs has not been started yet. Tom Steele advised that if this is removed another product might be heavier and this could affect the structure. Estates to ask a designer and structural engineer to consider a suitable alternative to go onto the roof on level 4. It was noted there is also vegetation in the children's area.

TS

Ian Powrie had initiated the fluid dynamics modelling around the helipad/ QEUH/RHC. It is probably going to take around 6 weeks for the report to come

IP

through.

## 6. AOCB

Tom Steele asked in terms of hypotheses do we actually have a range that we are actively pursuing. John Hood's own view is looking at how the patients breathed in air containing cryptococcal spores. This is complex !

These paragraphs below were added by JH in draft

Early on the focus was on the clear contamination of the plant rooms with pigeon ingress and pigeon fouling. See GP Environmental Pest Control Report (6<sup>th</sup> December 2018 to 8<sup>th</sup> March 2019).

One of the theories is that the Plant Rooms serving 6A, PICU and 4C were the source of the cryptococcus. The plant rooms might have been an issue with bird fouling in December (or before) but it is difficult to explain how cryptococcal spores got into the sealed AHUs. One of the theories is that this would have been at the time of AHU shut down and door opening for the 'final filter inspection/ replacement', with either air ingress directly into the duct post filter or pigeon faeces taken in on the feet of estates personnel directly onto the floor of the duct.

However the above would require maintenance of the filters - with door opening to allow ingress of spores. There is no evidence of AHU shut down with door opening (from the maintenance logs) of the AHUs serving 6A, PICU or 4C, during the time lines (dates during which the 2 case patients were in specific wards of the QEUH/RHC) prior to the isolation of *C. neoformans* from their blood cultures.

There are many other hypotheses that we are investigating (and will subsequently form an opinion on) but an important one is simply that both these high risk patients were in rooms whose air was filtered to an F7 standard not to a HEPA filtered standard. Therefore we must consider that the cryptococcal spores could have simply entered from the outside air through the air intakes and either bypassed the filters (being investigated) or that the filters simply did not remove them all. Air sampling has clearly shown the presence of *Cryptococcus* spp. (not *neoformans*) but surrogates of, such as *C. albidus*, *C. curvatus* and *C. uniguttulatus* in the air of a number of wards (see page 2 of Minute of 12<sup>th</sup> March) i.e. in wards 7A, 6A, 4C, 7D (level 12 plant rooms QEUH) and 1C (lower level plant room QEUH) plus PICU (plant room RHC). It should also be noted that 4B (adult BMTU) with HEPA filtered rooms under positive pressure has had no such isolations of cryptococci.

It was also noted that rooms within Ward 4C and the Renal Transplant area at the QEUH may need to be considered in any proposed upgrade to the ventilation system.

Dr Hood emphasised that the crucial control points are HEPA filtration of the air in positively pressurised rooms for the patients who are most at risk (essentially at risk Haemato-oncology patients). Patients within these rooms will spend the vast majority of time in them so it is essential that the air that they breathe is as free of fungal spores as possible and also consideration should be given to commencing an appropriate prophylactic antifungal agent(s) as a precaution (a clinical decision). The point being that the Board must (as they are doing) have a plan to provide an increased number of such protective isolation rooms for both adults and children.

For the final timeline as to when this report is likely to be completed... is difficult. Formal air testing results can take about 2-4 weeks to come through. If there is anything isolated from them that either the Mycology lab at GRI cannot identify or whose ID needs to be confirmed (e.g. any *Cryptococcus* spp.) this requires the isolates to be sent to the PHE Mycology Reference Laboratory in Bristol. This then takes even longer. The Fluid Dynamics Modelling is likely to take 6 weeks.

## 7. Date and Time of Next Meeting

The next meeting will be held on Wednesday 3<sup>rd</sup> April at 1400 on Level 3 Conference Room GWS-008 .

### Actions

John Hood will contact Dr Iain Kennedy from Public Health to find out if Public Health/Environmental Health have carried out any air sampling around the vicinity of the sewage works near the QEUH/RHC site..

**JH**

Future air samples will be looked at specifically at Ward 6A as the filters have been changed from an F7 to an F9 filter.

**JH**

Darryl Connor is to send John Hood larger print AHU maintenance schedules so he can read them easier.

**DC**

Ian Powrie to explain para 2 page 4 of minute of Meeting of 12 March regarding the the standard bypass testing of F7 and F9 filters with respect to the British Standard BSEN 1886.2007.

**IP**

Colin Purdon will find out the pressure ranges that should be expected when installing the new F9 filters and forward them onto Peter Hoffman.

**CP**

Darryl Connor is to be asked why he thought it was acceptable for the Pascal level to drop so low when the new F9 filters were installed.

**DC**

Colin Purdon and Darryl Connor will look to see if the ventilation system can be extended to the storage room beside PICU instead of 'filling in' the air vent and putting in an extractor fan within the room (which may fail).

**CP/DC**

John Hood will attempt to check behind the IPS panels in the wards above or below Ward 6A & 4C to see if any possible ingress of dirty air within that void area.

**JH**

Colin Purdon will forward on careful visual window check report once all identified rooms have been worked on.

**CP**

Estates are awaiting a structural engineer report to see if a suitable alternative can be found for the garden roof on Level 4.

**IP**

Ian Powrie is currently awaiting the fluid dynamics modelling report regarding the helipad/QEUH/RHC.

**IP**

**Cryptococcus IMT Expert Advisory Sub-Group  
Notes of Meeting held in Conference Room GWS-008,  
Level 3, RHC**

**Wednesday 3<sup>rd</sup> April 2019**

**Present:** Dr John Hood (chair), Ian Powrie, Colin Purdon, Darryl Conner, Sandra Devine, Ann Lang (minutes)

**Teleconference:** Peter Hoffman, Eddie McLaughlan, Ian Storrar, Annette Rankin

**Apologies:** Tom Steele

**1. Welcome and Introductions**

Dr Hood welcomed everyone to the meeting and apologies were received from the above mentioned.

**2. Minutes of Meeting – 12<sup>th</sup> March 2019**

The final copy of the minutes of 12<sup>th</sup> March 2019 were agreed.

**Minutes of Meeting – 22<sup>nd</sup> March 2019**

A final copy of the minutes of 22<sup>nd</sup> March were agreed with the following exceptions:

Page 1, item 2, 4<sup>th</sup> paragraph should read – “Peter Hoffman commented that people walking into the AHU ...”.

Page 1, item 3, 1<sup>st</sup> paragraph should read – “16 air samples of 1000 litres of air intakes were taken outside the plant rooms...”

Page 2, 1<sup>st</sup> paragraph should read – “Peter Hoffman commented that the results confirm filtration (outside air to room air) was within expected levels for this type of ventilation”.

Page 3, item 5, 5<sup>th</sup> paragraph should read – “Once all identified rooms have been visually checked ...”.

Page 4, 7<sup>h</sup> paragraph – delete “Trust” and add “Board”.

**3. Update on Air Testing and Pest Control**

On 27 March 2019 John Hood reported that air testing was carried out between the bottom perimeter of the Energy Centre and the Sewage Works (large sludge tanks). The wind was blowing from the Sewage Works towards the Energy Centre. The other areas sampled were PICU and Plant Room 41. Wards 6A, 7A and 4C were sampled on 28<sup>th</sup> March along with Roof samples (near the intakes, serving AHUs 122 and 124 that cover wards 6A and 4C).

During 5 December 2018 – 12 March 2019 air sampling was carried out in Ward 4B which is the Adult BMT. John stated that 94/138 of these had no growth. No counts were over 4 cfu in 500 litres of air sampled from the rooms. Two counts were 4 and 8 cfu/500L in the corridor. 68% of these samples were negative.

In Ward 6A during the period 9 January 2019 – 23 March 2019, 11 sets of samples were taken and 163/381 individual samples were negative which is a rate of 43%. This suggested that the HEPA filtered air was indeed cleaner than that of F7 filtered air. John Hood agreed to do a much more detailed comparison between the air counts in 4B and 6A over time. John Hood noted 54/56 samples with *Exophiala* from the samples taken in Ward 6A on 5 February 2019 and in Ward 4B (15/28) with *Exophiala* taken on 6 February 2019 which he cannot explain, at present.

Filter changes were carried out in AHU 4/5/6 in plant room 124 which covers Ward 4C on 2<sup>nd</sup> and 3<sup>rd</sup> April (yesterday and this morning) AHU 5 was shut down today with no breaches visualised. Darryl Conner said that AHU 5 serves rooms 68 and 69 and there were no evidence of any breaches. AHU 6 had only small breaches on top left and bottom L with a 'light breach' - through the silicone on the bottom R. AHU 4, however, had clear breaches on the top R, bottom R and all down the L side, particularly the middle 140mm. Ian Powrie stated that in the duct carcass on the bottom near side where the frame had been spot welded to it, there was a small gap between the frame edges. The far end also had intermittent gaps where light penetrated. In all AHUs examined the filter frames were resealed (all round and on both sides). We employed (on this occasion) silicone, but going forward we will use mastic (not transferring light and easier to remove and replace). Colin Purdon advised that all F7s will be upgraded to F9s in high risk areas.

There then took place a discussion about *Exophiala*: 6A testing on 20 March with 26 of 26 samples positive, 4C on 20 March with 8/8 positive. On 22 March, both in 4B with 22/28 positive and 5/6 positive in 4C.

Sandra Devine commented that previously the dishwashers were potentially the source of *Exophiala*. Ian Powrie said that all dishwashers had subsequently been fitted with point of use filters. There had also been complaints about them not cleaning dishes properly – but this was because the detergent and rinse agent were being placed in the machines 'the wrong way round'. John Hood felt that the *Exophiala*, was probably coming in on the external air, but could not yet prove it.

On 6 December 2018 GP Environmental Pest Control were brought in for the removal of the pigeon fouling in Plant Room 123 on Level 12 (serving - 7D,6D,5D & 4D Wards) this was started with pigeon fouling removal from the floor area, ledges and ducts at roof access door area. The next visit was on 23 December 2018 as an 'Emergency Response' to remove debris and contaminated air handling filters plus compilation of a "Pest Activity/Housekeeping Report" at Plant rooms 31,32,33,21,22, 23, 41, 41A plus Level 12 – 121,122,123, and 124'. John Hood asked what happened during the period from 6 – 23 December. Colin Purdon agreed to contact the company regarding this and also to ask what standard(s) they are working to.

CP

Peter Hoffman and John Hood discussed an article that they had read in the Journal of Veterinary Medicine Science from Thailand. They had tested 3 disinfectants (based on a quaternary ammonium compound, potassium monopersulphate or sodium hypochlorite). They tested each of the above against 'pure' *Cryptococcus neoformans* mixed with sterile pigeon droppings, They found that the one containing the quaternary ammonium compound was the most effective. Peter felt that this was not a particularly good paper as quaternary ammonium compounds are easily inactivated by organic matter e.g. faeces. In the article the product tested was a quaternary ammonium compound produced in Belgium. Peter wondered what disinfectant GP Environmental Pest Control used. Colin Purdon advised that the company used a Bio-Rid sanitant and Peter asked Colin if he could ask the company why they are using this particular quaternary ammonium compound. John Hood noted that Bio-Rid's product information sheet states that 'Bio-rid is used to control the disease organisms associated with pest birds (i.e. Pigeons, Starlings, Sparrows gulls etc.).

CP

It is intended to be used in areas where likely to come in contact with bird droppings,...'. 'This product will kill bacteria, fungi, protozoa Rickettsiales and viral organisms associated with birds.....' Peter said that once he has received all the information from the company he will look over it. Colin felt that the Bio-Rid was used on the pigeon droppings prior to their removal and then used again to sanitise the cleared surfaces. John Hood asked Peter if there was a better chemical to use and he replied that physical cleaning was better instead of using chemicals. Colin confirmed that they received a copy of the risk assessment and method statement from the company.

The gas cylinder storage room next to PICU where only oxygen canisters are stored is having its 'passive' vent filled in outside the room and replaced with an extractor fan on the wall switched to extract which will be on constantly. Peter Hoffman and John Hood are both concerned that the extractor fan may break down and we are not aware that this has happened. Ian Powrie advised that the extractor face of the fan has an automatic louvre and there will be no penetration of air. Darryl Conner suggested that if the area is properly maintained with a modification of linking the control to the BMS monitoring the fan status and the room oxygen concentration, that this should address the concerns. He also said that as well as the area being monitored a critical alarm will be installed, PPM will be carried out and quarterly tests will be completed. John Hood asked Darryl to provide an update to him with the work to be carried out. Peter Hoffman suggested putting in a spur onto the main extract and have a grill on this so the extract air is drawn out of the room.

DC

On discussion with the Authorised Engineer Darryl Conner said it is common practice to store these gas bottles here and to have an extract ventilation system outside of the room. However with the addition of this breach would require rebalancing of the extract in the surrounding area. Colin Purdon advised as long as this area is monitored and fitted to a critical alarm this should work.

John Hood pointed out that the ingress of unfiltered air from 'The sanctuary' area into this gas cylinder storage was an issue. This room is next to PICU. There had been issues with pigeon fouling in the past but is now controlled with netting over the sanctuary. PICU corridor had a few positive air samples with *C. albidus* and the [REDACTED] of *Cryptococcus neoformans* had spent some time in the PICU. Therefore this room must have a robust fix that will not allow air from the outside in the Sanctuary gain access into this vulnerable area.

The group discussed the issues associated with this and these included:

- a) close the bottle store and block off the vents
- b) if staff want to keep this area there will be a substantial cost and there could be major disruption to the ward in order to facilitate a connection with the existing internal extract ventilation.

#### 4. Actions from 22 March 2019 Meeting

John Hood reported that he added in two identification results that had become available after the meeting and these included: 5/31 *Dematiaceous hyphomycete* – 'Black fungus' NOT *Exophiala* spp.; 2/31 *Lichthemia (Absidia) corymbifera*. He commented that the *Lichthemia* result was the same organism as the patient with flu in ICU. He also thought the results might be *Exophiala* rather than *D. hyphomycete* but they were not.

Ian Powrie was asked if the breach identified would be encompassed within the 2% allowed within the British Standard. Peter Hoffman asked if this was 2% of unfiltered air bypassing and Ian advised that this was assessed in a 'type testing' test rig. He said the manufacturer would have tested (on a rig in the factory) both an F7 unit but also up to an F9 standard which would allow a 0.5% bypass. Ian Powrie did say it was then, still a bypass of 48 cubic metre of air per hour.



Darryl Conner was asked to update on the F7 and F9 filters and the drop from 75 Pascal's to 35 Pascal's. He said that the F7 filter has approximately 8.0m<sup>2</sup> filter CSA (actually 5.2m<sup>2</sup> having checked notes) whereas the F9 filter has 17m<sup>2</sup> CSA, which is approximately double the filter area of the current filters in use. So he said he would expect the filter (DP) differential pressure to reduce from approximately 75-35 Pa hence half. When the filters deteriorate over time our early indicator dirty filter alarm is set to 1.5 times the clean DP of a newly installed one, this is approximately 55 Pa with a final dirty filter rating of 300 Pa before the filter is no longer adequate for use. In relation to F9 filters the ePM for 1 micron is 83% and the ePM for 2.5 microns is 87% As defined by the manufacturer's datasheet.

## 5. Further Actions Required

A close detailed check has taken place in Room 68/69 in Ward 4C. Both rooms showed no sign of air ingress although there was a small piece of mastic missing from the inside of the window. This was not felt to be significant. Still awaiting to gain access to room 5, ward 6A to carry this out. Once all identified rooms have had a close detailed visual check, Colin will forward the report to the group.

CP

Estates are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4.

TS

Ian Powrie has initiated the fluid dynamics modelling around the helipad/ QEUH/RHC. This data should be available in early May.

IP

John Hood will attempt to check behind the IPS panels in the wards above or below Ward 6A & 4C to see if any possible ingress of dirty air within that void area.

JH

Darryl Conner to provide John Hood with an update on the work relating to the cylinder store.

DC

Darryl Connor to send John Hood the maintenance schedules in large print for PICU.

DC

Continue to carry out air sampling in Wards 6A and 4C.

JH

John Hood will contact Dr Iain Kennedy from Public Health to find out if Public Health/Environmental Health have carried out any air sampling around the vicinity of the sewage works near the QEUH/RHC site.

JH

Ventilation upgrade within Ward 2A, RHC. This project has been passed over to capital planning regarding the designing and procurement. Peter Hoffman emphasised the need for solid ceilings in this critical area. A false ceiling adds a level of instability to the pressure control (positive pressure) of such a room, and such pressure control is crucial (along with HEPA filtration of the air).

IP

Colin Purdon agreed to contact Pest Control regarding what work was carried out between 6-23 December 2018 and what standards they are working to. To also ask Pest Control why they are using this particular quaternary ammonium compound.

CP

## 6. AOCB

Nil to update.

## 7. Date and Time of Next Meeting

The next meeting will be held on Wednesday 10<sup>th</sup> April at 1400 in Meeting Room LO/A/011 Seminar Room 3, Ground Floor, Laboratory Medicine Building, Queen Elizabeth University Hospital Campus.

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Meeting Room L0/A/011 Seminar Room 3, Ground Floor, Laboratory Medicine Building, Queen Elizabeth University Hospital

**Wednesday 10<sup>th</sup> April 2019 (Final)**

**Present:** Dr John Hood (chair), Ian Powrie, Colin Purdon, Sandra Devine, Ann Lang (minutes)

**Teleconference:** Peter Hoffman, Ian Storrar,

**Apologies:** Eddie McLaughlan, Tom Steele, Darryl Conner, Annette Rankin

#### 1. **Welcome and Introductions**

Dr Hood welcomed everyone to the meeting and apologies were received from the above mentioned.

#### 2. **Minutes of Meeting – 22<sup>nd</sup> March 2019**

The final copy of the minutes of 22<sup>nd</sup> March 2019 were agreed as an accurate record.

#### **Minutes of Meeting – 3<sup>rd</sup> April 2019**

The minutes of the previous meeting held on 3<sup>rd</sup> April 2019 were agreed as an accurate record with the following amendments:-

Page 2, 3<sup>rd</sup> paragraph – John Hood agreed to forward other wording relating to this paragraph.

#### 3. **Update on Air Testing**

John Hood reported that when air testing was carried out on 12<sup>th</sup> March 2019 a positive isolate for *Cryptococcus albidus* was identified in room 1, Ward 6A and room 71 in Ward 4C. He said these were the first isolates of *C. albidus* since 31<sup>st</sup> January 2019.

On 20<sup>h</sup> March 2019 there were 2 *Cryptococcus* isolates with one *Cryptococcus uniguttulatus* found in room 2, Ward 6A and one *Cryptococcus diffluens* in room 70, Ward 4C. JH commented that the rooms in each ward (above) were next to each other but is, presently, not sure of the significance.

Also from 20<sup>th</sup> March 1000L roof samples (from near the air intakes supplying Plantrooms 122A and 124C had grown a mixture of *Exophiala* spp.(in C only) *Hyaline hyphomycete*, *Dematiaceous hyphomycete* (in A only), *Penicillium* spp. *Aspergillus* spp., *Rhodotorula* spp.(A only) and *Cladosporium* spp.

122A had 29/18 cfu/1000L and 124C had 28/13 cfu/1000L at 22 and 30 deg C respectively.

On 20<sup>nd</sup> March samples were taken from the following areas which had grown *Exophiala* spp. :- Ward 6A - 26/26 samples

On 22nd March

- Ward 4B - 25/28 samples (with reduced colony forming units compared to 6A/4C)
- Ward 4C - 5/6 samples

Peter Hoffman commented that he has seen this before as *Exophiala* is a very mucoid colony and grows in 5–7 days and is easy to identify as it is black. He asked if this was yeast or fungal growing and John replied yeast.

JH, note in draft: correction *Exophiala* is actually described as a 'yeast-like fungus.' He said when looking at *Exophiala* large numbers appear quite suddenly.

John Hood updated on the following *Exophiala* results:-

1st February 2019	Ward 6A	0/57
5th February 2019	Ward 6A	54/56
6 <sup>th</sup> February 2019	Ward 4B	15/28
8 <sup>th</sup> February 2019	PICU	1/14
12 <sup>th</sup> February 2019	Ward 6A	4/60
20 <sup>th</sup> February 2019	Ward 6A	4/30
27 <sup>th</sup> February 2019	Ward 6A	17/26
27 <sup>th</sup> February 2019	Ward 4C	11/14
6 <sup>th</sup> March 2019	Ward 4B	0/28
6 <sup>th</sup> March 2019	Ward 5B	3/28
12 <sup>th</sup> March 2019	Ward 4B	0/12
12 <sup>th</sup> March 2019	Ward 6A	6/18
12 <sup>th</sup> March 2019	Ward 4C	0/14
20 <sup>th</sup> March 2019	Ward 6A	26/26
20 <sup>th</sup> March 2019	Ward 4C	8/8
22 <sup>nd</sup> March 2019	Ward 4B	25/28
22 <sup>nd</sup> March 2019	Ward 4C	5/6
9 <sup>th</sup> April 2019	Ward 4C	0/14

In Ward 4B it was noted that there had been recent water damage but the water issue had been addressed. Sandra Devine asked if it was only the wards noted above that were being sampled and John stated that Ward 7A, the CF ward was also sampled recently (results awaited) and there are no patients with positive *Exophiala* cultures in Ward 7A at the moment, or recently. Sandra informed that there are no infections to patients and Infection Prevention & Control are regularly checking this.

When sampling Ward 6A on 5<sup>th</sup> February and then sampling Ward 4B on 6<sup>th</sup> February John Hood reported that most of the rooms in 6A and about half of the rooms in 4B were positive for *Exophiala*. Ian Powrie asked if the wind pressure around the building could be a factor and John Hood replied when looking at the air testing results the fungi in the outside air certainly fluctuates.

John Hood noted that the ventilation in Ward 4B is not as 'stringent' as is in other BMT U's. Ian Powrie mentioned that the rooms are HEPA filtered but the ancillary spaces are not. It was noted that no corridors have opening windows. John Hood commented that if the rooms are positive pressure the air will be pushed into the corridor and not in the opposite direction. Ian Powrie confirmed that the corridors are at higher pressure to the general hospital environment but the rooms are under positive pressure, although the corridors do not have supply of fresh air. Ian Storrar asked if there were extracts in the corridors and this was confirmed.

In relation to the vent air grills and to remove the ceiling for these Ian Powrie advised that some wards have ceiling voids vented to other spaces. These have been taken out of Ward 2A but not other wards. John Hood asked Ian Powrie to provide him with an update on the work that would be required for this to be carried out in other

IP

JH

wards. Ian said he would expect there to be dust in the ceiling void and this could be released to the ward corridor but this would not affect Ward 4B. He suggested to take out the vent air grills from Wards 6A, 7A, 4C, 4A and 4D and then resample these areas. John Hood agreed to carry this out. Ian Powrie said that the grill vents are noisy and are operating at 80% capacity instead of 100% due to the level of noise. John agreed to discuss the above with Dr Inkster on her return from annual leave.

IP

John Hood commented that when looking at the air results there appears to be a pattern and Peter Hoffman stated that he thinks that whatever is in the air is coming into the hospital.

JH informed the group that he is waiting for the results of air samples taken on the border of the hospital (Energy Centre) with the sewage works and these were taken from the car park with the wind which was blowing from the sewage works.

Ian Powrie advised that the wards (6A and 4C) sampled have mobile HEPA filters in them and the filters would be changed depending on the usage but usually every 3-5 years as it 'self-monitors' and has a warning light. Peter Hoffman stated that there are misgivings regarding the portable HEPA filters as most would not have a filtration capacity for a constant reduction in contaminants. Ian Powrie reported that the filter can do about 3 air changes of 'contaminated' air per hour.

Sandra Devine asked if the ventilation specification (i.e. F7/9 final filtration) is working appropriately for other types of patients (i.e. those not significantly immunosuppressed or at risk haemato-oncology/transplant patients) and she was assured that it was. Ian Powrie advised that they were informed by HPS that F7 specification for the general environment was acceptable and what we have installed is working to that specification. The ventilation for the general population is achieving the level of reduction expected and Peter Hoffman confirmed that the F7/9 rooms are adequate for the general hospital population.

#### 4. Actions Carried Forward from 3 April 2019 Meeting

A close detailed check has taken place in Room 68/69 in Ward 4C. Both rooms showed no sign of air ingress although there was a small piece of mastic missing from the inside of the window. This was not felt to be significant. Still waiting access to room 5, ward 6A to carry this out. Once all the identified rooms have had a close detailed visual check, Colin will forward the report to the group.

CP

Estates are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4.

TS

John Hood will attempt to check behind the IPS panels in the wards above or below Ward 6A & 4C to see if any possible ingress of dirty air within that void area.\* also see later.

JH

Continue to carry out air sampling in Wards 6A, 4B and 4C.

JH

John Hood will contact Dr Iain Kennedy from Public Health to find out if Public Health/Environmental Health have carried out any level of monitoring around the vicinity of the sewage works near the QEUH/RHC site.

JH

Ventilation upgrade within Ward 2A, RHC. This project has been passed over to capital planning regarding the designing and procurement. Peter Hoffman emphasised the need for solid ceilings in this critical area. A false ceiling adds a level of instability to the pressure control (positive pressure) of such a room, and such pressure control is crucial (along with HEPA filtration of the air).

IP

**5. Further Actions Required**

Ian Powrie has initiated the fluid dynamics modelling around the helipad/ QEUH/RHC. He will contact Brookfield regarding the analysis data they have for the wind study they carried out. .

IP

John Hood to send the update from Darryl Conner to the group regarding the work relating to the cylinder store. Ian Powrie to provide further wording for this section regarding linking to existing extract vent not a viable solution. This is now inserted by JH on 29 May 2019, below.

JH/IP

'SHTM 02-01 does not recommend connection of manifold rooms\cylinder stores to general supply & extract and ventilation, in order to avoid the risk of gas transfer from the cylinder store to occupied spaces serviced by the general ventilation.

IP

Additional measures in compliance with SHTM-02-01 part A section 14.14; introduced to mitigate the increased risk of oxygen enrichment under dedicated extract fan failure conditions, include the installation of gas leak detection connected and monitored via to the Building Management System (BMS) and supported by a suitable Planned Preventive Maintenance (PPM) schedule to ensure the condition and operation of the extract fan are maintained.

Oxygen depletion protection has not been included as the cylinder store is not used for storage of asphyxiate gas cylinders, any future proposed change of use of this store to include asphyxiate gases requires approval of the MGPS (AP) and additional measures implemented'.

With regards to the ventilation upgrade Ian Powrie confirmed that a progress meeting had taken place yesterday and they are working through the feasibility and on site investigation.

Colin Purdon contacted Pest Control and forwarded John Hood information relating to the work carried out 6-23 December 2018. It was agreed for Colin Purdon to ask Pest Control for a more detailed report regarding their findings. Ian Powrie suggested they put the information in the format of a plan/layout.

CP

Discussion took place regarding the statement Pest Control are working to. It was agreed that this is a general statement and Ian Storrar said that it is not clear what standard is being used as a service. Colin Purdon to also ask Pest Control why they are using the particular quaternary ammonium compound as this is not explained properly.

CP

Ian Powrie advised that wards are fitted with Ceiling Vent Grilles (CVG's) which are open vents between the ceiling and the ward corridors, the purpose of these vents are to allow for venting and detection of gas services leaks above the ceiling where there are mechanical joints, in our case the only gases above ceilings are Medical Gas Piped System (MGPS) that are all welded joints and therefore no need for vent grilles within the ward environment.

IP

JH

Proposal to remove these (circa 6-8 units per ward) under an HAI SCRIBE control arrangements, simple procedure to remove / lift out grill and replace with a solid ceiling tile. This position has been reviewed and endorsed by our Authorising Engineer (MGPS) and Health Facilities Scotland)

This also may be coupled with air sampling behind the IPS panels noted above\*.

John Hood to carry out resampling in Wards 6A, 7A, 4C, 4A and 4D once the grill air vents have been taken out and to also discuss this with Dr Inkster on her return from annual leave.

**6. AOCB**

The maintenance schedules showed that in Ward 2A, RHC where the male patient was in September 2018, there was only one set of panel filters (i.e. NOT the final F7 filters) changed and that occurred 3 days prior to the patient being admitted. John Hood advised that this information shows that the hypothesis of cryptococcal spores gaining entry into the AHUs either on the feet of personnel or in the air when the AHU doors were opened for final filter change etc is **most** unlikely. Looking at the time line of both patients and the wards that they were in, coupled with the maintenance logs of the respective AHU's, shows that no such AHU openings took place during these time lines of either patient.

**7. Date and Time of Next Meeting**

The next meeting will be held on Friday 26<sup>th</sup> April at 9.30am in Facilities Meeting Room 5, Ground Floor, Laboratory Building, Queen Elizabeth University Hospital Campus.

## **Cryptococcus IMT Expert Advisory Sub-Group**

### **Notes of Meeting held in Facilities Meeting Room 5, Ground Floor, Laboratory Building, Queen Elizabeth University Hospital**

**Friday 26<sup>th</sup> April 2019**

**Present:** Dr John Hood (chair), Tom Steele, Ian Powrie, Colin Purdon, Darryl Conner, Ann Lang (minutes)

**Teleconference:** Peter Hoffman, Ian Storrar

**Apologies:** Eddie McLaughlan, Sandra Devine, Annette Rankin

#### **1. Welcome and Introductions**

Dr Hood welcomed everyone to the meeting and apologies were received from the above mentioned.

#### **2. Minutes of Meeting – 3<sup>rd</sup> April 2019**

The final copy of the minutes of the previous meeting held on 3<sup>rd</sup> April 2019 were agreed with the following amendments:-

Page 2, 3<sup>rd</sup> paragraph – John Hood agreed to forward other wording relating to this paragraph.

#### **Minutes of Meeting – 10<sup>th</sup> April 2019**

The minutes for the meeting of 10<sup>h</sup> April 2019 were agreed as an accurate record with the following amendment:-

Page 3, 2<sup>nd</sup> para should read – “...whatever is in the air is coming into the hospital. That would be expected unless there is specialist ventilation to exclude fungi”.

Page 5, 2<sup>nd</sup> para – Ian Powrie to provide further wording relating to this paragraph.

#### Comments from minutes of 10<sup>th</sup> April 2019

With regards to the HEPA filtered rooms in Ward 4B Peter Hoffman asked for confirmation that these were under positive pressure and this was confirmed, although the corridors and the ancillary spaces are not HEPA filtered.

John Hood reported that air sampling was routinely carried out in 4B (monthly – prior to December 2018 and more frequently since). Peter Hoffman raised concerns that any fungi are being identified in the air of rooms in Ward 4B. John Hood said that fungi can be found in these rooms, albeit in much lower numbers, than in e.g. 6A or 4C. Tom Steele asked how fungi could be in this area. Peter Hoffman asked if the terminal HEPAs have been tested for particle penetration, on fitting, to see if the particles are going through or bypassing the filtration. Ian Powrie advised that during validation these passed all the testing requirements. Peter Hoffman commented that air must be getting into the rooms other than through the HEPAs and Ian Powrie stated that when the room door opens the pressure regime collapses. Peter commented that, as this is a minor source of ingress of low level contamination it is possible that, if these rooms are not maintained under positive pressure, unfiltered air could be entering the rooms via gaps in their fabric.

Ian Storrar said it may not be associated with the ventilation but could be fungi on people coming into the rooms. Peter commented that people would be a source of bacteria typical of skin, but them being a source of the fungi found, is very unlikely.

Ian Powrie stated that, in the past, when the doors were found to be open there had been positive results. Tom Steele asked if we can see if we can put self closers on these doors and for Infection Control to make sure that staff are aware of the importance of keeping doors closed, as much as possible in Ward 4B. Peter Hoffman asked if the doors were alarmed at the Nurses Station and Ian Powrie confirmed that they were.

In March 2019 John Hood reported that a large number of rooms had grown *Exophiala*. (See Minute of 10 April (pages 1 and 2, and below) Ian Powrie asked what the normal source for this would be and John replied that this could be associated with dampness, but Tom Steele advised that all the showers and water joints have been checked. Peter Hoffman stated that medium to long-term damp could definitely be a source of airborne fungi but the reported historic minor damp was unlikely to be a significant source. Tom asked if Infection Control could go round with one of his team to check every floor and shower to make sure there is no water ingress. John agreed to discuss this with Dr Inkster.

John Hood noted that Ward 4B sometimes gets small numbers of *Exophiala* in its air sampling. Peter Hoffman suggested that maybe the fungi are coming from laundered linen which could be damp on production from the laundry. Tom Steele confirmed that Facilities manage the laundry services and Ian Powrie commented that linen should be dry when dispatched but not sure of the process when it goes to the linen store and will look into this. Peter Hoffman stated that it would take disturbance of the damp linen to produce significant airborne fungi.

Peter Hoffman asked for clarification regarding dust in the ceiling void and if this could be released to the ward corridors. Ian Powrie advised that wards are fitted with Ceiling Vent Grilles (CVG's) which are open vents between the ceiling and the ward corridors, the purpose of these vents are to allow for venting and detection of gas services leaks above the ceiling where there are mechanical joints, in our case the only gases above ceilings are Medical Gas Piped System (MGPS) that are all welded joints and therefore no need for vent grilles within the ward environment. He said they carried out a review process regarding the design and looked at this with the Authorised Engineer and HFS and these were installed appropriately. They have been removed from high risk areas and there is a programme to remove these from other wards.

With regards to the mobile HEPA units these give the equivalent of 3 air changes per hour in these room volumes when on their highest setting. Ours are not likely to be operating on this setting and will be running at 75% with 6 settings and Darryl Conner confirmed there are 7 of these in the corridors and one per room. Peter Hoffman asked what the rate is at night time if these are switched down and Tom Steele informed that clinical staff are asked not to switch these down. Peter Hoffman stated that the mobile units help but will not work as good as a HEPA filter.

### 3. Update on Air Testing

John Hood reported that he continues to carry out air testing.

From the 12<sup>th</sup> – 20<sup>th</sup> March 2019 two *Cryptococcus albidus*, one *Cryptococcus uniguttulatus* and one *Cryptococcus diffluens* were identified. Peter Hoffman asked if any of these were identified in the HEPA filter rooms and John Hood confirmed that *Cryptococcus* spp. has never been identified in these HEPA filtered rooms. He said that Ward 4B is the only ward having routine air sampling carried out that has not yet had a positive (compared with 6A and 4C etc).

Room 5 in Ward 6A was sampled on 9<sup>th</sup> April 2019 and 140/205\* colony forming units were identified as *Exophiala*. This was repeated on 16<sup>th</sup> April 2019 in the same room and 22/14 colony forming units were identified, presumed to be *Exophiala*.

Estates/  
Infection  
Control

Infection  
Control/  
Estates  
JH – PH



On 17<sup>th</sup> April 2019 samples from the room and toilet area had 0/0 cfu and 1cfu of a yeast/0, respectively. (\*counts performed at 22 and 30 degrees Centigrade)

John Hood said that on 25<sup>th</sup> April 2019 they had looked behind the vinyl in the shower room/toilet of Room 5 6A (although this had been replaced in January/February 2019). NO dampness was found – or evidence of previous water damage.

Peter Hoffman asked what had been the source of the problem earlier this year. Tom Steele replied that between the wall vinyl and the floor vinyl, there had been an industry standard joint. This had often failed due to differential movement in the new structure (contraction), which resulted in unseen water ingress behind the vinyl in the ensuite (these are essentially wet rooms). John Hood said that (on the 25<sup>th</sup> April) when they cut round the vinyl around the shower drain hole (experience showed that this was often where the problem started). There was no evidence of water ingress behind the vinyl. Similarly no issues were found in two other areas behind the reflection of the vinyl – where again, previous problems had been identified. John also said that when they took off the IPS panels in 3 areas (whb in shower room, in room itself and behind WC) they were all 'bone' dry with no evidence of actual or previous water-damage. Peter Hoffman stated that there could be damp elsewhere in the void or in areas supplying air to the void and John said that they intended to do air sampling in the void in these 3 areas (noted above) that day (26<sup>th</sup>). He also noted that they had sampled above the ceiling void in the toilet area on 24<sup>th</sup> April 2019.

JH

Tom Steele asked if the area above the ceiling void could be sealed to separate the air movement between that and the IPS panel. Ian Powrie said the IPS panel at the top is open to the ceiling void and concerned that *Cryptococcus* could have got into the rooms this way. He said that the area around the panel can be sealed with silicone and suggested this was done in Wards 6A and 4C as the high risk wards first. Then to do this in Ward 7A and all other wards can be sealed dependant on gaining access to the wards. Peter Hoffman commented that this is not good quality assurance to ensure these panels remain sealed. John said when he does the smoke test with the panel on it is difficult to see but when smoke tested on the 25<sup>th</sup> with the panel (at the WC) off – the void was definitely at positive pressure to the room (at that time). This was also seen when the IPS panels were off at both WHBs. Ian Powrie advised that it is unlikely to have an open pathway from the plant rooms to the floors. The service risers are fire compartments and the plant rooms have fire retardant seals. Ian Storrar asked if this includes the drainage stack and Ian replied that they are sealed in the same way. John said that he and Ian Powrie will check the engineering risers to check for air movement coming into the wards from them. Ian recommended testing these in terms of smoke capabilities and said this could be done as a visual inspection with smoke. He said the risers are internal and there is no connection to the external environment. In terms of the possible positive pressure from the IPS panels, the flexible duct connection to the chilled beam could be torn resulting in positive pressure in the ceiling void/IPS. This should be checked.

JH/IP

Tom Steele asked if [REDACTED] *Cryptococcus neoformans* was detected in the hospital (air). John Hood confirmed *Cryptococcus neoformans* [REDACTED]. He confirmed that *Cryptococcus albidus* (and 3 other species of *Cryptococcus*) had been grown from air within the hospitals – on 6 occasions from 4C and 8 occasions from 6A (plus in a number of different areas in served by a variety of AHUs – including those in Level 12, Level 3 and those in RHC – added in draft by JH). Note also in draft by JH – the experts believe that *C. neoformans* is very rarely grown in air samples and *C. albidus* and possibly other species, are taken as a surrogate marker for its presence. Tom asked if we can rule out the original hypothesis of the plant rooms as the source on *C. neoformans* since it has subsequently been found that the 2 patients were covered by (at least two different plant rooms/AHUs). John stated that it is unlikely to be the plant rooms that were the source but this cannot yet be ruled out absolutely. On looking at the timelines for the 2 patients concerned John said that when checking the AHUs supplying the air to these patients during their stay in various wards – it was difficult to explain how 'contaminated' air from the plant room gained entry into the respective AHUs.

This would require (most likely) spores gaining access to the AHU from the surrounding plant room air. This would (most likely) need to be during a shut down of the AHU for e.g. a final filter change – with AHU doors opened - allowing spores access to the duct without the final filter in place. On scrutiny of the maintenance records of the AHUs and the various ward areas each patient was in at a related time – there is **no evidence** of a relevant AHU being shut down and doors being opened to allow such maintenance.

John Hood informed the group that 5 sets of air samples have been taken from the border of the hospital (Energy Centre) next to the sewage works with the wind blowing towards him, on 27 March 2019. 10 – 77 colony forming units per 500 Litres of air were sampled with a mixture of species of mucoraceous mould, Aspergillus and Penicillium identified.

John said that Sandra Devine contacted Dr Iain Kennedy from Public Health to find out if Public Health/Environmental Health have carried out any level of monitoring around the vicinity of the sewage works near the QEUH/RHC site. Public Health informed they only carry out odour testing and Peter Hoffman stated that outdoor air could have a widely fluctuating fungal spore burden and it would be difficult to say that a high level in the vicinity of the sewage works would not identify the sewage works as the source.

Tom Steele recommended that a separate group meet to bring closure to this review. John Hood advised that he is waiting to receive results from outstanding reports and he hoped to be able to provide a report by the end of May.

#### 4. Actions Carried Forward from 10 April 2019 Meeting

A close detailed check of the rooms has taken place and Colin Purdon confirmed there are no issues with the window and no signs of ingress or infiltration.

Estates are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he is meeting with Multiplex after this meeting.

John Hood has checked behind the IPS panels in room 5 in Ward 6A and intends to do this in other rooms in Wards 6A and 4C once the results from 6A room 5 are available.

Continue to carry out air sampling in Wards 6A, 4B and 4C.

With regards to the ventilation upgrade within Ward 2A RHC the feasibility review is ongoing. Ian Powrie informed that the documents have been circulated for comment and approval by Infection Control in relation to the air pressure control regime and one for protected lobbies in the ward and general environment. He said this will be an improvement over the design for 4B. The plan is to have HEPA filters both at the AHU and terminally, this would give improved resilience over a single point of failure. The terminal HEPA filter will protect against the transfer of air from one room to another and those at the AHU will protect the duct work. Peter Hoffman commented that any leaks will be outwards and he cannot see the need for the terminal HEPA filters. Ian advised that a company will design this for us and we will have an opportunity to comment on the design and can provide feedback at the consultation stage. When the outline is available Peter Hoffman offered to provide a review of the proposal.

Ian Powrie advised that they will also have a double door interlock in these areas. Peter Hoffman thought that a door interlock was excessive.

In relation to the fluid dynamics modelling around the helipad/QEUH/RHC Ian Powrie reported that it will be the end of next week before he receives any feedback from the company.

Colin Purdon advised that he has received no update from Pest Control regarding the work carried out between 6-23 December 2018 and why they are using the particular quaternary ammonium compound. He agreed to contact the Director of the company for an update.

TS

JH/DC

JH

IP

IP

CP

Ian Powrie advised that wards are fitted with Ceiling Vent Grilles (CVG's) which are open vents between the ceiling and the ward corridors. Ian Storrar advised that he was involved in the review of these and this was endorsed by HFS. Ian Powrie reported that these are in all wards and outpatients. The purpose of these vents are to allow for venting and detection of gas services leaks above the ceiling where there are mechanical joints. The only gases above ceilings are Medical Gas Piped System (MGPS) that are all welded joints and therefore no need for vent grilles within the ward environment. Ian Powrie said that they wrote to HFS and they agreed these could be removed. He said that they will take the CVGs out of Ward 2A and will then remove these from other areas i.e. Wards 6A, 7A and 4C and Colin Purdon agreed to arrange this. Ian Powrie agreed to forward a copy of the correspondence relating to this to Ian Storrar and Colin Purdon.

## 5. Further Actions Required

- |   |                 |
|---|-----------------|
| 1. Estates are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele to update after his meeting with Multiplex today.   | TS              |
| 2. John Hood has checked behind the IPS panels in room 5 in Ward 6A and intends to do this in other rooms in Wards 6A and 4C with Darryl Conner once the results from room 5 are available.   | JH/DC           |
| 3. Continue to carry out air sampling in Wards 6A, 4B and 4C.   | JH/Lab          |
| 4. In relation to the fluid dynamics modelling around the helipad/QEUH/RHC Ian Powrie reported that it will be the end of next week before he receives any feedback from the company.   | IP              |
| 5. Colin Purdon to contact the Director of the Pest Control company regarding the work carried out between 6-23 December 2018 and why they are using the particular quaternary ammonium compound.   | CP              |
| 6. Estates will remove the CVGs from Ward 2A and will then remove these from other areas i.e. Wards 6A, 7A and 4C. Colin Purdon agreed to arrange this. Ian Powrie agreed to forward a copy of the correspondence relating to this to Ian Storrar and Colin Purdon. | IP/CP           |
| 7. Proposal to put self closers on the doors in Ward 4B and for Infection Control to make sure staff understand the importance of trying to keep doors to patient rooms closed and also that ancillary doors to be kept closed.                                     | Estates<br>IC   |
| 8. Estates and Infection Control to check every floor and shower (in 4B, 6A, 4C and other critical areas) to make sure there is no evidence of water ingress. John agreed to discuss this with Dr Inkster.  | Estates<br>+ IC |
| 9. Colin Purdon and ICN to look into the process of the various stages of where linen is stored once dispatched. Discuss also with Dr Inkster.  | CP + IC         |
| 10. John Hood and Ian Powrie to check the engineering risers to make sure no air movement is coming into the wards. Ian recommended testing these in terms of smoke capabilities and said this could be done as a visual inspection with smoke.                     | IP + JH         |
| 11. JH and DC to inspect above ceiling in/near 6A room 5 for evidence of tear in duct supplying air to this room.   | JH + DC         |
| 12. Ventilation design for 2A to be sent to PH for comment, when available.   | IP              |
| 13. All IPS panels in 4B, 6A and 4C to be sealed with silicone.   | Estates         |

**6. AOCB**

With regards to the modification to the bottle store in PICU Darryl Conner informed that he met with the Authorised Engineer and Fire Officer. The Authorised Engineer for Medical Gas & Ventilation confirmed that the store is not classed as a LED environment and recommended local monitoring to be carried out which would mean this store is now classed as compliant. The Fire officer said when fitting a fire seal on the fire door this gives negative air flow and he said he is happy there is not a breach in the integrity of the room. The Authorised Engineer is also happy with the improved ventilation. Darryl said there is no requirement to monitor this and all that requires to be done is to install further monitoring of the fan status. Peter Hoffman commented that there could be two issues which include gas safety and contaminated air not coming back to the area outside the bottle store. Ian Powrie confirmed that this will be covered by the quarterly PPM to maintain the condition of the fan. There will be a designated monitored extract fan which has a non return damper on it. Peter Hoffman confirmed that he was happy with the suggestions made.

Ian Storrar commented that some of the above Actions (in 5) are really outside the remit of this group i.e. a review of the hypotheses of the possible sources of the *Cryptococcus neoformans* and the likely routes from the source (s) to the affected patients. (Added post Meeting of 9<sup>th</sup> May by JH)

**7. Date and Time of Next Meeting**

The next meeting will be held on Thursday 9<sup>th</sup> May at 2.00pm in Meeting Room L0/A/011 Seminar Room 3, Ground Floor, Laboratory Building, Queen Elizabeth University Hospital Campus.

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Meeting Room LO/A/011, Ground Floor, Laboratory Building, Queen Elizabeth University Hospital

**Thursday 9<sup>th</sup> May 2019 DRAFT**

**Present:** Dr John Hood (chair), Tom Steele, Ian Powrie, Colin Purdon, Sandra Devine, Ann Lang (minutes)

**Teleconference:** Peter Hoffman, Ian Storrar, Annette Rankin

**Apologies:** Eddie McLaughlan, Darryl Conner

#### 1. **Welcome and Introductions**

Dr Hood welcomed everyone to the meeting and apologies were received from the above mentioned.

#### 2. **Minutes of Meeting – 10<sup>th</sup> April 2019**

The minutes for the meeting of 10<sup>th</sup> April 2019 will be issued when they have been finalised

#### **Minutes of Meeting – 26<sup>th</sup> April 2019**

The minutes for the meeting of 26<sup>th</sup> April 2019 were agreed as an accurate record with the following amendment:-

Page 3, 5<sup>h</sup> para - should read "... floor vinyl there had been an industry standard joint which failed to differentiate movement in the structure wall which resulted ..."

Page 5, 5<sup>h</sup> para – should read "... ward corridors. This was supported by HFS and Ian Powrie said that he can forward documentation to confirm this."

Page 6, AOCB – Ian Storrar said at the last meeting some of the actions might be outwith the remit of this group.

#### 3. **Update on Air Testing**

John Hood reported that he continues to carry out air testing.

On 27<sup>h</sup> March the air was tested in RHC, PICU. All 12 samples were found to be positive for *Exophiala* and the last time this was checked (8<sup>th</sup> Feb) only 1/14 samples were positive with *Exophiala* (added in draft by JH).

Room 5 in Ward 6A was sampled on 9<sup>th</sup> April 2019 and 140/205 cfu were identified as *Exophiala* (see minute of 26 April). John Hood reported that 4C also has *Exophiala* intermittently grown in air samples (see minute of 10<sup>th</sup> April). Peter Hoffman commented that these two areas are neither positively pressurised nor HEPA filtered, but Ward 4B is.

Room 5 in Ward 6A (noted above) was closed to patients to see if any dampness could be found e.g. behind the vinyl in the shower area. However there was no outward evidence of dampness and the vinyl had been replaced earlier in the year. He said they looked behind the IPS panels in 3 areas, behind the toilet itself and behind the WHBs, in the room itself and in the toilet.

6 samples were taken (2 in each void) there was only 1 cfu of yeast and 1 cfu of fungi in one sample. Added in draft by JH – the 1 cfu of fungus was subsequently identified as *Exophiala*. Smoke testing with the IPS panels off in all 3 areas, noted above, showed air coming out the way. (Note that the ceiling void samples taken in Room 5, on 24 April, were negative with 0,0 counts, added in draft by JH).

Peter Hoffman asked how much of this was likely to be outside air and John replied that he was not sure. John Hood said that samples above were taken on 24<sup>th</sup> and 26<sup>th</sup> April and more sampling of voids will be carried out in other rooms, when they become available.

The counts in Ward 4B have been reasonably good since 17<sup>th</sup> April. Of the 30 samples taken on that day, 26 of these had no cfu. Added in draft by JH – with only 2 cfu of *Exophiala* isolated from 1/30 samples. On May 1st, of 28 samples 17 had no growth (so far), the corridors and a few rooms were positive with fungi.

Ian Powrie asked if the chilled beam could be a source for the *Exophiala* as the fresh air is mixed with the room air from the chilled beam. Peter Hoffman advised that the chilled beams provide fresh air and there is an element of recirculation but the air quality is determined by what the air was. A certain amount of air comes from the AHU and the air quality is already in the rooms in Wards 6A and 4C but not in Ward 4B as they have terminal HEPA filters. Ian Powrie said there is a possibility of condensation from room air hitting the chilled surface. If this occurred it should be identified and reported as soon as possible to allow a rapid response.

Colin Purdon confirmed that there is a programme to routinely inspect the chilled beams and this has been done recently and is carried out quarterly in high risk wards and 6 monthly in other areas.

John was asked if anything had changed since the last time Ward 4B was sampled. Peter Hoffman informed that it could be due to variations in outdoor wind speed and direction. Ian Powrie commented that the air permeability test was carried out in these rooms – they are positive pressure rooms so there should be little scope for outside air ingress. However, Ian said that one of the rooms (a Pack store) was previously positive pressurised (no extract) but without HEPA filtration, the supply grille in this room has since been modified and a H12 HEPA filter fitted, this has resulted in a reduction in air change per hour to 1.3 ACH, which has been accepted by senior ICD. The above is likely to mitigate the influx of non-HEPA filtered air into that part of the ward.

He also said there is another potential point of ingress of unfiltered air from the helipad lift core, which is adjacent to the above store room. If the door is opened there could be a fluctuation of air. However the door should be closed as it has electronic access control, therefore it can only be open by authorised staff and is monitored by a local alarm.

Wards 4B & 4C: John Hood reported that they looked at the pressure differences across the door that leads to the entrance of Ward 4B opposite the entrance to Ward 4C. He found a differential pressure of 6 pascals positive pressure from Ward 4B to the corridor and a positive pressure of 10pa from ward 4C to the same corridor. Off the same corridor (between 4B and 4C) is a Medical Staff office which has an external door leading to the Level 4 roof. The pressure differential reading between this room to the corridor was -1.5pa, i.e. air flowing from the corridor to the room (with all doors shut).

JH said that he had started to 'mark up' the room locations of positive air samples (for Cryptococcal species isolations) on the floor plans of both 6A and 4C. This with a view to seeing if there are any patterns emerging that may show, for example, proximity to e.g. mechanical risers etc.

In relation to the sewage works John Hood confirmed that he is not proposing to do more air sampling around the NHS perimeter with it. Tom Steele stated that he received a letter from a member of the public suggesting that the sewage works might be the cause. He said there was a detailed project analysis carried out before this site was selected for the new hospital and there was no perceived risk from its proximity to the hospital. He was happy to forward information relating to this.

#### **Further Actions Required**

- |    |    |   |                |
|----|----|---|----------------|
| 4. | 1. | <p>Estates are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he discussed this with Multiplex. He said that the green roof was part of the design and the sedum can be removed and an alternative ballast material installed. He said if we were to move the items from the roof we could cause further disturbance? John Hood said he would be concerned if <i>Haemato-oncology</i> patients were to go on to this roof but he was informed there is no access to it for these patients. Tom Steele said that he is of the opinion to maybe review this in the future but to leave it as is at the moment.</p> | TS             |
|    | 2. | <p>John Hood has checked behind the IPS panels in room 5 in Ward 6A and intends to do this in other rooms in Wards 6A and 4C, although there is difficulty getting access to the rooms.</p>   | JH/DC          |
|    | 3. | <p>Continue to carry out air sampling in Wards 6A, 4B and 4C.</p>   | JH             |
|    | 4. | <p>In relation to the fluid dynamics modelling around the helipad/QEUH/RHC Ian Powrie reported that the company's computerised model had a problem but a report should be available next week.<br/>Ian Storrer asked for the name of the consultant, Ian Powrie advised that the company was recommended by Caledonian University and that he would forward the details.</p>  | IP             |
|    | 5. | <p>The update from Pest Control was circulated to the group. Peter Hoffman offered to look this over and asked John what documents he would like for him to comment on.</p>   | PH/JH          |
|    | 6. | <p>With regards to the Ceiling Vent Grilles (CVG's) these have been removed from Ward 2A and a programme is being developed to remove these from all other areas i.e. Wards 6A, 7A and 4C. Ian and Colin Purdon agreed to arrange this.</p>   | IP/CP          |
|    | 7. | <p>Proposal to put self closers on the doors in Ward 4B and for Infection Control to make sure that staff understand the importance of keeping doors to patient rooms closed and also keeping doors to ancillary areas, closed as much as possible. John Hood advised that he discussed this with Teresa Inkster. Colin Purdon suggested speaking to the Fire Safety Advisor as the doors are fire rated doors. Tom Steele commented that the closures will be on the compartment doors and Ian Storrer said the Fire Officer may treat the bedrooms as compartments. This will be discussed with Bill Connelly, National Fire Advisor.</p>   | CP/<br>Estates |
|    | 8. | <p>It was agreed to check every floor and shower (in 4B, 6A, 4C and other critical areas) to make sure there is no evidence of water ingress. This has already been done in Ward 6A. John discussed this with Dr Inkster and she agreed for this to be carried out. Colin Purdon to arrange for a vinyl contractor to do this work.</p>   | CP             |

9. Colin Purdon and ICN to look into the process of the various stages of where linen is stored once dispatched and to map out the journey. Sandra Devine suggested that Kirsty McDaid, Lead Nurse based at GGH assist with this as she has already looked into this during the recent mucor incident. **CP/ Infection Control**
10. Ian Powrie and John Hood to inspect the engineering risers to make sure there is no opportunity for air movement into the ward from the plant rooms via the mechanical risers. **JH/IP**
11. John Hood confirmed that Room 5 in Ward 6A had been handed back to the ward, however the ceiling void and flexible duct connections have still to be accessed and inspected once the room is made available again. **JH/DC**
12. With regards to the ventilation design for Ward 2A an email was received from the Consultant Engineers and Peter Hoffman is to provide his comments on this. Ian Powrie said that we need to draw this to a conclusion to feedback to the designers as they have been advised by the Project Lead to adopt Peter Hoffmans recommendations for HEPA filter placement at source in the AHU. **PH**
- Ian advised that the design will include duplex AHUs for resilience (duty\standby) and the ancillary spaces within the ward will also be supplied by the same source.
- Peter Hoffman could see no advantage to having HEPA filters both in the air handling unit and as additional terminal filters. He could not see airborne transmission via static ductwork as a plausible transmission mechanism in the case of plant failure.
- Ian replied that we have designed in protection at each location locally with adoption of terminal HEPA filters.  
He said approximately 14 patients are served by one AHU and if this fails or during required routine maintenance and service all 14 patients would be affected.
- Ian suggested for Peter Hoffman to teleconference in to the next meeting of the Project Review Team and to provide any comments. It was noted that there are PPVL rooms available and 7 rooms are being converted to dedicated negative pressure rooms. Tom Steele said it would be interesting to know what is in the new children's hospital in Edinburgh and Ian Storrar agreed to check this. **PH**
13. All IPS panels in Wards 4B, 6A and 4C to be sealed with silicone. Colin Purdon advised that Ward 4B has been completed. He said that he will arrange for a company to come in to do remainder of the sealing at the end of next week. **IS**
- CP**

5. **AOCB**

Peter Hoffman forwarded comments regarding the documents received from Pest Control.

6. **Date and Time of Next Meeting**

The next meeting will be held on Wednesday 22<sup>nd</sup> May 2019 at 2.30pm in Conference Room GWS-009, Level 3, Royal Hospital for Children.



## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Conference Room GWS-009, Laboratory Building, Queen Elizabeth University Hospital

**Wednesday 22<sup>nd</sup> May 2019**

**Present:** Dr John Hood (chair), Ian Powrie, Sandra Devine, Darryl Conner, Ann Lang (minutes)

**Teleconference:** Peter Hoffman

**Apologies:** Eddie McLaughlan, Tom Steele, Colin Purdon, , Ian Storrar, Annette Rankin

#### 1. **Welcome and Introductions**

Dr Hood welcomed everyone to the meeting and apologies were received from the above mentioned.

#### 2. **Minutes of Meeting – 26<sup>th</sup> April 2019**

The minutes for the meeting of 26<sup>th</sup> April 2019 were issued and Ian Powrie will provide further comments on page 1.

IP

#### **Minutes of Meeting – 9<sup>th</sup> May 2019**

The minutes for the meeting of 9<sup>th</sup> May 2019 were agreed as an accurate record with the following amendment:-

Page 2, 4<sup>h</sup> para - should read "... reduction in air change per hour to 1.3 ..."

#### **Comments from Minutes of 9<sup>th</sup> May 2019**

With regards to the chilled beams it was requested that if any of them had condensation on them to try and obtain a sample and Ian Powrie suggested to swab the surface to check for *Exophiala*. Peter Hoffman commented that these should be dry. Ian Powrie stated that they had experienced issues with no dew point control on the system and the control system had been modified to introduce central dew point control for each chilled water zone. He said that central control is not as effective as having individual room control but the system has been dry since it was modified.

Peter Hoffman advised that if anything is found stuck on the chilled beams this will not be a source. Ian Powrie said that the induction element inducts room air to and mixes with, the supply air with the secondary generated fibres settling on the chilled beam coil surface. This had previously been sampled in ward 2A and tested negative. Peter Hoffman stated that dust can be vacuumed off, using a vacuum cleaner with a HEPA filtered exhaust, but it is not to be dispersed during normal use and he does not see chilled beams as being an airborne source of contamination.

#### 3. **Update on Air Testing**

John Hood reported that he continues to carry out air testing. He said from 5<sup>th</sup> December 2018 – 15<sup>th</sup> May 2019, 1800 air samples have been carried out. *Exophiala* is now being investigated by the Infection Prevention & Control team.

Counts taken from Ward 6A on 8<sup>th</sup> May were as follows:-

- 26 samples were taken - 20 had no cfu, 5 had 1 to 2 cfu of fungus only, but in one room, the daycare patient lounge, the fungal count was >100cfu (this is being investigated by the ICT).

Counts taken from Ward 6A on 14<sup>th</sup> May were:-

- 28 samples were taken – 13 had no cfu, 15 had between 1 and 6 fungal cfu and 8 of the 28 had 1 to 5 cfu of yeasts.

Counts taken from Ward 4C on 8<sup>th</sup> May were:-

- 14 samples were taken – 11 had no cfu and 3 had 1 cfu of fungus only.

Counts taken from Ward 4C on 14<sup>th</sup> May were:-

- 14 samples were taken – 7 had no cfu, 3 had 1 cfu of fungus only and 5 out of 14 samples had 1 to 4 cfu of yeasts.

Particle counts in Ward 4B (n=14) at  $\geq 0.5$  microns were satisfactory (patient rooms at 96.6 to 99.9%, and corridors, 89 to 92% reduction compared to outside air).

The last Cryptococcal species isolates from air sampling were both *C. diffluens* isolated from 6A room 2, on 9 April 2019 and 7A room 23, on 30 April 2019.

On 10<sup>th</sup> May Ian Powrie and John Hood looked at the mechanical/electrical risers in Ward 4B. The doors from the risers are kept locked and seem well sealed with no smoke ingress or egress found around the door. John reported that most of these were negative to the ward, with air coming into the risers at between 1.7 to 4 Pascals. Peter Hoffman asked if any of these were in the patient rooms and it was confirmed that they were not.

Peter Hoffman asked how the wet services entered the bedroom IPS, Ian Powrie explained that the water supplies come into the room through the ceiling void from the mechanical riser, drainage services rise from the floor below into the IPS where the floor is sealed within the IPS.

Ian Powrie stated that drains go down to the floor below and drain penetration is sealed in the IPS ceiling. In Ward 4B Ian Powrie advised that these are sealed and as part of the permeability test showed that these are within the compliance limits. IPS panel joints are currently being sealed in Wards 6A and 4C.

Ian reported that they are following the Scottish Health Planning Note (SHPN) 04 supplement 1 for PPVL air permeability standards and are currently working with HFS to look at another more practical test model. Peter Hoffman notes that this test for 'sealability' does not show an absence of air leaks, but permeability acceptable within a context of energy efficiency in buildings.

The BSRIA model was previously recommended under SBAR by Health Protection Scotland (HPS) for adoption in ward 4B at positive or negative pressure of 50 Pascals. However this proved difficult to implement in a live clinical environment as the volume of air could not be adequately generated to effectively complete this test and resulted in dust being drawn from service voids.

John Hood advised that the rooms in Ward 4B were under positive differential pressure to the corridor of between 9 to 11 Pascals (with the room door closed). Ward 4B also had all room IPS panels sealed with silicone.

In Ward 6A, John said he is still to investigate further Room 5. When he previously looked behind the IPS panels in 3 areas: behind the toilet itself and behind the WHBs, in the room itself and in the toilet and carried out 2 air samples in each void (i.e. 6 samples). Only one sample was positive with 1cfu of yeast and 1cfu of fungus. See minute of 9<sup>th</sup> May. Ian Powrie said that they wanted to examine above

the ceiling in Room 5 but there has been no available access recently. He said the flexible duct connecting from the main duct to the chilled beam might be torn – causing positive pressure in the ceiling void. Therefore we need to ascertain if this flexible duct is damaged or not.

In Ward 4B (as this was to become the BMT unit) the risers were sealed both above and below. Ian Powrie informed that the other mechanical risers are open between floors on to the 12<sup>th</sup> floor (this being sealed on the 12<sup>th</sup> floor and bottom floor) and deemed to be fire compartments. He suspects the risers are open in Wards 6A and 4C and could have an air pathway up the length of the building. This was inspected in Ward 6A and all horizontal penetration from the riser to the ward corridor are well sealed. He said they have still to inspect the final point of Level 4 to ensure these are sealed.

IP  
Comment

Air testing was carried out in 3 'rooms' that have risers in Ward 4B (HOW- 038, Mech Riser, HOW – 200, Elect Riser and HOW- 207, Mech Riser). Six samples were taken and 1 cfu of fungus was found in 3 of 3 samples and 0 cfu in 3 of the paired samples.

John Hood and Ian Powrie looked at the pressure differences across the door that leads to the entrance of Ward 4B opposite the entrance to Ward 4C. (See Minute of 9<sup>h</sup> May p2 para 6). Off the same corridor (between 4B and 4C) is a Medical Staff office which has an external door leading to the Level 4 roof. This was looked at again on 10<sup>th</sup> May and 4 Pascals of positive pressure was coming out of 4B corridor and 10 Pascals were coming out of the entrance to Ward 4C. **If the door to Ward 4C was then opened - Ward 4B (previously putting out 4 Pascals) then became negative - to minus 1.5 Pascals i.e. dirty air from the corridor was being pulled into Ward 4B.** A number of the doors are to be improved with the seals replaced including Ward 4B door to corridor.

Action  
required  
IP/CP

Peter Hoffman suggested reducing the extract in the corridor in Ward 4B. The door to Ward 4B is locked and not to be used unless there is an emergency (i.e. it is a fire exit). As part of future modifications Ian Powrie said there should be a lobby proposal to protect both wards and perhaps to change the use of the Medics room for use by only Estates staff to access the roof. As the air brought in from the roof will be external unfiltered dirty air. Added by JH in Draft) JH felt that this area of 4B, 4C and the Medics room (with a door out onto the roof) was a real issue that needed careful robust planning/mitigation of control of the air quality/protective isolation in these critical (BMTU etc) patient areas.

Action  
required  
IP/CP

Last week (15 May) John Hood reported he and IP had looked at the Risers in Ward 6A. He said they looked at both the mechanical/ electrical risers and carried out air samples in 5 riser areas. The risers were found not to be sealed like Ward 4B and were open both top and bottom. Positive pressure was found to be coming out of GENW1 – 082/T11 and CA-006/T1 risers with up to 3 Pascals to the ward corridor. CA-006/T1 had clear evidence of smoke going out of the area around the Top Right of the closed door into the corridor – to be sealed ASAP. It was decided that Wards 6A and (probably 4C - to be looked at next week) will need to be sealed both above and below and Ian Powrie and Darryl Conner have agreed to progress this.

IP/DC

John Hood said that they looked at the Plant Rooms on Level 12 and looked at the riser penetration. Ian Powrie advised that this is a concrete structure and is fire rated and fully intact. The electrical risers were also checked and are sealed on every floor with no breaches between the floors. John said that they will look at Ward 4C next Wednesday (29 May). He said he is still waiting on air sampling results but there is evidence of places where dirty air can get into the ward.

JH/IP

Tom Steele has information regarding the sewage works and will send this to John Hood.

TS

**4. Further Actions Required**

1. Carry forward - Estates are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he discussed this with Multiplex. He said that the green roof was part of the design and the sedum can be removed and an alternative ballast material installed. He said if we were to move the items from the roof we could cause further disturbance? John Hood said he would be concerned if *Haemato-oncology* patients were to go on to this roof but he was informed there is no access to it for these patients. Tom Steele said that he is of the opinion to maybe review this in the future but to leave it as is at the moment. **TS**
  2. John Hood has checked behind the IPS panels in room 5 in Ward 6A and intends to do this in other rooms in Wards 6A and 4C. It was agreed to have access to the room next Wednesday (29<sup>th</sup>) to inspect above ceiling (to check the flexible duct to Chilled Beam) and for the room to be emptied for the inspection. He said he will check the positive pressure on the IPS panel and Peter Hoffman stated that these can be sealed at any point in time. **JH/DC/IP**
  3. Continue to carry out air sampling in Wards 6A, 4B and 4C. **JH**
  4. In relation to the fluid dynamics modelling around the helipad/QEUH/RHC Ian Powrie reported that the company have requested another 2/3 weeks to input the data and a report should be available by last week in June. **IP**
  5. The update from Pest Control was circulated to the group and Peter Hoffman provided comments on these. He said the quaternary ammonium compounds are rapidly inactivated by organic matter and they are relying on physical removal rather than disinfection. Ian Powrie advised that he understood that the product was used to sanitise and soften the guano to ease physical removal, followed by reapplication of the sanitant once all residual material had been removed. Peter Hoffman noted that this detail was missing from the methods statement.
  6. Carry forward - With regards to the Ceiling Vent Grilles (CVG's) these have been removed from Ward 2A and a programme is being developed to remove these from all other areas i.e. Wards 6A, 7A and 4C. Ian and Colin Purdon agreed to arrange this. **IP/CP**
  7. Proposal to put self closers on the doors in Ward 4B and for Infection Control to make sure that staff understand the importance of keeping doors to patient rooms closed and also keeping doors to ancillary areas, closed as much as possible. John Hood advised that he discussed this with Teresa Inkster. Colin Purdon suggested speaking to the Fire Safety Advisor as the doors are fire rated doors. Tom Steele commented that the closures will be on the compartment doors and Ian Storrar said the Fire Officer may treat the bedrooms as compartments. This will be discussed with Bill Connelly, National Fire Advisor. **CP**
- After discussion it was decided that if self closers are put on doors it may be difficult to move patients. Sandra Devine agreed to discuss this with Teresa Inkster and to maybe take this to Myra Campbell, Clinical Services Manager. Sandra suggested this was discussed with the clinicians to make this a recommendation to take forward. **SD**
8. It was agreed to check every floor and shower (in 4B, 6A, 4C and other critical areas) to make sure there is no evidence of water ingress. This has already been done in Ward 6A. John discussed this with Dr Inkster and she agreed for this to be carried out. Colin Purdon to arrange for a vinyl contractor to do this work. Darryl Conner updated that he has a spreadsheet of the work ongoing in the three wards and will ask for clarification regarding the wording in the spreadsheet. **CP**  
**DC**

9. Colin Purdon and ICN to look into the process of the various stages of where linen is stored once dispatched and to map out the journey. Sandra Devine suggested that Kirsty McDaid, Lead Nurse based at GGH assist with this as she has already looked into this during the recent mucor incident. Infection Control are taking this forward. **Infection Control**
10. Ian Powrie and John Hood to inspect the engineering risers to make sure there is no opportunity for air movement into the ward from the plant rooms via the mechanical risers. This will be carried out in Ward 4C next week. **JH/IP**
11. John Hood confirmed that Room 5 in Ward 6A had been handed back to the ward, however the ceiling void and flexible duct connections have still to be accessed and inspected once the room is made available again. This will be completed next Wednesday. **JH/DC**
12. With regards to the ventilation design for Ward 2A an email was received from the Consultant Engineers and Peter Hoffman is to provide his comments on this. Ian Powrie said that we need to draw this to a conclusion to feedback to the designers as they have been advised by the Project Lead to adopt Peter Hoffman's recommendations for HEPA filter placement at source in the AHU. **PH**

Ian advised that the design will include duplex AHUs for resilience (duty/standby) and the ancillary spaces within the ward will also be supplied by the same source.

Peter Hoffman could see no advantage to having HEPA filters both in the air handling unit and as additional terminal filters. He could not see airborne transmission via static ductwork as a plausible transmission mechanism in the case of plant failure. Ian replied that we have designed in protection at each location locally with adoption of terminal HEPA filters. He said approximately 14 patients are served by one AHU and if this fails or during required routine maintenance and service all 14 patients would be affected.

Ian suggested for Peter Hoffman to teleconference in to the next meeting of the Project Review Team and to provide any comments. It was noted that there are PPVL rooms available and 7 rooms are being converted to dedicated negative pressure rooms. Tom Steele said it would be interesting to know what is in the new children's hospital in Edinburgh and Ian Storrar agreed to check this. **PH**

It was agreed that this item is outwith the remit of this group and will be forwarded to the Project Team for Ward 2A. **IS**

13. Carry forward - All IPS panels in Wards 4B, 6A and 4C to be sealed with silicone. Colin Purdon advised that Ward 4B has been completed. This should be completed for the other wards by Friday. CP to confirm at next Meeting. **CP**

## 5. AOCB

Sandra Devine asked John Hood when the report from this group would be available as it will need to go to Dr Inkster's management team for comments and then to Dr Armstrong. John said that he will prepare a statement regarding the hypothesis. **JH**

## 6. Date and Time of Next Meeting

The next meeting will be held on Thursday 6<sup>th</sup> June at 2.00pm in Facilities Meeting Room 5, Ground Floor, Laboratory Building, QEUH campus.

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Meeting Room 1 Old Central Medical Building (CMB), Queen Elizabeth University Hospital

**Wednesday 6 June 2019 at 2.00pm Draft 1h + PH (? Final)**

**Present:** Dr John Hood (chair), Ian Powrie, Sandra Devine, Colin Purdon, Pauline Hamilton (minutes)

**Teleconference:** Althea de Souza (CFD Consultant) – Item 2 (Presentation),  
Annette Rankin, Peter Hoffman (until 3.00pm)

**Apologies:** Tom Steele, Ian Storrar, Darryl Conner, Eddie McLaughlan

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting and teleconference introductions were made. Apologies were received from the abovementioned.</p>	
<p><b>2. Computational Fluid Dynamics (CFD) Model (Presentation) – Althea de Souza</b></p> <p>Author, Althea de Souza provided a teleconference presentation on the Computational Fluid Dynamics (CFD) Simulations of Airflow around Roof-Level Ventilation Ducts model, distributed to the group.</p> <p>Please see amended report of 14<sup>th</sup> June 2019. (added in draft by JH)</p> <p>Althea described the simulation model of external wind impact on ventilation systems and explained this computer-based model used data from the hospital, and that this computer process requires data for input with everything defined explicitly.</p> <p>The wind strengths and directions were taken from the WSP Energy Ltd report from 2010 and 2011. Althea explained the isotherm dynamic and that the prevailing wind is from the SW and the average is 18 metres per second (m/s) from the SW. The second most frequent wind direction is from ENE and is less strong (max average of 9 m/s). In terms of the helicopter, the effects have been captured as a momentum source to simulate the rotors. Metres per second have been used throughout.</p> <p>Althea concluded that 'in the CFD simulations undertaken, they demonstrate that the air arriving at the AHU intake locations does not originate in the region beneath the helipad, for any of the scenarios considered.' As a result of this conclusion, 'it is therefore <i>unlikely</i> that debris from the helipad area is being carried into the hospital ventilation system (s) and so anything drawn into the AHUs <i>intakes</i> is coming from the wider environment' and not affected by the shape of the building or the presence of a helicopter. 'Whilst it is not possible to determine how far away potential contamination will originate, it should be noted that anything carried in the flow will be lightweight, since heavier matter will fall out due to gravity.' (See page 40 of report, 5. Conclusions)</p> <p>Discussion and questions followed.</p>	

Item	Action
<p>John Hood asked if this included the air intakes for 4B (4B supplied by an AHU on Low Level 3). Althea reported that the air intake is between Core-B and Core-C on podium Level 3, and there is an intake there in the lightwell and it draws its air from there. Althea referred to slide 38 (bottom right-hand side shows the air intake), the secondary wind direction showing airflow path to Tower D. Althea will consider this, and will go back into the specific model, between Cores B and C. Ian Powrie advised that those two lightwells are in the South elevation (intakes for 4B).</p> <p>Ian Powrie asked if it would be possible to include this area in the CFD report and amend the report accordingly.</p> <p>Peter Hoffman asked if there are louvers on the Plant rooms. Althea explained there are louvers but are angled, dropping vertically, so that nothing can fall into the vents. Ian Powrie confirmed there are louvers on the external of the building. The AHU is attached to the louvers with a plenum. Peter Hoffman further asked about louvers, not the AHU, if the downflow from the helipad could push the air down into the Plant rooms. Ian Powrie stated this was not impossible but is unlikely because the louvers are fitted with sealed insulation boards. Peter Hoffman stated that it would therefore be difficult for air to get into the Plant rooms by this route. Ian Powrie stated that the only issue would be if any of the insulation panels were damaged or dislodged or if there was any movement.</p> <p>Ian Powrie thanked Althea for her time and effort for this piece of interesting work. Althea will provide the amended report probably by tomorrow morning (07/06/19). Ian Powrie will touch base with Tom Steele about the entrance to the Adult Hospital.</p> <p>There was some discussion after the presentation and Peter Hoffman stated it is unlikely to have been a build-up of aerosolisable material (e.g. pigeon faeces, added by JH in draft) as it would be regularly scoured by the helicopter. Ian Powrie added the area is now cleaned every two weeks as aerosolisable material was being stuck and this is why this report was prepared.</p>	<p>IP (AdS)</p>
<p><b>3. Minutes of Meeting – 22 May 2019</b></p>	
<p>John Hood referred to the minutes of 10/04/19 and reported that Ian Powrie has sent the form of words to be included in response to Darryl Conner’s assessment of the cylinder room. John Hood has updated the minutes accordingly and will forward to Pauline Hamilton for distribution to the group.</p>	<p>JH</p>
<p>The minutes of the last meeting held on 22 May 2019 were distributed with the agenda. The minutes were accepted with the following amendments:</p> <p><b>Page 2: 5<sup>th</sup> last para:</b> should read “... that these <b>IPS</b> panels are sealed ...”  <b>Page 3: 2<sup>nd</sup> last para:</b> should read “... sampling results <b>from Ward 6A</b> but ...”  <b>Page 5: AOCB:</b> should read “... Dr Inkster’s <b>incident</b> management team ...”</p>	
<p><b>Actions Update (from 22/05/19):</b></p> <p><b>Page 2: 5<sup>th</sup> para from bottom:</b> Ian Powrie will discuss IPS panels being sealed with Darryl Conner as some of the underside of WHBs panels were not done. Colin Purdon will check this, and all will be re-checked. Ian Powrie will check Ward 6A, Room 5.</p>	<p>IP CP</p>





Item	Action
<p>Sandra asked if the pressure was intentional when the upgrade was done in Ward 4C. Ian Powrie stated that the rooms were reversed to be slightly positive. John Hood explained that when the corridor door (out of 4C) is open there is then positive pressure in Room 75, and if corridor door is shut, it pushes air into the room from the corridor. This is a problem. Drawings were referred to and reference was made to positive pressure rooms in the Old BMTU at GRI where there was so much air in the corridor that the rooms nearest the Entrance doors (which were usually closed) had air pushing into them (rather than out) as the air had essentially nowhere else to go. The discussion then moved on to the more worrying issue of Ward 4B and the intermittent negatively pressurising of the corridor around the Rooms in the 70's. Ian Powrie described how the positive pressure in 4B corridor can reverse to negative when the doors (In/Out of 4C) are opened. This seems to act intermittently as at times the positive pressure in 4B corridor is sufficiently high not to go negative (added in Draft by JH). IP also noted (added in draft) that 4B corridor has extract but no supply whereas 4C corridor has supply but no extract. It was agreed that these issues need to be rectified. Ian Powrie suggested creating a lobby, and making this lobby negative compared to both ward corridors, so that the air pushes out into a negative environment. Also important to have interlocking doors so that the other doors cannot be simultaneously opened when any one door is open. It was suggested that in the review of Ward 4C design that the same principles will be applied as in new design for Ward 2A, i.e. HEPA filtered air and duplex AHUs to add resilience. This will need consideration by another group to take forward. Ian Powrie offered to set up a meeting with the BMT management clinicians and will include Teresa Inkster. Sandra stated that the Medical Director has intimidated that a new plan would need to go through Capital Planning, but agreed to take advice around this and update Ian Powrie.</p>	<p>IP</p> <p>SD</p>
<ul style="list-style-type: none"> <li>Colin Purdon confirmed the external door from the Drs Office) to the roof was fixed on 29/05/19, and on 01/06/19 the double-door - leading from the Corridor in 4B to the area opposite to the entrance to 4C was done. Ian Powrie wondered if a sign could be put on the door "need permit to access" for the roof area as the room should be for plant room access only. Colin Purdon will take this forward.</li> </ul>	<p>CP</p>
<ul style="list-style-type: none"> <li>Risers in Ward 6A have already been minuted in terms of the fact there are at least two 'rooms' containing risers that have positive pressure to the corridor that need to be sealed. Ian Powrie stated that two are putting air out into the corridor, i.e. CA-006/T1 and GENW1-082/T11. There is also a cluster of 4 cryptococcal isolates near the first riser (CA-006/T1), going into the ward itself, which we know to be pushing air out at 3 Pa into the corridor. Colin Purdon agreed to mastic seal these doors in that ward as a priority, and will also check if there is a gasket on the metal door.</li> </ul>	<p>CP</p>
<ul style="list-style-type: none"> <li>Wards 4C, 6A and 4B risers will be re-checked, and the floors and ceilings will be sealed if required. Colin Purdon asked where the pressure is coming from and Ian Powrie explained that the floors were checked in Ward 4C and were all intact (i.e. sealed both above and below). In 6A Riser W1 085 had 61 cfu of fungi growing, but also a presumptive <i>Cryptococcus uniguttulatus</i>. There are no obvious gaps. Ian Powrie has a meeting scheduled next week for the HPV with Sanondaf to look at the tank rooms. So this may also be an option if these (rooms/risers) are sealed - they could also be electrostatically HPV sprayed. An HAI-SCRIBE would be required for this. Comment in draft by Peter H – HPV likely to be of little benefit as this treatment would be aimed at disinfecting surfaces and would not affect aerosolised particles that would subsequently enter these risers or rooms. JH Comment on Comment – HPV may be useful if fungi thought to be growing in these riser/rooms, e.g. due to water damage. Colin Purdon stated this work would be challenging and added it would not be possible to have the rooms sealed off by next week. Ian Powrie asked if this could be done in the future once the rooms are sealed. John Hood referred to the biggest concern, (noted above) the mechanical riser (CA6-006) in 6A which has no fungi growing in it but is pressurised to the corridor. Colin Purdon will arrange to have this door sealed first (ceiling and floor will be sealed also), and to carry out sanitisation.</li> </ul>	<p>CP</p>

Item	Action
<ul style="list-style-type: none"> <li>Update on organisms grown from Ward 4B risers. Essentially they are in a variety of mechanical and electrical risers with small numbers of fungi (Penicillium, Cladosporium and occasional Aspergillus. Ian Powrie referred to staff using toilets in Wards 4B, 4C and 6A, who are not closing the doors but leaving them left open. Sandra will take this forward as an action to ensure staff close doors.</li> </ul>	SD
<p><b>5. Actions from 22 May 2019 Meeting</b></p> <p>Actions from 22/05/19 were updated during the meeting and noted in the minutes.</p>	
<p><b>6. <u>Further Actions Required</u></b></p>	
<p><b>1. 06/06/19 – Action ongoing: <i>Carry Forward</i></b> - Estates are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he discussed this with Multiplex. He said that the green roof was part of the design and the sedum can be removed and an alternative ballast material installed. He said if we were to move the items from the roof we could cause further disturbance? John Hood said he would be concerned if <i>Haemato-oncology</i> patients were to go on to this roof but he was informed there is no access to it for these patients. Tom Steele said that he is of the opinion to maybe review this in the future but to leave it as is at the moment.</p>	TS
<p><b>2. 06/06/19 - Action Update:</b> On inspection above the ceiling of Room 5 in Ward 6A showed that the services coming into the space were well sealed and in good condition. The flexible duct to the chilled beam was found to be intact.</p> <p>Subsequently (on 3<sup>rd</sup> June), a problem with the chilled beams was identified and Ian Powrie explained this was a mechanical joint failure causing a water leak. On this occasion it was a change in temperature that had caused the fittings to contract and hence create the leak. Colin Purdon added this was reported as a series of drips and - although not the remit of this group - it is being mentioned due to the mechanical failure. Colin Purdon has met with Teresa Inkster and Christine Peters. The ceiling tiles damaged with water were replaced, and Actichlor was used to wash down. All appropriate IPC measures have been taken (Ward 6A (adults) - x8 rooms).</p>	JH / DC / IP
<p><b>3. 06/06/19 – Action ongoing:</b> Continue to carry out air sampling in Wards 6A, 4B and 4C.</p>	JH
<p><b>4. 06/06/19 – Action ongoing:</b> Ian Powrie reported that fluid dynamics modelling around the helipad/QEUA/RHC report has been done with a caveat checking level 3 fluid dynamics. See report.</p>	IP
<p><b>5. 06/06/19 – Action closed:</b> Item in relation to Pest Control removed.</p>	
<p><b>6. 06/06/19 – Action ongoing:</b> Ian Powrie updated that currently working on a programme to remove the Ceiling Vent Grilles (CVG's), and that CVGs still need to be removed from Ward 6C and 6B. Colin Purdon confirmed HAI-SCRIBE is required. The programme will also include removal of CVGs in all clinical wards. A response is awaited from Ian Storrar in relation to HFS and the authorised engineer agreement that CVG vents are no longer required.</p>	IS

Item	Action
<p>7. <b>06/06/19 – Action ongoing:</b> Sandra reported that discussion is still to take place with Teresa Inkster and possibly Myra Campbell, CSM, in relation to self-closers on doors in Ward 4B, and IPC making sure that staff understand the importance of keeping doors to patient rooms closed and also keeping doors to ancillary areas closed as much as possible. Colin Purdon has discussed self-closers on doors with local Fire Safety Advisors and reported there would be no issues with this proposal. It was noted that discussion with the clinical teams would need to be held in relation to beds being taken out etc. Colin Purdon does not believe that all of the rooms have 30-minute doors fitted at present, only those near to fire escapes.</p>	SD
<p>8. <b>06/06/19 – Action ongoing:</b> Colin Purdon has forwarded the report put together by the flooring contractor and reported that Ward 6A has some minor issues to be rectified. Colin will re-send the report to the group. Colin also agreed to prepare an action plan as required to address the issues identified.</p>	CP
<p>9. <b>06/06/19 – Action closed:</b> Sandra confirmed IPC has investigated laundry storage and process. This action to be removed from the group's remit.</p>	CP
<p>10. <b>06/06/19 – Action ongoing:</b> It was confirmed that the engineering risers have been inspected however will be kept as ongoing until completion of the doors of these risers are sealed. Ian Powrie asked Colin Purdon to arrange to have the doors sealed over the next three weeks (by 27/06/19).</p>	CP
<p>11. <b>06/06/19 – Action closed:</b> It was confirmed that final inspection of Ward 6A Room 5 has taken place. Action completed.</p>	
<p>12. <b>06/06/19 – Action closed:</b> It was agreed and noted that overall ventilation design for Ward 2A is another forum therefore has been removed as an action for this group.</p>	
<p>13. <b>06/06/19 – Action carried forward:</b> Wards 6A and 4C IPS panels to be sealed with silicone by 24/05/19. Colin Purdon agreed today to have the bottom of all the panels re-checked.</p>	CP
<p>7. <b>AOCB</b></p>	
<p><b>A. Hypotheses</b></p>	
<p>John Hood provided a brief overview of the hypotheses.</p>	
<p>JH has now added to this in DRAFT (on 20<sup>th</sup> and 26<sup>th</sup> June) below:</p>	
<p>1. <b>The plant rooms on Level 12 were the source</b>, i.e. spores from the plant room environment itself gained entry into the AHU's this would have had to have been when they were shut down and the doors open for a filter change – essentially a final filter change, in order to allow spores access to the duct without the presence of the F7 filter. The theory being that spores would enter the AHU either in the air from the plant room or on the feet of the Estates staff. This was felt to be a possibility early on (21 December 2018) as the initial Plant Room air samples had 8 of 32 samples positive for what was then believed to be <i>C. albidus</i> (taken as a surrogate for <i>C. neoformans</i>). There was also evidence from 5<sup>th</sup> December of pigeon ingress and significant fouling in the plant rooms serving area D. This seems to have been dealt with in the following weeks by Pest Control by cleaning and pigeon control (see their documentation). Note that the area of pigeon fouling in D was described as 'wet' therefore likely little aerosolisation of cryptococcal spores would have occurred.</p>	

Item	Action
<p>The Plant rooms in D were not tested early on (PR123). Plant rooms 121 (B), 122 (A) and 124 (C) were. Essentially as A and C served 6A and 4C where the patients had been.</p> <p><b><u>Reasons why this hypothesis is most unlikely</u></b></p> <p>Firstly, the original hypothesis was that specifically Plant Rooms 122A and 124C (██████████ in 4C and 6A) were both implicated but not the others on Level 12 nor on Level 3 QEUH nor those in RHC.</p> <p>However fairly quickly air in rooms served from a variety of AHU's on Level 12 (AHUs serving D), Level 3 (1C) and RHC (PICU) grew <i>Cryptococcus</i> spp. Recently we have also grown <i>Cryptococcus</i> species in the air samples from areas within the Laboratory Block which are supplied from AHUs in Plant rooms completely separate from the hospitals. The suggestion being that this is good evidence that there is ongoing general contamination of the air with <i>Cryptococcal</i> species which is not related to pigeon faecal contamination of Plant rooms.</p> <p>Secondly, we have continued to grow <i>Cryptococcal</i> species since, in 6A and 4C, despite routine inspection and cleaning of all the Plant rooms (including those serving 4C and 6A).</p> <p>We have now had about 60 isolations. Only one of those originated from the HEPA filtered, positive pressurised rooms in 4B (BMTU). This was from the Corridor only and we have never had a positive from a patient room. We can also explain why this (the positive) has happened - by ingress of air from the bottom of the corridor (which at times can be negatively pressurised to the area outside 4B). See discussion above in para 1 of page 4 of this Minute.</p> <p>Therefore so far our sampling itself shows that the cryptococci are most likely to be coming in via the outside air itself – not from the Plant rooms and that the HEPA filtration/ positively pressurised rooms are clearly protective whereas those areas served by F7 filtration, alone, are not.</p> <p>The crucial evidence that the plant rooms themselves are NOT the source, is that the hypothesis requires the opening of the AHU during a change of the Final filter. This requires the AHU to be shut down.</p> <p>Estates log AHU shut downs and why - and then document it. I have looked at the logs for each of the AHUs and when they were shut down and opened for, e.g. a Final filter change (or even a panel filter change) and mapped this shut down to the time each ██████████ in the various Wards they were in, ██████████  <b>No shut downs occurred during any case patient stay in the above wards.</b></p> <p>Further, part of the hypothesis was that at the time the AHU door was opened (post fan) the belief was that air from the Plant room was likely to be dragged into the AHU, after the Final filter was removed – and therefore spores would go down the duct without the filter present. I witnessed on several occasions this scenario when the change of F7 final filters occurred. Exactly the opposite takes place with a <b>clear movement of air out of the duct not a pulling of air into it</b>. This is due to thermal currents in the duct itself.</p> <p><b>Therefore the Plant rooms on Level 12 are an unfeasible source of the cryptococcal spores.</b></p>	

Item	Action
<p><b>2. Cryptococci present in the outside air (via the air intakes) was the source.</b> This air then went through the AHU's <b>but the filtration was not of HEPA standard</b> (as in 4B, BMTU), i.e. it was of <b>F7 standard</b>. HEPA filters have both much superior filtration of the air and much better 'fit'* than F7s (a substantially lower grade filter – PH). In other words a probable significant proportion of fungal/cryptococcal spores will pass through those F7 filters. F7 filters also may bypass around the cassette/duct* interface and allow spores through, unlike well-fitting HEPAs. <b>This is also confirmed by the increased number of cfu of fungi (e.g. <i>Aspergillus</i> spp. grown from air sampling in 6A and 4C compared to that grown from rooms in 4B.</b></p> <p><b>Evidence for this is only 1 isolation of <i>Cryptococcus</i> spp. from 4B compared to 59 in the rest of the hospital non-HEPA filtered environments (as of 6 June 2016).</b> This will be expanded in the final report.</p> <p>We have also continued to isolate <i>Cryptococcus</i> spp. (quite regularly) from 6A and 4C (and from other areas of the site, note Lab Block positives recently).</p> <p><b>This is probably the most likely cause of these patients breathing in spores of <i>Cryptococcus neoformans</i> and their subsequent infections.</b></p>	
<p><b>3. Lack of positively pressurised rooms (where air leaks uniformly outwards) in 6A and 4C</b> [unlike those in 4B, BMTU which are positively pressurised (at around +10 Pascals to the corridor); with about 10 Air Changes per Hour (ACH)]. Therefore in these wards (4C and 6A), air will leak <b>inwards</b> with potentially dirty air ingress through a variety of possible routes (including various service voids, e.g. mechanical risers) which might be open within the plant rooms etc. Wards 6A and 4C were [REDACTED]</p> <p>Wards 6A and 4C do not have 10 ACH, as 4B, but have around 3 ACH only (because of chilled beams).</p> <p>Therefore both wards could have had dirty air ingress that contains cryptococcal spores (let alone other fungi such as <i>Mucor</i>, <i>Aspergillus</i> species etc – as documented by air testing results in these areas).</p> <p>See documented issues in certain ward risers where air from risers pushing out into the ward corridors. Mitigation plan for these areas is therefore required.</p> <p><b>Therefore the above deficiencies are also possible routes for Cryptococcal spores and thereby the subsequent infections.</b></p>	
<p><b>4. Cylinder Room near PICU</b></p> <p>We identified a gas cylinder store near PICU where there was a direct link between this storeroom and the outside air. This opened onto an area known as The Sanctuary – where there were documented issues with pigeon activity and fouling (See Pest Control Log of 6<sup>th</sup> Feb and 19<sup>h</sup> Feb 2019). Therefore this too was a plausible route of spores [REDACTED]</p> <p><b>Therefore this is another possible route of infection [REDACTED]</b> Mitigation plan required.</p>	

Item	Action
<p><b>5. The Helipad</b></p> <p>This was postulated as a possible issue with the helicopter down draft onto the helipad shifting/aerosolising pigeon guano into the AHU intakes on, particularly Level 12.</p> <p>Please see the report and subsequent discussion in this minute around the Computational Fluid Dynamics Model.</p> <p><b>Therefore the Helipad is unlikely to have contributed to the problem.</b></p> <p><b>The bottom line is that ‘at risk patients’ - as both cases were - need to be in protective isolation, i.e. HEPA filtered environments, under positive pressure with appropriate ACH, where the air uniformly leaks outwards and they receive appropriate antifungal and anti-cryptococcal prophylaxis.</b></p>	
<p><b>6. Identification of Cryptococcal Isolates</b></p> <p>Note that some 30 isolates of cryptococci (mainly from early on – January 2019) have not been formally identified by the Mycology Reference Lab. JH to arrange this with Bristol – but may take a few weeks before results available.</p>	
<p><b>7. Role of ‘Tube’ System</b></p> <p>I am also investigating the possible role of the laboratory ‘tube system’ – which again may take several weeks.</p>	
<p><b>8. Mitigation of Identified Issues</b></p> <p>Ian Powrie asked if there is a schedule showing this mitigation apart from the Cryptococcus IMT Expert Advisory Sub-Group minutes. Colin Purdon agreed to prepare a full schedule timeline as an action log.</p>	CP
<p><b>8. Date and Time of Next Meeting</b></p> <p>The next meeting will be held at 10.00am on Friday 21 June 2019, Meeting Room 1, old Central Medical Building (CMB), QEUH (behind the old clock tower).</p>	

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Meeting Room 1 Old Central Medical Building (CMB), Queen Elizabeth University Hospital

**Wednesday 6 June 2019 at 2.00pm Draft 1c**

**Present:** Dr John Hood (chair), Ian Powrie, Sandra Devine, Colin Purdon, Pauline Hamilton (minutes)

**Teleconference:** Althea de Souza (CFD Consultant) – Item 2 (Presentation),  
Annette Rankin, Peter Hoffman (until 3.00pm)

**Apologies:** Tom Steele, Ian Storrar, Darryl Conner, Eddie McLaughlan

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting and teleconference introductions were made. Apologies were received from the abovementioned.</p>	
<p><b>2. Computational Fluid Dynamics (CFD) Model (Presentation) – Althea de Souza</b></p> <p>Author, Althea de Souza provided a teleconference presentation on the Computational Fluid Dynamics (CFD) Simulations of Airflow around Roof-Level Ventilation Ducts model, distributed to the group.</p> <p>Please see amended report of 14<sup>th</sup> June 2019 (added in draft by JH)</p> <p>Althea described the simulation model of external wind impact on ventilation systems and explained this computer-based model used data from the hospital, and that this computer process requires data for input with everything defined explicitly.</p> <p>The wind strengths and directions were taken from the WSP Energy Ltd report from 2010 and 2011. Althea explained the isotherm dynamic and that the prevailing wind is from the SW and the average is 18 metres per second (m/s) from the SW. The second most frequent wind direction is from ENE and is less strong (max average of 9 m/s). In terms of the helicopter, the effects have been captured as a momentum source to simulate the rotors. Metres per second have been used throughout.</p> <p>Althea concluded that 'in the CFD simulations undertaken, they demonstrate that the air arriving at the AHU intake locations does not originate in the region beneath the helipad, for any of the scenarios considered.' As a result of this conclusion, 'it is therefore <i>unlikely</i> (JH italics in draft) that debris from the helipad area is being carried into the hospital ventilation system (s) ('s' added in draft by JH) and so anything drawn into the AHUs <i>intakes</i> (intakes added in draft by JH) is coming from the wider environment' and not affected by the shape of the building or the presence of a helicopter. 'Whilst it is not possible to determine how far away potential contamination will originate, it should be noted that anything carried in the flow will be lightweight, since heavier matter will fall out due to gravity.' (See page 40 of report, 5. Conclusions)</p>	

Item	Action
<p>Discussion and questions followed.</p> <p>Ian Powrie asked about Ward 4B supplied by an AHU, in particular on Low Level 3. Althea reported that the air intake is between Core-B and Core-C on podium Level 3, and there is an intake there in the lightwell and it draws its air from there. Althea referred to slide 38 (bottom right-hand side shows the air intake), the secondary wind direction showing airflow path to Tower D. John Hood asked does this impact on airflow in this area? Althea will consider this, and will go back into the specific model, between Cores B and C. <b>Ian Powrie added, those two lightwells and anything within that area.</b></p> <p>Althea stated there were some flows that shows circulation around that, so referring to previous slides (slide 37 and slide 32) the secondary wind direction shown on slide 32, again see that further out the airflow is not around the lightwells. <b>Ian Powrie asked if it would be possible to get results and added that all of the air intakes are on the far-side of the RHC showing no impact or affect by the helicopter, at all, therefore is comfortable with this level of report, with the adult hospital still to be reviewed.</b> Althea will amend the report accordingly. Peter Hoffman asked are there louvres on the plant room. Althea explained there are louvres but are angled, dropping vertically, so that nothing can fall into the vents. Ian Powrie confirmed there are louvres on the external of the building. The AHU is attached to the louvres with a plenum. Peter Hoffman further asked about louvres, not the AHU, if the downflow from the helipad could push the air down into the service <b>rights</b>. Ian Powrie stated this was not impossible but is unlikely because the louvres are fitted with sealed insulation boards. <b>Peter Hoffman stated, therefore it would be difficult for air to get into the plant room and any over pressure.</b> Ian Powrie stated that the only issue would be if any of the insulation panels were damaged or dislodged or if there was any movement.</p> <p>Ian Powrie thanked Althea for her time and effort for this piece of interesting work. Althea will provide the amended report probably by tomorrow morning (07/06/19). Ian Powrie will touch base with Tom Steele about the entrance to the Adult Hospital.</p> <p>There was some discussion after the presentation and Peter Hoffman stated it is unlikely to have been a build-up of aerosolisable material (e.g. pigeon faeces, added by JH in draft) as it would be regularly scoured by the helicopter. Ian Powrie added the area is now cleaned every two weeks as aerosolisable material was being stuck and this is why this report was prepared.</p>	<p>IP (AdS)</p>
<p><b>3. Minutes of Meeting – 22 May 2019</b></p> <p>John Hood referred to the minutes of 10/04/19 and reported that Ian Powrie has sent the form of words to be included in response to Darryl Conner's assessment of the cylinder room. John Hood has updated the minutes accordingly and will forward to Pauline Hamilton for distribution to the group.</p> <p>The minutes of the last meeting held on 22 May 2019 were distributed with the agenda. The minutes were accepted with the following amendments:</p> <p><b>Page 2: 5<sup>th</sup> last para:</b> should read "... that these <b>IPS</b> panels are sealed ..."</p> <p><b>Page 3: 2<sup>nd</sup> last para:</b> should read "... sampling results <b>from Ward 6A</b> but ..."</p> <p><b>Page 5: AOCB:</b> should read "... Dr Inkster's <b>incident</b> management team ..."</p>	<p>JH</p>



Item	Action
<p><b>Actions Update (from 22/05/19):</b></p> <ul style="list-style-type: none"> <li>• <b>Page 2: 5<sup>th</sup> para from bottom:</b> Ian Powrie will discuss IPS panels being sealed with Darryl Conner as some of the underside of WHBs panels were not done. Colin Purdon will check this, and all will be re-checked. Ian Powrie will check Ward 6A, Room 5.</li> <li>• <b>Page 3: para 2:</b> Ian Powrie reported today in relation to inspection of Level 4 Plant Rooms to ensure these are sealed, that they have been sealed with intumescent fibre boards, and verified that Wards 4C and 4B was already done. Ward 4A was checked in relation to the Ward 6A open riser. Ian Powrie will check further and add in anything required.</li> <li>• <b>Page 3: paras 3-6:</b> Ward 4B and negative pressure will be discussed later in the meeting.</li> </ul>	<p>IP</p> <p>CP</p> <p>IP</p>
<p><b>4. Update on Air Testing</b></p> <p>John Hood confirmed that since the last meeting (22/05/19), there has been isolation of four <i>Cryptococcus</i> species:</p> <ul style="list-style-type: none"> <li>• 14 May: Room 73 in Ward 4C - presumptive <i>C. albidus</i></li> <li>• 15 May: sample from Ward 6A electrical risers <i>C. uniguttulatus</i></li> <li>• 15 May: one in Ward 4B corridor (near rooms in 70's) presumptive <i>C. albidus</i></li> <li>• 21 May: Room 1 in Ward 6A presumptive <i>C. albidus</i></li> </ul> <p>This is the <i>First</i> isolation of any cryptococcus in Ward 4B ever. The presumptive isolation of <i>C. albidus</i> from Room 1 in Ward 6A will be discussed as part of a potential cluster around one of the Mechanical Risers (CA-006).</p> <ul style="list-style-type: none"> <li>• Testing was done when checking Ward 4C risers on 25/05/19. Electrical riser 178. There were 4 colony forming units (cfu) of fungi and movement of air from the riser into the corridor (0.1 to 0.2 Pa) via a leak on the door on the top right-hand side which needs to be sealed. Colin Purdon will take this forward. Ian Powrie asked that the focus is on the door sealing particularly where the metal door seals into the frame. <b>Some in the hinge-corner appear to be passing slightly at this point so may need gaskets fitted.</b></li> <li>• Mechanical riser 212 in Ward 4C on 25/05/19. There were 9 cfu fungi and a couple of yeasts. The riser was stopped from below but not from above. The horizontal penetrations looked good. The actual air movement from the corridor into the riser was at about +18 Pascals (Pa).</li> <li>• Mechanical riser 223 which is 'stopped' at level 3 plant room but open from above. There were 15/16 Pa of air going into this riser from the corridor and also evidence of smoke going into this riser because there was not good enough seal on the top right-hand vertical/corner of the door. Colin Purdon will take this forward.</li> <li>• Ward 4C electrical riser 220 is much the same as the others, i.e. sealed from below but not from above. There were 0.2 Pa from the corridor into the riser.</li> </ul> <p>There is concern about the differences in the pressures in 4C Rooms 66-75. Rooms 66 to 74 are between 0.4 to 2.9 Pa from rooms to corridor but Room 75 at the end of the corridor is consistently negative at -0.3 (i.e. air moving from corridor to room). Colin Purdon agreed to make adjustments to the room to make slightly positive.</p>	<p>CP</p> <p>CP</p> <p>CP</p>

Item	Action
<p>Sandra asked if the pressure was intentional when the upgrade was done in Ward 4C. <b>Ian Powrie stated that the rooms were reversed to be slightly positive.</b> John Hood explained that when the corridor door (out of 4C) is open there is then positive pressure in Room 75, and if corridor door is shut, it pushes air into the room from the corridor. This is a problem. Drawings were referred to and reference was made to positive pressure rooms in the Old BMTU at GRI where there was so much air in the corridor that the rooms nearest the Entrance doors (which were usually closed) had air pushing into them (rather than out) as the air had essentially nowhere else to go.</p>	
<p><b>The discussion then moved on to the more worrying issue of Ward 4B and the intermittent negatively pressurising of the corridor around the Rooms in the 70's. Ian Powrie described how the positive pressure moves out when the door is open but when closed could impact on Ward 4C from Ward 4B, and it was agreed needs to be rectified. Ian Powrie suggested when this is looked at make ??? Pascals for creating a lobby, incorporating into the area to negative compared to both wards, so that air pushes out to a negative environment. Also, interlocking doors so that the other doors cannot be opened when any one door is open. To replicate in Ward 2B what has been in Ward 2A, to include HEPA filtering to give duplex filters etc. This would need consideration by another group to take forward.</b> Ian Powrie offered to set up a meeting with the BMT management clinicians and will include Teresa Inkster. Sandra stated that the Medical Director has intimidated that a new plan would need to go through Capital Planning, but agreed to take advice around this and update Ian Powrie.</p>	<p>IP</p> <p>SD</p>
<ul style="list-style-type: none"> <li>Colin Purdon confirmed the external door*was done on 29/05/19, and on 01/06/19 the double-door* leading into the corridor was done. Ian Powrie wondered if a sign could be put on the door "need permit to access" for the roof area as the room should be for plant room access only. Colin Purdon will take this forward. CP to describe which doors from where to where*</li> </ul>	<p>CP</p>
<ul style="list-style-type: none"> <li>Risers in Ward 6A have already been minuted in terms of the fact there are at least two 'rooms' containing risers that have positive pressure to the corridor that need to be sealed. Ian Powrie stated that two are putting air out into the corridor i.e. CA-006/T1 and GENW1-082/T11. There is also a cluster of 4 cryptococcal isolates near the first riser (CA-006/T1), going into the ward itself, which we know to be pushing air out at 3 Pa into the corridor. Colin Purdon agreed to mastic seal these doors in that ward as a priority, and will also check if there is a gasket on the metal door.</li> </ul>	<p>CP</p>
<ul style="list-style-type: none"> <li>Wards 4C, 6A and 4B risers will be re-checked, and the floors and ceilings will be sealed if required. Colin Purdon asked where the pressure is coming from and Ian Powrie explained that the floors were checked in Ward 4C and were all intact. In 6A Riser W1 085 had 61 cfu of fungi growing, but also a presumptive <i>Cryptococcus uniguttulatus</i>. <b>There are no obvious gaps. Ian Powrie has a meeting scheduled next week for the HPV with Sanondaf to look at the tank room. So if these are sealed then could hypostatically spray. An HAI-SCRIBE would be required for this.</b> Colin Purdon stated this work would be challenging and added it would not be possible to have the rooms sealed off by next week. Ian Powrie asked if this could be done in the future once the rooms are sealed. John Hood referred to the biggest concern, (noted above) the mechanical riser (CA6-006) in 6A which has no fungi growing in it but is pressurised to the corridor. Colin Purdon will arrange to have this door sealed first (ceiling and floor will be sealed also), and to carry out sanitisation.</li> </ul>	<p>CP</p>
<ul style="list-style-type: none"> <li>Update on organisms grown from Ward 4B risers. Essentially they are in a variety of mechanical and electrical risers with small numbers of fungi (Penicillium, Cladosporium and occasional aspergillus. Ian Powrie referred to staff using toilets in Wards 4B, 4C and 6A, who are not closing the doors but leaving them left open. Sandra will take this forward as an action to ensure staff close doors.</li> </ul>	<p>SD</p>

Item	Action
<p><b>5. Actions from 22 May 2019 Meeting</b></p>	
<p>Actions from 22/05/19 were updated during the meeting and noted in the minutes.</p>	
<p><b>6. Further Actions Required</b></p>	
<p>1. <b>06/06/19 – Action ongoing:</b> <u>Carry Forward</u> - Estates are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he discussed this with Multiplex. He said that the green roof was part of the design and the sedum can be removed and an alternative ballast material installed. He said if we were to move the items from the roof we could cause further disturbance? John Hood said he would be concerned if <i>Haemato-oncology</i> patients were to go on to this roof but he was informed there is no access to it for these patients. Tom Steele said that he is of the opinion to maybe review this in the future but to leave it as is at the moment.</p>	TS
<p>2. <b>06/06/19 - Action Update:</b> On inspection above the ceiling of Room 5 in Ward 6A showed that the services coming into the space were well sealed and in good condition. The flexible duct to the chilled beam was found to be intact.</p> <p>Subsequently, a problem with the chilled beams was identified and Ian Powrie explained this was a mechanical joint failure causing condensation. On this occasion it was a change in temperature that caused the fittings to contract and create a leak. Colin Purdon added this was reported as a series of drips and although not for this group, it is being mentioned due to the mechanical failure. Colin Purdon has met with Teresa Inkster and Christine Peters. The ceiling tiles damaged with water were replaced, and Actichlor was used to wash down. All appropriate IPC measures have been taken (Ward 6A (adults) - x8 rooms).</p>	JH / DC / IP
<p>3. <b>06/06/19 – Action ongoing:</b> Continue to carry out air sampling in Wards 6A, 4B and 4C.</p>	JH
<p>4. <b>06/06/19 – Action ongoing:</b> Ian Powrie reported that fluid dynamics modelling around the helipad/QEUH/RHC report has been done with a caveat checking level 3 fluid dynamics. See report.</p>	IP
<p>5. <b>06/06/19 – Action closed:</b> Item in relation to Pest Control removed.</p>	
<p>6. <b>06/06/19 – Action ongoing:</b> Ian Powrie updated that currently working on a programme to remove the Ceiling Vent Grilles (CVG's), and that CVGs still need to be removed from Ward 6C and 6B. Colin Purdon confirmed HAI-SCRIBE is required. The programme will also include removal of CVGs in all clinical wards. A response is awaited from Ian Storrar in relation to HFS and the authorised engineer agreement that CVG vents are no longer required.</p>	IS
<p>7. <b>06/06/19 – Action ongoing:</b> Sandra reported that discussion is still to take place with Teresa Inkster and possibly Myra Campbell, CSM, in relation to self-closers on doors in Ward 4B, and IPC making sure that staff understand the importance of keeping doors to patient rooms closed and also keeping doors to ancillary areas closed as much as possible. Colin Purdon has discussed self-closers on doors with local Fire Safety Advisors and reported there would be no issues with this proposal. It was noted that discussion with the clinical teams would need to be held in relation to beds being taken out etc. Colin Purdon does not believe that all of the rooms have 30-minute doors fitted at present, only those near to fire escapes.</p>	SD  CP

Item	Action
<p>8. <b>06/06/19 – Action ongoing:</b> Colin Purdon has forwarded the report put together by??? and the contractor and reported that Ward 6C has some minor issues to be rectified. Colin will re-send the report to the group. Colin also agreed to prepare an action plan as required to address the issues identified.</p>	CP
<p>9. <b>06/06/19 – Action closed:</b> Sandra confirmed IPC has investigated laundry storage and process. This action to be removed from the group's remit.</p>	
<p>10. <b>06/06/19 – Action ongoing:</b> It was confirmed that the engineering risers have been inspected however will be kept as ongoing until completion of the doors of these risers are sealed. Ian Powrie asked Colin Purdon to arrange to have the doors sealed over the next three weeks (by 27/06/19).</p>	CP
<p>11. <b>06/06/19 – Action closed:</b> It was confirmed that final inspection of Ward 6A Room 5 has taken place. Action completed.</p>	
<p>12. <b>06/06/19 – Action closed:</b> It was agreed and noted that overall ventilation design for Ward 2A is another forum therefore has been removed as an action for this group.</p>	
<p>13. <b>06/06/19 – Action carried forward:</b> Wards 6A and 4C IPS panels to be sealed with silicone by 24/05/19. Colin Purdon agreed today to have the bottom of all the panels re-checked.</p>	CP
<p>7. <b>AOCB</b></p>	
<p>John Hood provided a brief overview of the hypotheses.</p>	
<p>JH has now added to this in DRAFT below:</p>	
<p>1. <b>The plant rooms on Level 12 were the source</b> i.e. spores from the plant room environment itself gained entry into the AHU's this would have had to have been when they were shut down and the doors open for a filter change – essentially a final filter change in order to allow spores access to the duct without the presence of the F7 filter. The theory being that spores would enter the AHU either in the air from the plant room or on the feet of the Estates staff. This was felt to be a possibility early on (21 December 2018) as the initial Plant Room air samples had 8 of 32 samples positive for what was then believed to be <i>C. albidus</i> (taken as a surrogate for <i>C. neoformans</i>). There was also evidence from 5<sup>th</sup> December of pigeon ingress and significant fouling in the plant rooms serving area D. This seems to have been dealt with in the following weeks by Pest Control by cleaning and pigeon control (see documentation)</p>	JH
<p>The Plant rooms in D were not tested early on (PR123). Plant rooms 121 (B), 122 (A) and 124 (C) were. Essentially as A and C served 6A and 4C where the patients had been.</p>	
<p><b><u>Reasons why this hypothesis is most unlikely</u></b></p>	
<p>Firstly, the original hypothesis was that specifically Plant Rooms 122A and 124C were both implicated but not the others on Level 12 nor in Level 3 nor in RHC. However fairly quickly air in rooms served from a variety of AHU's on Level 12 (AHUs serving D), Level 3 (1C) and RHC (PICU) grew <i>Cryptococcus</i> species. Secondly, we have continued to grow cryptococcal species since in, 6A and 4C despite routine inspection and cleaning of all plant rooms.</p>	

Item	Action
<p>We have now about 60 isolations. Only one of those originated from the HEPA filtered, sealed positive pressurised 4B (BMTU). This has had more samples from any other area. It was from the Corridor only and never from a patient room. We can also explain why this has happened by ingress of air from the bottom of the corridor.</p> <p>Therefore so far our sampling itself shows that the cryptococci are likely to be coming in via the outside air itself – not the plant rooms and that the HEPA filtration/sealed positive pressurised rooms are clearly protective whereas the F7s are not.</p> <p>The crucial evidence that the plant rooms themselves are the source is that the hypothesis requires the opening of the AHU during a change in the Final filter. This requires the AHU to be shut down.</p> <p>Estates log AHU shut downs and why - and document it. I have looked at the logs for each of the AHUs and when they were shut down and opened for e.g. a Final filter change and mapped this shut down to the time each patient was present in the various Wards they were in i.e. 2A (RHC), 6A, PICU and 4C.</p> <p><b>No shut downs occurred during any patient stay in the above wards.</b> Further part of the hypothesis was that at the time of AHU door opening the belief was that air from the plant room was likely to be dragged into the AHU from the Plant room after the Final filter was removed – and therefore spores would go down the duct without the filter present. I witnessed on several occasions this scenario when the change of F7 final filters occurred. Exactly the opposite takes place with a clear movement of air out of the duct not a pulling of air into it. This is due to thermal currents in the duct itself. Therefore the plant room on Level 12 are most unlikely to be the source of the cryptococcal spores</p> <p><b>2. Cryptococci present in the outside air (via the air intakes) was the source.</b> This air then went through the AHU's but the filtration was not of HEPA standard (as in 4B,BMTU) i.e. F7 standard with around 80% filtration as opposed to the HEPA filter's 99.9% filtration of 0.5 micron particles. In other words a probable significant proportion of fungal/cryptococcal spores would pass through those F7 filters. F7 filters also may bypass around the cassette/duct and allow spores through unlike well fitting HEPAs.</p> <p><b>3. Evidence for this is only 1 isolation of Cryptococcus species from 4B compared to 59 in the rest of the hospital non-hepa environments.</b> This will be expanded in the final report. <b>Lack of sealed and positive pressure rooms in 6A and 4C</b> (unlike those in 4B, BMTU which were sealed and positively pressurised). Therefore air will leak inwards with dirty air ingress through various routes including various service voids (e.g. mechanical risers) which might be open within the plant rooms. 6A and 4C were [REDACTED] rooms. 6A and 4C do not have 10 Air changes per Hour (ACH) as 4B but have around 3 ACH Therefore both could possibly had dirty air ingress containing cryptococcal spores.</p> <p><b>4. Cylinder Room near PICU</b> We identified a gas cylinder store near PICU where there was a direct link between this room and the outside air. This opened onto an area known as The Sanctuary – where there were documented issues with pigeon activity and fouling. Therefore this too was a plausible route of spores [REDACTED].</p> <p><b>Therefore a possible route of infection in one case.</b></p>	

Item	Action
<p><b>5. The Helipad</b></p> <p>This was postulated as a possible issue with the helicopter down draft onto the helipad shifting/aerosolising pigeon guano into the AHU intakes on, particularly Level 12.</p> <p>Please see discussion in this minute around the Computational Fluid Dynamics Model. <b>Therefore unlikely to have contributed to the problem.</b></p> <p><b>The bottom line is that at risk patients - as both cases were need to be in protective isolation i.e HEPA filtered environments with sealed rooms and under positive pressure</b></p> <p>Note that some 30 isolates of cryptococci (mainly from early on - January) have not been formally identified by the Mycology Reference Lab. JH to arrange this with Bristol – may take a few weeks.</p> <p>Ian Powrie asked if there is a schedule showing this mitigation apart from the Cryptococcus IMT Expert Advisory Sub-Group minutes.</p> <p>Colin Purdon agreed to prepare a full schedule timeline as an action log.</p>	
<p><b>8. Date and Time of Next Meeting</b></p> <p>The next meeting will be held at 10.00am on Friday 21 June 2019, Meeting Room 1, old Central Medical Building (CMB), QEUH (behind the old clock tower).</p>	

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Meeting Room 1 Old Central Medical Building (CMB), Queen Elizabeth University Hospital

Friday 21 June 2019 at 10.00am (commenced at 10.30am)

**DRAFT** (1c) 25 July 2019

**Present:** Dr John Hood (chair), Ian Powrie, Colin Purdon, Tom Steele (until 11.30am), Darryl Conner, Pauline Hamilton (minutes)

**Teleconference:** Annette Rankin (until 12.00pm), Eddie McLaughlan

**Apologies:** Sandra Devine, Ian Storrar, Peter Hoffman

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting. Teleconference introductions were made and apologies were received from the abovementioned.</p> <ul style="list-style-type: none"> <li>• <b>Revised CFD Model (encl)</b></li> </ul> <p>The revised CFD Model QS Report was distributed to the group. Tom Steele commented it was a very helpful report. Ian Powrie explained that the 3<sup>rd</sup> floor additional piece of work is more complex, however calculations from the report infer no detrimental impact. Ian Powrie will discuss the report with Althea on 27/06/19 to verify correct interpretation.</p>	IP
<p><b>3. Minutes of Meeting – 6 June 2019</b></p> <p>The minutes of the last meeting held on 6 June 2019 were distributed with the agenda. The minutes were accepted with the following amendments (these have however been annotated since by JH) – see updated Minutes of 6 June 2019 and below:</p> <p><b>Page 3: bp1:</b> should read "... to ensure <b>the risers</b> are sealed ..." and, Wards 4C and 4B <b>were</b> already done." Corrected in Final Minute.</p> <p><b>Page 4: para 1:</b> This paragraph was reviewed in Draft by JH and IP who changed it and are now happy with it – see Final Minute.</p> <p><b>Page 4: para 2:</b> CP has confirmed which doors related to 4B have been fixed and when – Final Minute has been changed.</p> <p><b>Page 4: para 4:</b> should read "... <b>electrostatically HPV sprayed.</b>" Please see comments from both PH and JH in Final Minute.</p> <p><b>Page 5: Item 6.2: Para 1</b> should read "<b>the flexible duct to the chilled beam was found to be intact ...</b>" insert: "<b>Inspected on 29 May 2019.</b>"</p> <p><b>Page 5: Item 6.2: Para 2</b> "<b>This was a mechanical joint failure causing a water leak...</b>" Final Minute has been changed.</p> <p><b>Page 6: Item 8:</b> should read "...by the <b>flooring</b> contractor and reported" Final Minute has been changed.</p> <p><b>Page 6: Item 7.1:</b> should read "...<b>ingress and ? significant fouling .... Note that the area of pigeon fouling in D was described as 'wet' therefore likely little aerosolisation of cryptococcal spores would have occurred</b>"</p>	

Item	Action
<p><b>Page 6: 7A Hypotheses: JH has now added to the original draft of 6 June of 20 and 26 June and with PH on 22 July 2019.</b></p> <p><b>Page 7: para 2:</b> should read "... Plant rooms themselves are <b>NOT</b> the source ..."</p> <p><b>Page 7: para 2:</b> should read "... <b>No shut downs occurred during any case patient stay...</b>"</p> <ul style="list-style-type: none"> <li>• <b>Actions Update (from 06/06/19):</b></li> <li>• <b>(06/06/19) p2: para 4:</b> As agreed, Ian Powrie has touched base with Tom Steele in relation to the entrance to the Adult Hospital and Level 3 air intake for Ward 4B. Ian reported today that this issue is not within the remit of this group and it has been escalated to Hazel who is doing additional works at the entrance. Hazel will work with Althea de Souza.</li> <li>• <b>(06/06/19) p2: Item 3:</b> The minutes of 10/04/19 have been updated and distributed to the group. Re: Cylinder Room mitigation.</li> <li>• <b>(06/06/19) p2: bp1:</b> Ian Powrie will discuss IPS panels being sealed with Darryl Conner as some of the underside of WHBs panels were not done. <b>(21/06/19)</b> Ian Powrie reported that all have been checked and any loose panels have been secured. Colin Purdon picked up with Darryl Conner and reported that all have been re-checked and all sealed. There were 2 rooms unable to get access to and this is still the same position today but this will be re-checked. This is an ongoing action.</li> <li>• <b>(06/06/19) p3: bp1:</b> Ian Powrie previously reported in relation to inspection of Level 4 risers and Level 3 Plant Rooms and ensuring the risers are sealed, that they have been sealed with intumescent fibre boards, and he verified that Wards 4C and 4B were already done. Ward 4A was checked in relation to the Ward 6A open riser. Ian Powrie will check further and add in anything required. <b>(21/06/19)</b> Ian Powrie confirmed the inspection of the floor in Level 4 riser and the Level 3 Plant room to ensure they are sealed off with no access for air transmission.</li> <li>• <b>(06/06/19) p3: Item 4:</b> Testing was done when checking Ward 4C risers. Colin Purdon and Darryl Conner are putting together a programme to address the doors and risers. Wards 6A, 4C and 4B risers are all documented. Also the risers at Ward 6A are sealed and this will be discussed later.</li> <li>• <b>(06/06/19) p3: Item 4:</b> There is concern about the differences in the pressures in 4C Rooms 66-75. Rooms 66 to 74 are between 0.4 to 2.9 Pa from rooms to corridor but Room 75 at the end of the corridor is consistently negative at -0.3 (i.e. air moving from corridor to room). ? Darryl agreed to make adjustments to the room to make slightly positive.</li> <li>• <b>Air into 4B Corridor (near the rooms in the 70's)</b></li> </ul> <p>Ian Powrie reported today that Darryl Conner will review with the commissioning engineer for an appropriate solution. Ian Powrie referred to a diagram and the crossroad coming off the Facilities corridor; a double-door into Ward 4C, a double-door into Ward 4B. The doors to 4C and 4B are opposite each other but at right angles half way between them there is a door into a room presently used as a Doctor's/Reporting Room for 4C. This room also has another single door directly onto the roof. IP explained that sometimes when Ward 4C doors are open the pressure regime across the double-doors to Ward 4B goes negative and the air is then pulled into 4B. It is crucial this is rectified as it currently allows dirty air into the corridor of 4B under these conditions and also a possibility of outside unfiltered air gaining access to that area from the roof via the Doctors/Reporting Room.</p>	<p style="text-align: right;">?DC</p>



Item	Action
<ul style="list-style-type: none"> <li> <p> <b>Creating a Lobby and Positive Pressure Protection</b>            Ian Powrie suggested looking at Ward 4C which is positive at 4 Pa, out and creating a lobby thereby providing a positive protection for 4B from these corridors. It was noted that this haemato-oncology ward is not configured for this group of neutropenic patients, and was originally designed as a general ward. John Hood explained that similarly 4B was originally designed as a general ward but that that the Haematology/Haemato – oncology clinicians decided to move BMT/ haemato-oncology from the GGH site to the QEUH site as there was no unit for high-dependency patients or ITU on that site. The QEUH building design had already been decided and nearly built?*, therefore design modifications had to be made to Ward 4B to make it suitable for the BMT service. This was clearly not an ideal situation. Ian Powrie added that Ward 4B is HEPA filtered for BMT patients and the rooms are better sealed and under positive pressure (around 9 to 10 Pa) with around 10ACHs, whereas Ward 6A and 4C haemato-oncology accommodation are not HEPA filtered and the rooms were originally neutral to the corridor, with only around 3 ACHs and are not so well sealed. Recent adjustments were made to make the rooms slightly positive to the corridor.         </p> </li> <li> <p> <b>Interim Measures – Air Pressure and Fire Safety</b>            There was discussion around interim measures until the final definitive measures can be put in place. Ian Powrie explained that the air pressure is high in Ward 4C corridor as the supply is 2 or 3 times higher than the extract in the Ward 4B corridor. John Hood added that there has been the first isolation of a <i>C. albidus</i> in the air sampling of Ward 4B (in the corridor). This is most likely coming in from the area outside Wards 4B/4C. (See previous Minute of 6 June 19, p4 para 1)         </p> <p>           Tom Steele asked if Ward 4B doors (at that junction) could be sealed off to protect against reversal of the pressure regime (as we know that when 4C door is opened, that 4B corridor opposite, even although the doors to 4B are shut, that 4B corridor can become negatively pressurised and suck ‘dirty air’ into it). This is a significant issue.         </p> <p>           Colin Purdon advised that the Fire Strategy required that the doors to be available for lateral evacuation of patients and staff in both directions, but he would review options of temporary seals with the site Fire Advisor. (outstanding 25 July 2019)         </p> <p>           There is a high volume of traffic, overall in this area (especially at one of the Entrances/Exits from 4C) and there are multiple doors nearby - with movement in and out all the time (apart from entrance/exit to 4B which is permanently closed unless opened in an emergency). Ian Powrie suggested taking 4C Drs/Reporting room away from the clinical team and making it an Estates area with controlled access ‘permit to work’ in order to minimise air ingress from the room access door to the roof outside (i.e. completely unfiltered air).         </p> </li> <li> <p> <b>Increase in Pressure</b>            Increase in the pressure regime was discussed. Ian Powrie stated that one of the patient’s positive for <i>Cryptococcus neoformans</i> was in Ward 4C for the duration of their stay and therefore was possibly exposed to it while in Ward 4C. If the pressure regime is altered to address the threshold to Ward 4B, care should be taken to make sure that there is no unintended detriment to the existing pressure regimes in 4B/4C.         </p> </li> </ul>	<p>??</p> <p>CP</p>

Item	Action
<p>John Hood added that the air changes are lower (worse) in 4C, because of the adoption of chilled beams. The positive pressure strategy in the Corridor in 4B/4B door needs to be ensured. Tom Steele suggested an increase in pressurisation on the 4B corridor side, and to tape the doors up as a short term measure. Ian Powrie stated that this needs to be via a controlled lobby combined with control of the access to the 4C Doctors Room/Reporting room which has also the external roof access and the concomitant risk of outside (completely unfiltered) air, gaining access to Ward 4B.</p> <p>John Hood mentioned that a mechanical riser in 4B had a water leak this morning. Colin Purdon explained that this is the low temperature water return pipe, and that the valve body gland has a slight leak. The valve will be changed today. ?update DC</p> <ul style="list-style-type: none"> <li>• <b>Restricted Area and Responsibility</b> <p>Restricting access would need to be agreed by Myra Campbell the Clinical Services Manager, and approved by Anne Harkness, who would also need to sanction approval of the Fire Officer.</p> <p>Clinical Services would need to find another space for clinical staff if this area is put out of action. The doors will still need to be sealed.</p> </li> <li>• <b>Sequencing of Works</b> <p>First measure would be to seal the doors and get a SOP put in place, then sequence the works. There is high volume of traffic in this area, and ancillary services in particular require this route to all FM services. Clinical staff can be moved elsewhere as previously mentioned. It was agreed that subject to approval by the Fire Officer, this door is to be sealed as soon as possible, allowing breakthrough in an emergency. Ian Powrie reported that at present there is security controlled access with identification badge required, and includes all clinical staff and any FM staff.</p> </li> <li>• <b>Previous Actions (below refers to Minute of 6 June 2019)</b> <p>Page 4, para 1 - Ian Powrie referred to the Ward 4B corridor and negative pressure in that corridor around the Rooms in the 70s, and that the pressure would need to be greater than +5 Pa. Darryl will review options.</p> <p>Page 4, para 1 - Sandra Devine had asked Ian Powrie to defer arranging a review meeting involving a clinical representatives from BMT and Estates etc to discuss ventilation design issues for e.g. 4C and 6A. This would need to go through Capital Planning.</p> <p>Page 4, para 2 - Permit to access was discussed. And confirmed?</p> <p>Page 4, para 3 - Ian Powrie stated this is riser CA-006/T1 going into the ward itself. Colin Purdon confirmed mastic seal to the doors has been done.</p> </li> </ul>	<p>DC</p>

Item	Action																																												
<p>Page 4, para 5 - Ian Powrie reported that the meeting with Sanondaf was held as planned but that the risers have not been included at this time as HPV treatment cannot be done until the risers are sealed. A suspended ceiling will need to be installed in each of the risers, and sealed off so that there is no air movement into the rest of the riser into Ward 6A, i.e. seal top and bottom of the risers. At present there is roof and floor penetration that are open within the riser fire compartment, effectively acting as a chimney. Ian Powrie explained this needs to be done retrospectively and is complex.</p> <p>Colin Purdon added, putting metal framing in is straightforward but the plasterboard and sealing is more complicated. Complexity is increased due to the need to implement HAI-SCRIBE controls adversely impacting on clinical functionality of the ward. Tom Steele suggested that the work could be moved outwith Ward 6A to avoid further impact on this patient group, sealing the riser ceiling on Level 5 (underside of Ward 6A) and on the floor of Level 8 risers on the top side of Level 7. This would effectively create a sealed chamber spanning both high-risk Wards 6A and 7A (CF) while minimising disruption to activity in both wards.</p> <p>Ian Powrie asked if there is a risk between CF and haemato-oncology if there is air movement between them. John Hood agreed to discuss this with Teresa Inkster.</p> <p>Colin Purdon and Darryl Conner to review this option pending feedback from Teresa Inkster on this proposal.</p>	<p>JH</p>																																												
<p>Page 4, para 5 – Colin Purdon reported that the challenge is the metal doors. Ian Powrie added there are no gaskets on the metal doors and that one of the doors needs to be re-aligned. Colin Purdon has advised that intumescent gasket seals would be fitted.</p>	<p>CP</p>																																												
<p><b>4. Update on Air Testing</b></p> <p>John Hood provided an update on air sampling which includes an update on those reported at the last meeting.</p>	<p>JH</p>																																												
<table border="1"> <thead> <tr> <th>Date</th> <th>Area</th> <th>Reported 06/06/19</th> <th>Reported 21/06/19</th> </tr> </thead> <tbody> <tr> <td>14/05/19</td> <td>Ward 4C Room 73</td> <td>presumptive <i>C. albidus</i></td> <td>confirmed as <i>C. albidus</i></td> </tr> <tr> <td>14/05/19</td> <td>Ward 6A Corridor</td> <td>-</td> <td>confirmed as <i>C. diffluens</i></td> </tr> <tr> <td>15/05/19</td> <td>Ward 6A Electrical Riser</td> <td><i>C. uniguttulatus</i></td> <td>confirmed as <i>C. uniguttulatus</i></td> </tr> <tr> <td>15/05/19</td> <td>Ward 4B corridor (near rooms in 70's)</td> <td>presumptive <i>C. albidus</i></td> <td>confirmed as <i>C. albidus</i></td> </tr> <tr> <td>21/05/19</td> <td>Ward 6A Room 1</td> <td>presumptive <i>C. albidus</i></td> <td>confirmed as <i>C. diffluens</i></td> </tr> <tr> <td>29/05/19</td> <td>Laboratory Block Level 1 Reception</td> <td>-</td> <td>presumptive <i>C. albidus</i></td> </tr> <tr> <td>29/05/19</td> <td>Blood Bank (huddle)</td> <td>-</td> <td>presumptive <i>C. uniguttulatus</i></td> </tr> <tr> <td>?Toxicology</td> <td>Main Corridor T/Board</td> <td>-</td> <td>presumptive <i>C. albidus</i></td> </tr> <tr> <td>11/06/19</td> <td>Ward 6A Corridor (Rooms 20-23)</td> <td>-</td> <td>presumptive <i>C. albidus</i></td> </tr> <tr> <td>11/06/19</td> <td>Ward 4C Room 70</td> <td></td> <td>presumptive <i>C. albidus</i></td> </tr> </tbody> </table>	Date	Area	Reported 06/06/19	Reported 21/06/19	14/05/19	Ward 4C Room 73	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	14/05/19	Ward 6A Corridor	-	confirmed as <i>C. diffluens</i>	15/05/19	Ward 6A Electrical Riser	<i>C. uniguttulatus</i>	confirmed as <i>C. uniguttulatus</i>	15/05/19	Ward 4B corridor (near rooms in 70's)	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	21/05/19	Ward 6A Room 1	presumptive <i>C. albidus</i>	confirmed as <i>C. diffluens</i>	29/05/19	Laboratory Block Level 1 Reception	-	presumptive <i>C. albidus</i>	29/05/19	Blood Bank (huddle)	-	presumptive <i>C. uniguttulatus</i>	?Toxicology	Main Corridor T/Board	-	presumptive <i>C. albidus</i>	11/06/19	Ward 6A Corridor (Rooms 20-23)	-	presumptive <i>C. albidus</i>	11/06/19	Ward 4C Room 70		presumptive <i>C. albidus</i>	
Date	Area	Reported 06/06/19	Reported 21/06/19																																										
14/05/19	Ward 4C Room 73	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>																																										
14/05/19	Ward 6A Corridor	-	confirmed as <i>C. diffluens</i>																																										
15/05/19	Ward 6A Electrical Riser	<i>C. uniguttulatus</i>	confirmed as <i>C. uniguttulatus</i>																																										
15/05/19	Ward 4B corridor (near rooms in 70's)	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>																																										
21/05/19	Ward 6A Room 1	presumptive <i>C. albidus</i>	confirmed as <i>C. diffluens</i>																																										
29/05/19	Laboratory Block Level 1 Reception	-	presumptive <i>C. albidus</i>																																										
29/05/19	Blood Bank (huddle)	-	presumptive <i>C. uniguttulatus</i>																																										
?Toxicology	Main Corridor T/Board	-	presumptive <i>C. albidus</i>																																										
11/06/19	Ward 6A Corridor (Rooms 20-23)	-	presumptive <i>C. albidus</i>																																										
11/06/19	Ward 4C Room 70		presumptive <i>C. albidus</i>																																										

Item	Action
<p>The Laboratory Block Level 1 has different air intakes; 3 different <i>Cryptococcus</i> spp found in the air (2 presumptive <i>C. albidus</i> and 1 presumptive <i>C. uniguttulatus</i>). Of note, this had been done for different reasons, but what it shows is their presence in the air from AHU's served from a completely different Plant Room neither in the QEUH nor RHC. As noted above (11/06/19), Ward 6A Corridor and Ward 4C Room 70 grew presumptive <i>C. albidus</i>.</p> <p>Teresa Inkster has been air sampling in the old building of the GRI where there is no ventilation apart from window opening, i.e. 'natural' ventilation only. The fungal counts from this are 180 (colony forming units) cfu to 12 cfu in these ward areas with some yeasts present (not yet identified). These are comparable air counts with the outside air on the GRI roof - with similar numbers of fungi found in the air (with no isolation of any <i>Cryptococcus</i> spp.)</p> <p><b>Issues with identification of Cryptococcal species: GRI Maldi and subsequent Reference Laboratory identification</b></p> <ul style="list-style-type: none"> <li>• Between 21 Dec 2018 and 11 Jan 2019, 14 Cryptococcal isolates were sent to the Reference Lab (these were mostly identified at GRI as <i>C. albidus</i>). However the Reference Lab in fact only confirmed that 2 were <i>C. albidus</i>, with 11 <i>C. diffluens</i> and 1 <i>C. albidosimilis</i>.</li> <li>• 12 samples were sent to the Reference Lab between 21 Feb and 12 May 2019, again most identified at GRI were <i>C. albidus</i> with 2 as <i>C. uniguttulatus</i>. The Reference Lab confirmed only 2 as <i>C. albidus</i>, with 2 <i>C. uniguttulatus</i> and 8 as <i>C. diffluens</i>.</li> </ul> <p>The significance of growing these different cryptococcal species that are not <i>C. albidus</i> are the subject of ongoing discussions with Liz Johnson, Head of the Reference Laboratory in Bristol (with respect to the use of <i>C. albidus</i> as a surrogate marker for <i>C. neoformans</i> etc).</p> <p>Some 30 isolates identified on GRI Maldi (from 21 Dec 2018 to 31 Jan 2019 with 29 identified as <i>C. albidus</i>) have recently been sent to Bristol for formal identification.</p> <p>John Hood reported that Pod sampling has not been done yet but this will be done some time next week. The pod system has never been looked at before and may be complex.</p>	
<p><b>5. Actions from 6 June 2019 Meeting</b></p>	
<p>Actions from 06/06/19 were updated during the meeting and noted in the minutes.</p>	
<p><b>6. Further Actions Required</b></p>	
<p>1. <b>06/06/19 - Action ongoing: <u>Carry Forward</u></b> - Estates are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he discussed this with Multiplex. He said that the green roof was part of the design and the sedum can be removed and an alternative ballast material installed. He said if we were to move the items from the roof we could cause further disturbance? John Hood said he would be concerned if <i>Haemato-oncology</i> patients were to go on to this roof but he was informed there is no access to it for these patients. Tom Steele said that he is of the opinion to maybe review this in the future but to leave it as is at the moment. <b>21/06/19</b> – no update. <b>Closed.</b></p>	<p>TS</p>

Item	Action
<p>2. <b>21/06/19 - Action update:</b> On 29 May 2019, inspection above the ceiling of Room 5 in Ward 6A showed that the services coming into the space were well sealed and in good condition. The flexible duct to the chilled beam was found to be intact.</p>	
<p><b>21/06/19 - Action complete:</b> Subsequently, a problem with the chilled beams (in 6A) was identified and Ian Powrie explained this was a mechanical joint failure causing condensation. On this occasion it was a loss of low temperature hot water heating circuit that resulted in a change in temperature causing contraction of the pipework and fittings resulting in a slight leak. Colin Purdon added this was reported as a series of drips and although not for this group, it is being mentioned due to the mechanical failure. Colin Purdon has met with Teresa Inkster and Christine Peters. The ceiling tiles affected by water damage were replaced, and Actichlor was used to wash down. All appropriate IPC measures have been taken (Ward 6A x8 rooms).</p>	
<p>3. <b>21/06/19 - Action ongoing:</b> Continue to carry out air sampling in Wards 6A, 4B and 4C.</p>	JH
<p>4. <b>21/06/19 - Action closed:</b> Ian Powrie reported that fluid dynamics modelling around the helipad/QEUH/RHC report was now completed (see Report Rev 3). The IMT Expert Advisory Sub-Group accepted the findings of the CFD Report.</p>	
<p>5. <b>06/06/19 - Action closed:</b> Item in relation to Pest Control.</p>	
<p>6. <b>21/06/19 - Action ongoing:</b> Ian Powrie updated that priority has been given to Wards 6A and 4C for removal of the Ceiling Vent Grilles (CVG's). Ward 4B has been done. Timeline will be done, but Wards 6A and 4C is expected to be done in the next couple of weeks, ongoing for removal of CVGs in other clinical wards.</p>	
<p>Ian Powrie asked Eddie McLaughlan for HFS to confirm endorsement that HFS and the authorised engineer agreement that CVG vents are no longer required. Ian Powrie has received background information about ventilation and gas leaks from Ian Storrar but needs confirmation of endorsement. Ian Powrie added that ventilation is only needed where there are mechanical joints on gas lines. Eddie McLaughlan reported that Ian Storrar is currently on annual leave. Eddie McLaughlan will arrange for HSF to confirm endorsement within this time.</p>	EMcL/ IS
<p>7. <b>21/06/19 - Action ongoing:</b> <u>Carry Forward</u> - Sandra Devine was not in attendance to provide an update that discussion is still to take place with Teresa Inkster and possibly Myra Campbell, Clinical Services Manager in relation to self-closers on doors in Ward 4B, and IPC making sure that staff understand the importance of keeping doors to patient rooms closed and also keeping doors to ancillary areas closed as much as possible.</p>	SD
<p><b>21/06/19 - Action ongoing:</b> Colin Purdon will check with the contractors if the rooms have 30-minute fire doors fitted at present. Colin Purdon previously discussed self-closers on doors with local Fire Safety Advisors and reported there would be no issues with this proposal. It was noted that discussion with the clinical teams would need to be held in relation to when beds being taken out etc. On 25 July 2019, Colin to have walk round with Fire Safety advisor shortly.</p>	CP
<p>8. <b>21/06/19 - Action ongoing:</b> Colin Purdon updated that the action plan has been prepared and is being used to programme and prioritise the issues previously identified. The report was put together by the flooring contractor and Ward 4C has some minor issues to be rectified.</p>	CP

Item	Action
<p>9. <b>06/06/19 - Action closed:</b> Sandra confirmed IPC has investigated laundry storage and process. This action to be removed from the group's remit. Action complete.</p>	
<p>10. <b>21/06/19 - Action ongoing:</b> It was confirmed that the engineering risers have been inspected however will be kept as ongoing until completion of the doors of these risers are sealed. Ian Powrie asked Colin Purdon to arrange to have the doors sealed over the next three weeks (by 27/06/19). Colin Purdon reported that the frames have been sealed. Darryl Conner is taking forward the action for the risers.</p>	CP/ DC
<p>11. <b>06/06/19 - Action closed:</b> It was confirmed that final inspection of Ward 6A Room 5 has taken place. Action complete.</p>	
<p>12. <b>06/06/19 - Action closed:</b> It was agreed and noted that overall ventilation design for Ward 2A is in another forum therefore has been removed as an action for this group. Action closed.</p>	
<p>13. <b>21/06/19 - Action ongoing:</b> Wards 6A and 4C IPS panels to be sealed with silicone by 24/05/19. Colin Purdon previously agreed to have the bottom of all the panels re-checked. All but two IPS panels have been confirmed as complete. CP to confirm.</p>	CP
<p>7. <b>AOCB</b></p>	
<p>John Hood reported that hypotheses after the last minute had been added, and explained this is an (for him mostly) an aide memoire for the final report.</p>	
<p>1. <b>Discussion</b> <b>Hypotheses</b></p>	
<p><b>Plant Rooms on Level 12:</b> John Hood noted comments on preliminary discussions around the Hypotheses (see minute of 06/06/19). Ian Powrie reported that it was thought that investigations established there was very little pigeon fouling in other Plant Rooms compared with Plant Rooms serving D (PR123) in early December 2018. John Hood agreed to review the information received from Pest Control, but we were continuing to grow cryptococci from air samples without any perceived issues of fouling in Plant Rooms since January 2019 to present.</p>	
<p><b>**Note – include this in 21/06/19 minutes. Eddie McLaughlan must comment**</b></p>	EM/JH
<p>Eddie McLaughlan asked, is there an issue with the outside source of cryptococcus and there not being Reference. Eddie McLaughlan stated that this made the case for Scottish specific guidance on specialist ventilation systems for neutropenic / severely immunocompromised patients. [REDACTED]</p> <p>[REDACTED] Anything included in the guidance around moving patients from outside a protective environment would need to be taken to Teresa Inkster for discussion.</p>	
<p>Again the real issue is not having enough protective isolation rooms with HEPA filtration, about 10ACH, under positive pressure with about +10Pa moving outwards.</p>	
<p>John Hood also pointed out that early identification of the cryptococci grown from the QEUH air sampling was of <i>C. albidus</i>. These subsequently have been identified as <i>C. diffluens</i> (close to <i>C. albidus</i>) by Bristol and he will speak to the Reference Laboratory about this. The original IMT minute record <i>C. albidus</i> however the 30-plus samples that did not go the Reference Laboratory at the outset have now been sent and are coming back as <i>C. diffluens</i>.</p>	EM/JH

Item	Action
<p><b>8. Date and Time of Next Meeting</b></p> <p>The next meeting will be held at 1.00pm on Friday 28 June 2019, Meeting Room 1, in the old Central Medical Building (CMB), QEUH (behind the old clock tower). Teleconferencing will be available.</p> <p>Of note, Ian Powrie leaves the organisation on 28/06/19.</p>	

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Meeting Room 1 Old Central Medical Building (CMB), Queen Elizabeth University Hospital

**Friday 28 June 2019 at 1.00pm Draft 2 (25 July 2019)**

**Present:** Dr John Hood (chair), Ian Powrie, Darryl Conner, Pauline Hamilton (minutes)

**Teleconference:** -

**Apologies:** Ian Storrar, Eddie McLaughlan, Colin Purdon, Tom Steele, Sandra Devine, Peter Hoffman

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting. Apologies were received from the abovementioned.</p>	
<p><b>2. Minutes of Meeting held on 21 June 2019</b></p> <p>The minutes of the last meeting held on 21/06/19 were tabled and updated at today's meeting, still to be distributed to the group.</p> <p>The final version of the minutes of 06/06/19 were distributed to the group today. The hypotheses was expanded in these notes.</p> <ul style="list-style-type: none"> <li>• <b>Actions Update:</b></li> <li>• <b>(06/06/19) p3: bp1:</b> Ian Powrie will discuss IPS panels being sealed with Darryl Conner as some of the underside of WHBs panels were not done. <b>(21/06/19)</b> Ian Powrie reported all have been checked and any loose panels secured. Colin Purdon picked up with Darryl Conner and reported all have been re-checked and all sealed. There were 2 rooms unable to get access to and this is still the same position today but will be re-checked. <b>(28/06/19)</b> Darryl Conner confirmed all now done. Ian Powrie reported that of all the rooms checked, the 2 rooms were still be checked one of which was Room 5. Darryl Conner will confirm by e-mail that Rooms A and B, and Ward 6A Room 5 is the only one not sealed on the underside. Ian Powrie and John Hood had inspected this area.</li> <li>• <b>(06/06/19) p3: Item 4:</b> Testing was done when checking Ward 4C risers. Colin Purdon and Darryl Conner are putting together a programme to address the door and risers. Wards 6A, 4C and 4B risers are all documented. Also the risers at Ward 6A are sealed. <b>(28/06/19)</b> Darryl Conner reported that Colin Purdon was dealing with this and is confident this has all now been done.</li> <li>• <b>(06/06/19) p3: Item 4:</b> There is concern about the differences in the pressures in 4C Rooms 66-75. Rooms 66 to 74 are between 0.4 to 2.9 Pa from rooms to corridor but Room 75 at the end of the corridor is consistently negative at -0.3 (i.e. air moving from corridor to room). Colin Purdon to make adjustments to the room to make slightly positive. <b>(28/06/19)</b> Ian Powrie clarified this was the room at the end of the corridor and is still to be done. Ian Powrie asked Darryl Conner to be careful not to affect the pressure regimes for the area when adjustments are made.</li> </ul>	<p>DC</p> <p>CP</p> <p>DC</p>



Item	Action
<ul style="list-style-type: none"> <li> <b>Air into the Corridor</b> <p>At the last meeting there was discussion around air into the corridor (Ward 4C Room 75), and Ian Powrie had explained that when Ward 4C doors are open the pressure regime across the double-doors to Ward 4B goes negative and the air is dragged in. It was noted, it is crucial this area is rectified as it currently allows dirty air into the corridor under these conditions. Ian Powrie suggested today, either increase the pressure in the room (the one with the positive pressure in the corridor) or reduce the pressure in the corridor. Ian Powrie asked, if this can be done, to first of all check the adjustment to make sure the balance has not been altered anywhere else. Darryl Conner will need to scan Ward 4C first-off before making any adjustment. Ian Powrie added that the commissioning engineer will need to review all of the rooms and check that correction has not made things worse, with a view to increasing the pressure in Room 5 in the same range as the other rooms. Darryl Conner will do the pressure change but will ask Ian ?? to do the re-balance.</p> </li> </ul>	DC
<ul style="list-style-type: none"> <li> <b>Increase in Pressure</b> <p>At the last meeting increase in pressure regime was discussed. Ian Powrie stated today that the minimum for isolation rooms should be 8 with a target of 10. Darryl Conner will consider with the commissioning engineer reducing the corridor supply volume in Ward 4C which will reduce the positive pressure impact from 4C on 4B. This will be considered when ensuring that it does not generate an impact on any other part of the ventilation system.</p> </li> </ul>	DC
<ul style="list-style-type: none"> <li> <b>Restricted Area and Responsibility</b> <p>Restricting access was discussed at the last meeting. Today Ian Powrie reported there may be an issue about restricting access and would need to decide who would engage with Myra Campbell the CSM, and for approval Anne Harkness. Ian Powrie suggested waiting until the ward modification is being done as part of the remit for the lobbies when re-designing the ventilation from Ward 4C, as the ward will need to be split from Renal in terms of ventilation, and will become a controlled access for Estates with a permit to access to go out on the roof. The space is still being used as a doctors' room at today's date. The next issue is the volume of traffic and fluctuation of air. Darryl Conner will check that the seals have been done. Ian Powrie stated the doors can be taped on both side to restrict access with a notice on the door "for emergency use only". Darryl Conner will contact the Fire Officer for approval.</p> </li> </ul>	DC DC
<ul style="list-style-type: none"> <li> <b>Sequencing of Works</b> <p>Sequencing of works will be done after increase in pressure and restricted access is complete.</p> </li> </ul>	
<ul style="list-style-type: none"> <li> <b>Previous Actions (21/06/19)</b> <p>Page 4, para 4 - Ian Powrie stated this is riser CA-006/T1 going into the ward itself. Colin Purdon confirmed mastic seal to the doors has been done. <b>28/06/19</b> – Ian Powrie clarified this is the lift core riser in Ward 6A and added that Colin Purdon has said we are using foam gasket door seals but thinks we should be using intumescent door seals as these would expand and seal more in the event of heat.</p> </li> </ul>	

Item	Action
------	--------

- Page 4, para 5 - Ian Powrie previously reported that the meeting with Sanondaf was held as planned but the risers were not included at this time as HPV treatment cannot be done until the risers are sealed. **28/06/19** – Ian Powrie reported that discussions will need to be held to establish sanitise options once sealed and for Darryl Conner to speak to Sanondaf at the right time. Darryl Conner stated that one of the actions about sealing the risers should have been fed into another group (Specialist Critical Ventilation Steering Group) and that a meeting was held last week. At that meeting Darryl Conner explained the reasoning behind sealing the risers. Ian Powrie suggested John Hood discusses with Teresa Inkster; the priority of works, practicality and control measures, preparing the SCRIBE, and moving forward with regards to ventilation. Ian Powrie pointed out there may be a gap in discussion between the groups who are meeting. Tom Steele previously suggested as part of this group, moving works from Levels 5 and 8 and sealing Levels 6 and 7, and John Hood was to establish if there was any risk for the CF and BMT patients. This discussion may help make sense for the other group. Darryl Conner added that any work of that type that impacts on patients', needs to be approved by the SCV SG who meet monthly.

DC

#### 4. Update on Air Testing

John Hood provided an update on air sampling which includes an update on those reported at previous meetings.

Date	Area	Reported 06/06/19	Reported 21/06/19	Reported 28/06/19
14/05/19	Ward 4C Room 73	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	
14/05/19	Ward 6A Corridor	-	confirmed as <i>C. diffluens</i>	
15/05/19	Ward 6A Electrical Riser	<i>C. uniguttulatus</i>	confirmed as <i>C. uniguttulatus</i>	
15/05/19	Ward 4B corridor (near rooms in 70's)	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	
21/05/19	Ward 6A Room 1	presumptive <i>C. albidus</i>	confirmed as <i>C. diffluens</i>	
29/05/19	Laboratory Block Level 1 Reception	-	<del>presumptive <i>C. albidus</i></del>	confirmed as <i>C. diffluens</i>
29/05/19	Blood Bank (huddle)	-	<del>presumptive <i>C. uniguttulatus</i></del>	confirmed as <i>C. uniguttulatus</i>
?Toxicology	Main Corridor T/Board	-	<del>presumptive <i>C. albidus</i></del>	confirmed as <i>C. albidus</i>
11/06/19	Ward 6A Corridor (Rooms 20-23)	-	presumptive <i>C. albidus</i>	
11/06/19	Ward 4C Room 70		presumptive <i>C. albidus</i>	
17/06/19	Ward 6A Treatment Room POD	-	-	presumptive <i>C. albidus</i>
17/06/19	Ward 6A Corridor Nurses Station	-	-	? <i>C. albidus</i>

Ian Powrie confirmed the condition of the plant rooms is "immaculate". There were so far nine positive air samples with Cryptococcal species in May 2019 and four so far for June 2019, therefore fluctuation. This is varying because of the outside air not issues in the Plant Room.

John Hood requested updated full-size drawings (A0) for Wards 6A, 4B and 4C. Darryl Conner will ask Colin Purdon to arrange this on his return from annual leave.

DC

Item	Action
<p><b>5. Actions from 28 June 2019 Meeting</b></p> <p>Actions from 28/06/19 were updated during the meeting and noted in the minutes.</p>	
<p><b>6. <u>Further Actions Required</u></b></p>	
<p><b>1. 06/06/19 - Action ongoing: <u>Carry Forward</u></b> - Estates are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he discussed this with Multiplex. He said that the green roof was part of the design and the sedum can be removed and an alternative ballast material installed. He said if we were to move the items from the roof we could cause further disturbance? John Hood said he would be concerned if <i>Haemato-oncology</i> patients were to go on to this roof but he was informed there is no access to it for these patients. Tom Steele said that he is of the opinion to maybe review this in the future but to leave it as is at the moment. <b>28/06/19</b> – no update.</p>	TS
<p><b>2. 21/06/19 - Action update: <u>Date to be added</u></b> - On inspection above the ceiling of Room 5 in Ward 6A showed that the services coming into the space were well sealed and in good condition. The flexible duct to the chilled beam was found to be intact. <u>Date of inspection to be added</u>. <b>28/06/19</b> – Darryl Conner reported this was sealed on 05/06/19 and has inspected a bank of rooms since then. All sealed and cleaned out. John Hood will check date – 29 May 2019.</p>	JH
<p><b>3. 21/06/19 - Action ongoing:</b> Continue to carry out air sampling in Wards 6A, 4B and 4C.</p>	JH
<p><b>4. 21/06/19 - Action ongoing:</b> Ian Powrie updated that priority has been given to Wards 6A and 4C for removal of the Ceiling Vent Grilles (CVG's). Ward 4B has been done. Timeline will be done, but Wards 6A and 4C is expected to be done in the next couple of weeks, ongoing for removal of CVGs in other clinical wards. <b>28/06/19</b> - SCRIBE sitting with IPC. Ward 4B has been done. Wards 6A and 4C have yet to be done – SCRIBE required.</p>	IS
<p><b>21/06/19 - Action ongoing:</b> Ian Powrie asked Eddie McLaughlan for HFS to confirm endorsement that HFS and the authorised engineer agreement that CVG vents are no longer required. Ian Powrie has received background information about ventilation and gas leaks from Ian Storrar but needs confirmation of endorsement. Ian Powrie added that ventilation is only needed where there are mechanical joints on gas lines. Eddie McLaughlan reported that Ian Storrar is currently on annual leave. Eddie McLaughlan will arrange for HSF to confirm endorsement within this time. <b>28/06/19</b> – Ian Powrie reported that Ian Storrar is to confirm.</p>	EMcL / IS
<p><b>5. 21/06/19 - Action ongoing: <u>Carry Forward</u></b> - Sandra Devine was not in attendance to provide an update that discussion is still to take place with Teresa Inkster and possibly Myra Campbell, Clinical Services Manager in relation to self-closers on doors in Ward 4B, and IPC making sure that staff understand the importance of keeping doors to patient rooms closed and also keeping doors to ancillary areas closed as much as possible. <b>28/06/19</b> – Darryl Conner asked about self-closers. Ian Powrie stated this is what Sandra Devine was going to discuss with clinical colleagues</p>	SD
<p><b>21/06/19 - Action ongoing: <u>Carry Forward</u></b> – Colin Purdon will check with the contractors if the rooms have 30-minute fire doors fitted at present. Colin Purdon previously discussed self-closers on doors with local Fire Safety Advisors and reported there would be no issues with this proposal. It was noted that discussion with the clinical teams would need to be held in relation to beds being taken out etc.</p>	CP

Item	Action
<p>6. <b>21/06/19 - Action ongoing:</b> <u>Carry Forward</u> - Colin Purdon updated that the action plan has been prepared and is being used to programme and prioritise the issues previously identified. The report was put together by the flooring contractor and Ward 6A has some minor issues to be rectified.</p>	CP
<p>7. <b>21/06/19 - Action ongoing:</b> It was confirmed that the engineering risers have been inspected however will be kept as ongoing until completion of the door risers are sealed. Ian Powrie asked Colin Purdon to arrange to have the doors sealed over the next three weeks (by 27/06/19). Colin Purdon reported that the frames have been sealed. Darryl Conner is taking forward the action for the risers. <b>28/06/19</b> - On hold with Teresa Inkster as mentioned earlier (page 3 bp1). Ian Powrie asked Darryl Conner to check if the seals itself are fine to adjust the door, but if not put a gasket in. Ian Powrie added that only one was looked at in Ward 6, but asked that all of the doors are sealed air tight (sweep Wards 4B, 6A, 4C for all riser doors).</p>	DC
<p>8. <b>21/06/19 - Action ongoing:</b> Wards 6A and 4C IPS panels to be sealed with silicone by 24/05/19. Colin Purdon previously agreed to have the bottom of all the panels re-checked. All but two IPS panels have been confirmed as complete. <b>28/06/19</b> – Action ongoing.</p>	CP/ DC

### Closed / Completed Actions

- **21/06/19 - Action complete:** A problem with the chilled beams was identified and Ian Powrie explained this was a mechanical joint failure causing condensation. On this occasion it was a loss of low temperature hot water heating circuit that resulted in a change in temperature causing contraction of the pipework and fittings resulting in a slight leak. Colin Purdon added this was reported as a series of drips and although not for this group, it is being mentioned due to the mechanical failure. Colin Purdon has met with Teresa Inkster and Christine Peters. The ceiling tiles affected by water were replaced, and Actichlor was used to wash down. All appropriate IPC measures have been taken (Ward 6A children - x8 rooms).
  - **21/06/19 - Action closed:** Ian Powrie reported that fluid dynamics modelling around the helipad/QEUH/RHC report was now completed (see Report Rev 3). The IMT Expert Advisory Sub-Group accepted the findings of the CFD Report.
  - **06/06/19 - Action closed:** Item in relation to Pest Control.
  - **06/06/19 - Action closed:** Sandra confirmed IPC has investigated laundry storage and process. This action to be removed from the group's remit. Action complete.
  - **06/06/19 - Action closed:** It was confirmed that final inspection of Ward 6A Room 5 has taken place. Action complete.
  - **06/06/19 - Action closed:** It was agreed and noted that overall ventilation design for Ward 2A is another forum therefore has been removed as an action for this group.
7. **AOCB**
- Hypotheses is included in the 06/06/19 minute.
8. **Date and Time of Next Meeting**
- The next meeting will be arranged to be held in the next couple of weeks.

### Cryptococcus IMT Expert Advisory Sub-Group

#### Notes of Meeting held in Facilities Meeting Hub Old Central Medical Building (CMB), Queen Elizabeth University Hospital

Friday 26 July 2019 at 1.00pm Draft 5b JH 8/8/19

**Present:** Dr John Hood (chair), Darryl Conner, Sandra Devine, Pauline Hamilton (minutes)

**Teleconference:** Peter Hoffman, Annette Rankin

**Apologies:** Ian Storrar, Eddie McLaughlan, Colin Purdon, Tom Steele

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting. Teleconference introductions were made and apologies were received from the abovementioned.</p>	
<p><b>2. Minutes of Meetings held on 21 and 28 June 2019</b></p> <p>The minutes of the meetings held on 21 and 28 June 2019 were sent earlier today with the agenda, therefore amendments may need to be noted at a later date to allow the group time for review. John Hood commented that Eddie McLaughlan needs to review the discussion noted in the minutes of 21/06/19 (page 8, item 7.1 - Hypotheses) and change as appropriate.</p>	EMcL
<p><b>• Actions Update:</b></p> <p><b>• (06/06/19) p3: bp1:</b> Ian Powrie will discuss IPS panels being sealed with Darryl Conner as some of the underside of WHBs panels were not done. <b>(21/06/19)</b> Colin Purdon picked up with Darryl Conner and reported all have been re-checked and all sealed. There were 2 rooms unable to get access to and this is still the same position today but will be re-checked. <b>(28/06/19)</b> Darryl Conner confirmed all now done. Ian Powrie reported that of all the rooms checked, the 2 rooms were still be checked one of which was Room 5. Darryl Conner will confirm by e-mail that Rooms A and B, and Ward 6A Room 5 is the only one not sealed on the underside. Ian Powrie and John Hood had inspected this area.</p>	DC
<p><b>• (06/06/19) p3: Item 4:</b> There is concern about the differences in the pressures in 4C Rooms 66-75. Rooms 66 to 74 are between 0.4 to 2.9 Pa from rooms to corridor but Room 75 at the end of the corridor is consistently negative at -0.3 (i.e. air moving from corridor to room). Colin Purdon to make adjustments to the ventilation to make this room slightly positive. <b>(28/06/19)</b> Ian Powrie clarified this was the room at the end of the corridor and is still to be done. Ian Powrie asked Darryl Conner to be careful not to affect the pressure regimes for the area when adjustments are made. <b>(26/07/19)</b> Darryl Conner agreed to make adjustments to the ventilation to make this room slightly positive.</p>	DC
<p><b>• (21/06/19) p3: bp2:</b> Colin Purdon advised that the Fire Strategy required that the doors to be available for lateral evacuation of patients and staff in both directions, but he would review options of temporary seals with the site Fire Advisor. <b>(29/07/19)</b> Action outstanding. To be completed.</p>	CP

Item	Action
<ul style="list-style-type: none"> <li>(21/06/19) p4: para2: John Hood mentioned that a mechanical riser in 4B had a water leak this morning. Colin Purdon explained that this is the low temperature water return pipe, and that the valve body gland has a slight leak. The valve will be changed today. (29/07/19) Darryl Conner confirmed as done. Action complete.</li> </ul>	
<ul style="list-style-type: none"> <li>(21/06/19) p5: para3: Ian Powrie asked if there is a risk between CF and haemato-oncology if there is air movement between them. John Hood agreed to discuss this with Teresa Inkster. (26/07/19) Action carried forward (Teresa Inkster has just returned from annual leave).</li> </ul>	JH
<ul style="list-style-type: none"> <li>(21/06/19) p5: para5: Colin Purdon has advised that intumescent gasket seals would be fitted. (26/07/19) Darryl Conner confirmed that the intumescent gasket riser seals has been completed. The only action outstanding in relation to this is the installation of the false ceilings.</li> </ul>	DC
<ul style="list-style-type: none"> <li>(21/06/19) p7: item 7: para2: On 25 July 2019, Colin (Purdon) to have walk round with Fire Safety Advisor shortly. (26/07/19) Colin Purdon will set-up a meeting with the Fire Officers soon.</li> </ul>	CP
<ul style="list-style-type: none"> <li>(21/06/19) p8: item 13: All but two IPS panels have been confirmed as complete. (26/07/19) Action complete.</li> </ul>	
<ul style="list-style-type: none"> <li>(21/06/19) p8: item7.1: para 1 and 2: Noted at the start of the minutes (Item 2) that Eddie McLaughlan must comment on the specialist ventilation systems.</li> </ul>	EMcL
<ul style="list-style-type: none"> <li>(28/06/19) p2: bp1: There had been discussion around air into the corridor (Ward 4C Room 75), and Ian Powrie had explained that the commissioning engineer will need to review all of the rooms and check that correction has not made things worse, with a view to increasing the pressure in Room 5 in the same range as the other rooms. (26/07/19) Darryl Conner confirmed he will do the pressure change but will ask Ian McKenzie to do the re-balance.</li> </ul>	DC
<ul style="list-style-type: none"> <li>(28/06/19) p3: item 4: Isolates from both air tests on 17/06/19 have been confirmed as <i>C. diffluens</i>.</li> </ul>	

#### 4. Update on Air Testing

John Hood provided an update on air sampling which includes an update on those reported at previous meetings.

Date	Area	Reported 06/06/19	Reported 21/06/19	Reported 28/06/19	Reported 26/07/19
14/05/19	Ward 4C Room 73	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	-	-
14/05/19	Ward 6A Corridor	-	confirmed as <i>C. diffluens</i>	-	-
15/05/19	Ward 6A Electrical Riser	<i>C. uniguttulatus</i>	confirmed as <i>C. uniguttulatus</i>	-	-
15/05/19	Ward 4B corridor (near rooms in 70's)	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	-	-
21/05/19	Ward 6A Room 1	presumptive <i>C. albidus</i>	confirmed as <i>C. diffluens</i>	-	-
29/05/19	Lab Block Level 1 Reception	-	presumptive <i>C. albidus</i>	confirmed as <i>C. diffluens</i>	-
29/05/19	Blood Bank LB-L1 (huddle)	-	presumptive <i>C. uniguttulatus</i>	confirmed as <i>C. uniguttulatus</i>	-

Cont/...

Item	Action
------	--------

Cont/...

Date	Area	Reported 06/06/19	Reported 21/06/19	Reported 28/06/19	Reported 26/07/19
29/05/19	Ward 4C Riser 223			confirmed as <i>C. uniguttulatus</i>	
29/05/19	Main Corridor Training Board Lab Block L1	-	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	-
11/06/19	Ward 6A Corridor (Rooms 20-23)	-	presumptive <i>C. albidus</i>	-	confirmed as <i>C. diffluens</i>
11/06/19	Ward 4C Room 70		presumptive <i>C. albidus</i>	-	confirmed as <i>C. diffluens</i>
17/06/19	Ward 6A Treatment Room/ POD	-	-	presumptive <i>C. albidus</i>	confirmed as <i>C. diffluens</i>
17/06/19	Ward 6A Corridor Nurses Station	-	-	? <i>C. albidus</i>	confirmed as <i>C. diffluens</i>
27/06/19	Ward 6A Clean Utility Room	-	-	-	confirmed as <i>C. diffluens</i>
28/06/19	4B (BMTU) Corridor 70's	-	-	-	confirmed as <i>C. diffluens</i>
03/07/19	Ward 6A Room 24	-	-	-	confirmed as <i>C. diffluens</i>
03/07/19	Ward 6A Room 2	-	-	-	confirmed as <i>C. uniguttulatus</i>

On 28/06/19 there was a positive *Cryptococcus* spp. isolated from the BMT corridor, the second found in this area. This has been confirmed, not as *C. albidus* as previously, but as *C. diffluens*. This confirms that there is an issue with this corridor (see previous minutes).

FIGURE 1

'Cryptococcal species' isolates from air sampling 21 Dec 2018 to Jun/Jul 2019							
	<i>N. diffluens</i>	<i>N. albida</i>	<i>N. albido-similis</i>	<i>F. uniguttulata</i>	<i>Cutan. curvatus</i>	ID TBC	Total
*Dec 21 <sup>st</sup> 2018 n=53	13	0	1	0	1 Roof#	1	16
Jan 19 n=422	24	3	0	0	0	0	27
Feb 19 n=440	0	0	0	1	0	0	1
Mar 19 n=320	4	0	0	1	0	0	5
Apr 19 n=334	2	0	0	0	0	0	2
May 19 n=420	7	3	0	3	0	0	13
Jun 19 n=448	8	0	0	0	0	0	8
Jul 19	1 sf	0 sf	0 sf	1 sf	0 sf	0	2 sf
<b>Total sf</b>	<b>59</b>	<b>6</b>	<b>1</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>74</b>

sf = so far

Item	Action
<p><b>Most of next 3 pages added/extended in Draft by JH</b></p> <p>John Hood referred to a paper distributed to the group (Figure 1, above) and reported that air sampling had started on 21/12/18. On that day, 53 air samples were taken: in patient rooms and corridors in Wards 6A, 4C and PICU (Paediatric Intensive Care Unit), some specific Plant Rooms and some outside air samples from the roof of QEUH – outside the Plant Rooms on Level 12. Overall, 16 of these 53 air samples were positive for a cryptococcal species.</p> <p><b>Plant Room Samples</b></p> <p>32 air samples were taken from Plant Rooms 121,122 (serves 6A) and 124 (serves 4C). Of these 32 samples only 8 were positive for cryptococcal species.</p> <p><b>PR 121: 3/24 positive (for cryptococcal species).</b></p> <p>2/24 <i>C. diffluens</i> 1/24 <i>C. albido-similis</i> 18/24 'overgrown with fungi'*** 1/24 <i>Candida albicans</i> 1/24 <i>Rhodotorula mucilaginosa</i> 1/24 <i>Candida colliculosa</i></p> <p><b>PR 122 (6A): 1/4 positive (for cryptococcal species).</b></p> <p>1/4 <i>C. diffluens</i> 2/4 'overgrown with fungi'*** 1/4 <i>Rhodotorula mucilaginosa</i></p> <p><b>PR 124 (4C): 4/4 positive (for cryptococcal species).</b></p> <p>1/4 ID to be confirmed 3/4 <i>C. diffluens</i></p> <p><b>PR 123 (D)</b> was not tested as it was not thought to be implicated. Also at that time Plant Room 121(B) was thought to be the Plant Room that served Ward 4B (BMT) – see below, it is not.</p> <p><b>Patient Area Samples</b></p> <p>15 samples were taken from Rooms/corridors in 6A, 4C and PICU (paediatric intensive care).</p> <p><b>7/15 samples from these patient areas were positive for cryptococcal species. (all <i>C. diffluens</i>)</b></p> <p>6A: 3/6 positive – <i>C. diffluens</i> 4C: 2/6 positive – <i>C. diffluens</i> PICU: 2/3 positive – <i>C. diffluens</i></p> <p><b>Roof Samples</b></p> <p>1/6 positive for cryptococcal species - <i>C. curvatus</i> 1/6 <i>Candida guilliermondii</i> 1/6 Yeast unable to identify 3/6 'overgrown with fungi'***</p> <p><b>NB: PICU is served by separate Air Handling Units (AHUs) in RHC (not on Level 12 QEUH) namely PR 41 AHUs 13, 14, 15 &amp; 16. 4B (BMTU) is served by PR 31 AHU63 (on level 3 of QEUH, not Level 12).</b></p>	



Item	Action
------	--------

The cryptococcal species have been split into *C. albidus*, *diffluens*, *uniguttulatus* and *curvatus*. *Cryptococcus curvatus* was the **only** 'cryptococcus' grown in an air sample from **outside air, so far** (taken on the QEUH roof Dec 21 2018).

Just to further confuse ... please find the 'new' names for the above strains of cryptococci!

*Naganishia albida* = *Cryptococcus albidus*  
*Naganishia diffluens* = *Cryptococcus diffluens*  
*Naganishia albido-similis* = *Cryptococcus albido-similis*  
*Filobasidium uniguttulatum* = *Cryptococcus uniguttulatus*  
*Cutaneotrichosporum curvatum* = *Cryptococcus curvatus*

Peter Hoffman asked if the air samples noted above are 1 m<sup>3</sup> each. John Hood replied that the air samples taken on the roof (from about early March 2019) were of 1000L, i.e. 1 m<sup>3</sup>. Prior to that they were of 500L. All room/corridors etc are of 500L.

Up to early July 2019, there have been 74 positive air samples (out of some 2500+ samples) with various cryptococcal species isolated, although the air sampling figures for all testing have yet to be finalised. Looking at all the positive results from Dec 2018 to recently:

#### FIGURE 2

##### Positive Crypto spp. results by month and per number of samples

Month	No of positives	No of samples
December 21 <sup>st</sup> 2018 (1day)	16	53
Jan 19	27	422
Feb 19	1	440
March 19	5	320
April 19	2	334
May 19	13	420
June 19	8	448
July 19	2 so far	To be confirmed

The cause of this variation is unknown, but likely to do with varying weather conditions and wind speeds/directions. Cryptococci are almost certainly in the outside air and, as previously discussed, cannot be easily isolated from the outside air but almost only (in our experience) isolated from air samples from patients' rooms/corridors etc and from air in the Plant Rooms. The air within the Plant Rooms is unfiltered air from the outside therefore it is likely to be very similar to that entering the air intakes of the AHUs.

On the balance of the evidence, so far, it is unlikely that the source of the *C. neoformans* has been as a result of pigeon fouling in the Plant Rooms, and this has been noted in previous minutes. It is difficult to figure out how even if the Plant Room had heavy contamination of pigeon faeces that either spores or yeast cells could have got into 'closed' AHUs. It should also be noted that few of the samples were taken (on 21 Dec 2018) from the Plant Rooms serving Wards 6A and 4C (with 5 of 8 positive), but the vast majority of samples on that day were taken from Plant Room 121 (with only 3/24 samples positive with *Crypto* spp.) This Plant Room was believed to be serving Ward 4B at that point in time.

Commented [PH1]:

Commented [PH2R1]: This reads like they are more difficult to grow from outdoor than indoor air. Is this the case?

Item	Action
<p>However! A d in ft by :</p> <p>Questions to be asked:</p> <ol style="list-style-type: none"> <li>1. Those involved in the sampling of Plant Rooms on that day need to be asked why PR 121 had that larger no of samples taken e.g. was it because it was most visibly contaminated? and or were PRs 122 and 124 less visibly contaminated?</li> <li>2. Why was PR 123 not sampled – as this was the PR (D) described on 5 December 2018 as contaminated with pigeon guano (described as wet) with evidence of significant pigeon ingress.</li> <li>3. Of the 74 isolations of <i>Cryptococcal</i> species so far, 59 are <i>C. diffluens</i> with only 6 <i>C. albidus</i>. JH to discuss with Dr Elizabeth Johnson at PHE Mycology Laboratory, Bristol – as original hypothesis was to employ <i>C. albidus</i> as a surrogate marker for <i>C. neoformans</i>. Question – is this true with <i>C. diffluens</i>? Is there any evidence to back-up either organism being a surrogate marker for <i>C. neoformans</i>?</li> </ol> <p>John Hood stated that this investigation is now drawing to a close, and repeat air sampling of the Plant Rooms will be done over the next few weeks and also air sampling of those Plant Rooms on Levels 2 and 3, not sampled before. On 25/07/19, the Level 12 Plant Rooms (121,122,123 and 124) that ventilate Ward 6A and 4C and the top 4 floors of the QEUH, were checked along with Bernie McCulloch from Estates. These areas were found to be clean with no evidence of any pigeon ingress or fouling. Environmental cleans are being done thoroughly and checks are being carried out that there is no pigeon roosting/fouling including on top of the ducts or anywhere within these Plant Rooms. Also, the Level 3 Plant Rooms (32 and 33) were also found to be clean. Plant Room 31 was visited for the first time. This Plant Room houses in the region of 60 AHUs stacked up with ductwork, and could possibly have problems with pigeons getting into these areas which are difficult to inspect. However GP Environmental are carrying out such inspections. There are also different contractors currently changing the outside panels of the building, who need to enter Plant Room 31 to access the outside. On one occasion a pigeon has got in through an open door into the Plant Room but the area was quickly cleaned. This has all been logged by GP Environmental. It is inevitable that with contractors going in and out of these areas that pigeons could get in.</p> <p>One thing of note is that when it is really hot weather, there are ventilation vents on Level 3 that automatically open, effectively allowing in unfiltered air into the large atrium of the QEUH , although this is infrequent and likely to be only during hot weather. However it emphasises the need for minimising doors being kept opened into or within Wards with high-risk patients, e.g. 4B, 4C and 6A. Darryl Conner explained that there is a median temperature for the atrium itself.</p> <p>John Hood confirmed he has already been to see the Plant Rooms in RHC, in the past, but will go back and check these next week.</p> <p>John Hood stated that the indoor air sampling results are NOT thought to be related to pigeon ingress or contamination of the Plant Rooms themselves but the <i>Cryptococcus neoformans</i> is almost certainly occasionally present in the air infiltrating from outdoors, no doubt depending on the prevailing conditions outside. Peter Hoffman agreed with this statement.</p>	<p>Commented [PH3]: How assessed?</p>

Item	Action
<p>John Hood added that the only <i>Cryptococcus</i> species grown from pigeon droppings from Level 12 Plant Rooms, were 3/18 positive, all for <i>C. uniguttulatus</i>. This is the only evidence of <i>Cryptococcus species</i> present in pigeon's faeces sampled from the hospital site. There have been no isolations of <i>C. neoformans</i> from any specimens or air samples only being isolated from the blood cultures of both the patients affected. The Bristol Mycology Reference Laboratory have said that (in their experience) <i>C. neoformans</i> is very rarely grown from air samples. Peter Hoffman asked where the connection of <i>C. neoformans</i> and pigeon droppings came from. John Hood replied probably from work in the 1950s when scientists first started looking at <i>C. neoformans</i> and human disease. John Hood stated that he believed that there is a high amount of ammonia in pigeon droppings which kills or inhibits <i>C. neoformans</i> in the GI tract of pigeons. Early on in the outbreak Dr Elizabeth Johnson from PHE Bristol suggested to Dr Inkster could employ <i>Cryptococcus albidus</i> as a surrogate marker for <i>C. neoformans</i> as it is found in wheat grain which pigeons eat, and the <i>C. neoformans</i> exists in the soil.</p>	
<p><b>5. Actions from 26 July 2019 Meeting</b></p> <p>Actions from 26/07/19 were updated during the meeting and noted in the minutes.</p>	
<p><b>6. Further Actions Required</b></p>	
<p>1. <b>21/06/19</b> - Continue to carry out air sampling in Wards 6A, 4B and 4C. <b>26/07/19</b> - Action ongoing.</p>	JH
<p>2. <b>21/06/19 - Action ongoing:</b> Ian Powrie updated that priority has been given to Wards 6A and 4C for removal of the Ceiling Vent Grilles (CVG's). Ward 4B has been done. Timeline will be done, but Wards 6A and 4C is expected to be done in the next couple of weeks, ongoing for removal of CVGs in other clinical wards. <b>28/06/19</b> - SCRIBE sitting with IPC. Ward 4B has been done. Wards 6A and 4C have yet to be done – <b>SCRIBE required. 26/07/19</b> - Darryl Conner has asked Teresa Inkster about replacing CVGs in Ward 4B with ceiling tiles. There was one action was to replace CVGs in Ward 4C, but there is a problem with increased permeability of the space. It has already been established that the notional average is up to or less than 2 Pa to replace CVGs. It has been suggested it might be possible to trim back the extract in the en suites, but the air change in the en suites would be reduced slightly. This information has gone to the Specialist Ventilation Group. Darryl Conner reported that the area from 4B into 4C, at time of measurement is showing negative, but on investigation and measurement outside Room 75, it goes up to 75? Pa because of the opening and closing of the doors and air being forced up into 4D. Without designation of the lobbies into mitigating areas, the closing or opening of any one door adjusted the pressure regimes definitively.</p>	IS
<p>Darryl Conner has submitted SCRIBEs for the process for removal of CVGs, and all are the same apart from the level of protection for each department being moved. Ward 6A is next on the list, which requires feedback from Teresa Inkster, but can be actioned immediately. John Hood thought the SCRIBE employed in 4B could be used for the other areas as same work is being carried out and had been successfully used in a more critical area. Darryl Conner explained that effectively it is the same SCRIBE and is used as a template however each area requires sign-off. <b>Action ongoing – SCRIBE required.</b></p>	DC

Item	Action
<p><b>21/06/19 - Action ongoing:</b> Ian Powrie asked Eddie McLaughlan for HFS to confirm endorsement that HFS and the authorised engineer agreement that CVG vents are no longer required. Ian Powrie has received background information about ventilation and gas leaks from Ian Storrar but needs confirmation of endorsement. Ian Powrie added that ventilation is only needed where there are mechanical joints on gas lines. Eddie McLaughlan reported that Ian Storrar is currently on annual leave. Eddie McLaughlan will arrange for HSF to confirm endorsement within this time. <b>28/06/19</b> – Ian Powrie reported that Ian Storrar is still to confirm. <b>26/07/19</b> - Darryl Conner reported that Ian Storrar was asked (by Ian Powrie) to confirm endorsement of removal of the CVGs. Annette Rankin stated that Ian Storrar is likely involved in the current ongoing issues in NHS Lothian and suggested he is reminded to take this action forward. Darryl Conner will contact Ian Storrar as suggested. <b>Action ongoing.</b></p>	IS DC
<p>3. <b>21/06/19 - Action ongoing: Carry Forward</b> - Sandra Devine was then not in attendance to provide an update that a discussion is still to take place with Teresa Inkster and possibly Myra Campbell (Clinical Services Manager) in relation to self-closers on doors in Ward 4B, and that IPC team is making sure that staff understand the importance of keeping doors to patient rooms closed and also keeping doors to ancillary areas closed as much as possible. <b>28/06/19</b> - Darryl Conner asked about self-closers. Ian Powrie stated this is what Sandra Devine was going to discuss with clinical colleagues. <b>26/07/19</b> - Sandra reported that two IPC Nurses visited Ward 4B to emphasise the importance of closing doors, and signage has also been put up. Sandra is arranging to meet with Myra Campbell to discuss self-closers on doors and will explain the issue of the 4B corridor and how the problem exists. Darryl Conner pointed out that practically this may be difficult to put in place as every door is bespoke and takes around 8 weeks from order, effectively taking rooms out-of-use. Sandra will make this a consideration. <b>Action ongoing.</b></p>	SD
<p><b>21/06/19 - Action ongoing: Carry Forward</b> – Colin Purdon will check with the contractors if the rooms have 30-minute fire doors fitted at present. Colin Purdon previously discussed self-closers on doors with local Fire Safety Advisors and reported there would be no issues with this proposal. It was noted that discussion with the clinical teams would need to be held in relation to beds being taken out etc. <b>26/07/19</b> - deferred until discussions with relevant parties have taken place as noted in the minutes and also as noted, a walk round with the Fire Advisor to be arranged. <b>Action ongoing.</b></p>	CP
<p>4. <b>21/06/19 - Action ongoing: Flooring: Carry Forward</b> - Colin Purdon updated that the action plan has been prepared and is being used to programme and prioritise the issues previously identified. The report was put together by the flooring contractor and Ward 6A has some minor issues to be rectified. <b>26/07/19 – Action carry forward / ongoing.</b></p>	CP
<p>5. <b>21/06/19 - Action ongoing:</b> It was confirmed that the engineering risers have been inspected however this action will be kept as ongoing until completion of the doors to risers' rooms are sealed. Ian Powrie asked Colin Purdon to arrange to have the doors sealed over the next three weeks (by 27/06/19). Colin Purdon reported that the frames have been sealed. Darryl Conner is taking forward the action for the risers. <b>28/06/19</b> - On hold with Teresa Inkster as mentioned earlier (page 3 bp1). Ian Powrie asked Darryl Conner to check if the seals itself are fine to adjust the door, but if not, to put a gasket in. Ian Powrie added that only one was looked at in Ward 6, but asked that all of the doors are sealed air tight (sweep Wards 4B, 6A, 4C for all riser doors). <b>26/07/19</b> - Fire Advisor to endorse and if IPC can sanction, then this will be done. John Hood asked if Darryl Conner is in a position to comment. Darryl Conner reported that Teresa Inkster wanted this item discussed at the Specialist Ventilation Group and following discussion at the first meeting put forward their</p>	

Item	Action
<p>intentions and what was required to accommodate the work. However Teresa Inkster had responded that the downtime would cause more risk than what the existing risk is in relation to the risers. Darryl Conner stated that in the interim a control of the risers. The doors are sealed, but the adjacent ceilings and floors of the risers have not yet been done. Clarification from the Fire Advisor is required to ensure that there is no breach of fire integrity as they are horizontally sealed to each level. Darryl Conner stated this will need to be discussed at the Specialist Ventilation Group and will ask for this to be included as an agenda item for discussion. <b>Action ongoing.</b></p>	DC
<p>6. <b>21/06/19 - Action ongoing:</b> Wards 6A and 4C IPS panels to be sealed with silicone by 24/05/19. Colin Purdon previously agreed to have the bottom of all the panels re-checked. All but two IPS panels have been confirmed as complete. <b>28/06/19 – Action ongoing. 26/07/19 - Darryl Conner confirmed that Room 5 6A was done and has been told that the other room has also been done. Darryl Conner will check both have been sealed and will confirm this. Action ongoing.</b></p>	DC
<p>* <b>NEW ACTIONS:</b></p>	
<p>7. <b>(26/07/19):</b> Eddie McLaughlan to review the discussion noted in the minutes of 21/06/19 (page 8, item 7.1 - Hypotheses) and change as appropriate.</p>	EMcL
<p>8. <b>(26/07/19):</b> Colin Purdon to get the GP Environmental (Pest Control Company) to give an update on their formal cleaning and ongoing identification of problems in the Plant Rooms. Darryl Conner will discuss this with Colin Purdon on 28/07/19. Of note, this will be required for part of the final discussion and Report.</p>	DC
<p>9. <b>(26/07/19):</b> John Hood to inform Liz Johnson at the Reference Laboratory in Bristol of the cryptococcus isolates and will forward the breakdown of this, in order to discuss the implications and any views, and if these are valid surrogate markers.</p>	JH
<p>10. <b>(26/07/19):</b> John Hood to continue doing walk round of Plant Rooms. Awaiting results of air samples from the Plant Rooms tested so far.</p>	JH
<p>11. <b>(26/07/19):</b> John Hood referred to the tube system, and will need to discuss this with Colin Purdon in the next couple of weeks, who will in turn talk to the engineers. To understand and find out (Level 3) the possibility of air being dragged from the Plant Room to the PODs into areas such as in 6A, 4B and 4C. This is specimen transport tubes that should all be under vacuum. John Hood wants to confirm air cannot be dragged in and then pushed out into a critical area. John Hood would value Peter Hoffman's opinion. Peter stated that they work under significant negative pressure, and by definition no air comes out of the system other than air that is mechanically removed and should not replace the air on the ward.</p>	
<p><b>Closed / Completed Actions</b></p>	
<ul style="list-style-type: none"> <li>• <b>06/06/19 - Action closed:</b> Item in relation to Pest Control.</li> <li>• <b>06/06/19 - Action closed:</b> Sandra confirmed IPC has investigated laundry storage and process. This action to be removed from the group's remit. Action complete.</li> <li>• <b>06/06/19 - Action closed:</b> It was confirmed that final inspection of Ward 6A Room 5 has taken place. Action complete - see Bp 6, below.</li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li>• <b>06/06/19 - Action closed:</b> It was agreed and noted that overall ventilation design for Ward 2A is the responsibility of another forum therefore it has been removed as an action for this group.</li> <li>• <b>06/06/19</b> - Estates are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he discussed this with Multiplex. He said that the green roof was part of the design and the sedum can be removed and an alternative ballast material installed. He said if we were to move the items from the roof we could cause further disturbance? John Hood said he would be concerned if <i>Haemato-oncology</i> patients were to go on to this roof but he was informed there is no access to it for these patients. Tom Steele said that he is of the opinion to maybe review this in the future but to leave it as is at the moment. <b>21/06/19</b> - no update. <b>26/07/19 - Action closed meantime.</b></li> <li>• <b>21/06/19</b> - On 29 May 2019, inspection above the ceiling of Room 5 in Ward 6A showed that the services coming into the space were well sealed and in good condition. The flexible duct to the chilled beam was found to be intact. <b>28/06/19</b> – Darryl Conner reported this was sealed on 05/06/19 and has inspected a bank of rooms since then. All sealed and cleaned out. <b>26/07/19 - Action closed.</b></li> <li>• <b>21/06/19 - Action closed:</b> Ian Powrie reported that fluid dynamics modelling around the helipad/QEUF/RHC report was now completed (see Report Rev 3). The IMT Expert Advisory Sub-Group accepted the findings of the CFD Report.</li> <li>• <b>21/06/19 - Action complete:</b> A problem with the chilled beams was identified and Ian Powrie explained this was a mechanical joint failure causing a leak. On this occasion it was a loss of low temperature hot water heating circuit that resulted in a change in temperature causing contraction of the pipework and fittings resulting in a slight leak. Colin Purdon added this was reported as a series of drips and although not for this group, it is being mentioned due to the mechanical failure. Colin Purdon has met with Teresa Inkster and Christine Peters. The ceiling tiles affected by water were replaced, and Actichlor was used to wash down. All appropriate IPC measures have been taken (Ward 6A children - x8 rooms).</li> </ul>	
<p>7. <b>AOCB</b></p>	
<ul style="list-style-type: none"> <li>• Nil of note.</li> </ul>	
<p>8. <b>Date and Time of Next Meeting</b></p> <p>The next meeting will be held in the week beginning 5 August 2019 and details of where and when will follow in due course.</p>	

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Meeting Room 1 Old Central Medical Building (CMB), Queen Elizabeth University Hospital

**Friday 9 August 2019 at 1.00pm Draft 3**

**Present:** Dr John Hood (chair), Darryl Conner, Sandra Devine, Colin Purdon, Tom Steele, Pauline Hamilton (minutes)

**Teleconference:** Peter Hoffman

**Apologies:** Ian Storrar, Eddie McLaughlan

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting. Teleconference introductions were made and apologies were received from the abovementioned.</p>	
<p><b>2. Minutes of Meetings held on 26 July 2019</b></p> <p>The minutes of the meeting held on 26 July 2019 were accepted with the following amendments:</p> <p style="padding-left: 40px;"><b>Page 7: Item 6.2:</b> should read "... the notional average is <b>1.2 to 2 Pa</b> to replace CVGs."</p> <ul style="list-style-type: none"> <li>• <b>Actions Update:</b></li> <li>• <b>(06/06/19) p3: bp1:</b> Ian Powrie will discuss IPS panels being sealed with Darryl Conner as some of the underside of WHBs panels were not done. <b>(21/06/19)</b> Colin Purdon picked up with Darryl Conner and reported all have been re-checked and all sealed. There were 2 rooms unable to get access to and this is still the same position today but will be re-checked. <b>(28/06/19)</b> Darryl Conner confirmed all now done. Ian Powrie reported that of all the rooms checked, the 2 rooms were still be checked one of which was Room 5. Darryl Conner will confirm by e-mail that Rooms A and B, and Ward 6A Room 5 is the only one not sealed on the underside. Ian Powrie and John Hood had inspected this area. <b>(09/08/19)</b> Darryl Conner confirmed as above. <b>Action complete.</b></li> <li>• <b>(06/06/19) p3: Item 4:</b> There is concern about the differences in the pressures in 4C Rooms 66-75. Rooms 66 to 74 are between 0.4 to 2.9 Pa from rooms to corridor but Room 75 at the end of the corridor is consistently negative at -0.3 (i.e. air moving from corridor to room). Colin Purdon to make adjustments to the ventilation to make this room slightly positive. <b>(28/06/19)</b> Ian Powrie clarified this was the room at the end of the corridor and is still to be done. Ian Powrie asked Darryl Conner to be careful not to affect the pressure regimes for the area when adjustments are made. <b>(26/07/19)</b> Darryl Conner agreed to make adjustments to the ventilation to make this room slightly positive. <b>(09/08/19)</b> It was noted that this action has gone to the Specialist Ventilation Group. <b>Action closed - transferred</b></li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li>• <b>(21/06/19) p3: bp2:</b> Colin Purdon advised that the Fire Strategy required that the doors to be available for lateral evacuation of patients and staff in both directions, but he would review options of temporary seals with the site Fire Advisor. <b>(29/07/19)</b> Action outstanding. To be completed. <b>(09/08/19)</b> ?John Hood reported that draft seals have been fitted on the Ward 4B door that is locked on the outside, through to the doctor's room and it is only Estates that go in and out of that area. Darryl Conner will discuss with the Fire Advisor. <b>?Action ongoing</b></li> <li>• <b>(21/06/19) p4: para2:</b> John Hood mentioned that a mechanical riser in 4B had a water leak this morning. Colin Purdon explained that this is the low temperature water return pipe, and that the valve body gland has a slight leak. The valve will be changed today. <b>(29/07/19)</b> Darryl Conner confirmed as done. <b>Action complete.</b></li> <li>• <b>(21/06/19) p5: para3:</b> Ian Powrie asked if there is a risk between CF and haemato-oncology if there is air movement between them. John Hood agreed to discuss this with Teresa Inkster. <b>(26/07/19)</b> Action carried forward (Teresa Inkster has just returned from annual leave). <b>(09/08/19)</b> John Hood reported that Teresa Inkster has concurred no significant risk. <b>Action complete.</b></li> <li>• <b>(21/06/19) p5: para5:</b> Colin Purdon has advised that intumescent gasket seals would be fitted. <b>(26/07/19)</b> Darryl Conner confirmed that the intumescent gasket riser seals has been completed. The only action outstanding in relation to this is the installation of the false ceilings. <b>(09/08/19)</b> Darryl Conner reported that installation of the false ceilings is still to be done but that this action is for the Specialist Ventilation Group. <b>Action closed - transferred.</b></li> </ul>	DC
<ul style="list-style-type: none"> <li>• <b>(21/06/19) p7: item 7: para2:</b> On 25 July 2019, Colin (Purdon) to have walk round with Fire Safety Advisor shortly. <b>(26/07/19)</b> Colin Purdon will set-up a meeting with the Fire Officers soon. <b>(09/08/19)</b> Colin Purdon reported that a walk round with the Fire Advisor is still to be arranged.</li> <li>• <b>(21/06/19) p8: item 13:</b> All but two IPS panels have been confirmed as complete. <b>(26/07/19)</b> Action complete.</li> <li>• <b>(21/06/19) p8: item7.1: para 1 and 2:</b> Noted at the start of the minutes (Item 2) that Eddie McLaughlan must comment on the specialist ventilation systems. <b>(09/08/19)</b> John Hood reported he received an e-mail response from Eddie McLaughlan (detail later in minute). <b>Action ongoing</b></li> </ul>	CP
<ul style="list-style-type: none"> <li>• <b>(28/06/19) p2: bp1:</b> There had been discussion around air into the corridor (Ward 4C Room 75), and Ian Powrie had explained that the commissioning engineer will need to review all of the rooms and check that correction has not made things worse, with a view to increasing the pressure in Room 5 in the same range as the other rooms. <b>(26/07/19)</b> Darryl Conner confirmed he will do the pressure change but will ask <b>Ian McKenzie</b> to do the re-balance. <b>(09/08/19)</b> John Hood reported that the Specialist Ventilation Group will need to discuss the air pressures. Darryl Conner explained that the doors need to be closed because when the doors are open <b>this forces into a ??positive state.</b> It was noted that it is only through discussion at meetings that it was realised the effect of doors being left open affecting all of the pressures, therefore ward staff would definitely not be aware of these issues. <b>Action closed - transferred.</b></li> <li>• <b>(28/06/19) p3: item 4:</b> Isolates from both air tests on 17/06/19 have been confirmed as <i>C. diffluens</i>.</li> </ul>	DC



Item						Action
4.	<b>Update on Air Testing</b>					
Air sampling reports (06/06/19 to 26/07/19).						
Date	Area	Reported 06/06/19	Reported 21/06/19	Reported 28/06/19	Reported 26/07/19	
14/05/19	Ward 4C Room 73	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	-	-	
14/05/19	Ward 6A Corridor	-	confirmed as <i>C. diffluens</i>	-	-	
15/05/19	Ward 6A Electrical Riser	<i>C.</i> <i>uniguttulatus</i>	confirmed as <i>C. uniguttulatus</i>	-	-	
15/05/19	Ward 4B corridor (near rooms in 70's)	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	-	-	
21/05/19	Ward 6A Room 1	presumptive <i>C. albidus</i>	confirmed as <i>C. diffluens</i>	-	-	
29/05/19	Lab Block Level 1 Reception	-	presumptive <del><i>C. albidus</i></del>	confirmed as <i>C. diffluens</i>	-	
29/05/19	Blood Bank LB-L1 (huddle)	-	presumptive <del><i>C. uniguttulatus</i></del>	confirmed as <i>C. uniguttulatus</i>	-	
29/05/19	Ward 4C Riser 223			confirmed as <i>C. uniguttulatus</i>		
29/05/19	Main Corridor Training Board Lab Block L1	-	presumptive <del><i>C. albidus</i></del>	confirmed as <i>C. albidus</i>	-	
11/06/19	Ward 6A Corridor (Rooms 20-23)	-	presumptive <i>C. albidus</i>	-	confirmed as <i>C. diffluens</i>	
11/06/19	Ward 4C Room 70		presumptive <i>C. albidus</i>	-	confirmed as <i>C. diffluens</i>	
17/06/19	Ward 6A Treatment Room/POD	-	-	presumptive <del><i>C. albidus</i></del>	confirmed as <i>C. diffluens</i>	
17/06/19	Ward 6A Corridor Nurses Station	-	-	? <del><i>C. albidus</i></del>	confirmed as <i>C. diffluens</i>	
27/06/19	Ward 6A Clean Utility Room	-	-	-	confirmed as <i>C. diffluens</i>	
28/06/19	4B (BMTU) Corridor 70's	-	-	-	confirmed as <i>C. diffluens</i>	
03/07/19	Ward 6A Room 24	-	-	-	confirmed as <i>C. diffluens</i>	
03/07/19	Ward 6A Room 2	-	-	-	confirmed as <i>C.uniguttulatus</i>	

Item	Action
------	--------

Figure 1 was included in the minutes of 26/07/19 but has been included in today's minutes for reference.

### FIGURE 1

'Cryptococcal species' isolates from air sampling 21 Dec 2018 to Jun/Jul 2019							
	<i>N. diffluens</i>	<i>N. albida</i>	<i>N. albido-similis</i>	<i>F.uniguttulata</i>	<i>Cutan. curvatus</i>	ID TBC	Total
*Dec 21 <sup>st</sup> 2018 n=53	13	0	1	0	1 Roof#	1	16
Jan 19 n=422	24	3	0	0	0	0	27
Feb 19 n=440	0	0	0	1	0	0	1
Mar 19 n=320	4	0	0	1	0	0	5
Apr 19 n=334	2	0	0	0	0	0	2
May 19 n=420	7	3	0	3	0	0	13
Jun 19 n=448	8	0	0	0	0	0	8
Jul 19	1 sf	0 sf	0 sf	1 sf	0 sf	0	2 sf
<b>Total sf</b>	<b>59</b>	<b>6</b>	<b>1</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>74</b>

sf = so far

John Hood explained that Figure 1 details the samples and speciation of the cryptococci, the total number of each *Cryptococcus* species and those isolates by month. There is a wide variation in the numbers of Cryptococcal species isolated each month. There were around 2500 samples taken between December 2018 and July 2019. As previously reported, it was the belief at the start of this investigation that *C. neoformans* is difficult to grow from the air, and its biology/ecology is complex. The theory was that *C. albidus* could be taken as a surrogate marker for *C. neoformans*. The belief being that *C. albidus* was also carried in the gut of pigeons but more easily grown. However it has proved not to be as straightforward as that. *C. neoformans* is ?closely linked to *C. diffluens* and *C. albidus*. The confirmed results from the Reference Lab of the 74 cryptococcal isolates sent are that 59 are *C. diffluens* and only 6 are *C. albidus*. These results need to be discussed with Dr Elizabeth Johnson at PHE Mycology Laboratory , Bristol as noted elsewhere.

Darryl Conner asked about the variable results. John Hood explained that this may be due to the weather e.g. the prevailing wind, the temperature etc.

John Hood referred to the Plant Room Samples and Patient Area Samples (below), these were included in the minutes of 26/07/19, and kept in today's minutes for reference.

#### Plant Room sampling 21/12/18

John Hood reported that the original samples were mostly from the Plant Rooms on Level 12, and that 53 samples were done on that one day. Plant Room 121 (B) was the plant room, then believed to be, supplying Ward 4B (BMTU) however it is NOT. The plant room supplying Ward 4B is Plant Room 31 AHU 63 (on level 3). Plant Room 122 (serves 6A) and 124 (serves 4C) are both on Level 12 QEUH. Unfortunately only 4 air samples were taken from each of these areas.

Item	Action
<p>Plant Room 123 (D) had no samples taken as it was not believed to be implicated in any of the cases.</p> <p><b>Plant Room Samples (from minute of 26/07/19 – included today for reference)</b> 32 air samples were taken from Plant Rooms 121,122 (serves 6A) and 124 (serves 4C). Of these 32 samples taken only 8 were positive for cryptococcal species.</p> <p><b>PR 121: 3/24 positive (for cryptococcal species).</b> 2/24 <i>C. diffluens</i> 1/24 <i>C. albido-similis</i> 18/24 'overgrown with fungi'** 1/24 <i>Candida albicans</i> 1/24 <i>Rhodotorula mucilaginosa</i> 1/24 <i>Candida colliculosa</i></p> <p><b>PR 122 (6A): 1/4 positive (for cryptococcal species).</b> 1/4 <i>C. diffluens</i> 2/4 'overgrown with fungi'*** 1/4 <i>Rhodotorula mucilaginosa</i></p> <p><b>PR 124 (4C): 4/4 positive (for cryptococcal species).</b> 1/4 ID to be confirmed 3/4 <i>C. diffluens</i></p> <p><b>PR 123 (D)</b> was not tested as it was not thought to be implicated. Also at that time Plant Room 121(B) was thought to be the Plant Room that served Ward 4B (BMT) – see above, it is not.</p>	
<p><b>Roof Samples</b> The roof samples – note that 3/6 were overgrown with fungi but this is not unusual from the outside air. Interestingly 1/6 samples grew <i>C. curvatus</i> (now <i>Cutaneotrichosporum curvatum</i>) which is the only positive sample from outside air that has grown a Cryptococcus species.</p> <p>As previously discussed, it was from early March 2019 when 1 m<sup>3</sup> of air sampling started for outside air samples i.e. 1000L as opposed to inside air samples have always been of 500L. Peter Hoffman stated 'getting more air but capturing more relevant fungi'. John Hood stated that of 2500+ samples, 74 were positive for cryptococcal species. It is unknown why there is variation in the positive samples by month as shown, but is likely to do with the weather conditions such as the prevailing winds, temperature etc.</p> <p>Sandra Devine asked about the vents in the Atrium of the QEUH being open during the recent warm weather (noted by JH) and asked if there is a log of that. Tom Steele referred to February 2019 and recalled the vents being open then, and thought that this was a sealed area apart from the doors. Darryl Conner explained that the vents opening is dependent on the internal conditions, i.e. the internal space temperature. So regardless of the external temperature, there can be occasions, either way, when the vents will open.</p> <p>JH in draft: the issue here is that there is likely to be an ingress of unfiltered outside air coming into the Atrium on these occasions. This emphasises the need, for example, of doors into critical areas being kept shut as much as possible. It also emphasises how complex air flows may be in this complex hospital and the need for robust protective isolation in critical areas i.e. not just HEPA filtered air.</p>	

Item	Action																											
<p><b>Patient Area Samples taken on 21/12/18 (from minute of 26/07/19 - included today for reference)</b> 15 samples were taken from Rooms/corridors in 6A, 4C and PICU (paediatric intensive care).</p> <p><b>7/15 samples from these patient areas were positive for cryptococcal species. (all <i>C. diffluens</i>)</b> 6A: 3/6 positive – <i>C. diffluens</i> 4C: 2/6 positive – <i>C. diffluens</i> PICU: 2/3 positive – <i>C. diffluens</i></p> <p><b>Roof Samples taken on 21/12/18</b> 1/6 positive for cryptococcal species - <i>C. curvatus</i> 1/6 <i>Candida guilliermondii</i> 1/6 Yeast unable to identify 3/6 'overgrown with fungi'**</p> <p><b>NB: PICU is served by separate Air Handling Units (AHUs) in RHC (not on Level 12 QEUH) namely PR 41 AHUs 13, 14, 15 &amp;16. 4B (BMTU) is served by PR 31 AHU63 (on level 3 of QEUH, not Level 12).</b></p> <p>The cryptococcal species have been split into <i>C. albidus</i>, <i>diffluens</i>, <i>uniguttulatus</i> and <i>curvatus</i>. <i>Cryptococcus curvatus</i> was the <b>only</b> 'cryptococcus' grown in an air sample from <b>outside air, so far</b> (taken on the QEUH roof Dec 21 2018).</p> <p>Just to further confuse ... please find the 'new' names for the above strains of cryptococci! <i>Naganishia albida</i> = <i>Cryptococcus albidus</i> <i>Naganishia diffluens</i> = <i>Cryptococcus diffluens</i> <i>Naganishia albido-similis</i> = <i>Cryptococcus albido-similis</i> <i>Filobasidium uniguttulatum</i> = <i>Cryptococcus uniguttulatus</i> <i>Cutaneotrichosporum curvatum</i> = <i>Cryptococcus curvatus</i></p> <p><b>FIGURE 2 (from minute of 26/07/19 - included today for reference)</b> <b>Positive Crypto spp. results by month and per number of samples</b></p> <table border="1"> <thead> <tr> <th>Month</th> <th>No of positives</th> <th>No of samples</th> </tr> </thead> <tbody> <tr> <td><b>December 21<sup>st</sup> 2018 (1day)</b></td> <td>16</td> <td>53</td> </tr> <tr> <td><b>Jan 19</b></td> <td>27</td> <td>422</td> </tr> <tr> <td><b>Feb 19</b></td> <td>1</td> <td>440</td> </tr> <tr> <td><b>March 19</b></td> <td>5</td> <td>320</td> </tr> <tr> <td><b>April 19</b></td> <td>2</td> <td>334</td> </tr> <tr> <td><b>May 19</b></td> <td>13</td> <td>420</td> </tr> <tr> <td><b>June 19</b></td> <td>8</td> <td>448</td> </tr> <tr> <td><b>July 19</b></td> <td>2 so far</td> <td>To be confirmed</td> </tr> </tbody> </table>	Month	No of positives	No of samples	<b>December 21<sup>st</sup> 2018 (1day)</b>	16	53	<b>Jan 19</b>	27	422	<b>Feb 19</b>	1	440	<b>March 19</b>	5	320	<b>April 19</b>	2	334	<b>May 19</b>	13	420	<b>June 19</b>	8	448	<b>July 19</b>	2 so far	To be confirmed	
Month	No of positives	No of samples																										
<b>December 21<sup>st</sup> 2018 (1day)</b>	16	53																										
<b>Jan 19</b>	27	422																										
<b>Feb 19</b>	1	440																										
<b>March 19</b>	5	320																										
<b>April 19</b>	2	334																										
<b>May 19</b>	13	420																										
<b>June 19</b>	8	448																										
<b>July 19</b>	2 so far	To be confirmed																										

Item	Action
<p><b>In response to the questions noted in the minutes of 26/07/19, page 8:</b></p> <p>However!</p> <p>Added in Draft of Minute of 26 July by JH:</p> <p><b>Questions to be asked:</b></p> <ol style="list-style-type: none"> <li>1. Those involved in the sampling of Plant Rooms on that day need to be asked why PR 121 had that larger no of samples taken e.g. was it because it was most visibly contaminated? and or were PRs 122 and 124 less visibly contaminated?</li> </ol> <p><b>Answer</b></p> <p>John Hood explained that the large number of samples taken from PR121, as stated earlier, is because Plant Room 121, was at that time, thought to be serving Ward 4B, BMTU)). He will be asking various people (Teresa Inkster, Ash Deshpande and Scott Richardson who were each involved on that day) to provide photographs (if available) of these areas to try and get a feel for how visibly contaminated with pigeon guano these areas actually were. There was also some evidence from GP Environmental reports that the QEUH Plant rooms on Level 2 and 3 were not hugely contaminated at that point in time (dated 24 December 2018), although on 05/12/18 - nearer the time to the [REDACTED] - there was ingress of pigeon droppings in Plant Room 123, and John Hood has asked Colin Purdon to get details from GP Environmental of what the level of pigeon contamination on Level 12 Plant Rooms was and expand on what action was taken in Level 12 Plant Rooms between 5 December and the end of December 2018.</p> <ol style="list-style-type: none"> <li>2. Why was PR 123 not sampled – this was the PR (D) described on 5 December 2018 as being contaminated with pigeon guano (described as wet) with evidence of significant pigeon ingress.</li> </ol> <p><b>Answer</b></p> <p>Infection Control and Microbiology were unaware of earlier problem with PR 123 and [REDACTED] served by this PR</p> <p><b>Added in draft by JH, 15 August 2019</b></p> <ol style="list-style-type: none"> <li>3. Of the 74 isolations of <i>Cryptococcal</i> species so far, 59 are <i>C. diffluens</i> with only 6 <i>C.albidus</i> . JH to discuss with Dr Elizabeth Johnson at PHE Mycology Laboratory, Bristol – as original hypothesis was to employ <i>C. albidus</i> as a surrogate marker for <i>C.neoformans</i>. Question – is this true with <i>C. diffluens</i>? Is there any evidence to back up either organism being a surrogate marker for <i>C. neoformans</i>?</li> </ol> <p><b>Answer</b></p> <p>Elizabeth Johnson, PHE Mycology Reference Laboratory, Bristol, to be contacted next week.</p> <p>Meanwhile, John Hood is attempting to read some 50 papers around <i>Cryptococcus neoformans/ albidus/diffluens</i> etc and will be in discussion with Dr Johnson about <i>C. diffluens/albidus</i> and the different cryptococcal species and whether <i>C. diffluens</i> can be employed as a surrogate marker for <i>C. neoformans</i></p>	



Item	Action
<p>Eddie McLaughlan offered in his e-mail to have a telephone discussion with John Hood to clarify anything further:</p> <p>“The first action on me was I think a double check with Ian Storrar about vents in ceilings containing medical gas pipework without joints, but he’s completely tied up at the moment. I think I said at the meeting that as you need to seal the ceiling for IC purposes and there are no joints in the pipework above the ceiling, it would take a major mechanical failure to compromise the pipework and as that seemed unlikely removing the vents and using a gas alarm seemed reasonable. That said, we are only a source of advice; the risk assessment should be done by the Board with advice from your Authorising Engineer as necessary.”</p> <p>‘I’ve read the second action twice and I’m not entirely clear what I’m commenting on but hopefully the following will cover it. The source of the continuing Cryptococcus can only really be the outside air or infiltration from within the building and, as it is being detected in non HEPA filtered spaces and not in HEPA filtered spaces (I presume this is still the case, then the outside air looks a likely candidate.’</p> <p>‘On the subject of guidance, there is a review of the ventilation guidance underway at present and whilst we have asked for more clarity around specialised ventilation for susceptible patients, it is not yet clear whether we will get it. If not we will need to do something specifically for Scotland, for which there is currently neither financial nor staff resource, and no progress is likely to be made on this whilst the RHCYP&amp;DCN review is ongoing. In the meantime, it is important that clinicians understand the level of protection available in the various environments within QEUH and place patients accordingly.’</p> <p>JH note in draft 14 August 19: I have emailed Eddie (on 13 August 2019) with the Minute of the 21<sup>st</sup> June (highlighted) so he knows what he was then commenting on.</p>	
<p>John Hood will telephone Eddie McLaughlin to discuss what was said at the time (21/06/19) for clarification. <b>Action ongoing</b></p>	JH
<p>3. <b>21/06/19 - Action ongoing: Carry Forward</b> - Sandra Devine was then not in attendance to provide an update that a discussion is still to take place with Teresa Inkster and possibly Myra Campbell (Clinical Services Manager) in relation to self-closers on doors in Ward 4B, and that IPC team is making sure that staff understand the importance of keeping doors to patient rooms closed and also keeping doors to ancillary areas closed as much as possible. <b>28/06/19</b> - Darryl Conner asked about self-closers. Ian Powrie stated this is what Sandra Devine was going to discuss with clinical colleagues. <b>26/07/19</b> - Sandra Devine reported that two IPC Nurses visited Ward 4B to emphasise the importance of closing doors, and signage has also been put up. Sandra Devine is arranging to meet with Myra Campbell to discuss self-closers on doors and will explain the issue of the 4B corridor and how the problem exists. Darryl Conner pointed out that practically this may be difficult to put in place as every door is bespoke and takes around 8 weeks from order, effectively taking rooms out-of-use. Sandra Devine will make this a consideration. <b>Action ongoing.</b></p> <p><b>09/08/19</b> - Sandra Devine met with Myra Campbell on 08/08/19 and they both visited Ward 4B. There was overwhelming opinion not to have self-closers on doors in Ward 4B therefore this action should not be taken forward. <b>Action complete.</b></p> <p><b>21/06/19 - Action ongoing: Carry Forward</b> – Colin Purdon will check with the contractors if the rooms have 30-minute fire doors fitted at present. Colin Purdon previously discussed self-closers on doors with local Fire Safety Advisors and reported there would be no issues with this proposal. It was noted that discussion with the clinical teams would need to be held in relation to beds being taken out etc.</p> <p><b>26/07/19</b> - deferred until discussions with relevant parties have taken place as noted</p>	

Item	Action
<p>in the minutes and also as noted, a walk round with the Fire Advisor to be arranged. <b>Action ongoing. 09/08/19</b> – Colin Purdon stated that in light of Sandra Devine’s update (previous action) this action is no longer relevant. Colin Purdon added that fire doors are fitted adjacent to the fire exit points. Sandra Devine added that ward staff are aware of why this was being asked. <b>Action complete.</b></p>	
<p>4. <b>21/06/19 - Action ongoing: Flooring: Carry Forward</b> - Colin Purdon updated that the action plan has been prepared and is being used to programme and prioritise the issues previously identified. The report was put together by the flooring contractor and Ward 6A has some minor issues to be rectified. <b>26/07/19 – Action carry forward / ongoing. 09/08/19</b> – It was agreed this action should be taken to another forum. Colin Purdon added there is a programme ongoing for Level 7 managed by <b>Kerr</b>. <b>Action complete.</b></p>	
<p>5. <b>21/06/19 - Action ongoing:</b> It was confirmed that the engineering risers have been inspected however this action will be kept as ongoing until completion of the doors to risers’ rooms are sealed. Ian Powrie asked Colin Purdon to arrange to have the doors sealed over the next three weeks (by 27/06/19). Colin Purdon reported that the frames have been sealed. Darryl Conner is taking forward the action for the risers. <b>28/06/19</b> - On hold with Teresa Inkster as mentioned earlier (page 3 bp1). Ian Powrie asked Darryl Conner to check if the seals itself are fine to adjust the door, but if not, to put a gasket in. Ian Powrie added that only one was looked at in Ward 6, but asked that all of the doors are sealed air tight (sweep Wards 4B, 6A, 4C for all riser doors). <b>26/07/19</b> - Fire Advisor to endorse and if IPC can sanction, then this will be done. John Hood asked if Darryl Conner is in a position to comment. Darryl Conner reported that Teresa Inkster wanted this item discussed at the Specialist Ventilation Group and following discussion at the first meeting put forward their intentions and what was required to accommodate the work. However Teresa Inkster had responded that the downtime would cause more risk than what the existing risk is in relation to the risers. Darryl Conner stated that in the interim a control of the risers. The doors are sealed, but the adjacent ceilings and floors of the risers have not yet been done. Clarification from the Fire Advisor is required to ensure that there is no breach of fire integrity as they are horizontally sealed to each level. Darryl Conner stated this will need to be discussed at the Specialist Ventilation Group and will ask for this to be included as an agenda item for discussion. <b>Action ongoing. 09/08/19</b> – Darryl Conner reported that it was proposed at the Specialist Ventilation Group a level of modification and the process of sealing the risers, and the possibility of doing this at higher and lower floors. It was recognised that there would be disruption. Darryl Conner thinks the group might be satisfied with the intumescent seals and the doors are under lock and key therefore not regarded as an immediate risk. Peter Hoffman commented that if everything is adequately sealed at one point in time, there is no guarantee it is going to be like that in a few years (or less) from now, and is a temporary solution. So get things sealed but need to get the air flows correct and the air flow in the right direction. It was noted that Teresa Inkster has taken this over in the Specialist Ventilation Group. <b>Action closed - transferred.</b></p>	
<p>6. <b>21/06/19 - Action ongoing:</b> Wards 6A and 4C IPS panels to be sealed with silicone by 24/05/19. Colin Purdon previously agreed to have the bottom of all the panels re-checked. All but two IPS panels have been confirmed as complete. <b>28/06/19</b> – Action ongoing. <b>26/07/19</b> - Darryl Conner confirmed that Room 5 6A was done and has been told that the other room has also been done. Darryl Conner will check both have been sealed and will confirm this. <b>Action ongoing. 09/08/19</b> – Darryl Conner confirmed <b>Action complete.</b></p>	
<p>* <b>NEW ACTIONS:</b></p>	



Item	Action
<p>7. (26/07/19): Eddie McLaughlan to review the discussion noted in the minutes of 21/06/19 (page 8, item 7.1 - Hypotheses) and change as appropriate. 09/08/19 – As mentioned earlier John Hood will telephone/email Eddie McLaughlin and as part of that discussion will ask for re-wording from Eddie McLaughlin. <b>Action ongoing.</b></p>	JH
<p>8. (26/07/19): Colin Purdon to get the GP Environmental (Pest Control Company) to give an update on their formal cleaning and ongoing identification of problems in the Plant Rooms. Darryl Conner will discuss this with Colin Purdon on 28/07/19. Of note, this will be required for part of the final discussion and Report. 09/08/19 – Colin Purdon will request a report from the pest control company as noted. <b>Action ongoing</b></p>	DC
<p>9. (26/07/19): John Hood to inform Liz Johnson at the Reference Laboratory in Bristol of the cryptococcus isolates and will forward the breakdown of this, in order to discuss the implications and any views, and if these are valid surrogate markers for <i>C.neoformans</i>. 09/08/19 – John Hood will speak to Liz Johnson next week.</p>	JH
<p>10. (26/07/19): John Hood to continue doing walk round of Plant Rooms. Awaiting results of air samples from the Level 12 Plant Rooms tested on 25 July 2019. 09/08/19 – John Hood reported that walk round of all of the Plant Rooms has been done at QUEH and RHC. Plant Room 31 has AHUs marked both 21 and 31 – which is a little confusing as the first number(i.e. 2 or 3 should indicate which floor that Plant Room is on!). No evidence of pigeon ingress or droppings Plant Room 22 is in the Adult QUEH, is huge! Again the only thing discovered there was some water on the floors but apparently this is due to the heat exchangers, in both QUEH and RHC. Plant Room 22 is very clean, with no evidence of pigeon ingress or droppings. There was water on the floor in Plant Room 21 and there was still some general debris but this will be cleaned this week. There was no evidence of pigeon ingress or droppings. Plant Room 41 (RHC), again the floor needed a brush, but there was no evidence of pigeons or pigeon droppings. Some light ingress was noted but there is netting fitting above so pigeons could not get in. Plant Room 41A (RHC) is a small plant room, with no evidence of any pigeon ingress or droppings. John Hood will visit the Plant Rooms serving the labs next because two areas in Floor 1 Lab Block have grown <i>Cryptococcus</i> spp. (one <i>C.albidus</i> and one <i>C. diffluens</i>). These Plant Rooms are completely separate from the Plant Rooms in either QUEH or RHC. <b>Action ongoing.</b></p>	JH
<p>11. (26/07/19): John Hood referred to the tube system, and will need to discuss this with Colin Purdon in the next couple of weeks, who will in turn talk to the engineers from Swisslog. In order to understand and find out (Level 3) the possibility of air being dragged from the Plant Room to the PODs of areas such as in 6A, 4B and 4C. This is specimen transport tubes that ? should all be under vacuum. John Hood however wants to confirm that air cannot be dragged in (e.g. from the Plant Rooms) and then pushed out into critical areas via the tube system. 09/08/19 - John Hood stated that he needs to understand how this system works and asked Colin Purdon to speak to the Swisslog engineers and arrange a meeting for him to discuss this with them. It is John Hood's view that we should probably not be putting the tube system into the heart of critical areas such as BMTU or Haemato-oncology areas with high risk patients. Peter Hoffman stated that he would like to retract what was said last Meeting about the vacuum, and John Hood agreed to remove this comment. The issue of the tube system was also one of the original hypotheses of how fungal/yeast spores may have gained entry into the air of such critical areas. <b>Action ongoing.</b></p>	CP

Item	Action
<p><b>Closed / Completed Actions</b></p> <ul style="list-style-type: none"> <li>• <b>06/06/19 - Action closed:</b> Item in relation to Pest Control.</li> <li>• <b>06/06/19 - Action closed - transferred:</b> Sandra confirmed IPC has investigated laundry storage and process. This action to be removed from the group's remit. Action complete.</li> <li>• <b>06/06/19 - Action closed:</b> It was confirmed that final inspection of Ward 6A Room 5 has taken place. Action complete - see Bp 6, below.</li> <li>• <b>06/06/19 - Action closed - transferred:</b> It was agreed and noted that overall ventilation design for Ward 2A is the responsibility of another forum therefore it has been removed as an action for this group.</li> <li>• <b>06/06/19 -</b> Estates are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he discussed this with Multiplex. He said that the green roof was part of the design and the sedum can be removed and an alternative ballast material installed. He said if we were to move the items from the roof we could cause further disturbance? John Hood said he would be concerned if <i>Haemato-oncology</i> patients were to go on to this roof but he was informed there is no access to it for these patients. Tom Steele said that he is of the opinion to maybe review this in the future but to leave it as is at the moment. <b>21/06/19 -</b> no update. <b>26/07/19 - Action closed meantime.</b></li> <li>• <b>21/06/19 -</b> On 29 May 2019, inspection above the ceiling of Room 5 in Ward 6A showed that the services coming into the space were well sealed and in good condition. The flexible duct to the chilled beam was found to be intact. <b>26/07/19 - Action closed.</b></li> <li>• <b>21/06/19 - Action closed:</b> Ian Powrie reported that fluid dynamics modelling around the helipad/QEUH/RHC report was now completed (see Report Rev 3). The IMT Expert Advisory Sub-Group accepted the findings of the CFD Report.</li> <li>• <b>21/06/19 - Action complete:</b> A problem with the chilled beams was identified and Ian Powrie explained this was a mechanical joint failure causing a leak. On this occasion it was a loss of low temperature hot water heating circuit that resulted in a change in temperature causing contraction of the pipework and fittings resulting in a slight leak. Colin Purdon added this was reported as a series of drips and although not for this group, it is being mentioned due to the mechanical failure. Colin Purdon has met with Teresa Inkster and Christine Peters. The ceiling tiles affected by water were replaced, and Actichlor was used to wash down. All appropriate IPC measures have been taken (Ward 6A children - x8 rooms).</li> <li>• There was further discussion on <i>Update on Air Testing</i>. John Hood clarified that if <i>Cryptococcus</i> spp. growing in the Plant Rooms air samples it is likely to be coming from the outside air but should perhaps warrant inspection for possible pigeon ingress (added in draft by JH) Sampling of the Plant Rooms is still ongoing and it will take (as usual) several weeks to get the results back. Especially with Plant Room and outside air samples as they often contain large numbers of different fungi that take some time to separate and identify.</li> </ul> <p>John Hood mentioned that he may e-mail a cryptococcal expert based in Minneapolis if required. Tom Steele also recommended Dr Gregory Gauthier an ID Physician based in Madison, Wisconsin.</p>	

Item	Action
<p><b>7. AOCB</b></p> <ul style="list-style-type: none"> <li>John Hood asked if anyone is putting together all the mitigation from all of the previous actions and hypotheses. Colin Purdon agreed to arrange to get the mitigation recorded.</li> <li>The process for group approval was discussed. Sandra Devine stated that the Cryptococcus Report has been requested by the Chief Executive. The draft will be circulated to the group for comment and amendment. When this is concluded the final document will be submitted to the Cryptococcus IMT for information. Approval will be via the Cryptococcus IMT Expert Sub-Group. Tom Steele added that the final hypotheses are required to articulate the discussions noted in the minutes.</li> </ul>	<p><b>CP</b></p> <p><b>JH</b></p>
<p><b>8. Date and Time of Next Meeting</b></p> <p>The next meeting will be held at 1.00pm on Friday 16 August 2019 in Meeting Room 1, old CMB (behind the clock tower), QEUH.</p>	

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Meeting Room 1 Old Central Medical Building (CMB), Queen Elizabeth University Hospital

**Friday 16 August 2019 at 2.45pm JH Draft 3, 22/8/19**

**Present:** Dr John Hood (chair), Sandra Devine, Colin Purdon, Ann Lang (minutes)

**Teleconference:** Tom Steele, Susie Dodd

**Apologies:** Ian Storrar, Eddie McLaughlan, Peter Hoffman, Annette Rankin

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting. Teleconference introductions were made and apologies were received from the above mentioned.</p>	
<p><b>2. Minutes of Meetings held on 9 August 2019</b></p> <p>The minutes of the meeting held on 9 August 2019 were accepted with the following amendment:-</p> <ul style="list-style-type: none"> <li>- Page 2, 1<sup>st</sup> para should read "<i>Darryl Conner</i> reported that draft seals ..."</li> </ul> <p>• <b>Actions Update:</b></p> <p>On page 5, last para John Hood reported that he had added a comment regarding the ingress of unfiltered outside air coming into the hospital Atrium when the vents are open. Colin Purdon explained that the vents on Level 3 and Level 12 (QEUH) open to allow air to come in, especially on hot days. The main issue was that care needed to be taken around critical areas (especially 4B). If doors to rooms and wards are left open, this essentially negates the positive pressures (from room and ward e.g. 4B) which are crucial protecting the vulnerable patient (s). Tom Steele asked if staff are aware of the implications of leaving door(s) open? He also commented on the large revolving doors at the main entrances to the hospitals which will also allow outside air to enter into the hospitals, as well as via the open vents in the QEUH. Sandra Devine reported that signs in critical wards have been put up to remind staff to close the doors. Discussion took place regarding the intercom into 4D between Wards 4C and 4D <del>not</del> not working properly and that could be why this door had been seen to be wedged open by JH. Tom Steele asked Colin Purdon to check the intercom and if it is not working to arrange for this to be fixed.</p> <p>John Hood updated the answer to Question 1 (p7 of Minute of 9 August 2019) that Dr Ash Deshpande who had sampled PR 121 on 21<sup>st</sup> December 2018 confirmed that PR 121 was targeted for sampling as it was thought to serve 4B (BMTU) – (which of course it does not). He confirmed that PR 121 was not picked because of the perception that it was more contaminated than PR 122 or PR 124. He also confirmed that he had found around a maximum of 20 areas of pigeon fouling in PR 121 – but this was small groups of white splashes on the floor and was not 'gross' contamination. He had taken some photographs which he had sent to Dr Inkster but had deleted them from his own phone.</p>	<p>Formatted: Not Highlight</p> <p>CP</p>

Item	Action
<p>It was noted that PR 123 had had more pigeon ingress (in early December 2018 – see GP Environmental Documentation plus pictures taken by them are available with evidence of much more pigeon guano – some looking wet and other areas dry). This Plant Room had been extensively cleaned on 6<sup>th</sup> December 2018. This area was not sampled on that day primarily because neither of the patient cases were served by AHUs in this Plant Room <u>and the Infection Control Team were not aware of problems in the Plant Room</u>. Tom Steele asked how many PRs there are on this site and Colin Purdon replied approximately 42 over the whole campus. He said he will check this and will look at the PR inspection list. Sandra asked why was there two cases at the one time and John Hood stated that <i>C. neoformans</i> is an issue as it is a yeast like fungus and it seems to be difficult to grow from air sampling in this country compared to that in warmer and drier climates such as Iran, South America and the Indian subcontinent etc</p> <p>Inserted in Draft by JH 22 August 2019: Soltani et al (2013) looked for <i>C. neoformans</i> in 120 samples of pigeon guano from 'Pigeon Towers' – now dilapidated but previously employed to collect pigeon droppings for use as a natural fertiliser – now superceded by cheaper artificial fertiliser. These 'Pigeon Towers' still contain mounds of dried pigeon droppings, but only 2/120 (2.5%) of samples of pigeon droppings grew <i>C. neoformans</i> .</p> <p>See email from Karen Caldwell of GP Environmental to Colin Purdon on 15<sup>th</sup> August 2019 entitled Plant room Works Summary Report Request. JH will forward.</p> <p>Discussed with Scott Richardson (Biomedical Scientist you sampled PR 122 and 124 on 21 December 2019. Four pictures of PR 124 available on which a few pigeon droppings, only seen. PR 122 similarly sparse pigeon droppings only.</p>	

## Item

## Action

## 3. Update on Air Testing

Air sampling reports (06/06/19 to 26/07/19).

Date	Area	Reported 06/06/19	Reported 21/06/19	Reported 28/06/19	Reported 26/07/19
14/05/19	Ward 4C Room 73	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	-	-
14/05/19	Ward 6A Corridor	-	confirmed as <i>C. diffluens</i>	-	-
15/05/19	Ward 6A Electrical Riser	<i>C.</i> <i>uniguttulatus</i>	confirmed as <i>C. uniguttulatus</i>	-	-
15/05/19	Ward 4B corridor (near rooms in 70's)	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	-	-
21/05/19	Ward 6A Room 1	presumptive <i>C. albidus</i>	confirmed as <i>C. diffluens</i>	-	-
29/05/19	Lab Block Level 1 Reception	-	presumptive <del><i>C. albidus</i></del>	confirmed as <i>C. diffluens</i>	-
29/05/19	Blood Bank LB-L1 (huddle)	-	presumptive <del><i>C. uniguttulatus</i></del>	confirmed as <i>C. uniguttulatus</i>	-
29/05/19	Ward 4C Riser 223	-	-	confirmed as <i>C. uniguttulatus</i>	-
29/05/19	Main Corridor Training Board Lab Block L1	-	presumptive <del><i>C. albidus</i></del>	confirmed as <i>C. albidus</i>	-
11/06/19	Ward 6A Corridor (Rooms 20-23)	-	presumptive <i>C. albidus</i>	-	confirmed as <i>C. diffluens</i>
11/06/19	Ward 4C Room 70	-	presumptive <i>C. albidus</i>	-	confirmed as <i>C. diffluens</i>
17/06/19	Ward 6A Treatment Room/POD	-	-	presumptive <del><i>C. albidus</i></del>	confirmed as <i>C. diffluens</i>
17/06/19	Ward 6A Corridor Nurses Station	-	-	? <del><i>C. albidus</i></del>	confirmed as <i>C. diffluens</i>
27/06/19	Ward 6A Clean Utility Room	-	-	-	confirmed as <i>C. diffluens</i>
28/06/19	4B (BMTU) Corridor 70's	-	-	-	confirmed as <i>C. diffluens</i>
03/07/19	Ward 6A Room 24	-	-	-	confirmed as <i>C. diffluens</i>
03/07/19	Ward 6A Room 2	-	-	-	confirmed as <i>C. uniguttulatus</i>
15/07/19	Ward 6A Room 24	-	-	-	confirmed as <i>C. diffluens</i>

Item

Action

FIGURE 1

‘Cryptococcal species’ isolates from air sampling 21 Dec 2018 to Jun/Jul 2019							
	<i>N. diffluens</i>	<i>N. albida</i>	<i>N. albido-similis</i>	<i>F.uniguttulata</i>	<i>Cutan. curvatus</i>	ID TBC	Total
*Dec 21 <sup>st</sup> 2018 n=53	13	0	1	0	1 Roof#	1	16
Jan 19 n=422	24	3	0	0	0	0	27
Feb 19 n=440	0	0	0	1	0	0	1
Mar 19 n=320	4	0	0	1	0	0	5
Apr 19 n=334	2	0	0	0	0	0	2
May 19 n=420	7	3	0	3	0	0	13
Jun 19 n=448	8	0	0	0	0	0	8
Jul 19	3	0	0	1	0	0	4
<b>Total sf</b>	<b>61</b>	<b>6</b>	<b>1</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>76</b>

sf = so far

John Hood explained that Figure 1 details the samples and speciation of the cryptococci, the total number of each *Cryptococcus* species and those isolates by month. One more positive case was identified on [REDACTED] in Room 24 in Ward 6A. Tom Steele asked if there was anyway to benchmark what normal is and John Hood replied that this is very difficult as the numbers clearly fluctuate ~~from month to month~~ and we can only speculate as to the reasons why. There were around 2500 samples taken between December 2018 and July 2019 and he said sampling has mainly been carried out in wards 6A, 4B and 4C.

FIGURE 2 (from minute of 26/07/19 - included today for reference)

Positive Crypto spp. results by month and per number of samples

Month	No of positives	No of samples
December 21 <sup>st</sup> 2018 (1day)	16	53
Jan 19	27	422
Feb 19	1	440
March 19	5	320
April 19	2	334
May 19	13	420
June 19	8	448
July 19	3	To be confirmed

Item	Action
<p><b>4. Actions from 9 August 2019 Meeting</b></p> <p>Actions from 09/08/19 were updated during the meeting and noted in the minutes.</p>	
<p><b>5. Further Actions Required</b></p>	
<p>1. <b>21/06/19</b> - Continue to carry out air sampling in Wards 6A, 4B and 4C. <b>26/07/19 - Action ongoing.</b> <b>09/08/19</b> – Difficult to carry out air sampling due to the ongoing separate issues associated with Ward 6A. <b>16/08/19</b> Ward 4C has not been sampled recently and will be in the next few weeks. <b>Action ongoing.</b></p>	JH
<p>2. <b>21/06/19 - Action ongoing:</b> Ian Powrie updated that priority has been given to Wards 6A and 4C for removal of the Ceiling Vent Grilles (CVG's). Ward 4B has been done. Timeline will be done, but Wards 6A and 4C is expected to be done in the next couple of weeks, ongoing for removal of CVGs in other clinical wards. <b>28/06/19</b> - SCRIBE sitting with IPC. Ward 4B has been done. Wards 6A and 4C have yet to be done – <b>SCRIBE required.</b> <b>26/07/19</b> - Darryl Conner has asked Teresa Inkster about replacing CVGs in Ward 4B with ceiling tiles. There was one action was to replace CVGs in Ward 4C, but there is a problem with increased permeability of the space. It has already been established that the notional average is <b>1.2 to 2 Pa</b> to replace CVGs. It has been suggested it might be possible to trim back the extract in the en suites, but the air change in the en suites would be reduced slightly. This information has gone to the Specialist Ventilation Group. Darryl Conner reported that the area from 4B into 4C, at time of measurement is showing negative, but on investigation and measurement outside 4C Room 75, <del>it goes up to was recorded to be</del> 1.2 to 2 Pa because of the opening and closing of the various doors and air moving into 4D (as door often can be kept open). Without <del>designation installation of ward lobbies of the lobbies</del> into mitigating areas, the closing or opening of any one door <del>adjusted alters the</del> pressure regimes <del>definitively</del>. Darryl Conner has submitted SCRIBEs for the process for removal of CVGs, and all are the same apart from the level of protection for each department being moved. Ward 6A is next on the list, which requires feedback from Teresa Inkster, but can be actioned immediately if required. John Hood thought the SCRIBE employed in 4B could be used for the other areas as same work is being carried out and had been successfully used in a more critical area. Darryl Conner explained that effectively it is the same SCRIBE and is used as a template however each area requires sign-off. <b>Action ongoing – SCRIBE required.</b> <b>09/08/19</b> - Amendment as noted at the start of the minute, that the notional average is 1.2 to 2 Pa. Darryl Conner commented that Teresa Inkster may not be keen to have CVGs removed. <b>Action ongoing – SCRIBE required.</b>  <b>N.B. Teresa must be happy before any CVG's removed she would rather have as much positive pressure in rooms as possible.</b>  <b>Action ongoing and transferred to the Specialist Ventilation Group.</b></p>	IS
<p>3. <b>21/06/19 - Action ongoing:</b> Ian Powrie asked Eddie McLaughlan for HFS to confirm endorsement that HFS and the authorised engineer agreement that CVG vents are no longer required. Ian Powrie has received background information about ventilation and gas leaks from Ian Storrar but needs confirmation of endorsement. Ian Powrie added that ventilation is only needed where there are mechanical joints on gas lines. Eddie McLaughlan reported that Ian Storrar is currently on annual leave. Eddie McLaughlan will arrange for HSF to confirm endorsement within this time. <b>28/06/19</b> – Ian Powrie reported that Ian Storrar is still to confirm. <b>26/07/19</b> - Darryl Conner reported that Ian Storrar was asked (by Ian Powrie) to confirm endorsement of removal of the CVGs. Annette Rankin stated that Ian Storrar is likely involved in the current ongoing issues in NHS Lothian and suggested he is reminded to take this action forward. Darryl Conner will contact Ian Storrar as suggested. <b>Action ongoing.</b> <del>09/08/19</del></p>	DC To com ment

Formatted: Not Highlight



Item	Action
<p><b>4.</b> An e-mail response was received from Eddie McLaughlan on 06/08/19 as noted below.</p>	
<p>Eddie McLaughlan offered in his e-mail to have a telephone discussion with John Hood to clarify anything further:</p>	
<p>“The first action on me was I think a double check with Ian Storrar about vents in ceilings containing medical gas pipework without joints, but he’s completely tied up at the moment. I think I said at the meeting that as you need to seal the ceiling for IC purposes and there are no joints in the pipework above the ceiling, it would take a major mechanical failure to compromise the pipework and as that seemed unlikely removing the vents and using a gas alarm seemed reasonable. That said, we are only a source of advice; the risk assessment should be done by the Board with advice from your Authorising Engineer as necessary.”</p>	
<p>‘I’ve read the second action twice and I’m not entirely clear what I’m commenting on but hopefully the following will cover it. The source of the continuing Cryptococcus can only really be the outside air or infiltration from within the building and, as it is being detected in non HEPA filtered spaces and not in HEPA filtered spaces (I presume this is still the case, then the outside air looks a likely candidate.’</p>	
<p>‘On the subject of guidance, there is a review of the ventilation guidance underway at present and whilst we have asked for more clarity around specialised ventilation for susceptible patients, it is not yet clear whether we will get it. If not we will need to do something specifically for Scotland, for which there is currently neither financial nor staff resource, and no progress is likely to be made on this whilst the RHCYP&amp;DCN review is ongoing. In the meantime, it is important that clinicians understand the level of protection available in the various environments within QEUH and place patients accordingly.’</p>	
<p><del>JH note in draft 14 August 19: I have emailed Eddie (on 13 August 2019) with the Minute of the 21<sup>st</sup> June (highlighted) so he knows what he was then commenting on.</del></p>	<p>Formatted: Normal, Indent: Left: 0.56 cm, Right: 0.56 cm, Tab stops: Not at 11.75 cm</p>
<p><del>26/07/19: Eddie McLaughlan to review the discussion noted in the minutes of 21/06/19 (page 8, item 7.1 - Hypotheses) and change as appropriate. 09/08/19 – As mentioned earlier John Hood will telephone/email Eddie McLaughlin and as part of that discussion will ask for re-wording from Eddie McLaughlin. 16/08/19 John forwarded the minute of 21<sup>st</sup> June for Eddie McLaughlan to comment on. Action closed.</del></p>	
<p><b>45.</b> <b>21/06/19 p3: bp2:</b> Colin Purdon advised that the Fire Strategy required that the doors to be available for lateral evacuation of patients and staff in both directions, but he would review options of temporary seals with the site Fire Advisor. <b>(29/07/19)</b> Action outstanding. To be completed. <b>(09/08/19)</b> Darryl Conner reported that draft seals have been fitted on the Ward 4B door that is locked on the outside, through to the doctor’s room and it is only Estates that go in and out of that area. Darryl Conner will discuss with the Fire Advisor. <b>Action ongoing</b></p>	DC
<p><del>5. 26/07/19: Eddie McLaughlan to review the discussion noted in the minutes of 21/06/19 (page 8, item 7.1 – Hypotheses) and change as appropriate. 09/08/19 – As mentioned earlier John Hood will telephone/email Eddie McLaughlin and as part of that discussion will ask for re-wording from Eddie McLaughlin. 16/08/19 John forwarded the minute of 21<sup>st</sup> June for Eddie McLaughlan to comment on. Action ongoing.</del></p>	EMcL

Item	Action
<p>6. <b>26/07/19:</b> John Hood to inform Liz Johnson at the Reference Laboratory in Bristol of the cryptococcus isolates and will forward the breakdown of this, in order to discuss the implications and any views, and if these are valid surrogate markers for <i>C.neoformans</i>. <b>09/08/19</b> – John Hood will speak to Liz Johnson next week. <b>16/08/19</b> John discussed with Liz Johnson and she said that neither can really be considered as surrogate markers for <i>C. neoformans</i> but it was difficult to be dogmatic about it. <b>Action closed.</b></p>	<b>JH</b>

Formatted: Font: Bold

Item	Action
<p>7. <b>26/07/19:</b> John Hood to continue doing walk round of Plant Rooms. Awaiting results of air samples from the Level 12 Plant Rooms tested on 25 July 2019. <b>09/08/19</b> – John Hood reported that walk round of <b>all</b> of the Plant Rooms has been done at QUEH and RHC. Plant Room 31 has AHUs marked both 21 and 31 – which is a little confusing as the first number (i.e. 2 or 3 should indicate which floor that Plant Room is on!). No evidence of pigeon ingress or droppings. Plant Room 22 is in the Adult QUEH and is huge! Again the only thing discovered there was some water on the floors but apparently this is from the heat exchangers (affected by the weather), in both QUEH and RHC. Plant Room 22 is very clean, with no evidence of pigeon ingress or droppings. There was water on the floor in Plant Room 21 and there was still some general debris in it but this will be cleaned this week. There was no evidence of pigeon ingress or droppings. Plant Room 41 (RHC), again, the floor needed a brush, but there was no evidence of pigeons or pigeon droppings. Some light ingress was noted but above the area of light ingress there is netting fitted so pigeons should not get in. Plant Room 41A (RHC) is a small plant room, with no evidence of any pigeon ingress or droppings. John Hood will visit the Plant Rooms serving the labs next because two areas in Floor 1 Lab Block have grown <i>Cryptococcus</i> spp. (one <i>C. albidus</i> and one <i>C. diffluens</i>). These Plant Rooms are completely separate from the Plant Rooms in either QUEH or RHC. <b>16/08/19</b> John Hood visited Plant Rooms on level 3, 2 and 4 and none of these areas had evidence of pigeon ingress or evidence that the pigeons are getting into these Plant Rooms (indeed very difficult to see how they could). Colin Purdon confirmed that there are F7s filters in the AHUs serving the Lab building. <b>Action <u>ongoing closed</u>.</b></p>	JH
<p>8. <b>26/07/19:</b> John Hood referred to the tube system, and will need to discuss this with Colin Purdon in the next couple of weeks, who will in turn talk to the engineers from Swisslog. In order to understand and find out (Level 3) the possibility of air being dragged from the Plant Room to the PODs of areas such as in 6A, 4B and 4C. This is specimen transport tubes that should all be under vacuum. John Hood however wants to confirm that air cannot be dragged in (e.g. from the Plant Rooms) and then pushed out into critical areas via the tube system. <b>09/08/19</b> - John Hood stated that he needs to understand how this system works and asked Colin Purdon to speak to the Swisslog engineers and arrange a meeting for him to discuss this with them. It is John Hood's view that we should probably not be putting the tube system into the heart of critical areas such as BMTU or Haemato-oncology areas with high risk patients. Peter Hoffman stated that he would like to retract what was said last meeting about the vacuum system and John Hood agreed to remove this comment. The issue of the tube system was also one of the original hypotheses was of how fungal/yeast spores might gain entry into the air of such critical areas. <b>16/08/19</b> John Hood commented that if we think that the tube system is pushing or pulling air into these areas from the Plant Rooms then, we should consider this in individual critical wards (particularly BMTU, 6A and 4C etc) as the air being brought in is unfiltered, and therefore another potential route of airborne spores, so a risk. Mitigation will be required if above is correct. <b>Action ongoing.</b></p>	CP
<p>9. John Hood asked if anyone is putting together all the mitigation from all of the previous actions and hypotheses. Colin Purdon agreed to arrange to get the mitigation recorded.</p>	CP
<p>* <b>NEW ACTIONS:</b></p> <ul style="list-style-type: none"> <li>• <u>Discussion took place regarding the intercom into Ward 4D not working properly and that could be why the doors have been wedged open. Tom Steele asked Colin Purdon to check the intercom and if it is not working to arrange for this to be fixed.</u></li> </ul>	CP

Formatted: Not Highlight

Item	Action
<b>Closed / Completed Actions</b>	
<ul style="list-style-type: none"> <li>• <b>(06/06/19) p3: bp1:</b> Ian Powrie will discuss IPS panels being sealed with Darryl Conner as some of the underside of WHBs panels were not done. <b>(21/06/19)</b> Colin Purdon picked up with Darryl Conner and reported all have been re-checked and all sealed. There were 2 rooms unable to get access to and this is still the same position today but will be re-checked. <b>(28/06/19)</b> Darryl Conner confirmed all now done. Ian Powrie reported that of all the rooms checked, the 2 rooms were still be checked one of which was Room 5. Darryl Conner will confirm by e-mail that Rooms A and B, and Ward 6A Room 5 is the only one not sealed on the underside. Ian Powrie and John Hood had inspected this area. <b>(09/08/19)</b> Darryl Conner confirmed as above. <b>Action complete.</b></li> <li>• <b>(06/06/19) p3: Item 4:</b> There is concern about the differences in the pressures in 4C Rooms 66-75. Rooms 66 to 74 are between 0.4 to 2.9 Pa from rooms to corridor but Room 75 at the end of the corridor is consistently negative at -0.3 (i.e. air moving from corridor to room). Colin Purdon to make adjustments to the ventilation to make this room slightly positive. <b>(28/06/19)</b> Ian Powrie clarified this was the room at the end of the corridor and is still to be done. Ian Powrie asked Darryl Conner to be careful not to affect the pressure regimes for the area when adjustments are made. <b>(26/07/19)</b> Darryl Conner agreed to make adjustments to the ventilation to make this room slightly positive. <b>(09/08/19)</b> It was noted that this action has gone to the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></li> <li>• <b>06/06/19 - Action closed:</b> Item in relation to Pest Control.</li> <li>• <b>06/06/19 - Action closed - transferred:</b> Sandra confirmed IPC has investigated laundry storage and process. This action to be removed from the group's remit. Action complete.</li> <li>• <b>06/06/19 - Action closed:</b> It was confirmed that final inspection of Ward 6A Room 5 has taken place. Action complete - see Bp 6, below.</li> <li>• <b>06/06/19 - Action closed - transferred:</b> It was agreed and noted that overall ventilation design for Ward 2A is the responsibility of another forum therefore it has been removed as an action for this group.</li> <li>• <b>06/06/19 - Estates</b> are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he discussed this with Multiplex. He said that the green roof was part of the design and the sedum can be removed and an alternative ballast material installed. He said if we were to move the items from the roof we could cause further disturbance? John Hood said he would be concerned if <i>Haemato-oncology</i> patients were to go on to this roof but he was informed there is no access to it for these patients. Tom Steele said that he is of the opinion to maybe review this in the future but to leave it as is at the moment. <b>21/06/19</b> - no update. <b>26/07/19 - Action closed meantime.</b></li> <li>• <b>21/06/19</b> - On 29 May 2019, inspection above the ceiling of Room 5 in Ward 6A showed that the services coming into the space were well sealed and in good condition. The flexible duct to the chilled beam was found to be intact. <b>26/07/19 - Action closed.</b></li> <li>• <b>21/06/19 - Action closed:</b> Ian Powrie reported that fluid dynamics modelling around the helipad/QEUH/RHC report was now completed (see Report Rev 3). The IMT Expert Advisory Sub-Group accepted the findings of the CFD Report.</li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li>• <b>21/06/19 - Action complete:</b> A problem with the chilled beams was identified and Ian Powrie explained this was a mechanical joint failure causing a leak. On this occasion it was a loss of low temperature hot water heating circuit that resulted in a change in temperature causing contraction of the pipework and fittings resulting in a slight leak. Colin Purdon added this was reported as a series of drips and although not for this group, it is being mentioned due to the mechanical failure. Colin Purdon has met with Teresa Inkster and Christine Peters. The ceiling tiles affected by water were replaced, and Actichlor was used to wash down. All appropriate IPC measures have been taken (Ward 6A children - x8 rooms).</li> <li>• <b>21/06/19 p4: para2:</b> John Hood mentioned that a mechanical riser in 4B had a water leak this morning. Colin Purdon explained that this is the low temperature water return pipe, and that the valve body gland has a slight leak. The valve will be changed today. <b>(29/07/19)</b> Darryl Conner confirmed as done. <b>Action complete.</b></li> <li>• <b>21/06/19 p5: para3:</b> Ian Powrie asked if there is a risk between CF and haemato-oncology if there is air movement between them. John Hood agreed to discuss this with Teresa Inkster. <b>(09/08/19)</b> John Hood reported that Teresa Inkster has concurred: no significant risk. <b>Action complete.</b></li> <li>• <b>21/06/19 p5: para5:</b> Colin Purdon has advised that intumescent gasket seals would be fitted. <b>(26/07/19)</b> Darryl Conner confirmed that the intumescent gasket riser seals has been completed. The only action outstanding in relation to this is the installation of the false ceilings. <b>(09/08/19)</b> Darryl Conner reported that installation of the false ceilings is still to be done but that this action is for the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></li> <li>• <b>21/06/19 p7: item 7: para2:</b> On 25 July 2019, Colin Purdon to have walk round with Fire Safety Advisor shortly. <b>(26/07/19)</b> Colin Purdon will set-up a meeting with the Fire Officers soon. <b>(09/08/19)</b> Colin Purdon reported that a walk round with the Fire Advisor is still to be arranged. <b>(16/08/19)</b> Sandra Devine commented that she had met with clinical and managerial representatives from 4B and had walked the patient pathway through the ward. After due consideration it was felt that automatic door closures would impede the movement of patients through the ward especially in emergencies therefore the meeting with Colin and the Fire Officer is no longer required. <b>Action complete</b></li> <li>• <b>21/06/19 p8: item 13:</b> All but two IPS panels have been confirmed as complete. <b>(26/07/19)</b> <b>Action complete.</b></li> <li>• <b>21/06/19 - Action ongoing: Carry Forward</b> - Sandra Devine was then not in attendance to provide an update that a discussion is still to take place with Teresa Inkster and possibly Myra Campbell (Clinical Services Manager) in relation to self-closers on doors in Ward 4B, and that IPC team is making sure that staff understand the importance of keeping doors to patient rooms closed and also keeping doors to ancillary areas closed as much as possible. <b>28/06/19</b> - Darryl Conner asked about self-closers. Ian Powrie stated this is what Sandra Devine was going to discuss with clinical colleagues. <b>26/07/19</b> - Sandra Devine reported that two IPC Nurses visited Ward 4B to emphasise the importance of closing doors, and signage has also been put up. Sandra Devine is arranging to meet with Myra Campbell to discuss self-closers on doors and will explain the issue of the 4B corridor and how the problem exists. Darryl Conner pointed out that practically this may be difficult to put in place as every door is bespoke and takes around 8 weeks from order, effectively taking rooms out-of-use. Sandra Devine will make this a consideration. <b>Action ongoing.</b> <b>09/08/19</b> - Sandra Devine met with Myra Campbell on 08/08/19 and they both visited Ward 4B. The overwhelming opinion was not to have self-closers on doors in Ward 4B therefore this action should not be taken forward. <b>Action complete.</b></li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li> <p>• <b>21/06/19 - Action ongoing: Carry Forward</b> – Colin Purdon will check with the contractors if the rooms have 30-minute fire doors fitted at present. Colin Purdon previously discussed self-closers on doors with local Fire Safety Advisors and reported there would be no issues with this proposal. It was noted that discussion with the clinical teams would need to be held in relation to beds being taken out etc. <b>26/07/19</b> - deferred until discussions with relevant parties have taken place as noted in the minutes and also as noted, a walk round with the Fire Advisor to be arranged. <b>Action ongoing. 09/08/19</b> – Colin Purdon stated that in light of Sandra Devine’s update (previous action) this action is no longer relevant. Colin Purdon added that fire doors are fitted adjacent to the fire exit points. Sandra Devine added that ward staff are aware of why this was being asked. <b>Action complete.</b></p> </li> <li> <p>• <b>21/06/19 - Action ongoing: Flooring: Carry Forward</b> - Colin Purdon updated that the action plan has been prepared and is being used to programme and prioritise the issues previously identified. The report was put together by the flooring contractor and Ward 6A has some minor issues to be rectified. <b>26/07/19 – Action carry forward / ongoing. 09/08/19</b> – It was agreed this action should be taken to another forum. Colin Purdon added there is a programme ongoing for Level 7 managed by Kerr Clarkson. <b>Action complete.</b></p> </li> <li> <p>• <b>21/06/19 - Action ongoing:</b> It was confirmed that the engineering risers have been inspected however this action will be kept as ongoing until completion of the doors to risers’ rooms are sealed. Ian Powrie asked Colin Purdon to arrange to have the doors sealed over the next three weeks (by 27/06/19). Colin Purdon reported that the frames have been sealed. Darryl Conner is taking forward the action for the risers. <b>28/06/19</b> - On hold with Teresa Inkster as mentioned earlier (page 3 bp1). Ian Powrie asked Darryl Conner to check if the seals itself are fine to adjust the door, but if not, to put a gasket in. Ian Powrie added that only one was looked at in Ward 6, but asked that all of the doors are sealed air tight (sweep Wards 4B, 6A, 4C for all riser doors). <b>26/07/19</b> - Fire Advisor to endorse and if IPC can sanction, then this will be done. John Hood asked if Darryl Conner is in a position to comment. Darryl Conner reported that Teresa Inkster wanted this item discussed at the Specialist Ventilation Group and following discussion at the first meeting put forward their intentions and what was required to accommodate the work. However Teresa Inkster had responded that the downtime would cause more risk than what the existing risk is in relation to the risers. Darryl Conner stated that in the interim a control of the risers. The doors are sealed, but the adjacent ceilings and floors of the risers have not yet been done. Clarification from the Fire Advisor is required to ensure that there is no breach of fire integrity as they are horizontally sealed to each level. Darryl Conner stated this will need to be discussed at the Specialist Ventilation Group and will ask for this to be included as an agenda item for discussion. <b>Action ongoing. 09/08/19</b> – Darryl Conner reported that it was proposed at the Specialist Ventilation Group a level of modification and the process of sealing the risers, and the possibility of doing this at higher and lower floors. It was recognised that there would be disruption. Darryl Conner thinks the group might be satisfied with the intumescent seals and the doors are under lock and key therefore not regarded as an immediate risk. Peter Hoffman commented that if everything is adequately sealed at one point in time, there is no guarantee it is going to be like that in a few years (or less) from now, and is a temporary solution. So get things sealed but need to get the air flows correct and the air flow in the right direction. It was noted that Teresa Inkster has taken this over in the Specialist Ventilation Group. <b>Action closed and transferred to the Specialist Ventilation Group.</b></p> </li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li>• <b>21/06/19 - Action ongoing:</b> Wards 6A and 4C IPS panels to be sealed with silicone by 24/05/19. Colin Purdon previously agreed to have the bottom of all the panels re-checked. All but two IPS panels have been confirmed as complete. <b>28/06/19 – Action ongoing.</b> <b>26/07/19 -</b> Darryl Conner confirmed that Room 5 6A was done and has been told that the other room has also been done. Darryl Conner will check both have been sealed and will confirm this. <b>Action ongoing.</b> <b>09/08/19 –</b> Darryl Conner confirmed. <b>Action complete.</b></li>   <li>• <b>28/06/19 p2: bp1:</b> There had been discussion around air in the corridor from Ward 4C into Room 75, and Ian Powrie had explained that the commissioning engineer will need to review all of the rooms and check that correction has not made things worse, with a view to increasing the pressure in Room 75 to the same range as the other rooms. <b>(26/07/19)</b> Darryl Conner confirmed he will do the pressure change but will ask <b>Ian McKenzie</b> to do the re-balance. <b>(09/08/19)</b> John Hood reported that the Specialist Ventilation Group will need to discuss the air pressures. Darryl Conner explained that the doors need to be closed because when the doors are open this could force the rooms into a negative state from the corridor. <b>(16/08/19)</b> It was noted that it is only through discussion at meetings that it was realised the effect of doors being left open affecting all of the pressures, therefore ward staff would definitely not be aware of these issues. <ul style="list-style-type: none"> <li>• <b>Action closed and transferred to the Specialist Ventilation Group.</b></li> </ul> </li>   <li><b>26/07/19:</b> Colin Purdon to get the GP Environmental (Pest Control Company) to give an update on their formal cleaning and ongoing identification of problems in the Plant Rooms. Darryl Conner will discuss this with Colin Purdon on 28/07/19. Of note, this will be required for part of the final discussion and Report. <b>09/08/19 –</b> Colin Purdon will request a report from the pest control company as noted. <b>16/08/19 –</b> Report from GP Environmental was received by Colin on 15<sup>th</sup> August 2019. Report to be sent round the group and discussed further at next meeting. <b>Action ongoing.</b></li> </ul>	
<p><b>6. AOCB</b></p> <ul style="list-style-type: none"> <li>• The first draft of the Cryptococcus Report was circulated to the group for comments. John Hood said the report is still to be updated with any recent results. Results also need to have some straightforward statistics applied to them. An update on the possible issues with the 'Tube' system plus... A quick overview of the ecology, biology and pathology of <i>Cryptococcus neoformans</i> is also required,</li> </ul>	All
<p><b>7. Date and Time of Next Meeting</b></p> <p>The next meeting will be held at 2.00pm on Friday 23 August 2019 in Facilities Meeting Hub, old CMB (behind the clock tower), QEUH.</p>	

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Meeting Room 1 Old Central Medical Building (CMB), Queen Elizabeth University Hospital

**Friday 16 August 2019 at 2.45pm**

**Present:** Dr John Hood (chair), Sandra Devine, Colin Purdon, Ann Lang (minutes)

**Teleconference:** Tom Steele, Susie Dodd

**Apologies:** Ian Storrar, Eddie McLaughlan, Peter Hoffman, Annette Rankin

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting. Teleconference introductions were made and apologies were received from the abovementioned.</p>	
<p><b>2. Minutes of Meetings held on 9 August 2019</b></p> <p>The minutes of the meeting held on 9 August 2019 were accepted with the following amendment:-</p> <ul style="list-style-type: none"> <li>- Page 2, 1<sup>st</sup> para should read "Darryl Conner reported that draft seals ..."</li> </ul> <p>• <b>Actions Update:</b></p> <p>On page 5, last para John Hood reported that he added a section regarding an ingress of unfiltered outside air coming into the hospital. Colin Purdon updated that the units in Level 3 and Level 12 open to allow air to come in, especially on hot days. It was noted that when the doors are left open it means the positive pressure air going out tends to get destroyed. Tom Steele asked if staff are aware of the implications of leaving the door open as every time the revolving door opens air is pushed through the door as well as the vents. Sandra Devine reported that signs have been put up to remind staff to close the doors. Discussion took place regarding the intercom between Wards 4B and 4C not working properly and that could be why the door was left open. Tom Steele asked Colin Purdon to check the intercom and if it is not working to arrange for this to be fixed.</p> <p>John Hood updated that Ash sampled PR 121 and found around 20 areas of pigeon ingress but not growth. It was noted that PR 123 has more pigeon ingress in that area but this was not sampled as GP Environmental cleaned the area. Also [REDACTED] served by this Plant Room. Tom Steele asked how many PRs there are and Colin Purdon replied approximately 42 over the campus. He said he will check this and will look at the PR inspection list. Sandra asked why was there two cases at the one time and John Hood stated that <i>C. neoformans</i> is an issue as it is a yeast like fungus and will only be there if the area is dry.</p>	<p><b>CP</b></p>



Item						Action
3.	<b>Update on Air Testing</b>					
	Air sampling reports (06/06/19 to 26/07/19).					
Date	Area	Reported 06/06/19	Reported 21/06/19	Reported 28/06/19	Reported 26/07/19	
14/05/19	Ward 4C Room 73	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	-	-	
14/05/19	Ward 6A Corridor	-	confirmed as <i>C. diffluens</i>	-	-	
15/05/19	Ward 6A Electrical Riser	<i>C.</i> <i>uniguttulatus</i>	confirmed as <i>C. uniguttulatus</i>	-	-	
15/05/19	Ward 4B corridor (near rooms in 70's)	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	-	-	
21/05/19	Ward 6A Room 1	presumptive <i>C. albidus</i>	confirmed as <i>C. diffluens</i>	-	-	
29/05/19	Lab Block Level 1 Reception	-	presumptive <del><i>C. albidus</i></del>	confirmed as <i>C. diffluens</i>	-	
29/05/19	Blood Bank LB-L1 (huddle)	-	presumptive <del><i>C. uniguttulatus</i></del>	confirmed as <i>C. uniguttulatus</i>	-	
29/05/19	Ward 4C Riser 223			confirmed as <i>C. uniguttulatus</i>		
29/05/19	Main Corridor Training Board Lab Block L1	-	presumptive <del><i>C. albidus</i></del>	confirmed as <i>C. albidus</i>	-	
11/06/19	Ward 6A Corridor (Rooms 20-23)	-	presumptive <i>C. albidus</i>	-	confirmed as <i>C. diffluens</i>	
11/06/19	Ward 4C Room 70		presumptive <i>C. albidus</i>	-	confirmed as <i>C. diffluens</i>	
17/06/19	Ward 6A Treatment Room/POD	-	-	presumptive <del><i>C. albidus</i></del>	confirmed as <i>C. diffluens</i>	
17/06/19	Ward 6A Corridor Nurses Station	-	-	? <i>C. albidus</i>	confirmed as <i>C. diffluens</i>	
27/06/19	Ward 6A Clean Utility Room	-	-	-	confirmed as <i>C. diffluens</i>	
28/06/19	4B (BMTU) Corridor 70's	-	-	-	confirmed as <i>C. diffluens</i>	
03/07/19	Ward 6A Room 24	-	-	-	confirmed as <i>C. diffluens</i>	
03/07/19	Ward 6A Room 2	-	-	-	confirmed as <i>C.uniguttulatus</i>	

Item

Action

**FIGURE 1**

<b>'Cryptococcal species' isolates from air sampling 21 Dec 2018 to Jun/Jul 2019</b>							
	<i>N. diffluens</i>	<i>N. albida</i>	<i>N. albido-similis</i>	<i>F.uniguttulata</i>	<i>Cutan. curvatus</i>	ID TBC	Total
<b>*Dec 21<sup>st</sup> 2018</b> n=53	13	0	1	0	1 Roof#	1	<b>16</b>
<b>Jan 19</b> n=422	24	3	0	0	0	0	<b>27</b>
<b>Feb 19</b> n=440	0	0	0	1	0	0	<b>1</b>
<b>Mar 19</b> n=320	4	0	0	1	0	0	<b>5</b>
<b>Apr 19</b> n=334	2	0	0	0	0	0	<b>2</b>
<b>May 19</b> n=420	7	3	0	3	0	0	<b>13</b>
<b>Jun 19</b> n=448	8	0	0	0	0	0	<b>8</b>
<b>Jul 19</b>	2 sf	0 sf	0 sf	1 sf	0 sf	0	<b>3 sf</b>
<b>Total sf</b>	<b>60</b>	<b>6</b>	<b>1</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>75</b>

sf = so far

John Hood explained that Figure 1 details the samples and speciation of the cryptococci, the total number of each *Cryptococcus* species and those isolates by month. One more positive case was identified on 15<sup>th</sup> July in Room 24 in Ward 6A. Tom Steele asked if there was anyway to benchmark what normal is and John Hood replied that this is very difficult as the numbers fluctuate. There were around 2500 samples taken between December 2018 and July 2019 and he said sampling has mainly been carried out in wards 6A, 4B and 4C.

**FIGURE 2 (from minute of 26/07/19 - included today for reference)****Positive Crypto spp. results by month and per number of samples**

<b>Month</b>	<b>No of positives</b>	<b>No of samples</b>
<b>December 21<sup>st</sup> 2018 (1day)</b>	16	53
<b>Jan 19</b>	27	422
<b>Feb 19</b>	1	440
<b>March 19</b>	5	320
<b>April 19</b>	2	334
<b>May 19</b>	13	420
<b>June 19</b>	8	448
<b>July 19</b>	2 so far	To be confirmed

Item	Action
<p>4. <b>Actions from 9 August 2019 Meeting</b></p> <p>Actions from 09/08/19 were updated during the meeting and noted in the minutes.</p>	
<p>5. <b><u>Further Actions Required</u></b></p>	
<p>1. <b>21/06/19</b> - Continue to carry out air sampling in Wards 6A, 4B and 4C. <b>26/07/19 - Action ongoing.</b> <b>09/0819</b> – Difficult to carry out air sampling due to the ongoing issues associated with Ward 6A. <b>16/08/19</b> Ward 4C has not been sampled and will be completed in a couple of weeks. <b>Action ongoing.</b></p>	JH
<p>2. <b>21/06/19 - Action ongoing:</b> Ian Powrie updated that priority has been given to Wards 6A and 4C for removal of the Ceiling Vent Grilles (CVG's). Ward 4B has been done. Timeline will be done, but Wards 6A and 4C is expected to be done in the next couple of weeks, ongoing for removal of CVGs in other clinical wards. <b>28/06/19</b> - SCRIBE sitting with IPC. Ward 4B has been done. Wards 6A and 4C have yet to be done – <b>SCRIBE required.</b> <b>26/07/19</b> - Darryl Conner has asked Teresa Inkster about replacing CVGs in Ward 4B with ceiling tiles. There was one action was to replace CVGs in Ward 4C, but there is a problem with increased permeability of the space. It has already been established that the notional average is <b>1.2 to 2 Pa</b> to replace CVGs. It has been suggested it might be possible to trim back the extract in the en suites, but the air change in the en suites would be reduced slightly. This information has gone to the Specialist Ventilation Group.</p>	IS
<p><b>Darryl Conner reported that the area from 4B into 4C, at time of measurement is showing negative, but on investigation and measurement outside 4C Room 75, it goes up to 1.2 to 2 Pa because of the opening and closing of the various doors and air moving into 4D (as door often can be kept open). Without designation of the lobbies into mitigating areas, the closing or opening of any one door adjusted the pressure regimes definitively.</b> Darryl Conner has submitted SCRIBES for the process for removal of CVGs, and all are the same apart from the level of protection for each department being moved. Ward 6A is next on the list, which requires feedback from Teresa Inkster, but can be actioned immediately if required. John Hood thought the SCRIBE employed in 4B could be used for the other areas as same work is being carried out and had been successfully used in a more critical area. Darryl Conner explained that effectively it is the same SCRIBE and is used as a template however each area requires sign-off. <b>Action ongoing – SCRIBE required.</b> <b>09/08/19</b> - Amendment as noted at the start of the minute, that the notional average is 1.2 to 2 Pa. Darryl Conner commented that Teresa Inkster may not be keen to have CVGs removed. <b>Action ongoing – SCRIBE required. N.B. Teresa must be happy before any CVG's removed she would rather have as much positive pressure in rooms as possible. Action ongoing and transferred to the Specialist Ventilation Group.</b></p>	DC
<p>3. <b>21/06/19 - Action ongoing:</b> Ian Powrie asked Eddie McLaughlan for HFS to confirm endorsement that HFS and the authorised engineer agreement that CVG vents are no longer required. Ian Powrie has received background information about ventilation and gas leaks from Ian Storrar but needs confirmation of endorsement. Ian Powrie added that ventilation is only needed where there are mechanical joints on gas lines. Eddie McLaughlan reported that Ian Storrar is currently on annual leave. Eddie McLaughlan will arrange for HSF to confirm endorsement within this time. <b>28/06/19</b> – Ian Powrie reported that Ian Storrar is still to confirm. <b>26/07/19</b> - Darryl Conner reported that Ian Storrar was asked (by Ian Powrie) to confirm endorsement of removal of the CVGs. Annette Rankin stated that Ian Storrar is likely involved in the current ongoing issues in NHS Lothian and suggested he is reminded to take this action forward. Darryl Conner will contact Ian Storrar as suggested. <b>Action ongoing.</b> <b>09/08/19</b> - An e-mail response was received from Eddie McLaughlan on 06/08/19 as noted below.</p>	DC

Item	Action
<p>Eddie McLaughlan offered in his e-mail to have a telephone discussion with John Hood to clarify anything further:</p> <p>“The first action on me was I think a double check with Ian Storrar about vents in ceilings containing medical gas pipework without joints, but he’s completely tied up at the moment. I think I said at the meeting that as you need to seal the ceiling for IC purposes and there are no joints in the pipework above the ceiling, it would take a major mechanical failure to compromise the pipework and as that seemed unlikely removing the vents and using a gas alarm seemed reasonable. That said, we are only a source of advice; the risk assessment should be done by the Board with advice from your Authorising Engineer as necessary.”</p> <p>‘I’ve read the second action twice and I’m not entirely clear what I’m commenting on but hopefully the following will cover it. The source of the continuing Cryptococcus can only really be the outside air or infiltration from within the building and, as it is being detected in non HEPA filtered spaces and not in HEPA filtered spaces (I presume this is still the case, then the outside air looks a likely candidate.’</p> <p>‘On the subject of guidance, there is a review of the ventilation guidance underway at present and whilst we have asked for more clarity around specialised ventilation for susceptible patients, it is not yet clear whether we will get it. If not we will need to do something specifically for Scotland, for which there is currently neither financial nor staff resource, and no progress is likely to be made on this whilst the RHCYP&amp;DCN review is ongoing. In the meantime, it is important that clinicians understand the level of protection available in the various environments within QEUH and place patients accordingly.’</p> <p>JH note in draft 14 August 19: I have emailed Eddie (on 13 August 2019) with the Minute of the 21<sup>st</sup> June (highlighted) so he knows what he was then commenting on.</p>	
<p>4. <b>21/06/19 p3: bp2:</b> Colin Purdon advised that the Fire Strategy required that the doors to be available for lateral evacuation of patients and staff in both directions, but he would review options of temporary seals with the site Fire Advisor. <b>(29/07/19)</b> Action outstanding. To be completed. <b>(09/08/19)</b> Darryl Conner reported that draft seals have been fitted on the Ward 4B door that is locked on the outside, through to the doctor’s room and it is only Estates that go in and out of that area. Darryl Conner will discuss with the Fire Advisor. <b>Action ongoing</b></p>	DC
<p>5. <b>26/07/19:</b> Eddie McLaughlan to review the discussion noted in the minutes of 21/06/19 (page 8, item 7.1 - Hypotheses) and change as appropriate. <b>09/08/19 –</b> As mentioned earlier John Hood will telephone/email Eddie McLaughlin and as part of that discussion will ask for re-wording from Eddie McLaughlin. <b>16/08/19</b> John forwarded the minute of 21<sup>st</sup> June for Eddie McLaughlan to comment on. <b>Action ongoing.</b></p>	EMcL
<p>6. <b>26/07/19:</b> John Hood to inform Liz Johnson at the Reference Laboratory in Bristol of the cryptococcus isolates and will forward the breakdown of this, in order to discuss the implications and any views, and if these are valid surrogate markers for <i>C.neoformans</i>. <b>09/08/19 –</b> John Hood will speak to Liz Johnson next week. <b>16/08/19</b> John discussed with Liz Johnson and she said neither can be considered as surrogate markers.</p>	JH

Item	Action
<p>7. <b>26/07/19:</b> John Hood to continue doing walk round of Plant Rooms. Awaiting results of air samples from the Level 12 Plant Rooms tested on 25 July 2019. <b>09/08/19</b> – John Hood reported that walk round of all of the Plant Rooms has been done at QUEH and RHC. Plant Room 31 has AHUs marked both 21 and 31 – which is a little confusing as the first number(i.e. 2 or 3 should indicate which floor that Plant Room is on!). No evidence of pigeon ingress or droppings Plant Room 22 is in the Adult QUEH, is huge! Again the only thing discovered there was some water on the floors but apparently this is due to the heat exchangers, in both QUEH and RHC. Plant Room 22 is very clean, with no evidence of pigeon ingress or droppings. There was water on the floor in Plant Room 21 and there was still some general debris but this will be cleaned this week. There was no evidence of pigeon ingress or droppings. Plant Room 41 (RHC), again the floor needed a brush, but there was no evidence of pigeons or pigeon droppings. Some light ingress was noted but there is netting fitting above so pigeons could not get in. Plant Room 41A (RHC) is a small plant room, with no evidence of any pigeon ingress or droppings. John Hood will visit the Plant Rooms serving the labs next because two areas in Floor 1 Lab Block have grown <i>Cryptococcus</i> spp. (one <i>C. albidus</i> and one <i>C. diffluens</i>). These Plant Rooms are completely separate from the Plant Rooms in either QUEH or RHC. <b>16/08/19</b> John Hood visited Plant Rooms on level 3, 2 and 4 and none of these areas had evidence of pigeon ingress or evidence that the pigeons are going through the hospital Plant Rooms. Colin Purdon confirmed that there are F7s in the Lab building. <b>Action ongoing.</b></p>	JH
<p>8. <b>26/07/19:</b> John Hood referred to the tube system, and will need to discuss this with Colin Purdon in the next couple of weeks, who will in turn talk to the engineers from Swisslog. In order to understand and find out (Level 3) the possibility of air being dragged from the Plant Room to the PODs of areas such as in 6A, 4B and 4C. This is specimen transport tubes that should all be under vacuum. John Hood however wants to confirm that air cannot be dragged in (e.g. from the Plant Rooms) and then pushed out into critical areas via the tube system. <b>09/08/19</b> - John Hood stated that he needs to understand how this system works and asked Colin Purdon to speak to the Swisslog engineers and arrange a meeting for him to discuss this with them. It is John Hood's view that we should probably not be putting the tube system into the heart of critical areas such as BMTU or Haemato-oncology areas with high risk patients. Peter Hoffman stated that he would like to retract what was said last meeting about the vacuum, and John Hood agreed to remove this comment. The issue of the tube system was also one of the original hypotheses of how fungal/yeast spores may have gained entry into the air of such critical areas. 16/08/19 John Hood commented that if we think that the tube system is pushing or pulling air in should we consider this in individual wards as the air being brought in is uncontrolled measure. He said the rooms are being protected if not dragging air in. There is a central transfer unit in Plant Room 31 and air pumps from there. John said that there is a possibility that there are unknown amount of gaps in the structure. <b>Action ongoing.</b></p>	CP
<p>9. John Hood asked if anyone is putting together all the mitigation from all of the previous actions and hypotheses. Colin Purdon agreed to arrange to get the mitigation recorded.</p>	CP
<p>* <b>NEW ACTIONS:</b></p> <ul style="list-style-type: none"> <li>• Discussion took place regarding the intercom between Wards 4B and 4C not working properly and that could be why the doors have been left open. Tom Steele asked Colin Purdon to check the intercom and if it is not working to arrange for this to be fixed.</li> </ul>	CP

Item	Action
<p><b>Closed / Completed Actions</b></p> <ul style="list-style-type: none"> <li>• <b>(06/06/19) p3: bp1:</b> Ian Powrie will discuss IPS panels being sealed with Darryl Conner as some of the underside of WHBs panels were not done. <b>(21/06/19)</b> Colin Purdon picked up with Darryl Conner and reported all have been re-checked and all sealed. There were 2 rooms unable to get access to and this is still the same position today but will be re-checked. <b>(28/06/19)</b> Darryl Conner confirmed all now done. Ian Powrie reported that of all the rooms checked, the 2 rooms were still be checked one of which was Room 5. Darryl Conner will confirm by e-mail that Rooms A and B, and Ward 6A Room 5 is the only one not sealed on the underside. Ian Powrie and John Hood had inspected this area. <b>(09/08/19)</b> Darryl Conner confirmed as above. <b>Action complete.</b></li> <li>• <b>(06/06/19) p3: Item 4:</b> There is concern about the differences in the pressures in 4C Rooms 66-75. Rooms 66 to 74 are between 0.4 to 2.9 Pa from rooms to corridor but Room 75 at the end of the corridor is consistently negative at -0.3 (i.e. air moving from corridor to room). Colin Purdon to make adjustments to the ventilation to make this room slightly positive. <b>(28/06/19)</b> Ian Powrie clarified this was the room at the end of the corridor and is still to be done. Ian Powrie asked Darryl Conner to be careful not to affect the pressure regimes for the area when adjustments are made. <b>(26/07/19)</b> Darryl Conner agreed to make adjustments to the ventilation to make this room slightly positive. <b>(09/08/19)</b> It was noted that this action has gone to the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></li> <li>• <b>06/06/19 - Action closed:</b> Item in relation to Pest Control.</li> <li>• <b>06/06/19 - Action closed - transferred:</b> Sandra confirmed IPC has investigated laundry storage and process. This action to be removed from the group's remit. Action complete.</li> <li>• <b>06/06/19 - Action closed:</b> It was confirmed that final inspection of Ward 6A Room 5 has taken place. Action complete - see Bp 6, below.</li> <li>• <b>06/06/19 - Action closed - transferred:</b> It was agreed and noted that overall ventilation design for Ward 2A is the responsibility of another forum therefore it has been removed as an action for this group.</li> <li>• <b>06/06/19 - Estates</b> are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he discussed this with Multiplex. He said that the green roof was part of the design and the sedum can be removed and an alternative ballast material installed. He said if we were to move the items from the roof we could cause further disturbance? John Hood said he would be concerned if <i>Haemato-oncology</i> patients were to go on to this roof but he was informed there is no access to it for these patients. Tom Steele said that he is of the opinion to maybe review this in the future but to leave it as is at the moment. <b>21/06/19</b> - no update. <b>26/07/19 - Action closed meantime.</b></li> <li>• <b>21/06/19</b> - On 29 May 2019, inspection above the ceiling of Room 5 in Ward 6A showed that the services coming into the space were well sealed and in good condition. The flexible duct to the chilled beam was found to be intact. <b>26/07/19 - Action closed.</b></li> <li>• <b>21/06/19 - Action closed:</b> Ian Powrie reported that fluid dynamics modelling around the helipad/QEUH/RHC report was now completed (see Report Rev 3). The IMT Expert Advisory Sub-Group accepted the findings of the CFD Report.</li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li>• <b>21/06/19 - Action complete:</b> A problem with the chilled beams was identified and Ian Powrie explained this was a mechanical joint failure causing a leak. On this occasion it was a loss of low temperature hot water heating circuit that resulted in a change in temperature causing contraction of the pipework and fittings resulting in a slight leak. Colin Purdon added this was reported as a series of drips and although not for this group, it is being mentioned due to the mechanical failure. Colin Purdon has met with Teresa Inkster and Christine Peters. The ceiling tiles affected by water were replaced, and Actichlor was used to wash down. All appropriate IPC measures have been taken (Ward 6A children - x8 rooms).</li> <li>• <b>21/06/19 p4: para2:</b> John Hood mentioned that a mechanical riser in 4B had a water leak this morning. Colin Purdon explained that this is the low temperature water return pipe, and that the valve body gland has a slight leak. The valve will be changed today. <b>(29/07/19)</b> Darryl Conner confirmed as done. <b>Action complete.</b></li> <li>• <b>21/06/19 p5: para3:</b> Ian Powrie asked if there is a risk between CF and haemato-oncology if there is air movement between them. John Hood agreed to discuss this with Teresa Inkster. <b>(09/08/19)</b> John Hood reported that Teresa Inkster has concurred no significant risk. <b>Action complete.</b></li> <li>• <b>21/06/19 p5: para5:</b> Colin Purdon has advised that intumescent gasket seals would be fitted. <b>(26/07/19)</b> Darryl Conner confirmed that the intumescent gasket riser seals has been completed. The only action outstanding in relation to this is the installation of the false ceilings. <b>(09/08/19)</b> Darryl Conner reported that installation of the false ceilings is still to be done but that this action is for the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></li> <li>• <b>21/06/19 p7: item 7: para2:</b> On 25 July 2019, Colin Purdon to have walk round with Fire Safety Advisor shortly. <b>(26/07/19)</b> Colin Purdon will set-up a meeting with the Fire Officers soon. <b>(09/08/19)</b> Colin Purdon reported that a walk round with the Fire Advisor is still to be arranged. <b>(16/08/19)</b> Sandra Devine commented that she had met with clinical and managerial representatives from 4B and had walked the patient pathway through the ward. After due consideration it was felt that automatic door closures would impede the movement of patients through the ward especially in emergencies so the meeting with Colin and the Fire Officer is no longer required. <b>Action complete</b></li> <li>• <b>21/06/19 p8: item 13:</b> All but two IPS panels have been confirmed as complete. <b>(26/07/19)</b> <b>Action complete.</b></li> <li>• <b>21/06/19 - Action ongoing: Carry Forward</b> - Sandra Devine was then not in attendance to provide an update that a discussion is still to take place with Teresa Inkster and possibly Myra Campbell (Clinical Services Manager) in relation to self-closers on doors in Ward 4B, and that IPC team is making sure that staff understand the importance of keeping doors to patient rooms closed and also keeping doors to ancillary areas closed as much as possible. <b>28/06/19</b> - Darryl Conner asked about self-closers. Ian Powrie stated this is what Sandra Devine was going to discuss with clinical colleagues. <b>26/07/19</b> - Sandra Devine reported that two IPC Nurses visited Ward 4B to emphasise the importance of closing doors, and signage has also been put up. Sandra Devine is arranging to meet with Myra Campbell to discuss self-closers on doors and will explain the issue of the 4B corridor and how the problem exists. Darryl Conner pointed out that practically this may be difficult to put in place as every door is bespoke and takes around 8 weeks from order, effectively taking rooms out-of-use. Sandra Devine will make this a consideration. <b>Action ongoing.</b> <b>09/08/19</b> - Sandra Devine met with Myra Campbell on 08/08/19 and they both visited Ward 4B. There was overwhelming opinion not to have self-closers on doors in Ward 4B therefore this action should not be taken forward. <b>Action complete.</b></li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li> <p>• <b>21/06/19 - Action ongoing: Carry Forward</b> – Colin Purdon will check with the contractors if the rooms have 30-minute fire doors fitted at present. Colin Purdon previously discussed self-closers on doors with local Fire Safety Advisors and reported there would be no issues with this proposal. It was noted that discussion with the clinical teams would need to be held in relation to beds being taken out etc. <b>26/07/19</b> - deferred until discussions with relevant parties have taken place as noted in the minutes and also as noted, a walk round with the Fire Advisor to be arranged. <b>Action ongoing. 09/08/19</b> – Colin Purdon stated that in light of Sandra Devine's update (previous action) this action is no longer relevant. Colin Purdon added that fire doors are fitted adjacent to the fire exit points. Sandra Devine added that ward staff are aware of why this was being asked. <b>Action complete.</b></p> </li> <li> <p>• <b>21/06/19 - Action ongoing: Flooring: Carry Forward</b> - Colin Purdon updated that the action plan has been prepared and is being used to programme and prioritise the issues previously identified. The report was put together by the flooring contractor and Ward 6A has some minor issues to be rectified. <b>26/07/19 – Action carry forward / ongoing. 09/08/19</b> – It was agreed this action should be taken to another forum. Colin Purdon added there is a programme ongoing for Level 7 managed by Kerr Clarkson. <b>Action complete.</b></p> </li> <li> <p>• <b>21/06/19 - Action ongoing:</b> It was confirmed that the engineering risers have been inspected however this action will be kept as ongoing until completion of the doors to risers' rooms are sealed. Ian Powrie asked Colin Purdon to arrange to have the doors sealed over the next three weeks (by 27/06/19). Colin Purdon reported that the frames have been sealed. Darryl Conner is taking forward the action for the risers. <b>28/06/19</b> - On hold with Teresa Inkster as mentioned earlier (page 3 bp1). Ian Powrie asked Darryl Conner to check if the seals itself are fine to adjust the door, but if not, to put a gasket in. Ian Powrie added that only one was looked at in Ward 6, but asked that all of the doors are sealed air tight (sweep Wards 4B, 6A, 4C for all riser doors). <b>26/07/19</b> - Fire Advisor to endorse and if IPC can sanction, then this will be done. John Hood asked if Darryl Conner is in a position to comment. Darryl Conner reported that Teresa Inkster wanted this item discussed at the Specialist Ventilation Group and following discussion at the first meeting put forward their intentions and what was required to accommodate the work. However Teresa Inkster had responded that the downtime would cause more risk than what the existing risk is in relation to the risers. Darryl Conner stated that in the interim a control of the risers. The doors are sealed, but the adjacent ceilings and floors of the risers have not yet been done. Clarification from the Fire Advisor is required to ensure that there is no breach of fire integrity as they are horizontally sealed to each level. Darryl Conner stated this will need to be discussed at the Specialist Ventilation Group and will ask for this to be included as an agenda item for discussion. <b>Action ongoing. 09/08/19</b> – Darryl Conner reported that it was proposed at the Specialist Ventilation Group a level of modification and the process of sealing the risers, and the possibility of doing this at higher and lower floors. It was recognised that there would be disruption. Darryl Conner thinks the group might be satisfied with the intumescent seals and the doors are under lock and key therefore not regarded as an immediate risk. Peter Hoffman commented that if everything is adequately sealed at one point in time, there is no guarantee it is going to be like that in a few years (or less) from now, and is a temporary solution. So get things sealed but need to get the air flows correct and the air flow in the right direction. It was noted that Teresa Inkster has taken this over in the Specialist Ventilation Group. <b>Action closed and transferred to the Specialist Ventilation Group.</b></p> </li> <li> <p>• <b>21/06/19 - Action ongoing:</b> Wards 6A and 4C IPS panels to be sealed with silicone by 24/05/19. Colin Purdon previously agreed to have the bottom of all the panels re-checked. All but two IPS panels have been confirmed as complete. <b>28/06/19</b> – Action ongoing.</p> </li> </ul>	



Item	Action
<p><b>26/07/19</b> - Darryl Conner confirmed that Room 5 6A was done and has been told that the other room has also been done. Darryl Conner will check both have been sealed and will confirm this. <b>Action ongoing. 09/08/19</b> – Darryl Conner confirmed <b>Action complete.</b></p> <ul style="list-style-type: none"> <li><b>28/06/19 p2: bp1:</b> There had been discussion around air in the corridor from Ward 4C into Room 75, and Ian Powrie had explained that the commissioning engineer will need to review all of the rooms and check that correction has not made things worse, with a view to increasing the pressure in Room 75 to the same range as the other rooms. <b>(26/07/19)</b> Darryl Conner confirmed he will do the pressure change but will ask <b>Ian McKenzie</b> to do the re-balance. <b>(09/08/19)</b> John Hood reported that the Specialist Ventilation Group will need to discuss the air pressures.</li> </ul> <p>Darryl Conner explained that the doors need to be closed because when the doors are open this could force the rooms into a negative state from the corridor. <b>(16/08/19)</b> It was noted that it is only through discussion at meetings that it was realised the effect of doors being left open affecting all of the pressures, therefore ward staff would definitely not be aware of these issues.</p> <ul style="list-style-type: none"> <li><b>Action closed and transferred to the Specialist Ventilation Group.</b></li> </ul> <p><b>26/07/19:</b> Colin Purdon to get the GP Environmental (Pest Control Company) to give an update on their formal cleaning and ongoing identification of problems in the Plant Rooms. Darryl Conner will discuss this with Colin Purdon on 28/07/19. Of note, this will be required for part of the final discussion and Report. <b>09/08/19</b> – Colin Purdon will request a report from the pest control company as noted. <b>Action complete</b></p>	
<p><b>6. AOCB</b></p> <ul style="list-style-type: none"> <li>The first draft of the Cryptococcus Report was circulated to the group for comments. John Hood said the report is still to be updated with graphs.</li> </ul>	<b>All</b>
<p><b>7. Date and Time of Next Meeting</b></p> <p>The next meeting will be held at 2.00pm on Friday 23 August 2019 in Facilities Meeting Hub, old CMB (behind the clock tower), QEUH.</p>	

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Meeting Room 1 Old Central Medical Building (CMB), Queen Elizabeth University Hospital

**Friday 23 August 2019 at 2.00pm FINAL**

**Present:** Dr John Hood (chair), Sandra Devine, Colin Purdon, Darryl Conner, Tom Steele, Ann Lang (minutes)

**Teleconference:** Peter Hoffman, Susie Dodd

**Apologies:** Annette Rankin

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting. Teleconference introductions were made and apologies were received from the above mentioned.</p> <p><b>2. Minutes of Meetings held on 16 August 2019</b></p> <p>The minutes of the meeting held on 16 August 2019 were accepted with the following amendment:-</p> <ul style="list-style-type: none"> <li>- Page 2, 1<sup>st</sup> para - should read "This area was not sampled on that day primarily [REDACTED] served by AHUs in this Plant Room and the Infection Control Team were not aware of these problems in that Plant Room".</li> <li>- Page 4, 1<sup>st</sup> para - should read "... as the numbers clearly fluctuate and we can only speculate as to the reasons why."</li> <li>- Page 5, 3<sup>rd</sup> para – should read "... outside 4C Room 75 it was recorded to be 1.2 to 2 Pa because of the opening and closing of various doors..."</li> <li>- Page 5, 3<sup>rd</sup> para – "Without the installation of ward lobbies in these areas, the opening or closing of any one door, we cannot mitigate against these pressure fluctuations".</li> </ul> <p>• <b>Actions Update:</b></p> <p>With regards to the intercom at Ward 4D Colin Purdon confirmed that this was checked during the week and the intercom is fully operational. He said the Technician did comment that the positive pressure in the ward is forcing the door open. Colin recommended that there should be increased staff awareness to ensure that they know the pressure regime they are working to and the importance of closing the door (s) behind them.</p> <p>John Hood forwarded the email from Karen Caldwell of GP Environmental to Colin Purdon to the group. These include the pictures that were taken of the pigeon ingress in PR 123 (D) on L12 in early December. It was noted that there was clear pigeon ingress through a defect in the roof on 5<sup>th</sup> December 2018 and this was dealt with from 6<sup>th</sup> December 2018 onwards. Peter Hoffman asked if it was clear that the dates of cleaning the pigeon ingress were [REDACTED]</p> <p>[REDACTED] John Hood replied that if there was pigeon guano aerosolization in the Plant Room this would still need to get from the Plant Room air into the Air Handling Units. [REDACTED]</p> <p>[REDACTED] Plant Room 122 - AHU's</p>	

JH

Item	Action
------	--------

4,5 and 6 (cover 6A patients) had been shut down and filters changed on the 21<sup>st</sup> of September 2018, [REDACTED]

[REDACTED] (the day the blood cultures also became positive) PICU is served by PR 41, RHC – AHUs 13,14,15 & 16. Please note that this Plant Room is in RHC NOT on Level 12 of QEUH. It is therefore nowhere near PR 123 (D) where the pigeon issue was found on 5<sup>th</sup> December 2018.

None of the above AHUs serving PICU, were opened between the week ending 14 October 2018 and week ending 30<sup>th</sup> December 2018.

U

Looking at the records: there were no AHU shutdowns in PR 124 from 1<sup>st</sup> October 2018 to the week ending 30<sup>th</sup> December 2018.

John Hood said that he will check the proximity of Plant Room D to Plant Rooms in towers A and C to see how close they are to each other.

### 3. Update on Air Testing

Very little air sampling has been carried out in Ward 4C due to the ongoing issues in Ward 6A. John Hood confirmed that there have been no new positive *Cryptococcus* spp. isolated.

Air sampling reports (06/06/19 to 26/07/19).

Date	Area	Reported 06/06/19	Reported 21/06/19	Reported 28/06/19	Reported 26/07/19
14/05/19	Ward 4C Room 73	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	-	-
14/05/19	Ward 6A Corridor	-	confirmed as <i>C. diffluens</i>	-	-
15/05/19	Ward 6A Electrical Riser	<i>C. uniguttulatus</i>	confirmed as <i>C. uniguttulatus</i>	-	-
15/05/19	Ward 4B corridor (near rooms in 70's)	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	-	-
21/05/19	Ward 6A Room 1	presumptive <i>C. albidus</i>	confirmed as <i>C. diffluens</i>	-	-
29/05/19	Lab Block Level 1 Reception	-	presumptive <i>C. albidus</i>	confirmed as <i>C. diffluens</i>	-
29/05/19	Blood Bank LB-L1 (huddle)	-	presumptive <i>C. uniguttulatus</i>	confirmed as <i>C. uniguttulatus</i>	-
29/05/19	Ward 4C Riser 223	-	-	confirmed as <i>C. uniguttulatus</i>	-
29/05/19	Main Corridor Training Board Lab Block L1	-	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	-
11/06/19	Ward 6A Corridor (Rooms 20-23)	-	presumptive <i>C. albidus</i>	-	confirmed as <i>C. diffluens</i>
11/06/19	Ward 4C Room 70	-	presumptive <i>C. albidus</i>	-	confirmed as <i>C. diffluens</i>
17/06/19	Ward 6A Treatment Room/POD	-	-	presumptive <i>C. albidus</i>	confirmed as <i>C. diffluens</i>
17/06/19	Ward 6A Corridor Nurses Station	-	-	? <i>C. albidus</i>	confirmed as <i>C. diffluens</i>

Item

Action

27/06/19	Ward 6A Clean Utility Room	-	-	-	confirmed as <i>C. diffluens</i>
28/06/19	4B (BMTU) Corridor 70's	-	-	-	confirmed as <i>C. diffluens</i>
03/07/19	Ward 6A Room 24	-	-	-	confirmed as <i>C. diffluens</i>
03/07/19	Ward 6A Room 2	-	-	-	confirmed as <i>C.uniguttulatus</i>
15/07/19	Ward 6A Room 23				confirmed as <i>C. diffluens</i>

**FIGURE 1****'Cryptococcal species' isolates from air sampling 21 Dec 2018 to Jun/Jul 2019**

	<i>N. diffluens</i>	<i>N. albida</i>	<i>N. albido-similis</i>	<i>F.uniguttulata</i>	<i>Cutan. curvatus</i>	ID TBC	Total
<b>*Dec 21<sup>st</sup> 2018</b> n=53	13	0	1	0	1 Roof#	1	<b>16</b>
<b>Jan 19</b> n=422	24	3	0	0	0	0	<b>27</b>
<b>Feb 19</b> n=440	0	0	0	1	0	0	<b>1</b>
<b>Mar 19</b> n=320	4	0	0	1	0	0	<b>5</b>
<b>Apr 19</b> n=334	2	0	0	0	0	0	<b>2</b>
<b>May 19</b> n=420	7	3	0	3	0	0	<b>13</b>
<b>Jun 19</b> n=448	8	0	0	0	0	0	<b>8</b>
<b>Jul 19</b>	3	0	0	1	0	0	<b>4</b>
<b>Total sf</b>	<b>61</b>	<b>6</b>	<b>1</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>76</b>

sf = so far

**FIGURE 2****Positive Crypto spp. results by month and per number of samples**

Month	No of positives	No of samples
<b>December 21<sup>st</sup> 2018 (1day)</b>	16	53
<b>Jan 19</b>	27	422
<b>Feb 19</b>	1	440
<b>March 19</b>	5	320
<b>April 19</b>	2	334
<b>May 19</b>	13	420
<b>June 19</b>	8	448
<b>July 19</b>	3	To be confirmed

**4. Actions from 23 August 2019 Meeting**

A47175206

Item	Action
<p>Actions from 23/08/19 were updated during the meeting and noted in the minutes.</p>	
<p>5. <b><u>Further Actions Required</u></b></p>	
<p>i. <b>21/06/19</b> - Continue to carry out air sampling in Wards 6A, 4B and 4C. <b>26/07/19 - Action ongoing. 09/0819</b> – Difficult to carry out air sampling due to the ongoing separate issues associated with Ward 6A. <b>16/08/19</b> Ward 4C has not been sampled recently and will be in the next few weeks. <b>23/08/19</b> Air sampling has not been carried out in Ward 4C due to the ongoing issues in Ward 6A. <b>Action ongoing.</b></p> <p>ii. <b>21/06/19 - Action ongoing:</b> Ian Powrie updated that priority has been given to Wards 6A and 4C for removal of the Ceiling Vent Grilles (CVG's). Ward 4B has been done. Timeline will be done, but Wards 6A and 4C is expected to be done in the next couple of weeks, ongoing for removal of CVGs in other clinical wards. <b>28/06/19 - SCRIBE sitting with IPC.</b> Ward 4B has been done. Wards 6A and 4C have yet to be done – <b>SCRIBE required. 26/07/19</b> - Darryl Conner has asked Teresa Inkster about replacing CVGs in Ward 4B with ceiling tiles. There was one action was to replace CVGs in Ward 4C, but there is a problem with increased permeability of the space. It has already been established that the notional average is <b>1.2 to 2 Pa</b> to replace CVGs. It has been suggested it might be possible to trim back the extract in the en suites, but the air change in the en suites would be reduced slightly. This information has gone to the Specialist Ventilation Group. Darryl Conner reported that the area from 4B into 4C, at time of measurement is showing negative, but on investigation and measurement outside 4C Room 75, it was recorded to be 1.2 to 2 Pa because of the opening and closing of the various doors and air moving into 4D (as door often can be kept open). Without installation of ward lobbies into mitigating areas, the closing or opening of any one door alters the pressure regimes.</p>	<p>JH</p>
<p>Darryl Conner has submitted SCRIBEs for the process for removal of CVGs, and all are the same apart from the level of protection for each department being moved. Ward 6A is next on the list, which requires feedback from Teresa Inkster, but can be actioned immediately if required.</p>	
<p>John Hood thought the SCRIBE employed in 4B could be used for the other areas as same work is being carried out and had been successfully used in a more critical area. Darryl Conner explained that effectively it is the same SCRIBE and is used as a template however each area requires sign-off. <b>Action ongoing – SCRIBE required. 09/08/19</b> - Amendment as noted at the start of the minute, that the notional average is 1.2 to 2 Pa. Darryl Conner commented that Teresa Inkster may not be keen to have CVGs removed. <b>Action ongoing – SCRIBE required.</b>  <b>N.B. Teresa must be happy before any CVG's removed she would rather have as much positive pressure in rooms as possible.</b>  <b>Action ongoing and transferred to the Specialist Ventilation Group.</b></p>	
<p>iii. <b>21/06/19 - Action ongoing:</b> Ian Powrie asked Eddie McLaughlan for HFS to confirm endorsement that HFS and the authorised engineer agreement that CVG vents are no longer required. Ian Powrie has received background information about ventilation and gas leaks from Ian Storrar but needs confirmation of endorsement. Ian Powrie added that ventilation is only needed where there are mechanical joints on gas lines. Eddie McLaughlan reported that Ian Storrar is currently on annual leave. Eddie McLaughlan will arrange for HSF to confirm endorsement within this time. <b>28/06/19</b> – Ian Powrie reported that Ian Storrar is still to confirm. <b>26/07/19</b> - Darryl Conner reported that Ian Storrar was asked (by Ian Powrie) to confirm endorsement of removal of the CVGs.</p>	
<p>Annette Rankin stated that Ian Storrar is likely involved in the current ongoing issues</p>	<p>DC</p>

Item	Action
<p>in NHS Lothian and suggested he is reminded to take this action forward. Darryl Conner will contact Ian Storrar as suggested. <b>Action ongoing.</b></p>	
<p>iv. <b>21/06/19 p3: bp2:</b> Colin Purdon advised that the Fire Strategy required that the doors to be available for lateral evacuation of patients and staff in both directions, but he would review options of temporary seals with the site Fire Advisor. <b>29/07/19</b> Action outstanding. To be completed. <b>09/08/19</b> Darryl Conner reported that draft seals have been fitted on the Ward 4B door that is locked on the outside, through to the doctor's room and it is only Estates that go in and out of that area. Darryl Conner will discuss with the Fire Advisor. <b>23/08/19</b> Darryl confirmed that he has spoken to Frank Deacon, Fire Officer and he is reviewing this. He will provide an update at the next meeting. <b>Action ongoing and if Fire Officer agrees this action will be transferred to the Specialist Ventilation Group.</b></p>	DC
<p>v. <b>26/07/19:</b> John Hood referred to the tube system, and will need to discuss this with Colin Purdon in the next couple of weeks, who will in turn talk to the engineers from Swisslog. In order to understand and find out (Level 3) the possibility of air being dragged from the Plant Room to the PODs of areas such as in 6A, 4B and 4C. This is specimen transport tubes that should ? all be under vacuum. John Hood however wants to confirm that air cannot be dragged in (e.g. from the Plant Rooms) and then pushed out into critical areas via the tube system. <b>09/08/19</b> - John Hood stated that he needs to understand how this system works and asked Colin Purdon to speak to the Swisslog engineers and arrange a meeting for him to discuss this. It is John Hood's view that we should probably not be putting the tube system into the heart of critical areas such as BMTU or Haemato-oncology areas with high risk patients. Peter Hoffman stated that he would like to retract what was said last meeting about the vacuum system and John Hood agreed to remove this comment. The issue of the tube system was also one of the original hypotheses was of how fungal/yeast spores might gain entry into the air of such critical areas. <b>16/08/19</b> John Hood commented that if we think that the tube system is pushing or pulling air into these areas from the Plant Rooms then, we should consider this in individual critical wards (particularly BMTU, 6A and 4C etc) as the air being brought in is unfiltered, and therefore another potential route of airborne spores, so a risk. Mitigation will be required if above is correct. <b>23/08/19</b> John Hood agreed to contact Adrian from Swisslog next week. <b>Action ongoing.</b></p>	JH
<p>vi. John Hood asked if anyone is putting together all the mitigation from all of the previous actions and hypotheses. Colin Purdon agreed to arrange to get the mitigation recorded. <b>23/08/19</b> Colin advised that he has started putting together the mitigation from all the previous actions.</p>	CP
<p>6. <b>Draft Report for Comments</b> A copy of the draft report was issued for comments. John Hood advised that for the report he will write a piece on the ecology and biology of <i>C. neoformans</i>. He said it is a yeast-like fungus and it seems to be difficult to grow from air sampling in this country compared to that in warmer and drier climates. He said at the time the pictures of Plant Room 123 showed an area of pigeon faeces but this looked obviously wet. This would therefore mean that any spores (if present) would be less likely to aerosolise. John asked if it would be logged anywhere, when the last time this Plant Room was entered by a staff member. Darryl Conner replied that once the area has its annual inspection it would be compliant and there should be no need to enter this area.</p>	

Item	Action
<p>In the report John stated that other things to look at will include looking at the 2,500 results and to look at the comparison between Ward 4B and Wards 6A and 4C. To also look at the statistics of comparing Ward 4B which has HEPA filtered air to Wards 6A/ 4C which has non-HEPA filtered air.</p> <p>Peter Hoffman suggested to include how little we really know about <i>C. neoformans</i> as well as its association with pigeon guano (which in itself is complex) it can also be associated with rotting wood or vegetation.</p>	
<p><b>Closed / Completed Actions</b></p>	
<ul style="list-style-type: none"> <li>• <b>(06/06/19) p3: bp1:</b> Ian Powrie will discuss IPS panels being sealed with Darryl Conner as some of the underside of WHBs panels were not done. <b>(21/06/19)</b> Colin Purdon picked up with Darryl Conner and reported all have been re-checked and all sealed. There were 2 rooms unable to get access to and this is still the same position today but will be re-checked. <b>(28/06/19)</b> Darryl Conner confirmed all now done. Ian Powrie reported that of all the rooms checked, the 2 rooms were still be checked one of which was Room 5. Darryl Conner will confirm by e-mail that Rooms A and B, and Ward 6A Room 5 is the only one not sealed on the underside. Ian Powrie and John Hood had inspected this area. <b>(09/08/19)</b> Darryl Conner confirmed as above. <b>Action complete.</b></li> <li>• <b>(06/06/19) p3: Item 4:</b> There is concern about the differences in the pressures in 4C Rooms 66-75. Rooms 66 to 74 are between 0.4 to 2.9 Pa from rooms to corridor but Room 75 at the end of the corridor is consistently negative at -0.3 (i.e. air moving from corridor to room). Colin Purdon to make adjustments to the ventilation to make this room slightly positive. <b>(28/06/19)</b> Ian Powrie clarified this was the room at the end of the corridor and is still to be done. Ian Powrie asked Darryl Conner to be careful not to affect the pressure regimes for the area when adjustments are made. <b>(26/07/19)</b> Darryl Conner agreed to make adjustments to the ventilation to make this room slightly positive. <b>(09/08/19)</b> It was noted that this action has gone to the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></li> <li>• <b>06/06/19 - Action closed:</b> Item in relation to Pest Control.</li> <li>• <b>06/06/19 - Action closed - transferred:</b> Sandra confirmed IPC has investigated laundry storage and process. This action to be removed from the group's remit. Action complete.</li> <li>• <b>06/06/19 - Action closed:</b> It was confirmed that final inspection of Ward 6A Room 5 has taken place. Action complete - see Bp 6, below.</li> <li>• <b>06/06/19 - Action closed - transferred:</b> It was agreed and noted that overall ventilation design for Ward 2A is the responsibility of another forum therefore it has been removed as an action for this group.</li> <li>• <b>06/06/19 - Estates</b> are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he discussed this with Multiplex. He said that the green roof was part of the design and the sedum can be removed and an alternative ballast material installed. He said if we were to move the items from the roof we could cause further disturbance? John Hood said he would be concerned if <i>Haemato-oncology</i> patients were to go on to this roof but he was informed there is no access to it for these patients. Tom Steele said that he is of the opinion to maybe review this in the future but to leave it as is at the moment. <b>21/06/19 - no update. 26/07/19 - Action closed meantime.</b></li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li>• <b>21/06/19</b> - On 29 May 2019, inspection above the ceiling of Room 5 in Ward 6A showed that the services coming into the space were well sealed and in good condition. The flexible duct to the chilled beam was found to be intact. <b>26/07/19 - Action closed.</b></li> <li>• <b>21/06/19 - Action closed:</b> Ian Powrie reported that fluid dynamics modelling around the helipad/QEUH/RHC report was now completed (see Report Rev 3). The IMT Expert Advisory Sub-Group accepted the findings of the CFD Report.</li> <li>• <b>21/06/19 - Action complete:</b> A problem with the chilled beams was identified and Ian Powrie explained this was a mechanical joint failure causing a leak. On this occasion it was a loss of low temperature hot water heating circuit that resulted in a change in temperature causing contraction of the pipework and fittings resulting in a slight leak. Colin Purdon added this was reported as a series of drips and although not for this group, it is being mentioned due to the mechanical failure. Colin Purdon has met with Teresa Inkster and Christine Peters. The ceiling tiles affected by water were replaced, and Actichlor was used to wash down. All appropriate IPC measures have been taken (Ward 6A children - x8 rooms).</li> <li>• <b>21/06/19 p4: para2:</b> John Hood mentioned that a mechanical riser in 4B had a water leak this morning. Colin Purdon explained that this is the low temperature water return pipe, and that the valve body gland has a slight leak. The valve will be changed today. <b>(29/07/19)</b> Darryl Conner confirmed as done. <b>Action complete.</b></li> <li>• <b>21/06/19 p5: para3:</b> Ian Powrie asked if there is a risk between CF and haemato-oncology if there is air movement between them. John Hood agreed to discuss this with Teresa Inkster. <b>(09/08/19)</b> John Hood reported that Teresa Inkster has concurred: no significant risk. <b>Action complete.</b></li> <li>• <b>21/06/19 p5: para5:</b> Colin Purdon has advised that intumescent gasket seals would be fitted. <b>(26/07/19)</b> Darryl Conner confirmed that the intumescent gasket riser seals has been completed. The only action outstanding in relation to this is the installation of the false ceilings. <b>(09/08/19)</b> Darryl Conner reported that installation of the false ceilings is still to be done but that this action is for the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></li> <li>• <b>21/06/19 p7: item 7: para2:</b> On 25 July 2019, Colin Purdon to have walk round with Fire Safety Advisor shortly. <b>(26/07/19)</b> Colin Purdon will set-up a meeting with the Fire Officers soon. <b>(09/08/19)</b> Colin Purdon reported that a walk round with the Fire Advisor is still to be arranged. <b>(16/08/19)</b> Sandra Devine commented that she had met with clinical and managerial representatives from 4B and had walked the patient pathway through the ward. After due consideration it was felt that automatic door closures would impede the movement of patients through the ward especially in emergencies therefore the meeting with Colin and the Fire Officer is no longer required. <b>Action complete</b></li> <li>• <b>21/06/19 p8: item 13:</b> All but two IPS panels have been confirmed as complete. <b>(26/07/19) Action complete.</b></li> <li>• <b>21/06/19 - Action ongoing: Carry Forward</b> - Sandra Devine was then not in attendance to provide an update that a discussion is still to take place with Teresa Inkster and possibly Myra Campbell (Clinical Services Manager) in relation to self-closers on doors in Ward 4B, and that IPC team is making sure that staff understand the importance of keeping doors to patient rooms closed and also keeping doors to ancillary areas closed as much as possible. <b>28/06/19</b> - Darryl Conner asked about self-closers.</li> </ul>	



Item	Action
<p>Ian Powrie stated this is what Sandra Devine was going to discuss with clinical colleagues. <b>26/07/19</b> - Sandra Devine reported that two IPC Nurses visited Ward 4B to emphasise the importance of closing doors, and signage has also been put up. Sandra Devine is arranging to meet with Myra Campbell to discuss self-closers on doors and will explain the issue of the 4B corridor and how the problem exists. Darryl Conner pointed out that practically this may be difficult to put in place as every door is bespoke and takes around 8 weeks from order, effectively taking rooms out-of-use. Sandra Devine will make this a consideration. <b>Action ongoing. 09/08/19</b> - Sandra Devine met with Myra Campbell on 08/08/19 and they both visited Ward 4B. The overwhelming opinion was not to have self-closers on doors in Ward 4B therefore this action should not be taken forward. <b>Action complete.</b></p> <ul style="list-style-type: none"> <li>• <b>21/06/19 - Action ongoing: Carry Forward</b> – Colin Purdon will check with the contractors if the rooms have 30-minute fire doors fitted at present. Colin Purdon previously discussed self-closers on doors with local Fire Safety Advisors and reported there would be no issues with this proposal. It was noted that discussion with the clinical teams would need to be held in relation to beds being taken out etc. <b>26/07/19</b> - deferred until discussions with relevant parties have taken place as noted in the minutes and also as noted, a walk round with the Fire Advisor to be arranged. <b>Action ongoing. 09/08/19</b> – Colin Purdon stated that in light of Sandra Devine’s update (previous action) this action is no longer relevant. Colin Purdon added that fire doors are fitted adjacent to the fire exit points. Sandra Devine added that ward staff are aware of why this was being asked. <b>Action complete.</b></li> <li>• <b>21/06/19 - Action ongoing: Flooring: Carry Forward</b> - Colin Purdon updated that the action plan has been prepared and is being used to programme and prioritise the issues previously identified. The report was put together by the flooring contractor and Ward 6A has some minor issues to be rectified. <b>26/07/19 – Action carry forward / ongoing. 09/08/19</b> – It was agreed this action should be taken to another forum. Colin Purdon added there is a programme ongoing for Level 7 managed by Kerr Clarkson. <b>Action complete.</b></li> <li>• <b>21/06/19 - Action ongoing:</b> It was confirmed that the engineering risers have been inspected however this action will be kept as ongoing until completion of the doors to risers’ rooms are sealed. Ian Powrie asked Colin Purdon to arrange to have the doors sealed over the next three weeks (by 27/06/19). Colin Purdon reported that the frames have been sealed. Darryl Conner is taking forward the action for the risers. <b>28/06/19</b> - On hold with Teresa Inkster as mentioned earlier (page 3 bp1). Ian Powrie asked Darryl Conner to check if the seals itself are fine to adjust the door, but if not, to put a gasket in. Ian Powrie added that only one was looked at in Ward 6, but asked that all of the doors are sealed air tight (sweep Wards 4B, 6A, 4C for all riser doors). <b>26/07/19</b> - Fire Advisor to endorse and if IPC can sanction, then this will be done. John Hood asked if Darryl Conner is in a position to comment. Darryl Conner reported that Teresa Inkster wanted this item discussed at the Specialist Ventilation Group and following discussion at the first meeting put forward their intentions and what was required to accommodate the work. However Teresa Inkster had responded that the downtime would cause more risk than what the existing risk is in relation to the risers. Darryl Conner stated that in the interim a control of the risers. The doors are sealed, but the adjacent ceilings and floors of the risers have not yet been done. Clarification from the Fire Advisor is required to ensure that there is no breach of fire integrity as they are horizontally sealed to each level. Darryl Conner stated this will need to be discussed at the Specialist Ventilation Group and will ask for this to be included as an agenda item for discussion. <b>Action ongoing. 09/08/19</b> – Darryl Conner reported that it was proposed at the Specialist Ventilation Group a level of modification and the process of sealing the risers, and the possibility of doing this at higher and lower floors. It was recognised that there would be disruption. Darryl Conner thinks the group might be satisfied with the intumescent seals and the doors are under lock and key therefore not regarded as an immediate risk.</li> </ul>	

Item	Action
<p>Peter Hoffman commented that if everything is adequately sealed at one point in time, there is no guarantee it is going to be like that in a few years (or less) from now, and is a temporary solution. So get things sealed but need to get the air flows correct and the air flow in the right direction. It was noted that Teresa Inkster has taken this over in the Specialist Ventilation Group. <b>Action closed and transferred to the Specialist Ventilation Group.</b></p> <ul style="list-style-type: none"> <li> <p>• <b>28/06/19 p2: bp1:</b> There had been discussion around air in the corridor from Ward 4C into Room 75, and Ian Powrie had explained that the commissioning engineer will need to review all of the rooms and check that correction has not made things worse, with a view to increasing the pressure in Room 75 to the same range as the other rooms. <b>(26/07/19)</b> Darryl Conner confirmed he will do the pressure change but will ask <b>Ian McKenzie</b> to do the re-balance. <b>(09/08/19)</b> John Hood reported that the Specialist Ventilation Group will need to discuss the air pressures. Darryl Conner explained that the doors need to be closed because when the doors are open this could force the rooms into a negative state from the corridor. <b>(16/08/19)</b> It was noted that it is only through discussion at meetings that it was realised the effect of doors being left open affecting all of the pressures, therefore ward staff would definitely not be aware of these issues. <b>Action closed and transferred to the Specialist Ventilation Group.</b></p> </li> <li> <p>• <b>26/07/19</b> - Darryl Conner confirmed that Room 5 6A was done and has been told that the other room has also been done. Darryl Conner will check both have been sealed and will confirm this. <b>Action ongoing.</b> <b>09/08/19</b> – Darryl Conner confirmed <b>Action complete.</b></p> </li> <li> <p>• <b>26/07/19:</b> John Hood to continue doing walk round of Plant Rooms. Awaiting results of air samples from the Level 12 Plant Rooms tested on 25 July 2019. <b>09/08/19</b> – John Hood reported that walk round of <b>all</b> of the Plant Rooms has been done at QUEH and RHC. Plant Room 31 has AHUs marked both 21 and 31 – which is a little confusing as the first number (i.e. 2 or 3 should indicate which floor that Plant Room is on!). No evidence of pigeon ingress or droppings. Plant Room 22 is in the Adult QUEH and is huge! Again the only thing discovered there was some water on the floors but apparently this is from the heat exchangers (affected by the weather), in both QUEH and RHC. Plant Room 22 is very clean, with no evidence of pigeon ingress or droppings. There was water on the floor in Plant Room 21 and there was still some general debris in it but this will be cleaned this week. There was no evidence of pigeon ingress or droppings. Plant Room 41 (RHC), again, the floor needed a brush, but there was no evidence of pigeons or pigeon droppings. Some light ingress was noted but above the area of light ingress there is netting fitted so pigeons should not get in. Plant Room 41A (RHC) is a small plant room, with no evidence of any pigeon ingress or droppings. John Hood will visit the Plant Rooms serving the labs next because two areas in Floor 1 Lab Block have grown <i>Cryptococcus</i> spp. (one <i>C. albidus</i> and one <i>C. diffluens</i>). These Plant Rooms are completely separate from the Plant Rooms in either QUEH or RHC. <b>16/08/19</b> John Hood visited Plant Rooms on level 3, 2 and 4 and none of these areas had evidence of pigeon ingress or evidence that the pigeons are getting into these Plant Rooms (indeed very difficult to see how they could). Colin Purdon confirmed that there are F7s filters in the AHUs serving the Lab building. <b>Action closed.</b></p> </li> <li> <p>• <b>26/07/19:</b> Colin Purdon to get the GP Environmental (Pest Control Company) to give an update on their formal cleaning and ongoing identification of problems in the Plant Rooms. Darryl Conner will discuss this with Colin Purdon on 28/07/19. Of note, this will be required for part of the final discussion and Report. <b>09/08/19</b> – Colin Purdon will request a report from the pest control company as noted. <b>16/08/19</b> – Report from GP Environmental was received by Colin on 15<sup>th</sup> August 2019. Report to be sent round the group and discussed further at next meeting. <b>Action closed.</b></p> </li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li>• <b>26/07/19:</b> John Hood to inform Liz Johnson at the Reference Laboratory in Bristol of the cryptococcus isolates and will forward the breakdown of this, in order to discuss the implications and any views, and if these are valid surrogate markers for <i>C. neoformans</i>. <b>09/08/19</b> – John Hood will speak to Liz Johnson next week. <b>16/08/19</b> John discussed with Liz Johnson and she said that neither can really be considered as surrogate markers for <i>C. neoformans</i> but it was difficult to be dogmatic about it. <b>Action closed.</b></li> <li>• <b>06/08/19</b> An e-mail response was received from Eddie McLaughlan on 06/08/19 as noted below.</li> </ul> <p>Eddie McLaughlan offered in his e-mail to have a telephone discussion with John Hood to clarify anything further:</p> <p>“The first action on me was I think a double check with Ian Storrar about vents in ceilings containing medical gas pipework without joints, but he’s completely tied up at the moment. I think I said at the meeting that as you need to seal the ceiling for IC purposes and there are no joints in the pipework above the ceiling, it would take a major mechanical failure to compromise the pipework and as that seemed unlikely removing the vents and using a gas alarm seemed reasonable. That said, we are only a source of advice; the risk assessment should be done by the Board with advice from your Authorising Engineer as necessary.”</p> <p>‘I’ve read the second action twice and I’m not entirely clear what I’m commenting on but hopefully the following will cover it. The source of the continuing Cryptococcus can only really be the outside air or infiltration from within the building and, as it is being detected in non HEPA filtered spaces and not in HEPA filtered spaces (I presume this is still the case, then the outside air looks a likely candidate.’</p> <p>‘On the subject of guidance, there is a review of the ventilation guidance underway at present and whilst we have asked for more clarity around specialised ventilation for susceptible patients, it is not yet clear whether we will get it. If not we will need to do something specifically for Scotland, for which there is currently neither financial nor staff resource, and no progress is likely to be made on this whilst the RHCYP&amp;DCN review is ongoing. In the meantime, it is important that clinicians understand the level of protection available in the various environments within QEUH and place patients accordingly.’</p> <p><b>26/07/19:</b> Eddie McLaughlan to review the discussion noted in the minutes of 21/06/19 (page 8, item 7.1 - Hypotheses) and change as appropriate. <b>09/08/19</b> – As mentioned earlier John Hood will telephone/email Eddie McLaughlin and as part of that discussion will ask for re-wording from Eddie McLaughlin. <b>16/08/19</b> John forwarded the minute of 21<sup>st</sup> June for Eddie McLaughlan to comment on. <b>23/08/19</b> Eddie replied with the following:</p> <p>“Not sure this is from memory, but I am content with the text highlighted in yellow in your attachment, including your addition. I’d be thoughtful about any inferences beyond the text, particularly in reference to the case of additional guidance. The need for specialist ventilation guidance is on a very long list of priorities and although we are hopeful of being in a better position for resource in the future, nothing is guaranteed”. <b>Action closed.</b></p>	
<p><b>6. AOCB</b> Nil to update.</p>	

**7. Date and Time of Next Meeting**

The next meeting will be held at 11.00am on Monday 2<sup>nd</sup> September 2019 with the venue to be confirmed.

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Meeting Room MRO.13 Ground Floor, Admin Building, Queen Elizabeth University Hospital

**Monday 2 September 2019 at 11.00am FINAL**

**Present:** Dr John Hood (chair), Darryl Conner, Tom Steele, Ann Lang (minutes)

**Teleconference:** Peter Hoffman, Susie Dodd

**Apologies:** Annette Rankin, Sandra Devine

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting. Teleconference introductions were made and apologies were received from the above mentioned.</p> <p><b>2. Minutes of Meetings held on 23 August 2019</b></p> <p>The minutes of the meeting held on 23 August 2019 were accepted with the following amendment:-</p> <ul style="list-style-type: none"> <li>- Page 1, last para - should read [REDACTED]</li> <li>- Added in Draft: See also Final Minute with minor changes by JH on 4<sup>th</sup> Sept 2019 marked in yellow.</li> </ul> <p>• <b>Actions Update:</b></p> <p>John Hood and Darryl Conner visited PR 123 where the pigeon ingress was identified in early December. This was to check the proximity of Plant Room D to Plant Rooms serving areas A and C. In PR 123 (D) - AHU 05 and 01 are the nearest to the area of pigeon ingress and fouling (of December 2019), then AHUs 02 and 04 were next and then AHUs 07 and 03 were at the far end of the Plant Room with AHU06 after AHU 07. John Hood said that AHU 07 (according to the Maintenance Log) had been opened in week ending 11<sup>th</sup> November 2018. although there was no date noted on the PPM itself. However we discovered that it had been signed on the AHU itself and that it had been opened on 29<sup>th</sup> November 2019. JH noted that this was only 6 days prior to the pigeon ingress being investigated by GP Environmental (added in Draft by JH: see their Document entitled 'Feral Pigeon Removal/Repellant Activities and detailed Cleaning/Sanitisation of Plantrooms at QEUH – Glasgow (from December 2018 to 08.03.2019). Tom Steele asked Darryl Conner if he can speak to the person who opened the AHU to see if they noticed any pigeon ingress.</p> <p>On looking at the plan of the Ward areas on level 4 (QEUH) there is a 'Facilities' corridor which is runs between the entrances to Wards 4B and 4C (see floor plan), with essentially Wards 4B and 4A 'above' this corridor (on the cross sectional plan) and Wards 4C and 4D below the plan. Interestingly one half of this corridor is served by PR123/07 (D) and the other half of corridor is served by PR124/07(C). This further emphasises the very complex nature of the ventilation systems of this hospital. We have previously noted that there are issues with intermittent reversals of airflow on the intersection of this corridor with 4B and 4C (with F7 filtered air moving into the bottom of the BMTU corridor (by Bed nos in the 70's). It will be important to understand (particularly) the airflow between 4D and 4C, especially if the movement of air is from 4D to 4C.</p>	DC

Item	Action
------	--------

Eddie McLaughlan to review the discussion noted in the minutes of 21/06/19 (page 8, item 7.1 - Hypotheses) and change as appropriate. John Hood forwarded the minute of 21<sup>st</sup> June for Eddie McLaughlan to comment on and Eddie replied with the following:

“Not sure this is from memory, but I am content with the text highlighted in yellow in your attachment, including your addition. I’d be thoughtful about any inferences beyond the text, particularly in reference to the case of additional guidance. The need for specialist ventilation guidance is on a very long list of priorities and although we are hopeful of being in a better position for resource in the future, nothing is guaranteed”.

Susie Dodd to check with Eddie if he is happy with the wording in the minutes.

### 3. Update on Air Testing

Very little air sampling has been carried out in Ward 4C but John Hood confirmed that there have been no new positive *Cryptococcus* spp. isolated.

Air sampling reports (06/06/19 to 26/07/19).

Date	Area	Reported 06/06/19	Reported 21/06/19	Reported 28/06/19	Reported 26/07/19
14/05/19	Ward 4C Room 73	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	-	-
14/05/19	Ward 6A Corridor	-	confirmed as <i>C. diffluens</i>	-	-
15/05/19	Ward 6A Electrical Riser	<i>C. uniguttulatus</i>	confirmed as <i>C. uniguttulatus</i>	-	-
15/05/19	Ward 4B corridor (near rooms in 70's)	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	-	-
21/05/19	Ward 6A Room 1	presumptive <i>C. albidus</i>	confirmed as <i>C. diffluens</i>	-	-
29/05/19	Lab Block Level 1 Reception	-	<del>presumptive <i>C. albidus</i></del>	confirmed as <i>C. diffluens</i>	-
29/05/19	Blood Bank LB-L1 (huddle)	-	<del>presumptive <i>C. uniguttulatus</i></del>	confirmed as <i>C. uniguttulatus</i>	-
29/05/19	Ward 4C Riser 223	-	-	confirmed as <i>C. uniguttulatus</i>	-
29/05/19	Main Corridor Training Board Lab Block L1	-	<del>presumptive <i>C. albidus</i></del>	confirmed as <i>C. albidus</i>	-
11/06/19	Ward 6A Corridor (Rooms 20-23)	-	presumptive <i>C. albidus</i>	-	confirmed as <i>C. diffluens</i>
11/06/19	Ward 4C Room 70	-	presumptive <i>C. albidus</i>	-	confirmed as <i>C. diffluens</i>
17/06/19	Ward 6A Treatment Room/POD	-	-	<del>presumptive <i>C. albidus</i></del>	confirmed as <i>C. diffluens</i>
17/06/19	Ward 6A Corridor Nurses Station	-	-	? <i>C. albidus</i>	confirmed as <i>C. diffluens</i>
27/06/19	Ward 6A Clean Utility Room	-	-	-	confirmed as <i>C. diffluens</i>
28/06/19	4B (BMTU) Corridor 70's	-	-	-	confirmed as <i>C. diffluens</i>

Item

Action

03/07/19	Ward 6A Room 24	-	-	-	confirmed as <i>C. diffluens</i>
03/07/19	Ward 6A Room 2	-	-	-	confirmed as <i>C. uniguttulatus</i>
15/07/19	Ward 6A Room 24				confirmed as <i>C. diffluens</i>

**FIGURE 1****'Cryptococcal species' isolates from air sampling 21 Dec 2018 to Jun/Jul 2019**

	<i>N. diffluens</i>	<i>N. albida</i>	<i>N. albido-similis</i>	<i>F. uniguttulata</i>	<i>Cutan. curvatus</i>	ID TBC	Total
<b>*Dec 21<sup>st</sup> 2018</b> n=53	13	0	1	0	1 Roof#	1	<b>16</b>
<b>Jan 19</b> n=422	24	3	0	0	0	0	<b>27</b>
<b>Feb 19</b> n=440	0	0	0	1	0	0	<b>1</b>
<b>Mar 19</b> n=320	4	0	0	1	0	0	<b>5</b>
<b>Apr 19</b> n=334	2	0	0	0	0	0	<b>2</b>
<b>May 19</b> n=420	7	3	0	3	0	0	<b>13</b>
<b>Jun 19</b> n=448	8	0	0	0	0	0	<b>8</b>
<b>Jul 19</b>	3	0	0	1	0	0	<b>4</b>
<b>Total sf</b>	<b>61</b>	<b>6</b>	<b>1</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>76</b>

sf = so far

**FIGURE 2****Positive Crypto spp. results by month and per number of samples**

Month	No of positives	No of samples
<b>December 21<sup>st</sup> 2018 (1day)</b>	16	53
<b>Jan 19</b>	27	422
<b>Feb 19</b>	1	440
<b>March 19</b>	5	320
<b>April 19</b>	2	334
<b>May 19</b>	13	420
<b>June 19</b>	8	448
<b>July 19</b>	3	To be confirmed

Item	Action
<p><b>4. Actions from 23 August 2019 Meeting</b></p> <p>Actions from 23/08/19 were updated during the meeting and noted in the minutes.</p>	
<p><b>5. <u>Further Actions Required</u></b></p>	
<p>i. <b>21/06/19</b> - Continue to carry out air sampling in Wards 6A, 4B and 4C. <b>26/07/19 - Action ongoing.</b> <b>09/0819</b> – Difficult to carry out air sampling due to the ongoing separate issues associated with Ward 6A. <b>16/08/19</b> Ward 4C has not been sampled recently and will be in the next few weeks. <b>23/08/19</b> Air sampling has not been carried out in Ward 4C due to the ongoing issues in Ward 6A. <b>02/09/19</b> There have been no new positive <i>Cryptococcus</i> species isolated. <b>Action ongoing.</b></p> <p>ii. <b>21/06/19 - Action ongoing:</b> Ian Powrie asked Eddie McLaughlan for HFS to confirm endorsement that HFS and the authorised engineer agreement that CVG vents are no longer required. Ian Powrie has received background information about ventilation and gas leaks from Ian Storrar but needs confirmation of endorsement. Ian Powrie added that ventilation is only needed where there are mechanical joints on gas lines. Eddie McLaughlan reported that Ian Storrar is currently on annual leave. Eddie McLaughlan will arrange for HSF to confirm endorsement within this time. <b>28/06/19</b> – Ian Powrie reported that Ian Storrar is still to confirm.</p>	<p>JH</p>
<p><b>26/07/19</b> - Darryl Conner reported that Ian Storrar was asked (by Ian Powrie) to confirm endorsement of removal of the CVGs. Annette Rankin stated that Ian Storrar is likely involved in the current ongoing issues in NHS Lothian and suggested he is reminded to take this action forward. Darryl Conner will contact Ian Storrar as suggested. <b>02/09/19</b> HFS to confirm endorsement of the removal of the CVGs. <b>Action ongoing.</b></p>	<p>HFS</p>
<p>iii. <b>21/06/19 p3: bp2:</b> Colin Purdon advised that the Fire Strategy required that the doors to be available for lateral evacuation of patients and staff in both directions, but he would review options of temporary seals with the site Fire Advisor. <b>29/07/19</b> Action outstanding. To be completed. <b>09/08/19</b> Darryl Conner reported that draft seals have been fitted on the Ward 4B door that is locked on the outside, through to the doctor's room and it is only Estates that go in and out of that area. Darryl Conner will discuss with the Fire Advisor. <b>23/08/19</b> Darryl confirmed that he has spoken to Frank Deacon, Fire Officer and he is reviewing this. He will provide an update at the next meeting. <b>02/09/19</b> Darryl updated that there is a meeting of the Specialist Ventilation Group next week and this will be discussed there, although he has had verbal agreement regarding this. <b>Action ongoing and if Fire Officer agrees this action will be transferred to the Specialist Ventilation Group.</b></p>	<p>DC</p>
<p>iv. <b>26/07/19:</b> John Hood referred to the tube system, and will need to discuss this with Colin Purdon in the next couple of weeks, who will in turn talk to the engineers from Swisslog. In order to understand and find out (Level 3) the possibility of air being dragged from the Plant Room to the PODs of areas such as in 6A, 4B and 4C. This is specimen transport tubes that should all, query, be under vacuum. John Hood however wants to confirm that air cannot be dragged in (e.g. from the Plant Rooms) and then pushed out into critical areas via the tube system. <b>09/08/19</b> - John Hood stated that he needs to understand how this system works and asked Colin Purdon to speak to the Swisslog engineers and arrange a meeting for him to discuss this. It is John Hood's view that we should probably not be putting the tube system into the heart of critical areas such as BMTU or Haemato-oncology areas with high risk patients. Peter Hoffman stated that he would like to retract what was said last meeting about the vacuum system and John Hood agreed to remove this comment. The issue of the tube system was also one of the original hypotheses. Was it possible that fungal/yeast spores might gain entry into the air of such critical areas via the Tube system? <b>16/08/19</b> John Hood commented that if we think that the tube system is pushing (or</p>	



Item	Action
<p>pulling) air into these areas from the Plant Rooms then, we should consider this in individual critical wards (particularly BMTU, 6A and 4C etc) as the air being unfiltered, and therefore another potential route of airborne spores, so a risk. Mitigation will be required if above is correct. <b>23/08/19</b> John Hood agreed to contact Adrian from Swisslog next week. <b>02/09/19</b> John Hood contacted Adrian from Swisslog on 26 August. He said that he received an email from Susie Dodd, HPS asking if there was a filter on the air intake in the Plant Room? It was confirmed there was a 'filter' on the intake in the Plant Room (made of wire mesh and plastic foam) i.e. will only keep large objects out, not fungal spores etc. He said there is air being sucked in and exhausted from the Plant Room and this then pushes the POD down the system to the Treatment/Prep Room of the Ward. However, this is where drugs are made up. We do have some air samples next to the pods in 4B, 4C and 6A – which JH will review. John H informed the Group that Adrian had stated that as the POD comes into the ceiling void above the Ward, the air pushing the POD is exhausted into this void. However JH was not sure if some 'dirty' air might still exhaust into the Treatment/Prep Room. Darryl wondered about this air exhausting into the void above the ceilings and the presence also of CVG's. Tom Steele commented that there was a smell detected in the Treatment/prep room in Ward 6A and asked if there was a CVG in the Treatment/prep room. Darryl advised that the smell was due to the adhesive used on the lino and the then use of actichlor which creates this smell. He said the fire compartment is split into 3 ways from top to bottom and if there is any discharge it would be into that space alone. Added in draft – Darryl needed to look at the drawings of this and will update at the next meeting whether further investigation will be required.</p>	<p>JH</p> <p>DC</p>
<p>Susie stated that if this was a significant ingress of unfiltered air it would occur in all other Treatment/prep rooms, thinking that we would be seeing infective consequences related to these other Treatment/prep rooms as well.</p>	<p>SD</p>
<p>Peter Hoffman felt that a small amount of unfiltered air coming into a Prep/Treatment room would have little effect on the air quality in a patient room. If patients are in positive pressure rooms (with air uniformly leaking outwards) and ventilated with HEPA filtered air. Peter Hoffman also said with regards to the air if microbe retentive filters could be fitted to the pneumatic transport system this would remove any airborne risk, though the significance is dubious. He thought that this was an insignificant source if the <i>C. neoformans</i> was getting to patients via the air.</p>	<p>PH</p>
<p>John Hood replied that if there are no HEPA filters in this area (as in all wards, including 4B) this could still be a problem but reported that the counts in Ward 4B rooms are mostly 0 cfu's for fungi (but not always).</p>	
<p>Tom Steele asked if there is any opportunity to improve the level of filtration at the Plant Room and Darryl replied that whatever gets into the Plant Room will be essentially similar to the outside air. John Hood suggested that if further investigation surrounding the risk associated with the Tube system in High Risk areas that it should be taken over by the Specialist Ventilation Group/HFS. <b>Action ongoing.</b></p>	<p>DC</p> <p>PH</p>
<p>v. John Hood asked if anyone is putting together all the mitigation from all of the previous actions and hypotheses. Colin Purdon agreed to arrange to get the mitigation recorded. <b>23/08/19</b> Colin advised that he has started putting together the mitigation from all the previous actions. <b>02/09/19</b> Darryl updated that Colin Purdon has started this.</p>	<p>CP</p>
<p>vi. <b>06/08/19</b> An e-mail response was received from Eddie McLaughlan on 06/08/19 as noted below.</p>	
<p>Eddie McLaughlan offered in his e-mail to have a telephone discussion with John Hood to clarify anything further:</p>	

Item	Action
<p>“The first action on me was I think a double check with Ian Storrar about vents in ceilings containing medical gas pipework without joints, but he’s completely tied up at the moment. I think I said at the meeting that as you need to seal the ceiling for IC purposes and there are no joints in the pipework above the ceiling, it would take a major mechanical failure to compromise the pipework and as that seemed unlikely removing the vents and using a gas alarm seemed reasonable. That said, we are only a source of advice; the risk assessment should be done by the Board with advice from your Authorising Engineer as necessary.”</p> <p>‘I’ve read the second action twice and I’m not entirely clear what I’m commenting on but hopefully the following will cover it. The source of the continuing Cryptococcus can only really be the outside air or infiltration from within the building and, as it is being detected in non HEPA filtered spaces and not in HEPA filtered spaces (I presume this is still the case, then the outside air looks a likely candidate.’</p> <p>‘On the subject of guidance, there is a review of the ventilation guidance underway at present and whilst we have asked for more clarity around specialised ventilation for susceptible patients, it is not yet clear whether we will get it. If not we will need to do something specifically for Scotland, for which there is currently neither financial nor staff resource, and no progress is likely to be made on this whilst the RHCYP&amp;DCN review is ongoing. In the meantime, it is important that clinicians understand the level of protection available in the various environments within QEUH and place patients accordingly.’</p> <p><b>26/07/19:</b> Eddie McLaughlan to review the discussion noted in the minutes of 21/06/19 (page 8, item 7.1 - Hypotheses) and change as appropriate. <b>09/08/19 –</b> As mentioned earlier John Hood will telephone/email Eddie McLaughlin and as part of that discussion will ask for re-wording from Eddie McLaughlin. <b>16/08/19</b> John forwarded the minute of 21<sup>st</sup> June for Eddie McLaughlan to comment on. <b>23/08/19</b> Eddie replied with the following:</p> <p>“Not sure this is from memory, but I am content with the text highlighted in yellow in your attachment, including your addition. I’d be thoughtful about any inferences beyond the text, particularly in reference to the case of additional guidance. The need for specialist ventilation guidance is on a very long list of priorities and although we are hopeful of being in a better position for resource in the future, nothing is guaranteed”. See page 2 of this Minute – Susie Dodd to ask Eddie if he is happy with the above. <b>Action ongoing</b></p>	
<p><b>6. Draft Report for Comments</b></p> <p>John Hood is working on the draft report and received comments from Tom Steele.</p> <p>In the report he said that he will include a brief explanation of the ecology and biology of <i>C. neoformans</i>, the dialogue regarding the tube system and the spreadsheets with air sampling results regarding Wards 6A, 4C and 4B.</p> <p>The report will also include how little we really know about <i>C. neoformans</i> as well as its association with pigeon guano (which in itself is complex) as this yeast-like fungus can also be associated with rotting wood or vegetation.</p> <p><b>Closed / Completed Actions</b></p> <ul style="list-style-type: none"> <li>• <b>(06/06/19) p3: bp1:</b> Ian Powrie will discuss IPS panels being sealed with Darryl Conner as some of the underside of WHBs panels were not done. <b>(21/06/19)</b> Colin Purdon picked up with Darryl Conner and reported all have been re-checked and all sealed. There were 2 rooms unable to get access to and this is still the same position today but will be re-checked. <b>(28/06/19)</b> Darryl Conner confirmed all now done.</li> </ul>	

Item	Action
<p>Ian Powrie reported that of all the rooms checked, the 2 rooms were still be checked one of which was Room 5. Darryl Conner will confirm by e-mail that Rooms A and B, and Ward 6A Room 5 is the only one not sealed on the underside. Ian Powrie and John Hood had inspected this area. <b>(09/08/19)</b> Darryl Conner confirmed as above. <b>Action complete.</b></p> <ul style="list-style-type: none"> <li>• <b>(06/06/19) p3: Item 4:</b> There is concern about the differences in the pressures in 4C Rooms 66-75. Rooms 66 to 74 are between 0.4 to 2.9 Pa from rooms to corridor but Room 75 at the end of the corridor is consistently negative at -0.3 (i.e. air moving from corridor to room). Colin Purdon to make adjustments to the ventilation to make this room slightly positive. <b>(28/06/19)</b> Ian Powrie clarified this was the room at the end of the corridor and is still to be done. Ian Powrie asked Darryl Conner to be careful not to affect the pressure regimes for the area when adjustments are made. <b>(26/07/19)</b> Darryl Conner agreed to make adjustments to the ventilation to make this room slightly positive. <b>(09/08/19)</b> It was noted that this action has gone to the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></li> <li>• <b>06/06/19 - Action closed:</b> Item in relation to Pest Control.</li> <li>• <b>06/06/19 - Action closed - transferred:</b> Sandra confirmed IPC has investigated laundry storage and process. This action to be removed from the group's remit. <b>Action complete.</b></li> <li>• <b>06/06/19 - Action closed:</b> It was confirmed that final inspection of Ward 6A Room 5 has taken place. Action complete - see Bp 6, below.</li> <li>• <b>06/06/19 - Action closed - transferred:</b> It was agreed and noted that overall ventilation design for Ward 2A is the responsibility of another forum therefore it has been removed as an action for this group.</li> <li>• <b>06/06/19 - Estates</b> are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he discussed this with Multiplex. He said that the green roof was part of the design and the sedum can be removed and an alternative ballast material installed. He said if we were to move the items from the roof we could cause further disturbance? John Hood said he would be concerned if <i>Haemato-oncology</i> patients were to go on to this roof but he was informed there is no access to it for these patients. Tom Steele said that he is of the opinion to maybe review this in the future but to leave it as is at the moment. <b>21/06/19 - no update. 26/07/19 - Action closed meantime.</b></li> <li>• <b>21/06/19 -</b> On 29 May 2019, inspection above the ceiling of Room 5 in Ward 6A showed that the services coming into the space were well sealed and in good condition. The flexible duct to the chilled beam was found to be intact. <b>26/07/19 - Action closed.</b></li> <li>• <b>21/06/19 - Action closed:</b> Ian Powrie reported that fluid dynamics modelling around the helipad/QEUH/RHC report was now completed (see Report Rev 3). The IMT Expert Advisory Sub-Group accepted the findings of the CFD Report.</li> <li>• <b>21/06/19 - Action complete:</b> A problem with the chilled beams was identified and Ian Powrie explained this was a mechanical joint failure causing a leak. On this occasion it was a loss of low temperature hot water heating circuit that resulted in a change in temperature causing contraction of the pipework and fittings resulting in a slight leak. Colin Purdon added this was reported as a series of drips and although not for this group, it is being mentioned due to the mechanical failure. Colin Purdon has met with Teresa Inkster and Christine Peters. The ceiling tiles affected by water were replaced, and Actichlor was used to wash down. All appropriate IPC measures have been taken (Ward 6A children - x8 rooms).</li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li>• <b>21/06/19 p4: para2:</b> John Hood mentioned that a mechanical riser in 4B had a water leak this morning. Colin Purdon explained that this is the low temperature water return pipe, and that the valve body gland has a slight leak. The valve will be changed today. <b>(29/07/19)</b> Darryl Conner confirmed as done. <b>Action complete.</b></li> <li>• <b>21/06/19 p5: para3:</b> Ian Powrie asked if there is a risk between CF and haemato-oncology if there is air movement between them. John Hood agreed to discuss this with Teresa Inkster. <b>(09/08/19)</b> John Hood reported that Teresa Inkster has concurred: no significant risk. <b>Action complete.</b></li> <li>• <b>21/06/19 p5: para5:</b> Colin Purdon has advised that intumescent gasket seals would be fitted. <b>(26/07/19)</b> Darryl Conner confirmed that the intumescent gasket riser seals has been completed. The only action outstanding in relation to this is the installation of the false ceilings. <b>(09/08/19)</b> Darryl Conner reported that installation of the false ceilings is still to be done but that this action is for the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></li> <li>• <b>21/06/19 p7: item 7: para2:</b> On 25 July 2019, Colin Purdon to have walk round with Fire Safety Advisor shortly. <b>(26/07/19)</b> Colin Purdon will set-up a meeting with the Fire Officers soon. <b>(09/08/19)</b> Colin Purdon reported that a walk round with the Fire Advisor is still to be arranged. <b>(16/08/19)</b> Sandra Devine commented that she had met with clinical and managerial representatives from 4B and had walked the patient pathway through the ward. After due consideration it was felt that automatic door closures would impede the movement of patients through the ward especially in emergencies therefore the meeting with Colin and the Fire Officer is no longer required. <b>Action complete</b></li> <li>• <b>21/06/19 p8: item 13:</b> All but two IPS panels have been confirmed as complete. <b>(26/07/19)</b> <b>Action complete.</b></li> <li>• <b>21/06/19 - Action ongoing: Carry Forward</b> - Sandra Devine was then not in attendance to provide an update that a discussion is still to take place with Teresa Inkster and possibly Myra Campbell (Clinical Services Manager) in relation to self-closers on doors in Ward 4B, and that IPC team is making sure that staff understand the importance of keeping doors to patient rooms closed and also keeping doors to ancillary areas closed as much as possible. <b>28/06/19</b> - Darryl Conner asked about self-closers. Ian Powrie stated this is what Sandra Devine was going to discuss with clinical colleagues. <b>26/07/19</b> - Sandra Devine reported that two IPC Nurses visited Ward 4B to emphasise the importance of closing doors, and signage has also been put up. Sandra Devine is arranging to meet with Myra Campbell to discuss self-closers on doors and will explain the issue of the 4B corridor and how the problem exists. Darryl Conner pointed out that practically this may be difficult to put in place as every door is bespoke and takes around 8 weeks from order, effectively taking rooms out-of-use. Sandra Devine will make this a consideration. <b>Action ongoing. 09/08/19</b> - Sandra Devine met with Myra Campbell on 08/08/19 and they both visited Ward 4B. The overwhelming opinion was not to have self-closers on doors in Ward 4B therefore this action should not be taken forward. <b>Action complete.</b></li> <li>• <b>21/06/19 - Action ongoing: Carry Forward</b> – Colin Purdon will check with the contractors if the rooms have 30-minute fire doors fitted at present. Colin Purdon previously discussed self-closers on doors with local Fire Safety Advisors and reported there would be no issues with this proposal. It was noted that discussion with the clinical teams would need to be held in relation to beds being taken out etc. <b>26/07/19</b> - deferred until discussions with relevant parties have taken place as noted in the minutes and also as noted, a walk round with the Fire Advisor to be arranged. <b>Action ongoing. 09/08/19</b> – Colin Purdon stated that in light of Sandra Devine’s update (previous action) this action is no longer relevant. Colin Purdon added that fire doors are fitted adjacent to the fire exit points. Sandra Devine added that ward staff are aware of why this was being asked. <b>Action complete.</b></li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li> <p>• <b>21/06/19 - Action ongoing: Flooring: Carry Forward</b> - Colin Purdon updated that the action plan has been prepared and is being used to programme and prioritise the issues previously identified. The report was put together by the flooring contractor and Ward 6A has some minor issues to be rectified. <b>26/07/19 – Action carry forward / ongoing. 09/08/19 –</b> It was agreed this action should be taken to another forum. Colin Purdon added there is a programme ongoing for Level 7 managed by Kerr Clarkson. <b>Action complete.</b></p> </li> <li> <p>• <b>21/06/19 - Action ongoing:</b> It was confirmed that the engineering risers have been inspected however this action will be kept as ongoing until completion of the doors to risers' rooms are sealed. Ian Powrie asked Colin Purdon to arrange to have the doors sealed over the next three weeks (by 27/06/19). Colin Purdon reported that the frames have been sealed. Darryl Conner is taking forward the action for the risers. <b>28/06/19 -</b> On hold with Teresa Inkster as mentioned earlier (page 3 bp1). Ian Powrie asked Darryl Conner to check if the seals itself are fine to adjust the door, but if not, to put a gasket in.            Ian Powrie added that only one was looked at in Ward 6, but asked that all of the doors are sealed air tight (sweep Wards 4B, 6A, 4C for all riser doors). <b>26/07/19 -</b> Fire Advisor to endorse and if IPC can sanction, then this will be done. John Hood asked if Darryl Conner is in a position to comment.            Darryl Conner reported that Teresa Inkster wanted this item discussed at the Specialist Ventilation Group and following discussion at the first meeting put forward their intentions and what was required to accommodate the work. However Teresa Inkster had responded that the downtime would cause more risk than what the existing risk is in relation to the risers. Darryl Conner stated that in the interim a control of the risers. The doors are sealed, but the adjacent ceilings and floors of the risers have not yet been done. Clarification from the Fire Advisor is required to ensure that there is no breach of fire integrity as they are horizontally sealed to each level. Darryl Conner stated this will need to be discussed at the Specialist Ventilation Group and will ask for this to be included as an agenda item for discussion. <b>Action ongoing. 09/08/19 –</b> Darryl Conner reported that it was proposed at the Specialist Ventilation Group a level of modification and the process of sealing the risers, and the possibility of doing this at higher and lower floors. It was recognised that there would be disruption. Darryl Conner thinks the group might be satisfied with the intumescent seals and the doors are under lock and key therefore not regarded as an immediate risk.</p> <p>Peter Hoffman commented that if everything is adequately sealed at one point in time, there is no guarantee it is going to be like that in a few years (or less) from now, and is a temporary solution. So get things sealed but need to get the air flows correct and the air flow in the right direction. It was noted that Teresa Inkster has taken this over in the Specialist Ventilation Group. <b>Action closed and transferred to the Specialist Ventilation Group.</b></p> </li> <li> <p>• <b>21/06/19 - Action ongoing:</b> Ian Powrie updated that priority has been given to Wards 6A and 4C for removal of the Ceiling Vent Grilles (CVG's). Ward 4B has been done. Timeline will be done, but Wards 6A and 4C is expected to be done in the next couple of weeks, ongoing for removal of CVGs in other clinical wards. <b>28/06/19 -</b> SCRIBE sitting with IPC. Ward 4B has been done. Wards 6A and 4C have yet to be done – <b>SCRIBE required. 26/07/19 -</b> Darryl Conner has asked Teresa Inkster about replacing CVGs in Ward 4B with ceiling tiles. There was one action was to replace CVGs in Ward 4C, but there is a problem with increased permeability of the space. It has already been established that the notional average is <b>1.2 to 2 Pa</b> to replace CVGs. It has been suggested it might be possible to trim back the extract in the en suites, but the air change in the en suites would be reduced slightly. This information has gone to the Specialist Ventilation Group. Darryl Conner reported that the area from 4B into 4C, at time of measurement is showing negative, but on investigation and measurement outside 4C Room 75, it was recorded to be 1.2 to 2 Pa because of the opening and closing of the various doors and air moving into 4D (as door often can be kept open).</p> </li> </ul>	

Item	Action
<p>Without installation of ward lobbies into mitigating areas, the closing or opening of any one door alters the pressure regimes.</p> <p>Darryl Conner has submitted SCRIBES for the process for removal of CVGs, and all are the same apart from the level of protection for each department being moved. Ward 6A is next on the list, which requires feedback from Teresa Inkster, but can be actioned immediately if required.</p> <p>John Hood thought the SCRIBE employed in 4B could be used for the other areas as same work is being carried out and had been successfully used in a more critical area. Darryl Conner explained that effectively it is the same SCRIBE and is used as a template however each area requires sign-off. <b>Action ongoing – SCRIBE required. 09/08/19</b> - Amendment as noted at the start of the minute, that the notional average is 1.2 to 2 Pa. Darryl Conner commented that Teresa Inkster may not be keen to have CVGs removed. <b>Action ongoing – SCRIBE required.</b></p> <p><b>N.B. Teresa must be happy before any CVG's removed she would rather have as much positive pressure in rooms as possible. Action ongoing and transferred to the Specialist Ventilation Group.</b></p> <ul style="list-style-type: none"> <li>• <b>28/06/19 p2: bp1:</b> There had been discussion around air in the corridor from Ward 4C into Room 75, and Ian Powrie had explained that the commissioning engineer will need to review all of the rooms and check that correction has not made things worse, with a view to increasing the pressure in Room 75 to the same range as the other rooms. <b>(26/07/19)</b> Darryl Conner confirmed he will do the pressure change but will ask <b>Ian McKenzie</b> to do the re-balance. <b>(09/08/19)</b> John Hood reported that the Specialist Ventilation Group will need to discuss the air pressures. Darryl Conner explained that the doors need to be closed because when the doors are open this could force the rooms into a negative state from the corridor. <b>(16/08/19)</b> It was noted that it is only through discussion at meetings that it was realised the effect of doors being left open affecting all of the pressures, therefore ward staff would definitely not be aware of these issues. <b>Action closed and transferred to the Specialist Ventilation Group.</b></li> <li>• <b>26/07/19</b> - Darryl Conner confirmed that Room 5 6A was done and has been told that the other room has also been done. Darryl Conner will check both have been sealed and will confirm this. <b>Action ongoing. 09/08/19 – Darryl Conner confirmed Action complete.</b></li> <li>• <b>26/07/19:</b> John Hood to continue doing walk round of Plant Rooms. Awaiting results of air samples from the Level 12 Plant Rooms tested on 25 July 2019. <b>09/08/19 –</b> John Hood reported that walk round of <b>all</b> of the Plant Rooms has been done at QUEH and RHC. Plant Room 31 has AHUs marked both 21 and 31 – which is a little confusing as the first number (i.e. 2 or 3 should indicate which floor that Plant Room is on!). No evidence of pigeon ingress or droppings. Plant Room 22 is in the Adult QUEH and is huge! Again the only thing discovered there was some water on the floors but apparently this is from the heat exchangers (affected by the weather), in both QUEH and RHC. Plant Room 22 is very clean, with no evidence of pigeon ingress or droppings. There was water on the floor in Plant Room 21 and there was still some general debris in it but this will be cleaned this week. There was no evidence of pigeon ingress or droppings. Plant Room 41 (RHC), again, the floor needed a brush, but there was no evidence of pigeons or pigeon droppings. Some light ingress was noted but above the area of light ingress there is netting fitted so pigeons should not get in. Plant Room 41A (RHC) is a small plant room, with no evidence of any pigeon ingress or droppings. John Hood will visit the Plant Rooms serving the labs next because two areas in Floor 1 Lab Block have grown <i>Cryptococcus</i> spp. (one <i>C. albidus</i> and one <i>C. diffluens</i>). These Plant Rooms are completely separate from the Plant Rooms in either QUEH or RHC.</li> </ul>	

Item	Action
<p><b>16/08/19</b> John Hood visited Plant Rooms on level 3, 2 and 4 and none of these areas had evidence of pigeon ingress or evidence that the pigeons are getting into these Plant Rooms (indeed very difficult to see how they could). Colin Purdon confirmed that there are F7s filters in the AHUs serving the Lab building. <b>Action closed.</b></p> <ul style="list-style-type: none"> <li>• <b>26/07/19:</b> Colin Purdon to get the GP Environmental (Pest Control Company) to give an update on their formal cleaning and ongoing identification of problems in the Plant Rooms. Darryl Conner will discuss this with Colin Purdon on 28/07/19. Of note, this will be required for part of the final discussion and Report. <b>09/08/19</b> – Colin Purdon will request a report from the pest control company as noted. <b>16/08/19</b> – Report from GP Environmental was received by Colin on 15<sup>th</sup> August 2019. Report to be sent round the group and discussed further at next meeting. <b>Action closed.</b></li> <li>• <b>26/07/19:</b> John Hood to inform Liz Johnson at the Reference Laboratory in Bristol of the cryptococcus isolates and will forward the breakdown of this, in order to discuss the implications and any views, and if these are valid surrogate markers for <i>C.neoformans</i>. <b>09/08/19</b> – John Hood will speak to Liz Johnson next week. <b>16/08/19</b> John discussed with Liz Johnson and she said that neither can really be considered as surrogate markers for <i>C. neoformans</i> but it was difficult to be dogmatic about it. <b>Action closed.</b></li> </ul>	
<p><b>6. AOCB</b></p>	<p>Nil to update.</p>
<p><b>7. Date and Time of Next Meeting</b></p>	<p>The next meeting will be held at 2.00pm on Monday 16<sup>th</sup> September 2019 in Facilities Meeting Room 5, Ground Floor, Laboratory Building, QEUH.</p>

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Meeting Room MRO.13 Ground Floor, Admin Building, Queen Elizabeth University Hospital

**Monday 2 September 2019 at 11.00am DRAFT 3**

**Present:** Dr John Hood (chair), Darryl Conner, Tom Steele, Ann Lang (minutes)

**Teleconference:** Peter Hoffman, Susie Dodd

**Apologies:** Annette Rankin, Sandra Devine, Colin Purdon

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting. Teleconference introductions were made and apologies were received from the above mentioned.</p> <p><b>2. Minutes of Meetings held on 23 August 2019</b></p> <p>The minutes of the meeting held on 23 August 2019 were accepted with the following amendment:-</p> <ul style="list-style-type: none"> <li>- Page 1, last para - should read [REDACTED]</li> <li>- Added in Draft: See also Final Minute with minor changes by JOHN HOOD on 4<sup>th</sup> Sept 2019 marked in yellow.</li> </ul> <p>• <b>Actions Update:</b></p> <p>John Hood and Darryl Conner visited PR 123 where the pigeon ingress was identified in early December. This was to check the proximity of Plant Room D to Plant Rooms serving areas A and C. In PR 123 (D) - AHU 05 and 01 are the nearest to the area of pigeon ingress and fouling (of December 2018), then AHUs 02 and 04 were next and then AHUs 07 and 03 were at the far end of the Plant Room with AHU06 after AHU 07. John Hood said that AHU 07 (according to the Maintenance Log) had been opened in week ending 11<sup>th</sup> November 2018. although there was no date noted on the PPM itself. However we discovered that it had been signed on the AHU itself and that it had been opened on 29<sup>th</sup> November 2018. John Hood noted that this was only 6 days prior to the pigeon ingress being investigated by GP Environmental (added in Draft by JOHN HOOD: see their Document entitled ' Feral Pigeon Removal/Repellant Activities and detailed Cleaning/Sanitisation of Plantrooms at QEUH – Glasgow (from December 2018 to 08.03.2019). Tom Steele asked Darryl Conner if he can speak to the person who opened the AHU to see if they noticed any pigeon ingress.</p> <p>On looking at the plan of the Ward areas on level 4 (QEUH) there is a 'Facilities' corridor which runs between the entrances to Wards 4B and 4C (see floor plan), with essentially Wards 4B and 4A 'above' this corridor (on the cross sectional plan) and Wards 4C and 4D below the plan. Interestingly one half of this corridor is served by PR123/07 (D) and the other half of corridor is served by PR124/07(C). This further emphasises the very complex nature of the ventilation systems of this hospital. We have previously noted that there are issues with intermittent reversals of airflow on the intersection of this corridor with 4B and 4C (with F7 filtered air moving into the bottom of the BMTU corridor (by Bed nos in the 70's).</p>	<p><b>DC</b></p>



Item	Action
------	--------

It will be important to understand (particularly) the airflow between 4D and 4C, especially if the movement of air is from 4D to 4C.

Eddie McLaughlan to review the discussion noted in the minutes of 21/06/19 (page 8, item 7.1 - Hypotheses) and change as appropriate. John Hood forwarded the minute of 21<sup>st</sup> June for Eddie McLaughlan to comment on and Eddie replied with the following:

“Not sure this is from memory, but I am content with the text highlighted in yellow in your attachment, including your addition. I’d be thoughtful about any inferences beyond the text, particularly in reference to the case of additional guidance. The need for specialist ventilation guidance is on a very long list of priorities and although we are hopeful of being in a better position for resource in the future, nothing is guaranteed”.

Susie Dodd to check with Eddie if he is happy with the wording in the minutes.

SD

### 3. Update on Air Testing

Very little air sampling has been carried out in Ward 4C but John Hood confirmed that there have been no new positive *Cryptococcus* spp. isolated.

Air sampling reports (06/06/19 to 26/07/19).

Date	Area	Reported 06/06/19	Reported 21/06/19	Reported 28/06/19	Reported 26/07/19
14/05/19	Ward 4C Room 73	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	-	-
14/05/19	Ward 6A Corridor	-	confirmed as <i>C. diffluens</i>	-	-
15/05/19	Ward 6A Electrical Riser	<i>C. uniguttulatus</i>	confirmed as <i>C. uniguttulatus</i>	-	-
15/05/19	Ward 4B corridor (near rooms in 70's)	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	-	-
21/05/19	Ward 6A Room 1	presumptive <i>C. albidus</i>	confirmed as <i>C. diffluens</i>	-	-
29/05/19	Lab Block Level 1 Reception	-	presumptive <i>C. albidus</i>	confirmed as <i>C. diffluens</i>	-
29/05/19	Blood Bank LB-L1 (huddle)	-	presumptive <i>C. uniguttulatus</i>	confirmed as <i>C. uniguttulatus</i>	-
29/05/19	Ward 4C Riser 223	-	-	confirmed as <i>C. uniguttulatus</i>	-
29/05/19	Main Corridor Training Board Lab Block L1	-	presumptive <i>C. albidus</i>	confirmed as <i>C. albidus</i>	-
11/06/19	Ward 6A Corridor (Rooms 20-23)	-	presumptive <i>C. albidus</i>	-	confirmed as <i>C. diffluens</i>
11/06/19	Ward 4C Room 70	-	presumptive <i>C. albidus</i>	-	confirmed as <i>C. diffluens</i>
17/06/19	Ward 6A Treatment Room/POD	-	-	presumptive <i>C. albidus</i>	confirmed as <i>C. diffluens</i>
17/06/19	Ward 6A Corridor Nurses Station	-	-	? <i>C. albidus</i>	confirmed as <i>C. diffluens</i>
27/06/19	Ward 6A Clean Utility Room	-	-	-	confirmed as <i>C. diffluens</i>

Item

Action

28/06/19	4B (BMTU) Corridor 70's	-	-	-	confirmed as <i>C. diffluens</i>
03/07/19	Ward 6A Room 24	-	-	-	confirmed as <i>C. diffluens</i>
03/07/19	Ward 6A Room 2	-	-	-	confirmed as <i>C.uniguttulatus</i>
15/07/19	Ward 6A Room 24				confirmed as <i>C. diffluens</i>

FIGURE 1

'Cryptococcal species' isolates from air sampling 21 Dec 2018 to Jun/Jul 2019							
	<i>N. diffluens</i>	<i>N. albida</i>	<i>N. albido-similis</i>	<i>F.uniguttulata</i>	<i>Cutan. curvatus</i>	ID TBC	Total
<b>*Dec 21<sup>st</sup> 2018</b> n=53	13	0	1	0	1 Roof#	1	<b>16</b>
<b>Jan 19</b> n=422	24	3	0	0	0	0	<b>27</b>
<b>Feb 19</b> n=440	0	0	0	1	0	0	<b>1</b>
<b>Mar 19</b> n=320	4	0	0	1	0	0	<b>5</b>
<b>Apr 19</b> n=334	2	0	0	0	0	0	<b>2</b>
<b>May 19</b> n=420	7	3	0	3	0	0	<b>13</b>
<b>Jun 19</b> n=448	8	0	0	0	0	0	<b>8</b>
<b>Jul 19</b>	3	0	0	1	0	0	<b>4</b>
<b>Total sf</b>	<b>61</b>	<b>6</b>	<b>1</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>76</b>

sf = so far

FIGURE 2

Positive Crypto spp. results by month and per number of samples

Month	No of positives	No of samples
<b>December 21<sup>st</sup> 2018 (1day)</b>	16	53
<b>Jan 19</b>	27	422
<b>Feb 19</b>	1	440
<b>March 19</b>	5	320
<b>April 19</b>	2	334
<b>May 19</b>	13	420
<b>June 19</b>	8	448
<b>July 19</b>	3	To be confirmed

Item	Action
<p><b>4. Actions from 23 August 2019 Meeting</b></p> <p>Actions from 23/08/19 were updated during the meeting and noted in the minutes.</p>	
<p><b>5. <u>Further Actions Required</u></b></p> <p>i. <b>21/06/19</b> - Continue to carry out air sampling in Wards 6A, 4B and 4C. <b>26/07/19 - Action ongoing. 09/0819</b> – Difficult to carry out air sampling due to the ongoing separate issues associated with Ward 6A. <b>16/08/19</b> Ward 4C has not been sampled recently and will be in the next few weeks. <b>23/08/19</b> Air sampling has not been carried out in Ward 4C due to the ongoing issues in Ward 6A. <b>02/09/19</b> There have been no new positive <i>Cryptococcus</i> species isolated. <b>Action ongoing.</b></p> <p>ii. <b>21/06/19 - Action ongoing:</b> Ian Powrie asked Eddie McLaughlan for HFS to confirm endorsement that HFS and the authorised engineer agreement that CVG vents are no longer required. Ian Powrie has received background information about ventilation and gas leaks from Ian Storrar but needs confirmation of endorsement. Ian Powrie added that ventilation is only needed where there are mechanical joints on gas lines. Eddie McLaughlan reported that Ian Storrar is currently on annual leave. Eddie McLaughlan will arrange for HSF to confirm endorsement within this time. <b>28/06/19</b> – Ian Powrie reported that Ian Storrar is still to confirm.</p> <p><b>26/07/19</b> - Darryl Conner reported that Ian Storrar was asked (by Ian Powrie) to confirm endorsement of removal of the CVGs. Annette Rankin stated that Ian Storrar is likely involved in the current ongoing issues in NHS Lothian and suggested he is reminded to take this action forward. Darryl Conner will contact Ian Storrar as suggested. <b>02/09/19</b> HFS to confirm endorsement of the removal of the CVGs. <b>Action ongoing.</b></p> <p>iii. <b>21/06/19 p3: bp2:</b> Colin Purdon advised that the Fire Strategy required that the doors to be available for lateral evacuation of patients and staff in both directions, but he would review options of temporary seals with the site Fire Advisor. <b>29/07/19</b> Action outstanding. To be completed. <b>09/08/19</b> Darryl Conner reported that draft seals have been fitted on the Ward 4B door that is locked on the outside, through to the doctor's room and it is only Estates that go in and out of that area. Darryl Conner will discuss with the Fire Advisor. <b>23/08/19</b> Darryl confirmed that he has spoken to Frank Deacon, Fire Officer and he is reviewing this. He will provide an update at the next meeting. <b>02/09/19</b> Darryl updated that there is a meeting of the Specialist Ventilation Group next week and this will be discussed there, although he has had verbal agreement regarding this. <b>Action ongoing and if Fire Officer agrees this action will be transferred to the Specialist Ventilation Group.</b></p> <p>iv. <b>26/07/19:</b> John Hood referred to the tube system, and will need to discuss this with Colin Purdon in the next couple of weeks, who will in turn talk to the engineers from Swisslog. In order to understand and find out (Level 3) the possibility of air being dragged from the Plant Room to the PODs of areas such as in 6A, 4B and 4C. This is specimen transport tubes that should all, query, be under vacuum. John Hood however wants to confirm that air cannot be dragged in (e.g. from the Plant Rooms) and then pushed out into critical areas via the tube system. <b>09/08/19</b> - John Hood stated that he needs to understand how this system works and asked Colin Purdon to speak to the Swisslog engineers and arrange a meeting for him to discuss this. It is John Hood's view that we should probably not be putting the tube system into the heart of critical areas such as BMTU or Haemato-oncology areas with high risk patients. Peter Hoffman stated that he would like to retract what was said last meeting about the vacuum system and John Hood agreed to remove this comment. The issue of the tube system was also one of the original hypotheses. Was it possible that fungal/yeast spores might gain entry into the air of such critical areas via the Tube system?</p>	<p><b>JOHN HOOD</b></p> <p><b>HFS</b></p> <p><b>DC</b></p>

Item	Action
<p>iv. <b>16/08/19</b> John Hood commented that if we think that the tube system is pushing (or pulling) air into these areas from the Plant Rooms then, we should consider this in individual critical wards (particularly BMTU, 6A and 4C etc) as the air being unfiltered, and therefore another potential route of airborne spores, so a risk. Mitigation will be required if above is correct. <b>23/08/19</b> John Hood agreed to contact Adrian from Swisslog next week. <b>02/09/19</b> John Hood contacted Adrian from Swisslog on 26 August. He said that he received an email from Susie Dodd, HPS asking if there was a filter on the air intake in the Plant Room? It was confirmed there was a 'filter' on the intake in the Plant Room (made of wire mesh and plastic foam) i.e. will only keep large objects out, not <b>funga</b> spores etc. He said there is air being sucked in and exhausted <b>from</b> the Plant Room and this then pushes the <b>POD</b> down the system to the Treatment/Prep Room of the Ward. However, this is where drugs are made up. We do have some air samples next to the pods in 4B, 4C and 6A – which <b>JOHN HOOD</b> will review. John Hood informed the Group that Adrian had stated that as the POD comes into the ceiling void above the Ward, the air pushing the POD is exhausted into this void. However John Hood was not sure if some 'dirty' air might still exhaust into the Treatment/Prep Room. <b>Darryl</b> wondered about this air exhausting into the void above the ceilings and the presence also of CVG's. Tom Steele commented that were was a smell detected in the Treatment/prep room in Ward 6A and asked if there was a CVG in the Treatment/prep room. Darryl advised that the smell was due to the adhesive used on the lino and the then use of actichlor which creates this smell. He said the fire compartment is split into 3 ways from top to bottom and if there is any discharge it would be into that space alone. Added in draft – Darryl needed to look at the drawings of this and will update at the next meeting whether further investigation will be required.</p> <p>Susie stated that if this was a significant ingress of unfiltered air it would occur in all other Treatment/prep rooms, thinking that we would be seeing infective consequences related to these other Treatment/prep rooms as well.</p> <p>Peter Hoffman felt that if patients are in positive pressure rooms (with air uniformly leaking outwards) and ventilated with HEPA filtered air that the issue of (likely) only small amounts of unfiltered air into the Treatment room would be small.</p> <p>John Hood replied that if there are no HEPA filters in this area (as in all wards, including 4B) this could still be a problem but reported that the counts in Ward 4B rooms are mostly 0 cfu's for fungi (but not always). Tom Steele asked if there is any opportunity to improve the level of filtration at the Plant Room and Darryl replied that whatever gets into the Plant Room will be essentially similar to the outside air. Peter Hoffman said with regards to the supply system if it ?? would be able to put filters on when filters get blocked air he agreed this was possible but not critical. He thought this was a minor source if the <i>C. neoformans</i> was getting to patients via the air.</p> <p>John Hood suggested that if further investigation surrounding the ? risk associated with the Tube system in High Risk areas that it should be taken over by the Specialist Ventilation Group/HfS</p> <p><b>Action ongoing.</b></p>	<p><b>JOHN HOOD</b></p> <p><b>DC</b></p> <p><b>SD</b></p> <p><b>PH</b></p> <p><b>DC</b></p> <p><b>PH</b></p>
<p>v. John Hood asked if anyone is putting together all the mitigation from all of the previous actions and hypotheses. Colin Purdon agreed to arrange to get the mitigation recorded. <b>23/08/19</b> Colin advised that he has started putting together the mitigation from all the previous actions. <b>02/09/19</b> Darryl updated that Colin Purdon has started this.</p>	<p><b>CP</b></p>

Item	Action
<p>vi. <b>06/08/19</b> An e-mail response was received from Eddie McLaughlan on 06/08/19 as noted below.</p> <p>Eddie McLaughlan offered in his e-mail to have a telephone discussion with John Hood to clarify anything further:</p> <p>“The first action on me was I think a double check with Ian Storrar about vents in ceilings containing medical gas pipework without joints, but he’s completely tied up at the moment. I think I said at the meeting that as you need to seal the ceiling for IC purposes and there are no joints in the pipework above the ceiling, it would take a major mechanical failure to compromise the pipework and as that seemed unlikely removing the vents and using a gas alarm seemed reasonable. That said, we are only a source of advice; the risk assessment should be done by the Board with advice from your Authorising Engineer as necessary.”</p> <p>‘I’ve read the second action twice and I’m not entirely clear what I’m commenting on but hopefully the following will cover it. The source of the continuing Cryptococcus can only really be the outside air or infiltration from within the building and, as it is being detected in non HEPA filtered spaces and not in HEPA filtered spaces (I presume this is still the case, then the outside air looks a likely candidate.’</p> <p>‘On the subject of guidance, there is a review of the ventilation guidance underway at present and whilst we have asked for more clarity around specialised ventilation for susceptible patients, it is not yet clear whether we will get it. If not we will need to do something specifically for Scotland, for which there is currently neither financial nor staff resource, and no progress is likely to be made on this whilst the RHCYP&amp;DCN review is ongoing. In the meantime, it is important that clinicians understand the level of protection available in the various environments within QEUH and place patients accordingly.’</p> <p><b>26/07/19:</b> Eddie McLaughlan to review the discussion noted in the minutes of 21/06/19 (page 8, item 7.1 - Hypotheses) and change as appropriate. <b>09/08/19 –</b> As mentioned earlier John Hood will telephone/email Eddie McLaughlin and as part of that discussion will ask for re-wording from Eddie McLaughlin. <b>16/08/19</b> John forwarded the minute of 21<sup>st</sup> June for Eddie McLaughlan to comment on. <b>23/08/19</b> Eddie replied with the following:</p> <p>“Not sure this is from memory, but I am content with the text highlighted in yellow in your attachment, including your addition. I’d be thoughtful about any inferences beyond the text, particularly in reference to the case of additional guidance. The need for specialist ventilation guidance is on a very long list of priorities and although we are hopeful of being in a better position for resource in the future, nothing is guaranteed”. <b>See page 2 of this Minute – Susie Dodd to ask Eddie if he is happy with the above.</b></p> <p><b>Action ongoing</b></p>	
<p><b>6. Draft Report for Comments</b></p> <p>John Hood is working on the draft report and received comments from Tom Steele.</p> <p>In the report he said that he will include a brief explanation of the ecology and biology of <i>C. neoformans</i>, the dialogue regarding the tube system and the spreadsheets with air sampling results regarding Wards 6A, 4C and 4B.</p> <p>The report will also include how little we really know about <i>C. neoformans</i> as well as its association with pigeon guano (which in itself is complex) as <b>this yeast-like fungus can also be associated with rotting wood or vegetation.</b></p>	

Item	Action
<b>Closed / Completed Actions</b>	
<ul style="list-style-type: none"> <li>• <b>(06/06/19) p3: bp1:</b> Ian Powrie will discuss IPS panels being sealed with Darryl Conner as some of the underside of WHBs panels were not done. <b>(21/06/19)</b> Colin Purdon picked up with Darryl Conner and reported all have been re-checked and all sealed. There were 2 rooms unable to get access to and this is still the same position today but will be re-checked. <b>(28/06/19)</b> Darryl Conner confirmed all now done. Ian Powrie reported that of all the rooms checked, the 2 rooms were still be checked one of which was Room 5. Darryl Conner will confirm by e-mail that Rooms A and B, and Ward 6A Room 5 is the only one not sealed on the underside. Ian Powrie and John Hood had inspected this area. <b>(09/08/19)</b> Darryl Conner confirmed as above. <b>Action complete.</b></li> <li>• <b>(06/06/19) p3: Item 4:</b> There is concern about the differences in the pressures in 4C Rooms 66-75. Rooms 66 to 74 are between 0.4 to 2.9 Pa from rooms to corridor but Room 75 at the end of the corridor is consistently negative at -0.3 (i.e. air moving from corridor to room). Colin Purdon to make adjustments to the ventilation to make this room slightly positive. <b>(28/06/19)</b> Ian Powrie clarified this was the room at the end of the corridor and is still to be done. Ian Powrie asked Darryl Conner to be careful not to affect the pressure regimes for the area when adjustments are made. <b>(26/07/19)</b> Darryl Conner agreed to make adjustments to the ventilation to make this room slightly positive. <b>(09/08/19)</b> It was noted that this action has gone to the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></li> <li>• <b>06/06/19 - Action closed:</b> Item in relation to Pest Control.</li> <li>• <b>06/06/19 - Action closed - transferred:</b> Sandra confirmed IPC has investigated laundry storage and process. This action to be removed from the group's remit. <b>Action complete.</b></li> <li>• <b>06/06/19 - Action closed:</b> It was confirmed that final inspection of Ward 6A Room 5 has taken place. Action complete - see Bp 6, below.</li> <li>• <b>06/06/19 - Action closed - transferred:</b> It was agreed and noted that overall ventilation design for Ward 2A is the responsibility of another forum therefore it has been removed as an action for this group.</li> <li>• <b>06/06/19 - Estates</b> are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he discussed this with Multiplex. He said that the green roof was part of the design and the sedum can be removed and an alternative ballast material installed. He said if we were to move the items from the roof we could cause further disturbance? John Hood said he would be concerned if <i>Haemato-oncology</i> patients were to go on to this roof but he was informed there is no access to it for these patients. Tom Steele said that he is of the opinion to maybe review this in the future but to leave it as is at the moment. <b>21/06/19 - no update. 26/07/19 - Action closed meantime.</b></li> <li>• <b>21/06/19 - On 29 May 2019,</b> inspection above the ceiling of Room 5 in Ward 6A showed that the services coming into the space were well sealed and in good condition. The flexible duct to the chilled beam was found to be intact. <b>26/07/19 - Action closed.</b></li> <li>• <b>21/06/19 - Action closed:</b> Ian Powrie reported that fluid dynamics modelling around the helipad/QEUH/RHC report was now completed (see Report Rev 3). The IMT Expert Advisory Sub-Group accepted the findings of the CFD Report.</li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li>• <b>21/06/19 - Action complete:</b> A problem with the chilled beams was identified and Ian Powrie explained this was a mechanical joint failure causing a leak. On this occasion it was a loss of low temperature hot water heating circuit that resulted in a change in temperature causing contraction of the pipework and fittings resulting in a slight leak. Colin Purdon added this was reported as a series of drips and although not for this group, it is being mentioned due to the mechanical failure. Colin Purdon has met with Teresa Inkster and Christine Peters. The ceiling tiles affected by water were replaced, and Actichlor was used to wash down. All appropriate IPC measures have been taken (Ward 6A children - x8 rooms).</li> <li>• <b>21/06/19 p4: para2:</b> John Hood mentioned that a mechanical riser in 4B had a water leak this morning. Colin Purdon explained that this is the low temperature water return pipe, and that the valve body gland has a slight leak. The valve will be changed today. <b>(29/07/19)</b> Darryl Conner confirmed as done. <b>Action complete.</b></li> <li>• <b>21/06/19 p5: para3:</b> Ian Powrie asked if there is a risk between CF and haemato-oncology if there is air movement between them. John Hood agreed to discuss this with Teresa Inkster. <b>(09/08/19)</b> John Hood reported that Teresa Inkster has concurred: no significant risk. <b>Action complete.</b></li> <li>• <b>21/06/19 p5: para5:</b> Colin Purdon has advised that intumescent gasket seals would be fitted. <b>(26/07/19)</b> Darryl Conner confirmed that the intumescent gasket riser seals has been completed. The only action outstanding in relation to this is the installation of the false ceilings. <b>(09/08/19)</b> Darryl Conner reported that installation of the false ceilings is still to be done but that this action is for the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></li> <li>• <b>21/06/19 p7: item 7: para2:</b> On 25 July 2019, Colin Purdon to have walk round with Fire Safety Advisor shortly. <b>(26/07/19)</b> Colin Purdon will set-up a meeting with the Fire Officers soon. <b>(09/08/19)</b> Colin Purdon reported that a walk round with the Fire Advisor is still to be arranged. <b>(16/08/19)</b> Sandra Devine commented that she had met with clinical and managerial representatives from 4B and had walked the patient pathway through the ward. After due consideration it was felt that automatic door closures would impede the movement of patients through the ward especially in emergencies therefore the meeting with Colin and the Fire Officer is no longer required. <b>Action complete</b></li> <li>• <b>21/06/19 p8: item 13:</b> All but two IPS panels have been confirmed as complete. <b>(26/07/19)</b> <b>Action complete.</b></li> <li>• <b>21/06/19 - Action ongoing: Carry Forward</b> - Sandra Devine was then not in attendance to provide an update that a discussion is still to take place with Teresa Inkster and possibly Myra Campbell (Clinical Services Manager) in relation to self-closers on doors in Ward 4B, and that IPC team is making sure that staff understand the importance of keeping doors to patient rooms closed and also keeping doors to ancillary areas closed as much as possible. <b>28/06/19</b> - Darryl Conner asked about self-closers. Ian Powrie stated this is what Sandra Devine was going to discuss with clinical colleagues. <b>26/07/19</b> - Sandra Devine reported that two IPC Nurses visited Ward 4B to emphasise the importance of closing doors, and signage has also been put up. Sandra Devine is arranging to meet with Myra Campbell to discuss self-closers on doors and will explain the issue of the 4B corridor and how the problem exists. Darryl Conner pointed out that practically this may be difficult to put in place as every door is bespoke and takes around 8 weeks from order, effectively taking rooms out-of-use. Sandra Devine will make this a consideration. <b>Action ongoing. 09/08/19</b> - Sandra Devine met with Myra Campbell on 08/08/19 and they both visited Ward 4B. The overwhelming opinion was not to have self-closers on doors in Ward 4B therefore this action should not be taken forward. <b>Action complete.</b></li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li> <p>• <b>21/06/19 - Action ongoing: Carry Forward</b> – Colin Purdon will check with the contractors if the rooms have 30-minute fire doors fitted at present. Colin Purdon previously discussed self-closers on doors with local Fire Safety Advisors and reported there would be no issues with this proposal. It was noted that discussion with the clinical teams would need to be held in relation to beds being taken out etc. <b>26/07/19</b> - deferred until discussions with relevant parties have taken place as noted in the minutes and also as noted, a walk round with the Fire Advisor to be arranged.</p> <p><b>Action ongoing. 09/08/19</b> – Colin Purdon stated that in light of Sandra Devine’s update (previous action) this action is no longer relevant. Colin Purdon added that fire doors are fitted adjacent to the fire exit points. Sandra Devine added that ward staff are aware of why this was being asked. <b>Action complete.</b></p> </li> <li> <p>• <b>21/06/19 - Action ongoing: Flooring: Carry Forward</b> - Colin Purdon updated that the action plan has been prepared and is being used to programme and prioritise the issues previously identified. The report was put together by the flooring contractor and Ward 6A has some minor issues to be rectified. <b>26/07/19 – Action carry forward / ongoing. 09/08/19</b> – It was agreed this action should be taken to another forum. Colin Purdon added there is a programme ongoing for Level 7 managed by Kerr Clarkson. <b>Action complete.</b></p> </li> <li> <p>• <b>21/06/19 - Action ongoing:</b> It was confirmed that the engineering risers have been inspected however this action will be kept as ongoing until completion of the doors to risers’ rooms are sealed. Ian Powrie asked Colin Purdon to arrange to have the doors sealed over the next three weeks (by 27/06/19). Colin Purdon reported that the frames have been sealed. Darryl Conner is taking forward the action for the risers. <b>28/06/19</b> - On hold with Teresa Inkster as mentioned earlier (page 3 bp1). Ian Powrie asked Darryl Conner to check if the seals itself are fine to adjust the door, but if not, to put a gasket in.</p> <p>Ian Powrie added that only one was looked at in Ward 6, but asked that all of the doors are sealed air tight (sweep Wards 4B, 6A, 4C for all riser doors). <b>26/07/19</b> - Fire Advisor to endorse and if IPC can sanction, then this will be done. John Hood asked if Darryl Conner is in a position to comment.</p> <p>Darryl Conner reported that Teresa Inkster wanted this item discussed at the Specialist Ventilation Group and following discussion at the first meeting put forward their intentions and what was required to accommodate the work. However Teresa Inkster had responded that the downtime would cause more risk than what the existing risk is in relation to the risers. Darryl Conner stated that in the interim a control of the risers. The doors are sealed, but the adjacent ceilings and floors of the risers have not yet been done. Clarification from the Fire Advisor is required to ensure that there is no breach of fire integrity as they are horizontally sealed to each level. Darryl Conner stated this will need to be discussed at the Specialist Ventilation Group and will ask for this to be included as an agenda item for discussion. <b>Action ongoing. 09/08/19</b> – Darryl Conner reported that it was proposed at the Specialist Ventilation Group a level of modification and the process of sealing the risers, and the possibility of doing this at higher and lower floors. It was recognised that there would be disruption. Darryl Conner thinks the group might be satisfied with the intumescent seals and the doors are under lock and key therefore not regarded as an immediate risk.</p> <p>Peter Hoffman commented that if everything is adequately sealed at one point in time, there is no guarantee it is going to be like that in a few years (or less) from now, and is a temporary solution. So get things sealed but need to get the air flows correct and the air flow in the right direction. It was noted that Teresa Inkster has taken this over in the Specialist Ventilation Group. <b>Action closed and transferred to the Specialist Ventilation Group.</b></p> </li> </ul>	



Item	Action
<ul style="list-style-type: none"> <li> <p>• <b>21/06/19 - Action ongoing:</b> Ian Powrie updated that priority has been given to Wards 6A and 4C for removal of the Ceiling Vent Grilles (CVG's). Ward 4B has been done. Timeline will be done, but Wards 6A and 4C is expected to be done in the next couple of weeks, ongoing for removal of CVGs in other clinical wards. <b>28/06/19 - SCRIBE</b> sitting with IPC. Ward 4B has been done. Wards 6A and 4C have yet to be done – <b>SCRIBE required.</b> <b>26/07/19 -</b> Darryl Conner has asked Teresa Inkster about replacing CVGs in Ward 4B with ceiling tiles. There was one action was to replace CVGs in Ward 4C, but there is a problem with increased permeability of the space. It has already been established that the notional average is <b>1.2 to 2 Pa</b> to replace CVGs. It has been suggested it might be possible to trim back the extract in the en suites, but the air change in the en suites would be reduced slightly. This information has gone to the Specialist Ventilation Group. Darryl Conner reported that the area from 4B into 4C, at time of measurement is showing negative, but on investigation and measurement outside 4C Room 75, it was recorded to be 1.2 to 2 Pa because of the opening and closing of the various doors and air moving into 4D (as door often can be kept open). Without installation of ward lobbies into mitigating areas, the closing or opening of any one door alters the pressure regimes.</p> <p>Darryl Conner has submitted SCRIBEs for the process for removal of CVGs, and all are the same apart from the level of protection for each department being moved. Ward 6A is next on the list, which requires feedback from Teresa Inkster, but can be actioned immediately if required.</p> <p>John Hood thought the SCRIBE employed in 4B could be used for the other areas as same work is being carried out and had been successfully used in a more critical area. Darryl Conner explained that effectively it is the same SCRIBE and is used as a template however each area requires sign-off. <b>Action ongoing – SCRIBE required.</b> <b>09/08/19 -</b> Amendment as noted at the start of the minute, that the notional average is 1.2 to 2 Pa. Darryl Conner commented that Teresa Inkster may not be keen to have CVGs removed. <b>Action ongoing – SCRIBE required.</b>  <b>N.B. Teresa must be happy before any CVG's removed she would rather have as much positive pressure in rooms as possible. Action ongoing and transferred to the Specialist Ventilation Group.</b></p> </li> <li> <p>• <b>28/06/19 p2: bp1:</b> There had been discussion around air in the corridor from Ward 4C into Room 75, and Ian Powrie had explained that the commissioning engineer will need to review all of the rooms and check that correction has not made things worse, with a view to increasing the pressure in Room 75 to the same range as the other rooms. <b>(26/07/19)</b> Darryl Conner confirmed he will do the pressure change but will ask <b>Ian McKenzie</b> to do the re-balance. <b>(09/08/19)</b> John Hood reported that the Specialist Ventilation Group will need to discuss the air pressures. Darryl Conner explained that the doors need to be closed because when the doors are open this could force the rooms into a negative state from the corridor. <b>(16/08/19)</b> It was noted that it is only through discussion at meetings that it was realised the effect of doors being left open affecting all of the pressures, therefore ward staff would definitely not be aware of these issues. <b>Action closed and transferred to the Specialist Ventilation Group.</b></p> </li> <li> <p>• <b>26/07/19 -</b> Darryl Conner confirmed that Room 5 6A was done and has been told that the other room has also been done. Darryl Conner will check both have been sealed and will confirm this. <b>Action ongoing. 09/08/19 –</b> Darryl Conner confirmed <b>Action complete.</b></p> </li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li> <p>• <b>26/07/19:</b> John Hood to continue doing walk round of Plant Rooms. Awaiting results of air samples from the Level 12 Plant Rooms tested on 25 July 2019. <b>09/08/19</b> – John Hood reported that walk round of <b>all</b> of the Plant Rooms has been done at QUEH and RHC. Plant Room 31 has AHUs marked both 21 and 31 – which is a little confusing as the first number (i.e. 2 or 3 should indicate which floor that Plant Room is on!). No evidence of pigeon ingress or droppings. Plant Room 22 is in the Adult QUEH and is huge! Again the only thing discovered there was some water on the floors but apparently this is from the heat exchangers (affected by the weather), in both QUEH and RHC. Plant Room 22 is very clean, with no evidence of pigeon ingress or droppings. There was water on the floor in Plant Room 21 and there was still some general debris in it but this will be cleaned this week. There was no evidence of pigeon ingress or droppings. Plant Room 41 (RHC), again, the floor needed a brush, but there was no evidence of pigeons or pigeon droppings. Some light ingress was noted but above the area of light ingress there is netting fitted so pigeons should not get in. Plant Room 41A (RHC) is a small plant room, with no evidence of any pigeon ingress or droppings. John Hood will visit the Plant Rooms serving the labs next because two areas in Floor 1 Lab Block have grown <i>Cryptococcus</i> spp. (one <i>C. albidus</i> and one <i>C. diffluens</i>). These Plant Rooms are completely separate from the Plant Rooms in either QUEH or RHC. <b>16/08/19</b> John Hood visited Plant Rooms on level 3, 2 and 4 and none of these areas had evidence of pigeon ingress or evidence that the pigeons are getting into these Plant Rooms (indeed very difficult to see how they could). Colin Purdon confirmed that there are F7s filters in the AHUs serving the Lab building. <b>Action closed.</b></p> </li> <li> <p>• <b>26/07/19:</b> Colin Purdon to get the GP Environmental (Pest Control Company) to give an update on their formal cleaning and ongoing identification of problems in the Plant Rooms. Darryl Conner will discuss this with Colin Purdon on 28/07/19. Of note, this will be required for part of the final discussion and Report. <b>09/08/19</b> – Colin Purdon will request a report from the pest control company as noted. <b>16/08/19</b> – Report from GP Environmental was received by Colin on 15<sup>th</sup> August 2019. Report to be sent round the group and discussed further at next meeting. <b>Action closed.</b></p> </li> <li> <p>• <b>26/07/19:</b> John Hood to inform Liz Johnson at the Reference Laboratory in Bristol of the cryptococcus isolates and will forward the breakdown of this, in order to discuss the implications and any views, and if these are valid surrogate markers for <i>C. neoformans</i>. <b>09/08/19</b> – John Hood will speak to Liz Johnson next week. <b>16/08/19</b> John discussed with Liz Johnson and she said that neither can really be considered as surrogate markers for <i>C. neoformans</i> but it was difficult to be dogmatic about it. <b>Action closed.</b></p> </li> </ul>	
<p>6. <b>AOCB</b> Nil to update.</p>	
<p>7. <b>Date and Time of Next Meeting</b></p> <p>The next meeting will be held at 2.00pm on Monday 16<sup>th</sup> September 2019 in Facilities Meeting Room 5, Ground Floor, Laboratory Building, QUEH.</p>	

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Facilities Meeting Room Laboratory Building, Queen Elizabeth University Hospital

**Monday 16 September 2019 at 2.00pm Draft 2b**

**Present:** Dr John Hood (chair), Darryl Conner, Sandra Devine, Colin Purdon, Ann Lang (minutes)

**Teleconference:** Peter Hoffman, Susie Dodd, Tom Steele

**Apologies:** Annette Rankin, Ian Storrar

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting. Teleconference introductions were made and apologies were received from the above mentioned.</p> <p><b>2. Minutes of Meetings held on 2 September 2019</b></p> <p>The minutes of the meeting held on 2 September 2019 were accepted with the following amendment:-</p> <ul style="list-style-type: none"> <li>- Page 1 – Colin Purdon to be added to the apologies.</li> <li>- Page 5, 3<sup>rd</sup> para – John Hood to send Ann Lang the wording received from Peter Hoffman.</li> <li>- Page 6, 5<sup>th</sup> para – Susie Dodd spoke to Eddie McLaughlan regarding the wording in the document and will forward his comments to Ann Lang for the minutes.</li> </ul> <p>• <b>Actions Update:</b></p> <p>There is a Facilities corridor (on each level of the QEUH) on level 4 of which one end runs to the area between the entrances to Wards 4B and 4C. There is therefore an interface between Wards 4B and 4C at one end of this corridor and also an interface between Wards 4A and 4D at the other end of this corridor. John Hood said there are four points on any one floor where two of these wards interact with each other (i.e. 3 doors) and either the door to the lifts or the door to this facilities corridor. Any or all of these doors can be open at any point of time – indeed in some areas 2 or 3 can be wedged open. He said that we already know that air movement is already taking place between 4C and 4B, and at times depending on the outside conditions we have seen air from 4C is pushed into the adjacent corridor in 4B when the door to 4C is opened. (See previous Minute).</p> <p>The good news is that this does not seem to be so bad as previously, after the door to 4B is now better sealed - however a definitive fix has not yet occurred as the door into/out of 4B is a fire door and it would also explain why we are still recently had positive crypto cultures in not only 4B corridor but also rooms in 4B. This is an indication of the complexity of the air movement within this building where the aim is to prevent 'unfiltered' air or non-HEPA filtered air moving into high-risk areas like 4B BMTU and also Haemato-oncology areas such as 4C and 6A – although they are not HEPA-filtered.</p> <p><b>*A QEUH floorplan needs to be included here</b></p>	<p>JH</p>

Item	Action
<p>On 3<sup>rd</sup> September 2019 John Hood and Darryl Conner looked at Wards 4C, 4D and 4B intersections.  Ward 4C is pushing air out to Ward 4D at approximately 20 pascals with doors all shut  Ward 4C is pushing air out to Ward 4D at approximately 6 pascals with door to lifts open  Ward 4A is pushing air out to Ward 4D at approximately 10 pascals with doors all shut</p> <p>On Monday 9<sup>th</sup> and Saturday 14 Sept John Hood reported that he checked Wards 6A, 6B, 6C and 6D. The interface between Wards 6A and 6B has a door to the lifts on the left and the interface between Ward 6A and 6D has a door to the Facilities corridor on the right.</p> <p><b>6A, 6B and Lifts</b>  All doors shut – 6A negatively pressurised i.e. pulling air into it at minus 3.5 Pa  Lift door open – 6A still negatively pressurised but less so at minus 1.9 Pa  Door to 6B open – 6A more negatively pressurised at minus 9.3 Pa  Both above doors open – 6A negatively pressurised at minus 7.4Pa</p> <p><b>6A, 6D and Facilities Corridor</b>  All doors shut - 6A positively pressurised at 0.3 to 1Pa out  Door to 6D open – 6A negatively pressurised minus 1Pa to minus 2Pa into 6A  Corridor door open – 6A positively pressurised at 3Pa out  Both doors open – 6A positively pressurised at 2.3 to 4Pa out</p> <p>John commented that the complexity of which doors are open at any one point in time makes it difficult to understand which way the air is going around the hospital and at present there is little control of this with doors being wedged opened. Consequently we have little control of the air.</p> <p>This again emphasises the need to control the air movement in order to protect BMTU and Haemato-oncology patients who are most at risk of airborne fungal infections i.e. with HEPA- filtered air, positive pressure rooms with air uniformly leaking outwards.</p> <p>In relation to the air sampling results John Hood confirmed that he will compare which Wards (between 4B, 4C and 6A) have had the best air sampling results from the start of 2019 to present. Hopefully this may also show the differences between rooms within each Ward.</p> <p>From 5<sup>th</sup> December 2018 to the end of August 2019 there have been 461 samples taken from <u>ROOMS ONLY</u> in Ward 4B. 334 of these samples had 0 counts for fungi which is a rate of 72.5%.</p> <p>In Ward 6A John Hood reported that 514 samples were taken from <u>ROOMS ONLY</u> from 12 February 2019 to recently and of these samples 194 had 0 counts which is a rate of 37.7%.</p> <p>He said that consequently 127 of samples taken in rooms in Ward 4B had counts of greater than 0. Peter Hoffman wondered if the HEPAs have been checked. Darryl Conner confirmed they had been tested during the verification report and it passed the challenge testing. This testing includes scanning the filter face and to put smoke through this to make certain it is at 0 counts. <i>Note in draft by JH: the challenge test will be performed employing a particle count NOT a fungal/bacterial air count.</i></p>	<p style="text-align: right;">JH</p>

### 3. Update on Air Testing

Air sampling has not been carried out in Ward 4C since the end of July 2019.  
*Added in Draft – Discussed with Julie Black who will try to arrange Air sampling in 4C week beginning 23 September.*

Figures 1 and 2 below have also been updated.

John Hood reported that there have been 11 new isolates of *Cryptococcus* spp. in August that have been formally identified with one result outstanding.

He said this is the first time that any *Cryptococcus* spp. (actually *C. curvatus*) have been grown in Ward 4B (two rooms). *Cryptococcus* was also identified in six rooms in Ward 6A (x5 *C. curvatus*, x1 presumptive *C. albidus* and x1 *C. diffluens*) and also in the Microbiology Department (Molecular Lab and BC Room) in the Laboratory Block : x1 *C. uniguttulatus* and x1 *C. diffluens*. It was highlighted that the Plant Rooms that serve the Lab Block are remote from the Hospitals and not near Plant Rooms on Level 12 or Level 3 of the QEUH.

Air sampling reports from July 1<sup>st</sup> to August 28<sup>th</sup> 2019

Date taken	Area	Presumptive	Confirmed
03/07/19	Ward 6A Room 24		<i>C. diffluens</i>
03/07/19	Ward 6A Room 2		<i>C.uniguttulatus</i>
15/07/19	Ward 6A Room 24		<i>C. diffluens</i>
24/07/19	Ward 4C Corridor		<i>C.uniguttulatus</i>
08/08/19	Ward 6A Room 1	<i>C. albidus</i>	
08/08/19	Ward 6A Room 24		<i>C. curvatus</i>
20/08/19	Ward 4B Room 78 Bathroom		<i>C. curvatus</i>
20/08/19	Ward 4B Room 90		<i>C. curvatus</i>
20/08/19	L4 Labs Molecular Lab		<i>C.uniguttulatus</i>
20/08/19	L4 Labs BC room		<i>C. diffluens</i>
27/8/19	Ward 6A Room 5		<i>C. curvatus</i>
27/8/19	Ward 6A Room 5 i.e. both samples pos		<i>C. curvatus</i>
27/8/19	Ward 6A Room 6		<i>C. curvatus</i>
27/8/19	Ward 6A Room 26		<i>C. curvatus</i>
27/8/19	Ward 6A Room 8		<i>C. diffluens</i>

FIGURE 1

<b>'Cryptococcal species' isolates from air sampling 21 Dec 2018 to Jun/Jul 2019</b>							
	<i>N. diffluens</i>	<i>N. albida</i>	<i>N. albido-similis</i>	<i>F.uniguttulata</i>	<i>Cutan. curvatus</i>	ID TBC	Total
<b>*Dec 21<sup>st</sup> 2018</b> n=53	13	0	1	0	1 Roof#	1	<b>16</b>
<b>Jan 19</b> n=422	24	3	0	0	0	0	<b>27</b>
<b>Feb 19</b> n=440	0	0	0	1	0	0	<b>1</b>
<b>Mar 19</b> n=320	4	0	0	1	0	0	<b>5</b>
<b>Apr 19</b> n=334	2	0	0	0	0	0	<b>2</b>
<b>May 19</b> n=420	7	3	0	3	0	0	<b>13</b>
<b>Jun 19</b> n=448	8	0	0	0	0	0	<b>8</b>
<b>Jul 19</b>	3	0	0	2	0	0	<b>5</b>
<b>Aug 19</b>	2	?	0	2	7	1	<b>12</b>
<b>Total sf</b>	<b>63</b>	<b>6</b>	<b>1</b>	<b>9</b>	<b>8</b>	<b>2</b>	<b>89</b>

sf = so far

*Inserted in Draft by JH-* It is of note that there was in August 2019, 7 isolates of *Crypto curvatus* in 6A and 4B. It's only other isolation was from a single rooftop air sample (QEUH) taken on 21 Dec 2018 and this was the only growth of a *Cryptococcus* spp. isolated from all outside air sampling so far.

There only seems to be 3 cases of human infection caused by *C. curvatus* in the literature (D S J Ting et al., 2019. Eye and Contact Lens, 45: e5 – e10). Ting et al's case was immunocompetent but the other 2 cases were immunocompromised.

One case was in an AIDS patient with myeloradiculitis and the other with infected peritoneal fluid with a gastric lymphoma and peritonitis.

Item

Action

**FIGURE 2**  
**Positive Crypto spp. results by month and per number of samples**

Month	No of positives	No of samples
<b>December 21<sup>st</sup> 2018 (1day)</b>	16	53
<b>Jan 19</b>	27	422
<b>Feb 19</b>	1	440
<b>March 19</b>	5	320
<b>April 19</b>	2	334
<b>May 19</b>	13	420
<b>June 19</b>	8	448
<b>July 19</b>	5	To be confirmed
<b>August 19</b>	12	To be confirmed

#### 4. **Actions from 2 September 2019 Meeting**

Actions from 02/09/19 were updated during the meeting and noted in the minutes.

#### 5. **Further Actions Required**

- i. **21/06/19** - Continue to carry out air sampling in Wards 6A, 4B and 4C. **26/07/19 - Action ongoing.** **09/0819** – Difficult to carry out air sampling due to the ongoing separate issues associated with Ward 6A. **16/08/19** Ward 4C has not been sampled recently and will be in the next few weeks. **23/08/19** Air sampling has not been carried out in Ward 4C due to the ongoing issues in Ward 6A. **02/09/19** There have been no new positive *Cryptococcus* species isolated. **16/09/19** Air sampling is still to be carried out in Ward 4C. **Action ongoing.**
- ii. **21/06/19 - Action ongoing:** Ian Powrie asked Eddie McLaughlan for HFS to confirm endorsement that HFS and the authorised engineer agreement that CVG vents are no longer required. Ian Powrie has received background information about ventilation and gas leaks from Ian Storrar but needs confirmation of endorsement. Ian Powrie added that ventilation is only needed where there are mechanical joints on gas lines. Eddie McLaughlan reported that Ian Storrar is currently on annual leave. Eddie McLaughlan will arrange for HSF to confirm endorsement within this time. **28/06/19** – Ian Powrie reported that Ian Storrar is still to confirm. **26/07/19** - Darryl Conner reported that Ian Storrar was asked (by Ian Powrie) to confirm endorsement of removal of the CVGs. Annette Rankin stated that Ian Storrar is likely involved in the current ongoing issues in NHS Lothian and suggested he is reminded to take this action forward. Darryl Conner will contact Ian Storrar as suggested. **02/09/19** HFS to confirm endorsement of the removal of the CVGs. **16/09/19** Darryl updated that the Ventilation Group are happy to remove the CVGs as the risk of leakage or dilution required is minimal. This has not been formally signed off by HFS but they are happy if the Authorised Engineer has approved this. It was agreed that Darryl ask the Authorised Engineer to send him the re-endorsement again to close off this action. **Action ongoing.**

DC

## Item

- iii. **21/06/19 p3: bp2:** Colin Purdon advised that the Fire Strategy required that the doors to be available for lateral evacuation of patients and staff in both directions, but he would review options of temporary seals with the site Fire Advisor. **29/07/19** Action outstanding. To be completed. **09/08/19** Darryl Conner reported that draft seals have been fitted on the Ward 4B door that is locked on the outside, through to the doctor's room and it is only Estates that go in and out of that area. Darryl Conner will discuss with the Fire Advisor. **23/08/19** Darryl confirmed that he has spoken to Frank Deacon, Fire Officer and he is reviewing this. He will provide an update at the next meeting. **02/09/19** Darryl updated that there is a meeting of the Specialist Ventilation Group next week and this will be discussed there, although he has had verbal agreement regarding this. **16/09/19** Darryl reported that this was taken to the Ventilation Group and endorsement was received from the Fire Officer as they are happy with the fire seals. The Fire Officer has asked for the ICDs agreement on this. **Action ongoing and if Fire Officer agrees this action will be transferred to the Specialist Ventilation Group.**
- iv. **26/07/19:** John Hood referred to the tube system, and will need to discuss this with Colin Purdon in the next couple of weeks, who will in turn talk to the engineers from Swisslog. In order to understand and find out (Level 3) the possibility of air being dragged from the Plant Room to the PODs of areas such as in 6A, 4B and 4C. This is specimen transport tubes that should all, query, be under vacuum. John Hood however wants to confirm that air cannot be dragged in (e.g. from the Plant Rooms) and then pushed out into critical areas via the tube system. **09/08/19** - John Hood stated that he needs to understand how this system works and asked Colin Purdon to speak to the Swisslog engineers and arrange a meeting for him to discuss this. It is John Hood's view that we should probably not be putting the tube system into the heart of critical areas such as BMTU or Haemato-oncology areas with high risk patients. Peter Hoffman stated that he would like to retract what was said last meeting about the vacuum system and John Hood agreed to remove this comment. The issue of the tube system was also one of the original hypotheses. Was it possible that fungal/yeast spores might gain entry into the air of such critical areas via the Tube system? **16/08/19** John Hood commented that if we think that the tube system is pushing (or pulling) air into these areas from the Plant Rooms then, we should consider this in individual critical wards (particularly BMTU, 6A and 4C etc) as the air being unfiltered, and therefore another potential route of airborne spores, so a risk. Mitigation will be required if above is correct. **23/08/19** John Hood agreed to contact Adrian from Swisslog next week. **02/09/19** John Hood contacted Adrian from Swisslog on 26 August. He said that he received an email from Susie Dodd, HPS asking if there was a filter on the air intake in the Plant Room? It was confirmed there was a 'filter' on the intake in the Plant Room (made of wire mesh and plastic foam) i.e. will only keep large objects out, not fungal spores etc. He said there is air being sucked in and exhausted from the Plant Room and this then pushes the POD down the system to the Treatment/Prep Room of the Ward, however, this is where drugs are made up. We do have some air samples next to the pods in 4B, 4C and 6A – which John Hood will review. John Hood informed the Group that Adrian had stated that as the POD comes into the ceiling void above the Ward, the air pushing the POD is exhausted into this void. However John Hood was not sure if some 'dirty' air might still exhaust into the Treatment/Prep Room. Darryl wondered about this air exhausting into the void above the ceilings and the presence also of CVG's. Tom Steele commented that were was a smell detected in the Treatment/prep room in Ward 6A and asked if there was a CVG in the Treatment/prep room. Darryl advised that the smell was due to the adhesive used on the lino and the then use of actichlor which creates this smell. He said the fire compartment is split into 3 ways from top to bottom and if there is any discharge it would be into that space alone. *Added in draft* - Darryl needed to look at the drawings of this and will update at the next meeting whether further investigation will be required.



Item	Action
<p><b>iv. contd</b> Susie Dodd stated that if this was a significant ingress of unfiltered air it would occur in all other Treatment/prep rooms, thinking that we would be seeing infective consequences related to these other Treatment/prep rooms as well.</p> <p>Peter Hoffman felt that a small amount of unfiltered air coming into a Prep/Treatment room would have little effect on the air quality in a patient room, if the patients are in positive pressure rooms (with air uniformly leaking outwards) and ventilated with HEPA filtered air. Peter also said, with regards to the air, if microbe retentive filters could be fitted to the pneumatic transport system this would remove any airborne risk, though the significance carrying this out is dubious. He thought that this was an insignificant source if the <i>C. neoformans</i> was getting to patients via the air.</p> <p>John Hood replied that if there are no HEPA filters in this area (as in all wards, including ?4B) this could still be a problem but reported that the counts in Ward 4B rooms are mostly 0 cfu's for fungi (but not always).</p> <p>Tom Steele asked if there is any opportunity to improve the level of filtration at the Plant Room and Darryl replied that whatever gets into the Plant Room will be essentially similar to the outside air.</p> <p>John Hood suggested that if further investigation surrounding the risk associated with the Tube system in High Risk areas that it should be taken over by the Specialist Ventilation Group/HFS. <b>16/09/19</b> It was agreed that this should be discussed with HFS and the Ventilation Group regarding the risks associated with the tube system to see if there is any indication that anything that is discharged into the ceiling void could leak into the corridor. The consensus from IMT is that the risk related to the pneumatic tube system is likely to be small. <b>Action ongoing.</b></p>	
<p><b>v.</b> John Hood asked if anyone is putting together all the mitigation from all of the previous actions and hypotheses. Colin Purdon agreed to arrange to get the mitigation recorded. <b>23/08/19</b> Colin advised that he has started putting together the mitigation from all the previous actions. <b>02/09/19</b> Darryl updated that Colin Purdon has started this. <b>16/09/19</b> Colin confirmed that he has completed the mitigation from previous actions and will forward this to the group for return comments within a week.</p>	All
<p><b>vi. 06/08/19</b> An e-mail response was received from Eddie McLaughlan on 06/08/19 as noted below.</p> <p>Eddie McLaughlan offered in his e-mail to have a telephone discussion with John Hood to clarify anything further:</p> <p>“The first action on me was I think a double check with Ian Storrar about vents in ceilings containing medical gas pipework without joints, but he’s completely tied up at the moment. I think I said at the meeting that as you need to seal the ceiling for IC purposes and there are no joints in the pipework above the ceiling, it would take a major mechanical failure to compromise the pipework and as that seemed unlikely removing the vents and using a gas alarm seemed reasonable. That said, we are only a source of advice; the risk assessment should be done by the Board with advice from your Authorising Engineer as necessary.”</p> <p>‘I’ve read the second action twice and I’m not entirely clear what I’m commenting on but hopefully the following will cover it. The source of the continuing Cryptococcus can only really be the outside air or infiltration from within the building and, as it is being detected in non HEPA filtered spaces and not in HEPA filtered spaces (I presume this is still the case, then the outside air looks a likely candidate.’</p>	

## Item

## Action

'On the subject of guidance, there is a review of the ventilation guidance underway at present and whilst we have asked for more clarity around specialised ventilation for susceptible patients, it is not yet clear whether we will get it. If not we will need to do something specifically for Scotland, for which there is currently neither financial nor staff resource, and no progress is likely to be made on this whilst the RHCYP&DCN review is ongoing. In the meantime, it is important that clinicians understand the level of protection available in the various environments within QEUH and place patients accordingly.'

**26/07/19:** Eddie McLaughlan to review the discussion noted in the minutes of 21/06/19 (page 8, item 7.1 - Hypotheses) and change as appropriate. **09/08/19** – As mentioned earlier John Hood will telephone/email Eddie McLaughlan and as part of that discussion will ask for re-wording from Eddie McLaughlan. **16/08/19** John forwarded the minute of 21<sup>st</sup> June for Eddie McLaughlan to comment on. **23/08/19** Eddie replied with the following:

"Not sure this is from memory, but I am content with the text highlighted in yellow in your attachment, including your addition. I'd be thoughtful about any inferences beyond the text, particularly in reference to the case of additional guidance. The need for specialist ventilation guidance is on a very long list of priorities and although we are hopeful of being in a better position for resource in the future, nothing is guaranteed". **16/09/19** Susie Dodd confirmed that she spoke with Eddie McLaughlan and he forwarded wording below:-

*"I am content with the text attributed to me, however, none of it removes the need for the Board to take appropriate professional advice. In particular, the medical gas paragraph at the top requires advice from the Board's Authorising Engineer to inform the risk assessment. On the subject of neutropenic patients, although the guidance is not as detailed as might be desirable, it does state that wards for these patients should be HEPA filtered with a 10pa pressure regimen, so any decisions should take that as the starting point."*

## 6. Draft Report for Comments

John Hood is currently working on the draft report.

In the report he said that he will include a brief explanation of the ecology and biology of *C. neoformans*, the dialogue regarding the tube system and the spreadsheets with air sampling results regarding Wards 6A, 4C and 4B.

The report will also take account of how little we really know about *C. neoformans* as well as its association with pigeon guano (which is in itself complex) as this yeast-like fungus can also be associated with rotting wood or vegetation.

The hypotheses will also be incorporated in the report and this will be agreed with this group. John Hood stated that the lack of HEPA filtered rooms with positive pressure (and air leaking uniformly outwards) is one of the main conclusions. He also commented that the PICU cylinder room is a possibility ( ) but it might not be so likely as the room was in while in PICU was a PPVL room and this may have provided some protection. With regards to the helipad John Hood (and the Group) does not believe that this was a contributory factor, *inserted in Draft by JH (see previous Minutes and Report on Computational Fluid Dynamics Simulation of the External Flow Around Queen Elizabeth University Hospital, 14<sup>th</sup> June 2019).*

Item Closed / Completed Actions	Action
<ul style="list-style-type: none"> <li>• <b>(06/06/19) p3: bp1:</b> Ian Powrie will discuss IPS panels being sealed with Darryl Conner as some of the underside of WHBs panels were not done. <b>(21/06/19)</b> Colin Purdon picked up with Darryl Conner and reported all have been re-checked and all sealed. There were 2 rooms unable to get access to and this is still the same position today but will be re-checked. <b>(28/06/19)</b> Darryl Conner confirmed all now done. Ian Powrie reported that of all the rooms checked, the 2 rooms were still to be checked one of which was Room 5. Darryl Conner will confirm by e-mail that Rooms A and B, and Ward 6A Room 5 is the only one not sealed on the underside. Ian Powrie and John Hood had inspected this area. <b>(09/08/19)</b> Darryl Conner confirmed as above. <b>Action complete.</b></li> </ul>	
<ul style="list-style-type: none"> <li>• <b>(06/06/19) p3: Item 4:</b> There is concern about the differences in the pressures in 4C Rooms 66-75. Rooms 66 to 74 are between 0.4 to 2.9 Pa from rooms to corridor but Room 75 at the end of the corridor is consistently negative at -0.3 (i.e. air moving from corridor to room). Colin Purdon to make adjustments to the ventilation to make this room slightly positive. <b>(28/06/19)</b> Ian Powrie clarified this was the room at the end of the corridor and is still to be done. Ian Powrie asked Darryl Conner to be careful not to affect the pressure regimes for the area when adjustments are made. <b>(26/07/19)</b> Darryl Conner agreed to make adjustments to the ventilation to make this room slightly positive. <b>(09/08/19)</b> It was noted that this action has gone to the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></li> </ul>	
<ul style="list-style-type: none"> <li>• <b>06/06/19 - Action closed:</b> Item in relation to Pest Control.</li> </ul>	
<ul style="list-style-type: none"> <li>• <b>06/06/19 - Action closed - transferred:</b> Sandra confirmed IPC has investigated laundry storage and process. This action to be removed from the group's remit. <b>Action complete.</b></li> </ul>	
<ul style="list-style-type: none"> <li>• <b>06/06/19 - Action closed:</b> It was confirmed that final inspection of Ward 6A Room 5 has taken place. Action complete - see Bp 6, below.</li> </ul>	
<ul style="list-style-type: none"> <li>• <b>06/06/19 - Action closed - transferred:</b> It was agreed and noted that overall ventilation design for Ward 2A is the responsibility of another forum therefore it has been removed as an action for this group.</li> </ul>	
<ul style="list-style-type: none"> <li>• <b>06/06/19 - Estates</b> are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he discussed this with Multiplex. He said that the green roof was part of the design and the sedum can be removed and an alternative ballast material installed. He said if we were to move the items from the roof we could cause further disturbance? John Hood said he would be concerned if <i>Haemato-oncology</i> patients were to go on to this roof but he was informed there is no access to it for these patients. Tom Steele said that he is of the opinion to maybe review this in the future but to leave it as is at the moment. <b>21/06/19 - no update. 26/07/19 - Action closed meantime.</b></li> </ul>	
<ul style="list-style-type: none"> <li>• <b>21/06/19 -</b> On 29 May 2019, inspection above the ceiling of Room 5 in Ward 6A showed that the services coming into the space were well sealed and in good condition. The flexible duct to the chilled beam was found to be intact. <b>26/07/19 - Action closed.</b></li> </ul>	
<ul style="list-style-type: none"> <li>• <b>21/06/19 - Action closed:</b> Ian Powrie reported that fluid dynamics modelling around the helipad/QEUH/RHC report was now completed (see Report Rev 3). The IMT Expert Advisory Sub-Group accepted the findings of the CFD Report.</li> </ul>	

## Item

- **21/06/19 - Action complete:** A problem with the chilled beams was identified and Ian Powrie explained this was a mechanical joint failure causing a leak. On this occasion it was a loss of low temperature hot water heating circuit that resulted in a change in temperature causing contraction of the pipework and fittings resulting in a slight leak. Colin Purdon added this was reported as a series of drips and although not for this group, it is being mentioned due to the mechanical failure. Colin Purdon has met with Teresa Inkster and Christine Peters. The ceiling tiles affected by water were replaced, and Actichlor was used to wash down. All appropriate IPC measures have been taken (Ward 6A children - x8 rooms).
- **21/06/19 p4: para2:** John Hood mentioned that a mechanical riser in 4B had a water leak this morning. Colin Purdon explained that this is the low temperature water return pipe, and that the valve body gland has a slight leak. The valve will be changed today. **(29/07/19)** Darryl Conner confirmed as done. **Action complete.**
- **21/06/19 p5: para3:** Ian Powrie asked if there is a risk between CF and haemato-oncology if there is air movement between them. John Hood agreed to discuss this with Teresa Inkster. **(09/08/19)** John Hood reported that Teresa Inkster has concurred: no significant risk. **Action complete.**
- **21/06/19 p5: para5:** Colin Purdon has advised that intumescent gasket seals would be fitted. **(26/07/19)** Darryl Conner confirmed that the intumescent gasket riser seals has been completed. The only action outstanding in relation to this is the installation of the false ceilings. **(09/08/19)** Darryl Conner reported that installation of the false ceilings is still to be done but that this action is for the Specialist Ventilation Group. **Action closed and transferred to Specialist Ventilation Group.**
- **21/06/19 p7: item 7: para2:** On 25 July 2019, Colin Purdon to have walk round with Fire Safety Advisor shortly. **(26/07/19)** Colin Purdon will set-up a meeting with the Fire Officers soon. **(09/08/19)** Colin Purdon reported that a walk round with the Fire Advisor is still to be arranged. **(16/08/19)** Sandra Devine commented that she had met with clinical and managerial representatives from 4B and had walked the patient pathway through the ward. After due consideration it was felt that automatic door closures would impede the movement of patients through the ward especially in emergencies therefore the meeting with Colin and the Fire Officer is no longer required. **Action complete**
- **21/06/19 p8: item 13:** All but two IPS panels have been confirmed as complete. **(26/07/19)** **Action complete.**
- **21/06/19 - Action ongoing: Carry Forward** - Sandra Devine was then not in attendance to provide an update that a discussion is still to take place with Teresa Inkster and possibly Myra Campbell (Clinical Services Manager) in relation to self-closers on doors in Ward 4B, and that IPC team is making sure that staff understand the importance of keeping doors to patient rooms closed and also keeping doors to ancillary areas closed as much as possible. **28/06/19** - Darryl Conner asked about self-closers. Ian Powrie stated this is what Sandra Devine was going to discuss with clinical colleagues. **26/07/19** - Sandra Devine reported that two IPC Nurses visited Ward 4B to emphasise the importance of closing doors, and signage has also been put up. Sandra Devine is arranging to meet with Myra Campbell to discuss self-closers on doors and will explain the issue of the 4B corridor and how the problem exists. Darryl Conner pointed out that practically this may be difficult to put in place as every door is bespoke and takes around 8 weeks from order, effectively taking rooms out-of-use. Sandra Devine will make this a consideration. **Action ongoing. 09/08/19** - Sandra Devine met with Myra Campbell on 08/08/19 and they both visited Ward 4B. The overwhelming opinion was not to have self-closers on doors in Ward 4B therefore this action should not be taken forward. **Action complete.**

Item	Action
<ul style="list-style-type: none"> <li> <p>• <b>21/06/19 - Action ongoing: Carry Forward</b> – Colin Purdon will check with the contractors if the rooms have 30-minute fire doors fitted at present. Colin Purdon previously discussed self-closers on doors with local Fire Safety Advisors and reported there would be no issues with this proposal. It was noted that discussion with the clinical teams would need to be held in relation to beds being taken out etc. <b>26/07/19 -</b> deferred until discussions with relevant parties have taken place as noted in the minutes and also as noted, a walk round with the Fire Advisor to be arranged. <b>Action ongoing. 09/08/19</b> – Colin Purdon stated that in light of Sandra Devine’s update (previous action) this action is no longer relevant. Colin Purdon added that fire doors are fitted adjacent to the fire exit points. Sandra Devine added that ward staff are aware of why this was being asked. <b>Action complete.</b></p> </li> <li> <p>• <b>21/06/19 - Action ongoing: Flooring: Carry Forward</b> - Colin Purdon updated that the action plan has been prepared and is being used to programme and prioritise the issues previously identified. The report was put together by the flooring contractor and Ward 6A has some minor issues to be rectified. <b>26/07/19 – Action carry forward / ongoing. 09/08/19</b> – It was agreed this action should be taken to another forum. Colin Purdon added there is a programme ongoing for Level 7 managed by Kerr Clarkson. <b>Action complete.</b></p> </li> <li> <p>• <b>21/06/19 - Action ongoing:</b> It was confirmed that the engineering risers have been inspected however this action will be kept as ongoing until completion of the doors to risers’ rooms are sealed. Ian Powrie asked Colin Purdon to arrange to have the doors sealed over the next three weeks (by 27/06/19). Colin Purdon reported that the frames have been sealed. Darryl Conner is taking forward the action for the risers. <b>28/06/19</b> - On hold with Teresa Inkster as mentioned earlier (page 3 bp1). Ian Powrie asked Darryl Conner to check if the seals itself are fine to adjust the door, but if not, to put a gasket in. Ian Powrie added that only one was looked at in Ward 6, but asked that all of the doors are sealed air tight (sweep Wards 4B, 6A, 4C for all riser doors). <b>26/07/19 -</b> Fire Advisor to endorse and if IPC can sanction, then this will be done. John Hood asked if Darryl Conner is in a position to comment. Darryl Conner reported that Teresa Inkster wanted this item discussed at the Specialist Ventilation Group and following discussion at the first meeting put forward their intentions and what was required to accommodate the work. However Teresa Inkster had responded that the downtime would cause more risk than what the existing risk is in relation to the risers. Darryl Conner stated that in the interim a control of the risers. The doors are sealed, but the adjacent ceilings and floors of the risers have not yet been done. Clarification from the Fire Advisor is required to ensure that there is no breach of fire integrity as they are horizontally sealed to each level. Darryl Conner stated this will need to be discussed at the Specialist Ventilation Group and will ask for this to be included as an agenda item for discussion. <b>Action ongoing. 09/08/19</b> – Darryl Conner reported that it was proposed at the Specialist Ventilation Group a level of modification and the process of sealing the risers, and the possibility of doing this at higher and lower floors. It was recognised that there would be disruption. Darryl Conner thinks the group might be satisfied with the intumescent seals and the doors are under lock and key therefore not regarded as an immediate risk.</p> <p>Peter Hoffman commented that if everything is adequately sealed at one point in time, there is no guarantee it is going to be like that in a few years (or less) from now, and is a temporary solution. So get things sealed but need to get the air flows correct and the air flow in the right direction. It was noted that Teresa Inkster has taken this over in the Specialist Ventilation Group. <b>Action closed and transferred to the Specialist Ventilation Group.</b></p> </li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li> <p>• <b>21/06/19 - Action ongoing:</b> Ian Powrie updated that priority has been given to Wards 6A and 4C for removal of the Ceiling Vent Grilles (CVG's). Ward 4B has been done. Timeline will be done, but Wards 6A and 4C is expected to be done in the next couple of weeks, ongoing for removal of CVGs in other clinical wards. <b>28/06/19 - SCRIBE</b> sitting with IPC. Ward 4B has been done. Wards 6A and 4C have yet to be done – <b>SCRIBE required.</b> <b>26/07/19 -</b> Darryl Conner has asked Teresa Inkster about replacing CVGs in Ward 4B with ceiling tiles. There was one action was to replace CVGs in Ward 4C, but there is a problem with increased permeability of the space. It has already been established that the notional average is <b>1.2 to 2 Pa</b> to replace CVGs. It has been suggested it might be possible to trim back the extract in the en suites, but the air change in the en suites would be reduced slightly. This information has gone to the Specialist Ventilation Group. Darryl Conner reported that the area from 4B into 4C, at time of measurement is showing negative, but on investigation and measurement outside 4C Room 75, it was recorded to be 1.2 to 2 Pa because of the opening and closing of the various doors and air moving into 4D (as door often can be kept open). Without installation of ward lobbies into mitigating areas, the closing or opening of any one door alters the pressure regimes.</p> <p>Darryl Conner has submitted SCRIBES for the process for removal of CVGs, and all are the same apart from the level of protection for each department being moved. Ward 6A is next on the list, which requires feedback from Teresa Inkster, but can be actioned immediately if required.</p> <p>John Hood thought the SCRIBE employed in 4B could be used for the other areas as same work is being carried out and had been successfully used in a more critical area. Darryl Conner explained that effectively it is the same SCRIBE and is used as a template however each area requires sign-off. <b>Action ongoing – SCRIBE required.</b> <b>09/08/19 -</b> Amendment as noted at the start of the minute, that the notional average is 1.2 to 2 Pa. Darryl Conner commented that Teresa Inkster may not be keen to have CVGs removed. <b>Action ongoing – SCRIBE required.</b>  <b>N.B. Teresa must be happy before any CVG's removed she would rather have as much positive pressure in rooms as possible. Action ongoing and transferred to the Specialist Ventilation Group.</b></p> </li> <li> <p>• <b>28/06/19 p2: bp1:</b> There had been discussion around air in the corridor from Ward 4C into Room 75, and Ian Powrie had explained that the commissioning engineer will need to review all of the rooms and check that correction has not made things worse, with a view to increasing the pressure in Room 75 to the same range as the other rooms. <b>(26/07/19)</b> Darryl Conner confirmed he will do the pressure change but will ask <b>Ian McKenzie</b> to do the re-balance. <b>(09/08/19)</b> John Hood reported that the Specialist Ventilation Group will need to discuss the air pressures. Darryl Conner explained that the doors need to be closed because when the doors are open this could force the rooms into a negative state from the corridor. <b>(16/08/19)</b> It was noted that it is only through discussion at meetings that it was realised the effect of doors being left open affecting all of the pressures, therefore ward staff would definitely not be aware of these issues. <b>Action closed and transferred to the Specialist Ventilation Group.</b></p> </li> <li> <p>• <b>26/07/19 -</b> Darryl Conner confirmed that Room 5 6A was done and has been told that the other room has also been done. Darryl Conner will check both have been sealed and will confirm this. <b>Action ongoing. 09/08/19 –</b> Darryl Conner confirmed <b>Action complete.</b></p> </li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li> <p>• <b>26/07/19:</b> John Hood to continue doing walk round of Plant Rooms. Awaiting results of air samples from the Level 12 Plant Rooms tested on 25 July 2019. <b>09/08/19</b> – John Hood reported that walk round of <b>all</b> of the Plant Rooms has been done at QUEH and RHC. Plant Room 31 has AHUs marked both 21 and 31 – which is a little confusing as the first number (i.e. 2 or 3 should indicate which floor that Plant Room is on!). No evidence of pigeon ingress or droppings. Plant Room 22 is in the Adult QUEH and is huge! Again the only thing discovered there was some water on the floors but apparently this is from the heat exchangers (affected by the weather), in both QUEH and RHC. Plant Room 22 is very clean, with no evidence of pigeon ingress or droppings. There was water on the floor in Plant Room 21 and there was still some general debris in it but this will be cleaned this week. There was no evidence of pigeon ingress or droppings. Plant Room 41 (RHC), again, the floor needed a brush, but there was no evidence of pigeons or pigeon droppings. Some light ingress was noted but above the area of light ingress there is netting fitted so pigeons should not get in. Plant Room 41A (RHC) is a small plant room, with no evidence of any pigeon ingress or droppings. John Hood will visit the Plant Rooms serving the labs next because two areas in Floor 1 Lab Block have grown <i>Cryptococcus</i> spp. (one <i>C. albidus</i> and one <i>C. diffluens</i>). These Plant Rooms are completely separate from the Plant Rooms in either QUEH or RHC. <b>16/08/19</b> John Hood visited Plant Rooms on level 3, 2 and 4 and none of these areas had evidence of pigeon ingress or evidence that the pigeons are getting into these Plant Rooms (indeed very difficult to see how they could). Colin Purdon confirmed that there are F7s filters in the AHUs serving the Lab building. <b>Action closed.</b></p> </li> <li> <p>• <b>26/07/19:</b> Colin Purdon to get the GP Environmental (Pest Control Company) to give an update on their formal cleaning and ongoing identification of problems in the Plant Rooms. Darryl Conner will discuss this with Colin Purdon on 28/07/19. Of note, this will be required for part of the final discussion and Report. <b>09/08/19</b> – Colin Purdon will request a report from the pest control company as noted. <b>16/08/19</b> – Report from GP Environmental was received by Colin on 15<sup>th</sup> August 2019. Report to be sent round the group and discussed further at next meeting. <b>Action closed.</b></p> </li> <li> <p>• <b>26/07/19:</b> John Hood to inform Liz Johnson at the Reference Laboratory in Bristol of the cryptococcus isolates and will forward the breakdown of this, in order to discuss the implications and any views, and if these are valid surrogate markers for <i>C. neoformans</i>. <b>09/08/19</b> – John Hood will speak to Liz Johnson next week. <b>16/08/19</b> John discussed with Liz Johnson and she said that neither can really be considered as surrogate markers for <i>C. neoformans</i> but it was difficult to be dogmatic about it. <b>Action closed.</b></p> </li> </ul>	
<p>6. <b>AOCB</b> Nil to update.</p>	
<p>7. <b>Date and Time of Next Meeting</b></p> <p>The next meeting will be held at 2.00pm on Tuesday 24<sup>th</sup> September 2019 in Facilities Meeting Hub, CMB Building, QUEH.</p>	

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Facilities Meeting Hub CMB Building, Queen Elizabeth University Hospital

**Monday 24 September 2019 at 2.00pm Draft 5 (Final)**

**Present:** Dr John Hood (chair), Darryl Conner, Tom Steele, Colin Purdon, Susie Dodd, Ann Lang (minutes)

**Teleconference:** Peter Hoffman

**Apologies:** Ian Storrar, Sandra Devine, Eddie McLaughlan

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting. Teleconference introductions were made and apologies were received from the above mentioned.</p> <p><b>2. Minutes of Meetings held on 16 September 2019</b></p> <p>The minutes of the meeting held on 16 September 2019 were accepted with the following amendments:-</p> <ul style="list-style-type: none"> <li>- Page 2, 5<sup>th</sup> para – Delete sentence.</li> <li>- Page 8, para 3 – JH to added in comments from Peter Hoffman.</li> <li>- Page 8, para 4 and Page 8 para 4 and Page 9 para 1 to insert missed comments/discussion for Susie Dodd.</li> <li>- All now inserted in this copy by JH 25 Oct 2019</li> </ul> <p><b>Minutes of Previous Meetings for 2 September and 23 August 2019</b></p> <p>Copies of the final minutes for 23 August and 2 September 2019 were circulated to the group to confirm.</p> <ul style="list-style-type: none"> <li>• <b>Actions Update:</b> At times depending on the outside conditions we have seen air from 4C being pushed into the adjacent corridor in 4B when the door to 4C is opened. It was agreed to include the air movement with regards to 4B in the Mitigations table that Colin Purdon is preparing. John Hood confirmed that he will check the other entrance corridor to 4B i.e. to 4A.</li> </ul> <p>John Hood distributed a copy of the floor plan which shows the configuration of the wards and stated that two wards are linked to each other. He said that 4B is linked to 4C, 4B is also linked to 4A and 4C is also linked to 4D.</p> <p>At the beginning of September John said that he looked at the intersections on Level 4 and also 6A, 6B and 6D. With regards to 4C entrance (door opposite to 4B) air from 4C was consistently pushing out, between 5 and 13 Pa depending on which doors were open or shut at that intersection, as noted before. Note that we already had identified that given the right set of conditions and with this door to 4C open (NB Door to 4B is ALWAYS shut) the positive pressure from 4C is such that bottom corridor of 4B becomes negatively pressurised to 4C and the air at that intersection therefore non-HEPA filtered, will push into 4B corridor.</p>	<p>CP JH</p>



Item	Action
<p>Again at the other entrance to 4C (opposite 4D entrance), all doors shut - 4C pushing 12 Pa out. <b>No</b> configuration of doors opening at either 4C/4B or 4C/4D results in air being pushed into 4C.</p> <p>6A/6B - intersection also has door to lifts. All doors shut sees 6A negatively pressurised to this intersection at -3.5Pa. Opening door to lift area decreases the negative pressure in 6A to -1.5 to -2Pa while opening the Door to 6B increases the negative pressure in 6A to - 10 to -11Pa.. All doors open reduces the negative pressure in 6A to -7-8 Pa.</p> <p>6A/6D – intersection (plus door to Facilities corridor). All doors shut – 6A at + 0.3 to +1 Pa out of ward. With 6D door open – 6A at -1 to - 2 Pa. Door open to Facilities corridor and 6D door open – 6A at +2.3 to + 4 Pa. He said this Facilities corridor crosses a large number of doors (it transects the middle of the building on each floor) and consequently there is little or no control of the air.</p> <p>The take home message is therefore that 4B needs better control of the air around the intersection with 4B/4C. 4C seems best in terms of a consistent flow of air outwards from both corridors. 6A is also problematic, particularly at the 6A/6B intersection but also to a lesser extent at the 6A/6D intersection.</p> <p>The above underlines the complexities of air pressures and air movement in this large and complex hospital. This also underlines the importance of controlling the air around 'at risk' patients and not merely by HEPA – filtering the air. (Added in Draft 15/10/19 by JH)</p> <p>The results for the air sampling in 6A, 4C and 4B should be available next week. Approximately 70% of the air samples taken in 4B had 0 counts for fungi, (334 out of the 461 samples) and in 6A this was reduced to 40%. He said though that the rooms at the end of the corridors are more likely to have positive cfu – based on the above air pressure testing in 4B,4C and 6A.</p> <p>With regards to the HEPA filters in the Prep/Treatment Room in 4B John Hood stated that these are not present in other wards. Darryl Conner confirmed that he will send a template detailing where the HEPA filters are fitted in the wards (NB not mobile HEPAs).</p> <p>John Hood reported that Wards 4C and 6A do not have HEPA filtered rooms. 6A is also (at least intermittently) negatively pressurised compared to its surroundings. It would be preferred to change these wards to positive pressure rooms with HEPA filtered air and air consistently leaking outwards. Tom Steele asked if the wards do go back to a general ward would the present ventilation system be acceptable. JH felt that that would be acceptable. (JH added in Draft). Darryl Conner commented that significant improvement could be made to both wards (6A and 4C).</p> <p><b>3. Update on Air Testing</b></p> <p>John Hood informed that there have been two more <i>C. curvatus</i> in 6A and 4B which have been confirmed by the Reference Lab from samples taken on 30<sup>th</sup> August 2019. He said to date there have been 9 isolations of this particular <i>Cryptococcus</i> spp. in August. We have only grown this once before in December 2018 from a single air sample from outside air on the roof. Darryl Conner stated that the Plant Room and AHUs that serve 4B are operating without any issues, as before. John Hood commented that there have been variable amounts of different fungi (including different cryptococci) in the air around the hospital over the last 9 months of air sampling. This will be due to various factors such as the weather, the wind direction, temperature and others as yet unknown.</p>	<p>DC</p>

## Item

## Action

John Hood informed the Group that there are only 3 cases of human infection caused by *C. curvatus* documented in the literature. With one case relating to an eye and contact lens, 2 other cases were in the immunocompromised. One case was in an AIDS patient with myeloradiculitis and the other with infected peritoneal fluid with a gastric lymphoma and peritonitis.

The table below on the air sampling results has been updated. Air sampling reports from July 1<sup>st</sup> to August 31<sup>h</sup> 2019.

Date taken	Area	Presumptive	Confirmed
03/07/19	Ward 6A Room 24		<i>C. diffluens</i>
03/07/19	Ward 6A Room 2		<i>C.uniguttulatus</i>
15/07/19	Ward 6A Room 24		<i>C. diffluens</i>
24/07/19	Ward 4C Corridor		<i>C.uniguttulatus</i>
08/08/19	Ward 6A Room 1	<i>C. albidus</i>	
08/08/19	Ward 6A Room 24		<i>C. curvatus</i>
20/08/19	Ward 4B Room 78 Bathroom		<i>C. curvatus</i>
20/08/19	Ward 4B Room 90		<i>C. curvatus</i>
20/08/19	L4 Labs Molecular Lab		<i>C.uniguttulatus</i>
20/08/19	L4 Labs BC room		<i>C. diffluens</i>
27/8/19	Ward 6A Room 5		<i>C. curvatus</i>
27/8/19	Ward 6A Room 5 i.e. both samples pos		<i>C. curvatus</i>
27/8/19	Ward 6A Room 6		<i>C. curvatus</i>
27/8/19	Ward 6A Room 26		<i>C. curvatus</i>
27/8/19	Ward 6A Room 8		<i>C. diffluens</i>
30/8/19	Ward 6A Room 4		<i>C. curvatus</i>
30/8/19	Ward 6A Room 4		<i>C. curvatus</i>

Item

Action

FIGURE 1

<b>'Cryptococcal species' isolates from air sampling 21 Dec 2018 to Jun/Jul 2019</b>							
	<i>N. diffluens</i>	<i>N. albida</i>	<i>N. albido-similis</i>	<i>F.uniguttulata</i>	<i>Cutan. curvatus</i>	ID TBC	Total
<b>*Dec 21<sup>st</sup> 2018</b> n=53	13	0	1	0	1 Roof#	1	<b>16</b>
<b>Jan 19</b> n=422	24	3	0	0	0	0	<b>27</b>
<b>Feb 19</b> n=440	0	0	0	1	0	0	<b>1</b>
<b>Mar 19</b> n=320	4	0	0	1	0	0	<b>5</b>
<b>Apr 19</b> n=334	2	0	0	0	0	0	<b>2</b>
<b>May 19</b> n=420	7	3	0	3	0	0	<b>13</b>
<b>Jun 19</b> n=448	8	0	0	0	0	0	<b>8</b>
<b>Jul 19</b> n=419	3	0	0	2	0	0	<b>5</b>
<b>Aug 19</b> n=150	2	?	0	1	9	1	<b>13</b>
<b>Sept 19</b> n=98	1	0	0	0	0	0	<b>1</b>
<b>Total sf</b>	<b>63</b>	<b>6</b>	<b>1</b>	<b>8</b>	<b>10</b>	<b>2</b>	<b>91</b>

sf = so far

FIGURE 2

Positive Crypto spp. results by month and per number of samples

Month	No of positives	No of samples
<b>December 21<sup>st</sup> 2018 (1day)</b>	16	53
<b>Jan 19</b>	27	422
<b>Feb 19</b>	1	440
<b>March 19</b>	5	320
<b>April 19</b>	2	334
<b>May 19</b>	13	420
<b>June 19</b>	8	448
<b>July 19</b>	5	419
<b>August 19</b>	13	150
<b>September 19</b>	1	98

Item	Action
<p><b>4. Actions from 16 September 2019 Meeting</b></p> <p>Actions from 16/09/19 were updated during the meeting and noted in the minutes.</p>	
<p><b>5. <u>Further Actions Required</u></b></p> <p>i. <b>21/06/19</b> - Continue to carry out air sampling in Wards 6A, 4B and 4C. <b>26/07/19 - Action ongoing. 09/08/19</b> – Difficult to carry out air sampling due to the ongoing separate issues associated with Ward 6A. <b>16/08/19</b> Ward 4C has not been sampled recently and will be in the next few weeks. <b>23/08/19</b> Air sampling has not been carried out in Ward 4C due to the ongoing issues in Ward 6A. <b>02/09/19</b> There have been no new positive <i>Cryptococcus</i> species isolated. <b>16/09/19</b> Air sampling is still to be carried out in Ward 4C. <b>24/09/19</b> Air sampling is still to be carried out in Ward 4C. <b>Action ongoing.</b></p> <p>ii. <b>21/06/19 - Action ongoing:</b> Ian Powrie asked Eddie McLaughlan for HFS to confirm endorsement that HFS and the authorised engineer agreement that CVG vents are no longer required. Ian Powrie has received background information about ventilation and gas leaks from Ian Storrar but needs confirmation of endorsement. Ian Powrie added that ventilation is only needed where there are mechanical joints on gas lines. Eddie McLaughlan reported that Ian Storrar is currently on annual leave. Eddie McLaughlan will arrange for HFS to confirm endorsement within this time. <b>28/06/19</b> – Ian Powrie reported that Ian Storrar is still to confirm. <b>26/07/19</b> - Darryl Conner reported that Ian Storrar was asked (by Ian Powrie) to confirm endorsement of removal of the CVGs. Annette Rankin stated that Ian Storrar is likely involved in the current ongoing issues in NHS Lothian and suggested he is reminded to take this action forward. Darryl Conner will contact Ian Storrar as suggested. <b>02/09/19</b> HFS to confirm endorsement of the removal of the CVGs. <b>16/09/19</b> Darryl updated that the Ventilation Group are happy to remove the CVGs as the risk of leakage or dilution required is minimal. This has not been formally signed off by HFS but they are happy if the Authorised Engineer has approved this. It was agreed that Darryl ask the Authorised Engineer to send him the re-endorsement again to close off this action. <b>24/09/19</b> Darryl Conner reported that these are already working in 4B and there was a plan to do this for 6A but this was stopped by the Specialist Ventilation Group. He said that to remove the CVGs in 6A would be beneficial and could alter the pressure cascade coming into the rooms. It was agreed to ask the Ventilation Group for their advice. <b>Action ongoing to ask the Specialist Ventilation Group for their advice. Closed but Transferred.</b></p> <p>iv. <b>26/07/19:</b> John Hood referred to the tube system, and will need to discuss this with Colin Purdon in the next couple of weeks, who will in turn talk to the engineers from Swisslog. In order to understand and find out (Level 3) the possibility of air being dragged from the Plant Room to the PODs of areas such as in 6A, 4B and 4C. This is specimen transport tubes that should all, query, be under vacuum. John Hood however wants to confirm that air cannot be dragged in (e.g. from the Plant Rooms) and then pushed out into critical areas via the tube system. <b>09/08/19</b> - John Hood stated that he needs to understand how this system works and asked Colin Purdon to speak to the Swisslog engineers and arrange a meeting for him to discuss this. It is John Hood's view that we should probably not be putting the tube system into the heart of critical areas such as BMTU or Haemato-oncology areas with high risk patients. Peter Hoffman stated that he would like to retract what was said last meeting about the vacuum system and John Hood agreed to remove this comment. The issue of the tube system was also one of the original hypotheses. Was it possible that fungal/yeast spores might gain entry into the air of such critical areas via the Tube system?  <b>16/08/19</b> John Hood commented that if we think that the tube system is pushing (or pulling) air into these areas from the Plant Rooms then, we should consider this in individual critical wards (particularly BMTU, 6A and 4C etc) as the air being unfiltered, and therefore another potential route of airborne spores, so a possible risk. Mitigation will be required if above is correct.</p>	<p>DC</p>

Item	Action
<p><b>23/08/19</b> John Hood agreed to contact Adrian from Swisslog next week. <b>02/09/19</b> John Hood contacted Adrian from Swisslog on 26 August. He said that he received an email from Susie Dodd, HPS asking if there was a filter on the air intake in the Plant Room. It was confirmed there was a 'filter' on the intake in the Plant Room (made of wire mesh and plastic foam) i.e. will only keep large objects out, not fungal spores etc. He said there is air being sucked in and exhausted from the Plant Room and this then pushes the POD down the system to the Treatment/Prep Room of the Ward, however, this is where drugs are made up. We do have some air samples next to the pods in 4B, 4C and 6A – which John Hood will review. John Hood informed the Group that Adrian had stated that as the POD comes into the ceiling void above the Ward, the air pushing the POD is exhausted into this void. However John Hood was not sure if some 'dirty' air might still exhaust into the Treatment/Prep Room. Darryl wondered about this air exhausting into the void above the ceilings and the presence also of CVG's. Tom Steele commented that were was a smell detected in the Treatment/prep room in Ward 6A and asked if there was a CVG in the Treatment/prep room. Darryl advised that the smell was due to the adhesive used on the lino and the then use of actichlor which creates this smell. He said the fire compartment is split into 3 ways from top to bottom and if there is any discharge it would be into that space alone.</p> <p>Susie Dodd stated that if this was a significant ingress of unfiltered air it would occur in all other Treatment/prep rooms, thinking that we would be seeing infective consequences related to these other Treatment/Prep rooms as well.</p> <p>Peter Hoffman felt that a small amount of unfiltered air coming into a Prep/Treatment room would have little effect on the air quality in a patient room, if the patients are in positive pressure rooms (with air uniformly leaking outwards) and ventilated with HEPA filtered air. Peter also said, with regards to the air, if microbe retentive filters could be fitted to the pneumatic transport system this would remove any airborne risk, though the significance carrying this out is dubious. He thought that this was an insignificant source of how the <i>C. neoformans</i> got into patients via the air.</p> <p>John Hood replied that if there are no HEPA filters in this area* (as in all wards, including 4B) this could still be a problem but reported that the counts in Ward 4B rooms are mostly 0 cfu's for fungi (but not always).</p> <p>* Correction added in draft of Minute of 24 Sept 2019 – on 15 Oct 2019: while 4B has no HEPA filtered air in the corridors (only spill over from the Rooms ) the Treatment/Prep Room is HEPA-filtered – but only that room.</p> <p>Tom Steele asked if there is any opportunity to improve the level of filtration at the Plant Room and Darryl replied that the Plant Room is not sealed from the outside therefore the air will be essentially be similar to the outside air. John Hood suggested that if further investigation surrounding the risk associated with the Tube system in High Risk areas that it should be taken over by the Specialist Ventilation Group/HFS. <b>16/09/19</b> It was agreed that this should be discussed with HFS and the Ventilation Group regarding the risks associated with the tube system to see if there is any indication that anything that is discharged into the ceiling void could leak into the corridor. The consensus from IMT is that the risk related to the pneumatic tube system is likely to be small. <b>24/09/19</b> John Hood spoke to Swisslog regarding the movement of PODs and Peter Hoffman asked if the ceiling is solid or suspended and was informed that it is tiled. Peter Hoffman asked if there was a constant flow of air or only when the tube goes through the system and Darryl Conner replied that the motor only engages when in use and does not go into patient rooms. The POD comes from the Lab to the station and pushes the POD to the department and there is only one second of discharge to void. Susie Dodd agreed to follow this up with HFS. The group discussed if the PTS system (Star Delta motors) needed to be at the station of the ward or if it could be situated outside. This can be done by changing the destination pipe and move this to an alternative site. It was agreed that this is something that can be discussed with the Specialist Ventilation Group and Project Team. Peter Hoffman suggested putting one filter before the pre compressor as this would take the microbes out but is maybe something to maybe discuss this with Swisslog. <b>Action ongoing.</b></p>	<p>SD</p>

Item	Action
<p>v. John Hood asked if anyone is putting together all the mitigation from all of the previous actions and hypotheses. Colin Purdon agreed to arrange to get the mitigation recorded. <b>23/08/19</b> Colin advised that he has started putting together the mitigation from all the previous actions. <b>02/09/19</b> Darryl updated that Colin Purdon has started this. <b>16/09/19</b> Colin confirmed that he has completed the mitigation from previous actions and will forward this to the group for return comments within a week. <b>24/09/19</b> Colin Purdon to add the air movement into 4B to the mitigation report. Susie Dodd also asked for the report to include what the actual problem was, if this requires to be maintained and what has been done. <b>Action ongoing.</b></p>	CP
<p><b>6. Draft Report for Comments</b> John Hood is currently working on the draft report and hopes to issue a draft to the group in the next couple of weeks/years!</p>	JH
<p>In the report he said that he will include the lack of HEPA filtered rooms with positive pressure (and air leaking uniformly outwards) as one of the main conclusions [REDACTED] in an appropriate HEPA-filtered environment with air uniformly leaking outwards. He said it is unlikely that the Plant Rooms/AHUs were the cause.</p>	
<p>Discussion took place regarding the risers and doors that are sealed. It was noted that all riser doors in critical areas had the doors now resealed and all access is now controlled requiring a key. Darryl Conner confirmed that the risers are now sealed and there is no air coming from the risers into the ward.</p>	
<p>At the time of commissioning the hospital John Hood advised that he believed that the BMT areas were not included in the original plans (New Beatson had recently opened) and were added at a later stage.</p>	
<p>JH said that he is looking at the data from the air sampling to see if the counts suggest that there are higher counts at the end of each ward corridor (e.g. 4B/4C, 6A/6B) where we know that 'dirtier' air may be gaining access to these critical areas such as 4B,6A.</p>	JH
<p>In terms of guidance, Tom Steele stated that there are three client groups that require specialist ventilation i.e. Infectious Diseases (source isolation), BMT and Haematology-Oncology patients (protective isolation). He recommended that wards for these patients are the same as 4B. Added in Draft by JH – aspiration should be of a higher standard than 4B.</p>	TS
<p>Peter Hoffman stated that guidance for BMT and Haematology-Oncology patients was very poorly detailed and did not help design of units such as those in question. He further advised that, in the context of inadequate guidance, it is perfectly legitimate to design systems according to local and external expertise, and to record the logic behind the design intent. Tom Steele informed that he has a document with information from different SHTMs that he can send to Peter Hoffman.</p>	PH
<p>Discussion took place regarding patients in 4B and 4C. 4B is a transplant unit and once the patient has had their transplant and their counts are satisfactory, the children are transferred back to 6A. It is thought that adult patients who have recently undergone bone marrow transplant are housed in ward 4B but the criteria for transferring the patient to 4C is unclear and would need to be sought from the clinicians. Susie Dodd stated that it was her understanding that the patients in ward 4C were also very immunocompromised.</p>	SD
<p>The question was asked what proportion of the hospital is served by F7/F9 filters and it was confirmed that almost 100% of the hospital is served by these which is the appropriate standard level of filtration for patients that do not require 'protective isolation) Added by JH in draft (15/10/19). Some areas have F9 filters installed (6A and 4C) and the HEPA filtered rooms are for BMT/Haematology-Oncology patients in 4B. It was agreed that this should maybe be included at the beginning of the report.</p>	

Item	Action
<p>The report will also include a brief explanation of the ecology and biology of <i>C. neoformans</i>, the issues regarding the tube system and the spreadsheets with air sampling results of Wards 6A, 4C and 4B.</p> <p>The report will also take account of how little we really know about <i>C. neoformans</i> as well as its association with pigeon guano (which is in itself complex) as this yeast-like fungus can also be associated with rotting wood or vegetation.</p> <p>The hypotheses will be incorporated in the report and this will be agreed with this group. John Hood commented that the PICU cylinder room is also a possibility [REDACTED] [REDACTED] but it might be not so likely, as the room [REDACTED] was in while in PICU was a PPVL room and this may have provided some protection. With regards to the Helipad John Hood (and the Group) does not believe that this was a contributory factor, inserted in Draft by JH (see previous Minutes and Report on Computational Fluid Dynamics Simulation of the External Flow Around Queen Elizabeth University Hospital, 14<sup>th</sup> June 2019).</p> <p>Discussion took place around the hypothesis at the time of the Cryptococcus incident in December 2018 and what is now thought to be the possible/most likely hypothesis/hypotheses. It was accepted that the hypotheses at the time of the incident were based on the information that was available to the IMT at that time. Susie Dodd commented that it is often the case within IPC that a source cannot be identified with absolute certainty but the IPCT will use their expertise and knowledge alongside any circumstantial evidence available to them at the time to, formulate a hypothesis/hypotheses as to the potential source(s) and route(s) of transmission.</p>	SD
<p><b>Closed / Completed Actions</b></p>	
<ul style="list-style-type: none"> <li>• <b>(06/06/19) p3: bp1:</b> Ian Powrie will discuss IPS panels being sealed with Darryl Conner as some of the underside of WHBs panels were not done. <b>(21/06/19)</b> Colin Purdon picked up with Darryl Conner and reported all have been re-checked and all sealed. There were 2 rooms unable to get access to and this is still the same position today but will be re-checked. <b>(28/06/19)</b> Darryl Conner confirmed all now done. Ian Powrie reported that of all the rooms checked, the 2 rooms were still to be checked one of which was Room 5. Darryl Conner will confirm by e-mail that Rooms A and B, and Ward 6A Room 5 is the only one not sealed on the underside. Ian Powrie and John Hood had inspected this area. <b>(09/08/19)</b> Darryl Conner confirmed as above. <b>Action complete.</b></li> <li>• <b>(06/06/19) p3: Item 4:</b> There is concern about the differences in the pressures in 4C Rooms 66-75. Rooms 66 to 74 are between 0.4 to 2.9 Pa from rooms to corridor but Room 75 at the end of the corridor is consistently negative at -0.3 (i.e. air moving from corridor to room). Colin Purdon to make adjustments to the ventilation to make this room slightly positive. <b>(28/06/19)</b> Ian Powrie clarified this was the room at the end of the corridor and is still to be done. Ian Powrie asked Darryl Conner to be careful not to affect the pressure regimes for the area when adjustments are made. <b>(26/07/19)</b> Darryl Conner agreed to make adjustments to the ventilation to make this room slightly positive. <b>(09/08/19)</b> It was noted that this action has gone to the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></li> <li>• <b>06/06/19</b> - Item in relation to Pest Control. <b>Action closed</b></li> <li>• <b>06/06/19</b> - transferred: Sandra confirmed IPC has investigated laundry storage and process. This action to be removed from the group's remit. <b>Action complete.</b></li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li>• <b>06/06/19</b> - It was confirmed that final inspection of Ward 6A Room 5 has taken place. Action complete - see Bp 6, below. <b>Action closed</b></li> <li>• <b>06/06/19</b> - It was agreed and noted that overall ventilation design for Ward 2A is the responsibility of another forum therefore it has been removed as an action for this group. <b>Action closed - transferred</b></li> <li>• <b>06/06/19</b> - Estates are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he discussed this with Multiplex. He said that the green roof was part of the design and the sedum can be removed and an alternative ballast material installed. He said if we were to move the items from the roof we could cause further disturbance? John Hood said he would be concerned if <i>Haemato-oncology</i> patients were to go on to this roof but he was informed there is no access to it for these patients. Tom Steele said that he is of the opinion to maybe review this in the future but to leave it as is at the moment. <b>21/06/19</b> - no update. <b>26/07/19</b> - <b>Action closed meantime.</b></li> <li>• <b>21/06/19</b> - On 29 May 2019, inspection above the ceiling of Room 5 in Ward 6A showed that the services coming into the space were well sealed and in good condition. The flexible duct to the chilled beam was found to be intact. <b>26/07/19</b> - <b>Action closed.</b></li> <li>• <b>21/06/19</b> - Ian Powrie reported that fluid dynamics modelling around the helipad/QEUH/RHC report was now completed (see Report Rev 3). The IMT Expert Advisory Sub-Group accepted the findings of the CFD Report. <b>Action closed</b></li> <li>• <b>21/06/19</b> : A problem with the chilled beams was identified and Ian Powrie explained this was a mechanical joint failure causing a leak. On this occasion it was a loss of low temperature hot water heating circuit that resulted in a change in temperature causing contraction of the pipework and fittings resulting in a slight leak. Colin Purdon added this was reported as a series of drips and although not for this group, it is being mentioned due to the mechanical failure. Colin Purdon has met with Teresa Inkster and Christine Peters. The ceiling tiles affected by water were replaced, and Actichlor was used to wash down. All appropriate IPC measures have been taken (Ward 6A children - x8 rooms). <b>Action complete</b></li> <li>• <b>21/06/19 p4: para2:</b> John Hood mentioned that a mechanical riser in 4B had a water leak this morning. Colin Purdon explained that this is the low temperature water return pipe, and that the valve body gland has a slight leak. The valve will be changed today. <b>(29/07/19)</b> Darryl Conner confirmed as done. <b>Action complete.</b></li> <li>• <b>21/06/19 p5: para3:</b> Ian Powrie asked if there is a risk between CF and haemato-oncology if there is air movement between them. John Hood agreed to discuss this with Teresa Inkster. <b>(09/08/19)</b> John Hood reported that Teresa Inkster has concurred: no significant risk. <b>Action complete.</b></li> <li>• <b>21/06/19 p5: para5:</b> Colin Purdon has advised that intumescent gasket seals would be fitted. <b>(26/07/19)</b> Darryl Conner confirmed that the intumescent gasket riser seals has been completed. The only action outstanding in relation to this is the installation of the false ceilings. <b>(09/08/19)</b> Darryl Conner reported that installation of the false ceilings is still to be done but that this action is for the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></li> </ul>	



Item	Action
<ul style="list-style-type: none"> <li>• <b>21/06/19 p7: item 7: para2:</b> On 25 July 2019, Colin Purdon to have walk round with Fire Safety Advisor shortly. <b>(26/07/19)</b> Colin Purdon will set-up a meeting with the Fire Officers soon. <b>(09/08/19)</b> Colin Purdon reported that a walk round with the Fire Advisor is still to be arranged. <b>(16/08/19)</b> Sandra Devine commented that she had met with clinical and managerial representatives from 4B and had walked the patient pathway through the ward. After due consideration it was felt that automatic door closures would impede the movement of patients through the ward especially in emergencies therefore the meeting with Colin and the Fire Officer is no longer required. <b>Action complete</b></li> <li>• <b>21/06/19 p8: item 13:</b> All but two IPS panels have been confirmed as complete. <b>(26/07/19) Action complete.</b></li> <li>• <b>21/06/19 - Action ongoing: Carry Forward</b> - Sandra Devine was then not in attendance to provide an update that a discussion is still to take place with Teresa Inkster and possibly Myra Campbell (Clinical Services Manager) in relation to self-closers on doors in Ward 4B, and that IPC team is making sure that staff understand the importance of keeping doors to patient rooms closed and also keeping doors to ancillary areas closed as much as possible. <b>28/06/19</b> - Darryl Conner asked about self-closers. Ian Powrie stated this is what Sandra Devine was going to discuss with clinical colleagues. <b>26/07/19</b> - Sandra Devine reported that two IPC Nurses visited Ward 4B to emphasise the importance of closing doors, and signage has also been put up. Sandra Devine is arranging to meet with Myra Campbell to discuss self-closers on doors and will explain the issue of the 4B corridor and how the problem exists. Darryl Conner pointed out that practically this may be difficult to put in place as every door is bespoke and takes around 8 weeks from order, effectively taking rooms out-of-use. Sandra Devine will make this a consideration. <b>Action ongoing. 09/08/19</b> - Sandra Devine met with Myra Campbell on 08/08/19 and they both visited Ward 4B. The overwhelming opinion was not to have self-closers on doors in Ward 4B therefore this action should not be taken forward. <b>Action complete.</b></li> <li>• <b>21/06/19 - Action ongoing: Carry Forward</b> – Colin Purdon will check with the contractors if the rooms have 30-minute fire doors fitted at present. Colin Purdon previously discussed self-closers on doors with local Fire Safety Advisors and reported there would be no issues with this proposal. It was noted that discussion with the clinical teams would need to be held in relation to beds being taken out etc. <b>26/07/19</b> - deferred until discussions with relevant parties have taken place as noted in the minutes and also as noted, a walk round with the Fire Advisor to be arranged. <b>Action ongoing. 09/08/19</b> – Colin Purdon stated that in light of Sandra Devine's update (previous action) this action is no longer relevant. Colin Purdon added that fire doors are fitted adjacent to the fire exit points. Sandra Devine added that ward staff are aware of why this was being asked. <b>Action complete.</b></li> <li>• <b>21/06/19 - Action ongoing: Flooring: Carry Forward</b> - Colin Purdon updated that the action plan has been prepared and is being used to programme and prioritise the issues previously identified. The report was put together by the flooring contractor and Ward 6A has some minor issues to be rectified. <b>26/07/19 – Action carry forward / ongoing. 09/08/19</b> – It was agreed this action should be taken to another forum. Colin Purdon added there is a programme ongoing for Level 7 managed by Kerr Clarkson. <b>Action complete.</b></li> <li>• <b>21/06/19 - Action ongoing:</b> It was confirmed that the engineering risers have been inspected however this action will be kept as ongoing until completion of the doors to risers' rooms are sealed. Ian Powrie asked Colin Purdon to arrange to have the doors sealed over the next three weeks (by 27/06/19). Colin Purdon reported that the frames have been sealed. Darryl Conner is taking forward the action for the risers. <b>28/06/19</b> - On hold with Teresa Inkster as mentioned earlier (page 3 bp1).</li> </ul>	

Item	Action
<p>Ian Powrie asked Darryl Conner to check if the seals itself are fine to adjust the door, but if not, to put a gasket in.</p> <p>Ian Powrie added that only one was looked at in Ward 6, but asked that all of the doors are sealed air tight (sweep Wards 4B, 6A, 4C for all riser doors). <b>26/07/19</b> - Fire Advisor to endorse and if IPC can sanction, then this will be done. John Hood asked if Darryl Conner is in a position to comment.</p> <p>Darryl Conner reported that Teresa Inkster wanted this item discussed at the Specialist Ventilation Group and following discussion at the first meeting put forward their intentions and what was required to accommodate the work. However Teresa Inkster had responded that the downtime would cause more risk than what the existing risk is in relation to the risers. Darryl Conner stated that in the interim a control of the risers. The doors are sealed, but the adjacent ceilings and floors of the risers have not yet been done.</p> <p>Clarification from the Fire Advisor is required to ensure that there is no breach of fire integrity as they are horizontally sealed to each level. Darryl Conner stated this will need to be discussed at the Specialist Ventilation Group and will ask for this to be included as an agenda item for discussion. <b>Action ongoing. 09/08/19</b> – Darryl Conner reported that it was proposed at the Specialist Ventilation Group a level of modification and the process of sealing the risers, and the possibility of doing this at higher and lower floors. It was recognised that there would be disruption. Darryl Conner thinks the group might be satisfied with the intumescent seals and the doors are under lock and key therefore not regarded as an immediate risk.</p> <p>Peter Hoffman commented that if everything is adequately sealed at one point in time, there is no guarantee it is going to be like that in a few years (or less) from now, and is a temporary solution. So get things sealed but need to get the air flows correct and the air flow in the right direction. It was noted that Teresa Inkster has taken this over in the Specialist Ventilation Group. <b>Action closed and transferred to the Specialist Ventilation Group.</b></p> <ul style="list-style-type: none"> <li> <p><b>21/06/19 - Action ongoing:</b> Ian Powrie updated that priority has been given to Wards 6A and 4C for removal of the Ceiling Vent Grilles (CVG's). Ward 4B has been done. Timeline will be done, but Wards 6A and 4C is expected to be done in the next couple of weeks, ongoing for removal of CVGs in other clinical wards. <b>28/06/19</b> - SCRIBE sitting with IPC. Ward 4B has been done. Wards 6A and 4C have yet to be done – <b>SCRIBE required. 26/07/19</b> - Darryl Conner has asked Teresa Inkster about replacing CVGs in Ward 4B with ceiling tiles. There was one action was to replace CVGs in Ward 4C, but there is a problem with increased permeability of the space. It has already been established that the notional average is <b>1.2 to 2 Pa</b> to replace CVGs. It has been suggested it might be possible to trim back the extract in the en suites, but the air change in the en suites would be reduced slightly. This information has gone to the Specialist Ventilation Group. Darryl Conner reported that the area from 4B into 4C, at time of measurement is showing negative, but on investigation and measurement outside 4C Room 75, it was recorded to be 1.2 to 2 Pa because of the opening and closing of the various doors and air moving into 4D (as door often can be kept open). Without installation of ward lobbies into mitigating areas, the closing or opening of any one door alters the pressure regimes.</p> <p>Darryl Conner has submitted SCRIBES for the process for removal of CVGs, and all are the same apart from the level of protection for each department being moved. Ward 6A is next on the list, which requires feedback from Teresa Inkster, but can be actioned immediately if required.</p> <p>John Hood thought the SCRIBE employed in 4B could be used for the other areas as same work is being carried out and had been successfully used in a more critical area. Darryl Conner explained that effectively it is the same SCRIBE and is used as a template however each area requires sign-off. <b>Action ongoing – SCRIBE required.</b></p> </li> </ul>	

Item	Action
<p><b>09/08/19</b> - Amendment as noted at the start of the minute, that the notional average is 1.2 to 2 Pa. Darryl Conner commented that Teresa Inkster may not be keen to have CVGs removed. <b>Action ongoing – SCRIBE required. Action ongoing and transferred to the Specialist Ventilation Group.</b></p> <p><b>N.B. Teresa must be happy before any CVG's removed she would rather have as much positive pressure in rooms as possible.</b></p>	
<ul style="list-style-type: none"> <li>• <b>21/06/19 p3: bp2:</b> Colin Purdon advised that the Fire Strategy required that the doors to be available for lateral evacuation of patients and staff in both directions, but he would review options of temporary seals with the site Fire Advisor. <b>29/07/19</b> Action outstanding. To be completed. <b>09/08/19</b> Darryl Conner reported that draft seals have been fitted on the Ward 4B door that is locked on the outside, through to the doctor's room and it is only Estates that go in and out of that area. Darryl Conner will discuss with the Fire Advisor. <b>23/08/19</b> Darryl confirmed that he has spoken to Frank Deacon, Fire Officer and he is reviewing this. He will provide an update at the next meeting. <b>02/09/19</b> Darryl updated that there is a meeting of the Specialist Ventilation Group next week and this will be discussed there, although he has had verbal agreement regarding this. <b>16/09/19</b> Darryl reported that this was taken to the Ventilation Group and endorsement was received from the Fire Officer as they are happy with the fire seals. The Fire Officer has asked for the ICDs agreement on this. <b>24/09/19</b> The group agreed to close this action as endorsement was received from the Fire Officer. <b>Action closed.</b></li> </ul>	
<ul style="list-style-type: none"> <li>• <b>28/06/19 p2: bp1:</b> There had been discussion around air in the corridor from Ward 4C into Room 75, and Ian Powrie had explained that the commissioning engineer will need to review all of the rooms and check that correction has not made things worse, with a view to increasing the pressure in Room 75 to the same range as the other rooms. <b>(26/07/19)</b> Darryl Conner confirmed he will do the pressure change but will ask <b>Ian McKenzie</b> to do the re-balance. <b>(09/08/19)</b> John Hood reported that the Specialist Ventilation Group will need to discuss the air pressures. Darryl Conner explained that the doors need to be closed because when the doors are open this could force the rooms into a negative state from the corridor. <b>(16/08/19)</b> It was noted that it is only through discussion at meetings that it was realised the effect of doors being left open affecting all of the pressures, therefore ward staff would definitely not be aware of these issues. <b>Action closed and transferred to the Specialist Ventilation Group.</b></li> </ul>	
<ul style="list-style-type: none"> <li>• <b>26/07/19</b> - Darryl Conner confirmed that Room 5 6A was done and has been told that the other room has also been done. Darryl Conner will check both have been sealed and will confirm this. <b>Action ongoing. 09/08/19 – Darryl Conner confirmed. Action complete.</b></li> </ul>	
<ul style="list-style-type: none"> <li>• <b>26/07/19:</b> John Hood to continue doing walk round of Plant Rooms. Awaiting results of air samples from the Level 12 Plant Rooms tested on 25 July 2019. <b>09/08/19 –</b> John Hood reported that walk round of <b>all</b> of the Plant Rooms has been done at QEUH and RHC. Plant Room 31 has AHUs marked both 21 and 31 – which is a little confusing as the first number (i.e. 2 or 3 should indicate which floor that Plant Room is on!). No evidence of pigeon ingress or droppings. Plant Room 22 is in the Adult QEUH and is huge! Again the only thing discovered there was some water on the floors but apparently this is from the heat exchangers (affected by the weather), in both QEUH and RHC. Plant Room 22 is very clean, with no evidence of pigeon ingress or droppings. There was water on the floor in Plant Room 21 and there was still some general debris in it but this will be cleaned this week. There was no evidence of pigeon ingress or droppings. Plant Room 41 (RHC), again, the floor needed a brush, but there was no evidence of pigeons or pigeon droppings. Some light ingress was noted but above the area of light ingress there is netting fitted so pigeons should not get in. Plant Room 41A (RHC) is a small plant room, with no evidence of any pigeon ingress or droppings.</li> </ul>	

Item	Action
<p>John Hood will visit the Plant Rooms serving the labs next because two areas in Floor 1 Lab Block have grown <i>Cryptococcus</i> spp. (one <i>C. albidus</i> and one <i>C. diffluens</i>). These Plant Rooms are completely separate from the Plant Rooms in either QUEH or RHC. <b>16/08/19</b> John Hood visited Plant Rooms on level 3, 2 and 4 and none of these areas had evidence of pigeon ingress or evidence that the pigeons are getting into these Plant Rooms (indeed very difficult to see how they could). Colin Purdon confirmed that there are F7s filters in the AHUs serving the Lab building. <b>Action closed.</b></p> <ul style="list-style-type: none"> <li>• <b>26/07/19:</b> Colin Purdon to get the GP Environmental (Pest Control Company) to give an update on their formal cleaning and ongoing identification of problems in the Plant Rooms. Darryl Conner will discuss this with Colin Purdon on 28/07/19. Of note, this will be required for part of the final discussion and Report. <b>09/08/19</b> – Colin Purdon will request a report from the pest control company as noted. <b>16/08/19</b> – Report from GP Environmental was received by Colin on 15<sup>h</sup> August 2019. Report to be sent round the group and discussed further at next meeting. <b>Action closed.</b></li> <li>• <b>26/07/19:</b> John Hood to inform Liz Johnson at the Reference Laboratory in Bristol of the cryptococcus isolates and will forward the breakdown of this, in order to discuss the implications and any views, and if these are valid surrogate markers for <i>C. neoformans</i>. <b>09/08/19</b> – John Hood will speak to Liz Johnson next week. <b>16/08/19</b> John discussed with Liz Johnson and she said that neither can really be considered as surrogate markers for <i>C. neoformans</i> but it was difficult to be dogmatic about it. <b>Action closed.</b></li> </ul> <p>vi. <b>06/08/19</b> An e-mail response was received from Eddie McLaughlan on 06/08/19 as noted below.</p> <p>Eddie McLaughlan offered in his e-mail to have a telephone discussion with John Hood to clarify anything further:</p> <p>“The first action on me was I think a double check with Ian Storrar about vents in ceilings containing medical gas pipework without joints, but he’s completely tied up at the moment. I think I said at the meeting that as you need to seal the ceiling for IC purposes and there are no joints in the pipework above the ceiling, it would take a major mechanical failure to compromise the pipework and as that seemed unlikely removing the vents and using a gas alarm seemed reasonable. That said, we are only a source of advice; the risk assessment should be done by the Board with advice from your Authorising Engineer as necessary.”</p> <p>‘I’ve read the second action twice and I’m not entirely clear what I’m commenting on but hopefully the following will cover it. The source of the continuing <i>Cryptococcus</i> can only really be the outside air or infiltration from within the building and, as it is being detected in non HEPA filtered spaces and not in HEPA filtered spaces (I presume this is still the case, then the outside air looks a likely candidate).’</p> <p>On the subject of guidance, there is a review of the ventilation guidance underway at present and whilst we have asked for more clarity around specialised ventilation for susceptible patients, it is not yet clear whether we will get it. If not we will need to do something specifically for Scotland, for which there is currently neither financial nor staff resource, and no progress is likely to be made on this whilst the RHCYP&amp;DCN review is ongoing. In the meantime, it is important that clinicians understand the level of protection available in the various environments within QUEH and place patients accordingly.’</p> <p><b>26/07/19:</b> Eddie McLaughlan to review the discussion noted in the minutes of 21/06/19 (page 8, item 7.1 - Hypotheses) and change as appropriate. <b>09/08/19</b> – As mentioned earlier John Hood will telephone/email Eddie McLaughlin and as part of that discussion will ask for re-wording from Eddie McLaughlin.</p>	

Item	Action
<p><b>16/08/19</b> John forwarded the minute of 21<sup>st</sup> June for Eddie McLaughlan to comment on. <b>23/08/19</b> Eddie replied with the following:  “Not sure this is from memory, but I am content with the text highlighted in yellow in your attachment, including your addition. I’d be thoughtful about any inferences beyond the text, particularly in reference to the case of additional guidance. The need for specialist ventilation guidance is on a very long list of priorities and although we are hopeful of being in a better position for resource in the future, nothing is guaranteed”.</p> <p><b>16/09/19</b> Susie Dodd confirmed that she spoke with Eddie McLaughlan and he forwarded wording below:-  <i>“I am content with the text attributed to me, however, none of it removes the need for the Board to take appropriate professional advice. In particular, the medical gas paragraph at the top requires advice from the Board’s Authorising Engineer to inform the risk assessment. On the subject of neutropenic patients, although the guidance is not as detailed as might be desirable, it does state that wards for these patients should be HEPA filtered with a 10pa pressure regimen, so any decisions should take that as the starting point.”</i> <b>Action closed.</b></p>	
<p><b>6. AOCB</b>  Nil to update.</p>	
<p><b>7. Date and Time of Next Meeting</b></p> <p>The next meeting will be held at 2.00pm on Wednesday 16<sup>th</sup> October 2019.</p>	

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Facilities Meeting Hub CMB Building, Queen Elizabeth University Hospital

**Monday 24 September 2019 at 2.00pm Draft 3**

**Present:** Dr John Hood (chair), Darryl Conner, Tom Steele, Colin Purdon, Susie Dodd, Ann Lang (minutes)

**Teleconference:** Peter Hoffman

**Apologies:** Ian Storrar, Sandra Devine, Eddie McLaughlan

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting. Teleconference introductions were made and apologies were received from the above mentioned.</p> <p><b>2. Minutes of Meetings held on 16 September 2019</b></p> <p>The minutes of the meeting held on 16 September 2019 were accepted with the following amendment:-</p> <ul style="list-style-type: none"> <li>- Page 2, 5<sup>th</sup> para – Delete sentence.</li> <li>- Page 6 – John Hood to add in comments from Peter Hoffman.</li> </ul> <p><b>Minutes of Previous Meetings for 2 September and 23 August 2019</b></p> <p>Copies of the final minutes for 23 August and 2 September 2019 were circulated to the group to confirm.</p> <ul style="list-style-type: none"> <li>• <b>Actions Update:</b> At times depending on the outside conditions we have seen air from 4C being pushed into the adjacent corridor in 4B when the door to 4C is opened. It was agreed to include the air movement with regards to 4B in the Mitigations table that Colin Purdon is preparing. John Hood confirmed that he will check the other entrance corridor to 4B i.e. to 4A.</li> </ul> <p>John Hood distributed a copy of the floor plan which shows the configuration of the wards and stated that two wards are linked to each other. He said that 4B is linked to 4C, 4B is also linked to 4A and 4C is also linked to 4D.</p> <p>At the beginning of September John said that he looked at the intersections on Level 4 and also 6A, 6B and 6D.</p> <p>With regards to 4C entrance (door opposite to 4B) air from 4C was consistently pushing out, between 5 and 13 Pa depending on which doors were open or shut at that intersection, as noted before. Note that we already had identified that given the right set of conditions and with this door to 4C open (NB Door to 4B is ALWAYS shut) the positive pressure from 4C is such that bottom corridor of 4B becomes negatively pressurised to 4C and the air at that intersection therefore non-HEPA filtered, will push into 4B corridor.</p>	<p>CP JH</p>

Item	Action
<p>Again at the other entrance to 4C (opposite 4D entrance), all doors shut - 4C pushing 12 Pa out. <b>No</b> configuration of doors opening at either 4C/4B or 4C/4D results in air being pushed into 4C.</p> <p>6A/6B - intersection also has door to lifts. All doors shut sees 6A negatively pressurised to this intersection at -3.5Pa. Opening door to lift area decreases the negative pressure in 6A to -1.5 to -2Pa while opening the Door to 6B increases the negative pressure in 6A to - 10 to -11Pa.. All doors open reduces the negative pressure in 6A to -7-8 Pa.</p> <p>6A/6D – intersection (plus door to Facilities corridor). All doors shut – 6A at + 0.3 to +1 Pa out of ward. With 6D door open – 6A at -1 to - 2 Pa. Door open to Facilities corridor and 6D door open – 6A at +2.3 to + 4 Pa. He said this Facilities corridor crosses a large number of doors (it transects the middle of the building on each floor) and consequently there is little or no control of the air.</p> <p>The take home message is therefore that 4B needs better control of the air around the intersection with 4B/4C. 4C seems best in terms of a consistent flow of air outwards from both corridors. 6A is also problematic, particularly at the 6A/6B intersection but also to a lesser extent at the 6A/6D intersection.</p> <p>The above underlines the complexities of air pressures and air movement in this large and complex hospital. This also underlines the importance of controlling the air around 'at risk' patients and not merely by HEPA – filtering the air. (Added in Draft 15/10/19 by JH)</p> <p>The results for the air sampling in 6A and 4B should be available next week. Approximately 70% of the air samples taken in 4B had 0 counts for fungi, (334 out of the 461 samples) and in 6A this was reduced to 40%. He said thought that the rooms at the end of the corridors are more likely to have positive cfu – based on the above air pressure testing in 4B,4C and 6A.</p> <p>With regards to the HEPA filters in the Prep/Treatment Room in 4B John Hood stated that these are not present in other wards. Darryl Conner confirmed that he will send a template detailing where the HEPA filters are fitted in the wards.</p> <p>John Hood reported that Wards 4C and 6A do not have HEPA filtered rooms. 6A is also negatively pressurised compared to its surroundings. It would be preferred to change these wards to positive pressure rooms with HEPA filtered air and air consistently leaking outwards. Tom Steele asked if the wards do go back to a general ward would the present ventilation system be acceptable. John Hood felt that that would be acceptable. (JH added in Draft). Darryl Conner commented that significant improvement could be made to both wards (6A and 4C).</p>	
<p><b>3. Update on Air Testing</b></p>	
<p>John Hood informed that there have been two more <i>C. curvatus</i> in 6A and 4B which have been confirmed by the Reference Lab from samples taken on 30<sup>th</sup> August 2019. He said to date there have been 9 isolations of this particular <i>Cryptococcus</i> spp. in August. We have only grown this once before in December 2018 from a single air sample from outside air on the roof. Darryl Conner stated that the Plant Room and AHUs that serve 4B are operating without any issues, as before. John Hood commented that there have been variable amounts of different fungi (including different cryptococci) in the air around the hospital over the last 9 months of air sampling. This will be due to various factors such as the weather, the wind direction, temperature and others as yet unknown.</p>	DC

## Item

## Action

John Hood informed the Group that there are only 3 cases of human infection caused by *C. curvatus* documented in the literature. With one case relating to an eye and contact lens, 2 other cases were in the immunocompromised. One case was in an AIDS patient with myeloradiculitis and the other with infected peritoneal fluid with a gastric lymphoma and peritonitis.

The table below on the air sampling results has been updated. Air sampling reports from July 1<sup>st</sup> to August 31<sup>h</sup> 2019.

Date taken	Area	Presumptive	Confirmed
03/07/19	Ward 6A Room 24		<i>C. diffluens</i>
03/07/19	Ward 6A Room 2		<i>C. uniguttulatus</i>
15/07/19	Ward 6A Room 24		<i>C. diffluens</i>
24/07/19	Ward 4C Corridor		<i>C. uniguttulatus</i>
08/08/19	Ward 6A Room 1	<i>C. albidus</i>	
08/08/19	Ward 6A Room 24		<i>C. curvatus</i>
20/08/19	Ward 4B Room 78 Bathroom		<i>C. curvatus</i>
20/08/19	Ward 4B Room 90		<i>C. curvatus</i>
20/08/19	L4 Labs Molecular Lab		<i>C. uniguttulatus</i>
20/08/19	L4 Labs BC room		<i>C. diffluens</i>
27/8/19	Ward 6A Room 5		<i>C. curvatus</i>
27/8/19	Ward 6A Room 5 i.e. both samples pos		<i>C. curvatus</i>
27/8/19	Ward 6A Room 6		<i>C. curvatus</i>
27/8/19	Ward 6A Room 26		<i>C. curvatus</i>
27/8/19	Ward 6A Room 8		<i>C. diffluens</i>
30/8/19	Ward 6A Room 4		<i>C. curvatus</i>
30/8/19	Ward 6A Room 4		<i>C. curvatus</i>



Item

Action

FIGURE 1

<b>'Cryptococcal species' isolates from air sampling 21 Dec 2018 to Jun/Jul 2019</b>							
	<i>N. diffluens</i>	<i>N. albida</i>	<i>N. albido-similis</i>	<i>F.uniguttulata</i>	<i>Cutan. curvatus</i>	ID TBC	Total
<b>*Dec 21<sup>st</sup> 2018</b> n=53	13	0	1	0	1 Roof#	1	<b>16</b>
<b>Jan 19</b> n=422	24	3	0	0	0	0	<b>27</b>
<b>Feb 19</b> n=440	0	0	0	1	0	0	<b>1</b>
<b>Mar 19</b> n=320	4	0	0	1	0	0	<b>5</b>
<b>Apr 19</b> n=334	2	0	0	0	0	0	<b>2</b>
<b>May 19</b> n=420	7	3	0	3	0	0	<b>13</b>
<b>Jun 19</b> n=448	8	0	0	0	0	0	<b>8</b>
<b>Jul 19</b> n=419	3	0	0	2	0	0	<b>5</b>
<b>Aug 19</b> n=150	2	?	0	1	9	1	<b>13</b>
<b>Sept 19</b> n=98	1	0	0	0	0	0	<b>1</b>
<b>Total sf</b>	<b>63</b>	<b>6</b>	<b>1</b>	<b>8</b>	<b>10</b>	<b>2</b>	<b>91</b>

sf = so far

FIGURE 2

Positive Crypto spp. results by month and per number of samples

Month	No of positives	No of samples
<b>December 21<sup>st</sup> 2018 (1day)</b>	16	53
<b>Jan 19</b>	27	422
<b>Feb 19</b>	1	440
<b>March 19</b>	5	320
<b>April 19</b>	2	334
<b>May 19</b>	13	420
<b>June 19</b>	8	448
<b>July 19</b>	5	419
<b>August 19</b>	13	150
<b>September 19</b>	1	98

Item	Action
<p><b>4. Actions from 16 September 2019 Meeting</b></p>	
<p>Actions from 16/09/19 were updated during the meeting and noted in the minutes.</p>	
<p><b>5. <u>Further Actions Required</u></b></p>	
<p>i. <b>21/06/19</b> - Continue to carry out air sampling in Wards 6A, 4B and 4C. <b>26/07/19 - Action ongoing.</b> <b>09/08/19</b> – Difficult to carry out air sampling due to the ongoing separate issues associated with Ward 6A. <b>16/08/19</b> Ward 4C has not been sampled recently and will be in the next few weeks. <b>23/08/19</b> Air sampling has not been carried out in Ward 4C due to the ongoing issues in Ward 6A. <b>02/09/19</b> There have been no new positive <i>Cryptococcus</i> species isolated. <b>16/09/19</b> Air sampling is still to be carried out in Ward 4C. <b>24/09/19</b> Air sampling is still to be carried out in Ward 4C. <b>Action ongoing.</b></p>	
<p>ii. <b>21/06/19 - Action ongoing:</b> Ian Powrie asked Eddie McLaughlan for HFS to confirm endorsement that HFS and the authorised engineer agreement that CVG vents are no longer required. Ian Powrie has received background information about ventilation and gas leaks from Ian Storrar but needs confirmation of endorsement. Ian Powrie added that ventilation is only needed where there are mechanical joints on gas lines. Eddie McLaughlan reported that Ian Storrar is currently on annual leave. Eddie McLaughlan will arrange for HFS to confirm endorsement within this time. <b>28/06/19</b> – Ian Powrie reported that Ian Storrar is still to confirm. <b>26/07/19</b> - Darryl Conner reported that Ian Storrar was asked (by Ian Powrie) to confirm endorsement of removal of the CVGs. Annette Rankin stated that Ian Storrar is likely involved in the current ongoing issues in NHS Lothian and suggested he is reminded to take this action forward. Darryl Conner will contact Ian Storrar as suggested. <b>02/09/19</b> HFS to confirm endorsement of the removal of the CVGs. <b>16/09/19</b> Darryl updated that the Ventilation Group are happy to remove the CVGs as the risk of leakage or dilution required is minimal. This has not been formally signed off by HFS but they are happy if the Authorised Engineer has approved this. It was agreed that Darryl ask the Authorised Engineer to send him the re-endorsement again to close off this action. <b>24/09/19</b> Darryl Conner reported that these are already working in 4B and there was a plan to do this for 6A but this was stopped by the Specialist Ventilation Group. He said that to remove the CVGs in 6A would be beneficial and could alter the pressure cascade coming into the rooms. It was agreed to ask the Ventilation Group for their advice. <b>Action ongoing to ask the Specialist Ventilation Group for their advice.</b></p>	DC
<p>iv. <b>26/07/19:</b> John Hood referred to the tube system, and will need to discuss this with Colin Purdon in the next couple of weeks, who will in turn talk to the engineers from Swisslog. In order to understand and find out (Level 3) the possibility of air being dragged from the Plant Room to the PODs of areas such as in 6A, 4B and 4C. This is specimen transport tubes that should all, query, be under vacuum. John Hood however wants to confirm that air cannot be dragged in (e.g. from the Plant Rooms) and then pushed out into critical areas via the tube system. <b>09/08/19</b> - John Hood stated that he needs to understand how this system works and asked Colin Purdon to speak to the Swisslog engineers and arrange a meeting for him to discuss this. It is John Hood's view that we should probably not be putting the tube system into the heart of critical areas such as BMTU or Haemato-oncology areas with high risk patients. Peter Hoffman stated that he would like to retract what was said last meeting about the vacuum system and John Hood agreed to remove this comment. The issue of the tube system was also one of the original hypotheses. Was it possible that fungal/yeast spores might gain entry into the air of such critical areas via the Tube system? <b>16/08/19</b> John Hood commented that if we think that the tube system is pushing (or pulling) air into these areas from the Plant Rooms then, we should consider this in individual critical wards (particularly BMTU, 6A and 4C etc) as the air being unfiltered, and therefore another potential route of airborne spores, so a possible risk. Mitigation will be required if above is correct.</p>	

Item	Action
<p><b>23/08/19</b> John Hood agreed to contact Adrian from Swisslog next week. <b>02/09/19</b> John Hood contacted Adrian from Swisslog on 26 August. He said that he received an email from Susie Dodd, HPS asking if there was a filter on the air intake in the Plant Room. It was confirmed there was a 'filter' on the intake in the Plant Room (made of wire mesh and plastic foam) i.e. will only keep large objects out, not fungal spores etc. He said there is air being sucked in and exhausted from the Plant Room and this then pushes the POD down the system to the Treatment/Prep Room of the Ward, however, this is where drugs are made up. We do have some air samples next to the pods in 4B, 4C and 6A – which John Hood will review. John Hood informed the Group that Adrian had stated that as the POD comes into the ceiling void above the Ward, the air pushing the POD is exhausted into this void. However John Hood was not sure if some 'dirty' air might still exhaust into the Treatment/Prep Room. Darryl wondered about this air exhausting into the void above the ceilings and the presence also of CVG's. Tom Steele commented that were was a smell detected in the Treatment/prep room in Ward 6A and asked if there was a CVG in the Treatment/prep room. Darryl advised that the smell was due to the adhesive used on the lino and the then use of actichlor which creates this smell. He said the fire compartment is split into 3 ways from top to bottom and if there is any discharge it would be into that space alone.</p> <p>Susie Dodd stated that if this was a significant ingress of unfiltered air it would occur in all other Treatment/prep rooms, thinking that we would be seeing infective consequences related to these other Treatment/Prep rooms as well.</p> <p>Peter Hoffman felt that a small amount of unfiltered air coming into a Prep/Treatment room would have little effect on the air quality in a patient room, if the patients are in positive pressure rooms (with air uniformly leaking outwards) and ventilated with HEPA filtered air. Peter also said, with regards to the air, if microbe retentive filters could be fitted to the pneumatic transport system this would remove any airborne risk, though the significance carrying this out is dubious. He thought that this was an insignificant source of how the <i>C. neoformans</i> got into patients via the air.</p> <p>John Hood replied that if there are no HEPA filters in this area* (as in all wards, including 4B) this could still be a problem but reported that the counts in Ward 4B rooms are mostly 0 cfu's for fungi (but not always).</p> <p>* Correction added in draft of Minute of 24 Sept 2019 – on 15 Oct 2019: while 4B has no HEPA filtered air in the corridors (only spill over from the Rooms – the Treatment/Prep Room is HEPA-filtered – but only that room).</p> <p>Tom Steele asked if there is any opportunity to improve the level of filtration at the Plant Room and Darryl replied that the Plant Room is not sealed from the outside therefore the air will be essentially be similar to the outside air. John Hood suggested that if further investigation surrounding the risk associated with the Tube system in High Risk areas that it should be taken over by the Specialist Ventilation Group/HFS. <b>16/09/19</b> It was agreed that this should be discussed with HFS and the Ventilation Group regarding the risks associated with the tube system to see if there is any indication that anything that is discharged into the ceiling void could leak into the corridor. The consensus from IMT is that the risk related to the pneumatic tube system is likely to be small. <b>24/09/19</b> John Hood spoke to Swisslog regarding the movement of PODs and Peter Hoffman asked if the ceiling is solid or suspended and was informed that it is tiled. Peter Hoffman asked if there was a constant flow of air or only when the tube goes through the system and Darryl Conner replied that the motor only engages when in use and does not go into patient rooms. The POD comes from the Lab to the station and pushes the POD to the department and there is only one second of discharge to void. Susie Dodd agreed to follow this up with HFS. The group discussed if the PTS system (Star Delta motors) needed to be at the station of the ward or if it could be situated outside. This can be done by changing the destination pipe and move this to an alternative site.</p>	<p style="text-align: right;"><b>SD</b></p>

Item	Action
<p>It was agreed that this is something that can be discussed with the Specialist Ventilation Group and Project Team. Peter Hoffman suggested putting one filter before the pre compressor as this would take the microbes out but is maybe something to maybe discuss this with Swisslog. <b>Action ongoing.</b></p>	
<p>v. John Hood asked if anyone is putting together all the mitigation from all of the previous actions and hypotheses. Colin Purdon agreed to arrange to get the mitigation recorded. <b>23/08/19</b> Colin advised that he has started putting together the mitigation from all the previous actions. <b>02/09/19</b> Darryl updated that Colin Purdon has started this. <b>16/09/19</b> Colin confirmed that he has completed the mitigation from previous actions and will forward this to the group for return comments within a week. <b>24/09/19</b> Colin Purdon to add the air movement into 4B to the mitigation report. Susie Dodd also asked for the report to include what the actual problem was, if this requires to be maintained and what has been done. <b>Action ongoing.</b></p>	CP
<p><b>6. Draft Report for Comments</b> John Hood is currently working on the draft report and hopes to issue a draft to the group in the next couple of weeks/years!</p>	JH
<p>In the report he said that he will include the lack of HEPA filtered rooms with positive pressure (and air leaking uniformly outwards) as one of the main conclusions as neither patient was in an appropriate HEPA-filtered environment with air uniformly leaking outwards. He said it is unlikely that the Plant Rooms/AHUs were the cause.</p>	
<p>Discussion took place regarding the risers and doors that are sealed. It was noted that all riser doors in critical areas had the doors now resealed and all access is now controlled requiring a key. Darryl Conner confirmed that the risers are now sealed and there is no air coming from the risers into the ward.</p>	
<p>At the time of commissioning the hospital John Hood advised that he believed that the BMT areas were not included in the original plans (New Beatson had recently opened) and were added at a later stage.</p>	
<p>JH said that he is looking at the data from the air sampling to see if the counts suggest that there are higher counts at the end of each ward corridor (e.g. 4B/4C, 6A/6B) where we know that 'dirtier' air may be gaining access to these critical areas such as 4B,6A.</p>	JH
<p>In terms of guidance, Tom Steele stated that there are three client groups that require specialist ventilation i.e. Infectious Diseases (source isolation), BMT and Haematology-Oncology patients (protective isolation). He recommended that wards for these patients are the same as 4B. Added in Draft by JH – aspiration should be of a higher standard than 4B.</p>	TS
<p>Peter Hoffman stated that as long as the reason for the outcome had been thought through and is recorded somewhere this should be acceptable. Peter Hoffman advised that there is different guidance in Scotland compared to England. Tom Steele informed that he has a document with information from different SHTMs that he can send to Peter Hoffman.</p>	PH to comment
<p>Discussion took place regarding patients in 4B and 4C. 4B is a transplant unit and once the patient has had their transplant, the children are transferred to 6A and the adults are transferred to 4C. The question was asked what proportion of the hospital is served by F7/F9 filters and it was confirmed that 100% of the hospital is served by these which is the appropriate standard level of filtration for patients that do not require 'protective isolation) Added by JH in draft (15/10/19). Some areas have F9 filters installed (6A and 4C) and the HEPA filtered rooms are for BMT/Haematology-Oncology patients in 4B. It was agreed that this should maybe be included at the beginning of the report.</p>	

Item	Action
<p>The report will also include a brief explanation of the ecology and biology of <i>C. neoformans</i>, the issues regarding the tube system and the spreadsheets with air sampling results of Wards 6A, 4C and 4B.</p> <p>The report will also take account of how little we really know about <i>C. neoformans</i> as well as its association with pigeon guano (which is in itself complex) as this yeast-like fungus can also be associated with rotting wood or vegetation.</p> <p>The hypotheses will be incorporated in the report and this will be agreed with this group. John Hood commented that the PICU cylinder room is also a possibility [REDACTED] [REDACTED] but it might not be so likely as the room [REDACTED] was in while in PICU was a PPVL room and this may have provided some protection. With regards to the helipad John Hood (and the Group) does not believe that this was a contributory factor, <i>inserted in Draft by JH (see previous Minutes and Report on Computational Fluid Dynamics Simulation of the External Flow Around Queen Elizabeth University Hospital, 14<sup>th</sup> June 2019).</i></p>	
<p><b>Closed / Completed Actions</b></p>	
<ul style="list-style-type: none"> <li>• <b>(06/06/19) p3: bp1:</b> Ian Powrie will discuss IPS panels being sealed with Darryl Conner as some of the underside of WHBs panels were not done. <b>(21/06/19)</b> Colin Purdon picked up with Darryl Conner and reported all have been re-checked and all sealed. There were 2 rooms unable to get access to and this is still the same position today but will be re-checked. <b>(28/06/19)</b> Darryl Conner confirmed all now done. Ian Powrie reported that of all the rooms checked, the 2 rooms were still to be checked one of which was Room 5. Darryl Conner will confirm by e-mail that Rooms A and B, and Ward 6A Room 5 is the only one not sealed on the underside. Ian Powrie and John Hood had inspected this area. <b>(09/08/19)</b> Darryl Conner confirmed as above. <b>Action complete.</b></li> <li>• <b>(06/06/19) p3: Item 4:</b> There is concern about the differences in the pressures in 4C Rooms 66-75. Rooms 66 to 74 are between 0.4 to 2.9 Pa from rooms to corridor but Room 75 at the end of the corridor is consistently negative at -0.3 (i.e. air moving from corridor to room). Colin Purdon to make adjustments to the ventilation to make this room slightly positive. <b>(28/06/19)</b> Ian Powrie clarified this was the room at the end of the corridor and is still to be done. Ian Powrie asked Darryl Conner to be careful not to affect the pressure regimes for the area when adjustments are made. <b>(26/07/19)</b> Darryl Conner agreed to make adjustments to the ventilation to make this room slightly positive. <b>(09/08/19)</b> It was noted that this action has gone to the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></li> <li>• <b>06/06/19</b> - Item in relation to Pest Control. <b>Action closed</b></li> <li>• <b>06/06/19</b> - transferred: Sandra confirmed IPC has investigated laundry storage and process. This action to be removed from the group's remit. <b>Action complete.</b></li> <li>• <b>06/06/19</b> - It was confirmed that final inspection of Ward 6A Room 5 has taken place. Action complete - see Bp 6, below. <b>Action closed</b></li> <li>• <b>06/06/19</b> - It was agreed and noted that overall ventilation design for Ward 2A is the responsibility of another forum therefore it has been removed as an action for this group. <b>Action closed - transferred</b></li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li>• <b>06/06/19</b> - Estates are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he discussed this with Multiplex. He said that the green roof was part of the design and the sedum can be removed and an alternative ballast material installed. He said if we were to move the items from the roof we could cause further disturbance? John Hood said he would be concerned if <i>Haemato-oncology</i> patients were to go on to this roof but he was informed there is no access to it for these patients. Tom Steele said that he is of the opinion to maybe review this in the future but to leave it as is at the moment. <b>21/06/19</b> - no update. <b>26/07/19</b> - <b>Action closed meantime.</b></li> <li>• <b>21/06/19</b> - On 29 May 2019, inspection above the ceiling of Room 5 in Ward 6A showed that the services coming into the space were well sealed and in good condition. The flexible duct to the chilled beam was found to be intact. <b>26/07/19</b> - <b>Action closed.</b></li> <li>• <b>21/06/19</b> - Ian Powrie reported that fluid dynamics modelling around the helipad/QEUH/RHC report was now completed (see Report Rev 3). The IMT Expert Advisory Sub-Group accepted the findings of the CFD Report. <b>Action closed</b></li> <li>• <b>21/06/19</b> : A problem with the chilled beams was identified and Ian Powrie explained this was a mechanical joint failure causing a leak. On this occasion it was a loss of low temperature hot water heating circuit that resulted in a change in temperature causing contraction of the pipework and fittings resulting in a slight leak. Colin Purdon added this was reported as a series of drips and although not for this group, it is being mentioned due to the mechanical failure. Colin Purdon has met with Teresa Inkster and Christine Peters. The ceiling tiles affected by water were replaced, and Actichlor was used to wash down. All appropriate IPC measures have been taken (Ward 6A children - x8 rooms). <b>Action complete</b></li> <li>• <b>21/06/19 p4: para2:</b> John Hood mentioned that a mechanical riser in 4B had a water leak this morning. Colin Purdon explained that this is the low temperature water return pipe, and that the valve body gland has a slight leak. The valve will be changed today. <b>(29/07/19)</b> Darryl Conner confirmed as done. <b>Action complete.</b></li> <li>• <b>21/06/19 p5: para3:</b> Ian Powrie asked if there is a risk between CF and haemato-oncology if there is air movement between them. John Hood agreed to discuss this with Teresa Inkster. <b>(09/08/19)</b> John Hood reported that Teresa Inkster has concurred: no significant risk. <b>Action complete.</b></li> <li>• <b>21/06/19 p5: para5:</b> Colin Purdon has advised that intumescent gasket seals would be fitted. <b>(26/07/19)</b> Darryl Conner confirmed that the intumescent gasket riser seals has been completed. The only action outstanding in relation to this is the installation of the false ceilings. <b>(09/08/19)</b> Darryl Conner reported that installation of the false ceilings is still to be done but that this action is for the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></li> <li>• <b>21/06/19 p7: item 7: para2:</b> On 25 July 2019, Colin Purdon to have walk round with Fire Safety Advisor shortly. <b>(26/07/19)</b> Colin Purdon will set-up a meeting with the Fire Officers soon. <b>(09/08/19)</b> Colin Purdon reported that a walk round with the Fire Advisor is still to be arranged. <b>(16/08/19)</b> Sandra Devine commented that she had met with clinical and managerial representatives from 4B and had walked the patient pathway through the ward. After due consideration it was felt that automatic door closures would impede the movement of patients through the ward especially in emergencies therefore the meeting with Colin and the Fire Officer is no longer required. <b>Action complete</b></li> <li>• <b>21/06/19 p8: item 13:</b> All but two IPS panels have been confirmed as complete. <b>(26/07/19)</b> <b>Action complete.</b></li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li> <p>• <b>21/06/19 - Action ongoing: Carry Forward</b> - Sandra Devine was then not in attendance to provide an update that a discussion is still to take place with Teresa Inkster and possibly Myra Campbell (Clinical Services Manager) in relation to self-closers on doors in Ward 4B, and that IPC team is making sure that staff understand the importance of keeping doors to patient rooms closed and also keeping doors to ancillary areas closed as much as possible. <b>28/06/19</b> - Darryl Conner asked about self-closers. Ian Powrie stated this is what Sandra Devine was going to discuss with clinical colleagues. <b>26/07/19</b> - Sandra Devine reported that two IPC Nurses visited Ward 4B to emphasise the importance of closing doors, and signage has also been put up. Sandra Devine is arranging to meet with Myra Campbell to discuss self-closers on doors and will explain the issue of the 4B corridor and how the problem exists. Darryl Conner pointed out that practically this may be difficult to put in place as every door is bespoke and takes around 8 weeks from order, effectively taking rooms out-of-use. Sandra Devine will make this a consideration. <b>Action ongoing. 09/08/19</b> - Sandra Devine met with Myra Campbell on 08/08/19 and they both visited Ward 4B. The overwhelming opinion was not to have self-closers on doors in Ward 4B therefore this action should not be taken forward. <b>Action complete.</b></p> </li> <li> <p>• <b>21/06/19 - Action ongoing: Carry Forward</b> – Colin Purdon will check with the contractors if the rooms have 30-minute fire doors fitted at present. Colin Purdon previously discussed self-closers on doors with local Fire Safety Advisors and reported there would be no issues with this proposal. It was noted that discussion with the clinical teams would need to be held in relation to beds being taken out etc. <b>26/07/19</b> - deferred until discussions with relevant parties have taken place as noted in the minutes and also as noted, a walk round with the Fire Advisor to be arranged. <b>Action ongoing. 09/08/19</b> – Colin Purdon stated that in light of Sandra Devine’s update (previous action) this action is no longer relevant. Colin Purdon added that fire doors are fitted adjacent to the fire exit points. Sandra Devine added that ward staff are aware of why this was being asked. <b>Action complete.</b></p> </li> <li> <p>• <b>21/06/19 - Action ongoing: Flooring: Carry Forward</b> - Colin Purdon updated that the action plan has been prepared and is being used to programme and prioritise the issues previously identified. The report was put together by the flooring contractor and Ward 6A has some minor issues to be rectified. <b>26/07/19 – Action carry forward / ongoing. 09/08/19</b> – It was agreed this action should be taken to another forum. Colin Purdon added there is a programme ongoing for Level 7 managed by Kerr Clarkson. <b>Action complete.</b></p> </li> <li> <p>• <b>21/06/19 - Action ongoing:</b> It was confirmed that the engineering risers have been inspected however this action will be kept as ongoing until completion of the doors to risers’ rooms are sealed. Ian Powrie asked Colin Purdon to arrange to have the doors sealed over the next three weeks (by 27/06/19). Colin Purdon reported that the frames have been sealed. Darryl Conner is taking forward the action for the risers. <b>28/06/19</b> - On hold with Teresa Inkster as mentioned earlier (page 3 bp1). Ian Powrie asked Darryl Conner to check if the seals itself are fine to adjust the door, but if not, to put a gasket in. Ian Powrie added that only one was looked at in Ward 6, but asked that all of the doors are sealed air tight (sweep Wards 4B, 6A, 4C for all riser doors). <b>26/07/19</b> - Fire Advisor to endorse and if IPC can sanction, then this will be done. John Hood asked if Darryl Conner is in a position to comment. Darryl Conner reported that Teresa Inkster wanted this item discussed at the Specialist Ventilation Group and following discussion at the first meeting put forward their intentions and what was required to accommodate the work. However Teresa Inkster had responded that the downtime would cause more risk than what the existing risk is in relation to the risers. Darryl Conner stated that in the interim a control of the risers. The doors are sealed, but the adjacent ceilings and floors of the risers have not yet been done.</p> </li> </ul>	

Item	Action
<p>Clarification from the Fire Advisor is required to ensure that there is no breach of fire integrity as they are horizontally sealed to each level. Darryl Conner stated this will need to be discussed at the Specialist Ventilation Group and will ask for this to be included as an agenda item for discussion. <b>Action ongoing. 09/08/19</b> – Darryl Conner reported that it was proposed at the Specialist Ventilation Group a level of modification and the process of sealing the risers, and the possibility of doing this at higher and lower floors. It was recognised that there would be disruption. Darryl Conner thinks the group might be satisfied with the intumescent seals and the doors are under lock and key therefore not regarded as an immediate risk.</p> <p>Peter Hoffman commented that if everything is adequately sealed at one point in time, there is no guarantee it is going to be like that in a few years (or less) from now, and is a temporary solution. So get things sealed but need to get the air flows correct and the air flow in the right direction. It was noted that Teresa Inkster has taken this over in the Specialist Ventilation Group. <b>Action closed and transferred to the Specialist Ventilation Group.</b></p> <ul style="list-style-type: none"> <li> <p><b>21/06/19 - Action ongoing:</b> Ian Powrie updated that priority has been given to Wards 6A and 4C for removal of the Ceiling Vent Grilles (CVG's). Ward 4B has been done. Timeline will be done, but Wards 6A and 4C is expected to be done in the next couple of weeks, ongoing for removal of CVGs in other clinical wards. <b>28/06/19 - SCRIBE</b> sitting with IPC. Ward 4B has been done. Wards 6A and 4C have yet to be done – <b>SCRIBE required. 26/07/19</b> - Darryl Conner has asked Teresa Inkster about replacing CVGs in Ward 4B with ceiling tiles. There was one action was to replace CVGs in Ward 4C, but there is a problem with increased permeability of the space. It has already been established that the notional average is <b>1.2 to 2 Pa</b> to replace CVGs. It has been suggested it might be possible to trim back the extract in the en suites, but the air change in the en suites would be reduced slightly. This information has gone to the Specialist Ventilation Group. Darryl Conner reported that the area from 4B into 4C, at time of measurement is showing negative, but on investigation and measurement outside 4C Room 75, it was recorded to be 1.2 to 2 Pa because of the opening and closing of the various doors and air moving into 4D (as door often can be kept open). Without installation of ward lobbies into mitigating areas, the closing or opening of any one door alters the pressure regimes.</p> <p>Darryl Conner has submitted SCRIBEs for the process for removal of CVGs, and all are the same apart from the level of protection for each department being moved. Ward 6A is next on the list, which requires feedback from Teresa Inkster, but can be actioned immediately if required.</p> <p>John Hood thought the SCRIBE employed in 4B could be used for the other areas as same work is being carried out and had been successfully used in a more critical area. Darryl Conner explained that effectively it is the same SCRIBE and is used as a template however each area requires sign-off. <b>Action ongoing – SCRIBE required. 09/08/19</b> - Amendment as noted at the start of the minute, that the notional average is 1.2 to 2 Pa. Darryl Conner commented that Teresa Inkster may not be keen to have CVGs removed. <b>Action ongoing – SCRIBE required. Action ongoing and transferred to the Specialist Ventilation Group.</b>  <b>N.B. Teresa must be happy before any CVG's removed she would rather have as much positive pressure in rooms as possible.</b></p> </li> <li> <p><b>21/06/19 p3: bp2:</b> Colin Purdon advised that the Fire Strategy required that the doors to be available for lateral evacuation of patients and staff in both directions, but he would review options of temporary seals with the site Fire Advisor. <b>29/07/19</b> Action outstanding. To be completed. <b>09/08/19</b> Darryl Conner reported that draft seals have been fitted on the Ward 4B door that is locked on the outside, through to the doctor's room and it is only Estates that go in and out of that area. Darryl Conner will discuss with the Fire Advisor. <b>23/08/19</b> Darryl confirmed that he has spoken to Frank Deacon, Fire Officer and he is reviewing this.</p> </li> </ul>	



Item	Action
<p>He will provide an update at the next meeting. <b>02/09/19</b> Darryl updated that there is a meeting of the Specialist Ventilation Group next week and this will be discussed there, although he has had verbal agreement regarding this. <b>16/09/19</b> Darryl reported that this was taken to the Ventilation Group and endorsement was received from the Fire Officer as they are happy with the fire seals. The Fire Officer has asked for the ICDs agreement on this. <b>24/09/19</b> The group agreed to close this action as endorsement was received from the Fire Officer. <b>Action closed.</b></p> <ul style="list-style-type: none"> <li> <p>• <b>28/06/19 p2: bp1:</b> There had been discussion around air in the corridor from Ward 4C into Room 75, and Ian Powrie had explained that the commissioning engineer will need to review all of the rooms and check that correction has not made things worse, with a view to increasing the pressure in Room 75 to the same range as the other rooms. <b>(26/07/19)</b> Darryl Conner confirmed he will do the pressure change but will ask <b>Ian McKenzie</b> to do the re-balance. <b>(09/08/19)</b> John Hood reported that the Specialist Ventilation Group will need to discuss the air pressures. Darryl Conner explained that the doors need to be closed because when the doors are open this could force the rooms into a negative state from the corridor. <b>(16/08/19)</b> It was noted that it is only through discussion at meetings that it was realised the effect of doors being left open affecting all of the pressures, therefore ward staff would definitely not be aware of these issues. <b>Action closed and transferred to the Specialist Ventilation Group.</b></p> </li> <li> <p>• <b>26/07/19</b> - Darryl Conner confirmed that Room 5 6A was done and has been told that the other room has also been done. Darryl Conner will check both have been sealed and will confirm this. <b>Action ongoing.</b> <b>09/08/19</b> – Darryl Conner confirmed. <b>Action complete.</b></p> </li> <li> <p>• <b>26/07/19:</b> John Hood to continue doing walk round of Plant Rooms. Awaiting results of air samples from the Level 12 Plant Rooms tested on 25 July 2019. <b>09/08/19</b> – John Hood reported that walk round of <b>all</b> of the Plant Rooms has been done at QUEH and RHC. Plant Room 31 has AHUs marked both 21 and 31 – which is a little confusing as the first number (i.e. 2 or 3 should indicate which floor that Plant Room is on!). No evidence of pigeon ingress or droppings. Plant Room 22 is in the Adult QUEH and is huge! Again the only thing discovered there was some water on the floors but apparently this is from the heat exchangers (affected by the weather), in both QUEH and RHC. Plant Room 22 is very clean, with no evidence of pigeon ingress or droppings. There was water on the floor in Plant Room 21 and there was still some general debris in it but this will be cleaned this week. There was no evidence of pigeon ingress or droppings. Plant Room 41 (RHC), again, the floor needed a brush, but there was no evidence of pigeons or pigeon droppings. Some light ingress was noted but above the area of light ingress there is netting fitted so pigeons should not get in. Plant Room 41A (RHC) is a small plant room, with no evidence of any pigeon ingress or droppings. John Hood will visit the Plant Rooms serving the labs next because two areas in Floor 1 Lab Block have grown <i>Cryptococcus</i> spp. (one <i>C. albidus</i> and one <i>C. diffluens</i>). These Plant Rooms are completely separate from the Plant Rooms in either QUEH or RHC. <b>16/08/19</b> John Hood visited Plant Rooms on level 3, 2 and 4 and none of these areas had evidence of pigeon ingress or evidence that the pigeons are getting into these Plant Rooms (indeed very difficult to see how they could). Colin Purdon confirmed that there are F7s filters in the AHUs serving the Lab building. <b>Action closed.</b></p> </li> <li> <p>• <b>26/07/19:</b> Colin Purdon to get the GP Environmental (Pest Control Company) to give an update on their formal cleaning and ongoing identification of problems in the Plant Rooms. Darryl Conner will discuss this with Colin Purdon on 28/07/19. Of note, this will be required for part of the final discussion and Report. <b>09/08/19</b> – Colin Purdon will request a report from the pest control company as noted. <b>16/08/19</b> – Report from GP Environmental was received by Colin on 15<sup>h</sup> August 2019. Report to be sent round the group and discussed further at next meeting. <b>Action closed.</b></p> </li> </ul>	

Item	Action
<p>• <b>26/07/19:</b> John Hood to inform Liz Johnson at the Reference Laboratory in Bristol of the cryptococcus isolates and will forward the breakdown of this, in order to discuss the implications and any views, and if these are valid surrogate markers for <i>C. neoformans</i>. <b>09/08/19</b> – John Hood will speak to Liz Johnson next week. <b>16/08/19</b> John discussed with Liz Johnson and she said that neither can really be considered as surrogate markers for <i>C. neoformans</i> but it was difficult to be dogmatic about it. <b>Action closed.</b></p> <p>vi. <b>06/08/19</b> An e-mail response was received from Eddie McLaughlan on 06/08/19 as noted below.</p> <p>Eddie McLaughlan offered in his e-mail to have a telephone discussion with John Hood to clarify anything further:</p> <p>“The first action on me was I think a double check with Ian Storrar about vents in ceilings containing medical gas pipework without joints, but he’s completely tied up at the moment. I think I said at the meeting that as you need to seal the ceiling for IC purposes and there are no joints in the pipework above the ceiling, it would take a major mechanical failure to compromise the pipework and as that seemed unlikely removing the vents and using a gas alarm seemed reasonable. That said, we are only a source of advice; the risk assessment should be done by the Board with advice from your Authorising Engineer as necessary.”</p> <p>‘I’ve read the second action twice and I’m not entirely clear what I’m commenting on but hopefully the following will cover it. The source of the continuing Cryptococcus can only really be the outside air or infiltration from within the building and, as it is being detected in non HEPA filtered spaces and not in HEPA filtered spaces (I presume this is still the case, then the outside air looks a likely candidate).’</p> <p>On the subject of guidance, there is a review of the ventilation guidance underway at present and whilst we have asked for more clarity around specialised ventilation for susceptible patients, it is not yet clear whether we will get it. If not we will need to do something specifically for Scotland, for which there is currently neither financial nor staff resource, and no progress is likely to be made on this whilst the RHCYP&amp;DCN review is ongoing. In the meantime, it is important that clinicians understand the level of protection available in the various environments within QEUH and place patients accordingly.’</p> <p><b>26/07/19:</b> Eddie McLaughlan to review the discussion noted in the minutes of 21/06/19 (page 8, item 7.1 - Hypotheses) and change as appropriate. <b>09/08/19</b> – As mentioned earlier John Hood will telephone/email Eddie McLaughlan and as part of that discussion will ask for re-wording from Eddie McLaughlan. <b>16/08/19</b> John forwarded the minute of 21<sup>st</sup> June for Eddie McLaughlan to comment on. <b>23/08/19</b> Eddie replied with the following:</p> <p>“Not sure this is from memory, but I am content with the text highlighted in yellow in your attachment, including your addition. I’d be thoughtful about any inferences beyond the text, particularly in reference to the case of additional guidance. The need for specialist ventilation guidance is on a very long list of priorities and although we are hopeful of being in a better position for resource in the future, nothing is guaranteed”.</p> <p><b>16/09/19</b> Susie Dodd confirmed that she spoke with Eddie McLaughlan and he forwarded wording below:-</p> <p><i>“I am content with the text attributed to me, however, none of it removes the need for the Board to take appropriate professional advice. In particular, the medical gas paragraph at the top requires advice from the Board’s Authorising Engineer to inform the risk assessment. On the subject of neutropenic patients, although the guidance is not as detailed as might be desirable, it does state that wards for these patients should be HEPA filtered with a 10pa pressure regimen, so any decisions should take that as the starting point.”</i> <b>Action closed.</b></p>	

Item	Action
<p>6. <b>AOCB</b> Nil to update.</p>	
<p>7. <b>Date and Time of Next Meeting</b> The next meeting will be held at 2.00pm on Wednesday 16<sup>th</sup> October 2019.</p>	

**Cryptococcus IMT Expert Advisory Sub-Group**  
**Draft 3**

**Notes of Meeting held in**  
**Meeting Room 0.13, Ground Floor**  
**Queen Elizabeth University Hospital**

**Wednesday 16 October 2019 at 2.00pm**

**Present:** Dr John Hood (chair), Colin Purdon, Sandra Devine, Ann Lang (minutes)

**Teleconference:** Peter Hoffman, Ian Storrar, Susie Dodd, Annette Rankin

**Apologies:** Tom Steele, Darryl Conner

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting. Teleconference introductions were made and apologies were received from the above mentioned.</p>	
<p><b>2. Minutes of Meetings held on 24 September 2019</b></p> <p>The minutes of the meeting held on 24 September 2019 were accepted with the following amendments:-</p> <ul style="list-style-type: none"> <li>- Page 7, 2<sup>nd</sup> last para – John Hood to provide the wording that Peter Hoffman agreed on.</li> <li>- Page 7, last para – Susie Dodd to send a form of wording for this paragraph relating to the transfer of patients after they have had their bone marrow transplant.</li> <li>- Page 8, 5<sup>th</sup> para – Susie Dodd to add in a paragraph regarding the most likely hypothesis when the group originally formed.</li> </ul> <p>• <b>Actions Update:</b> Added by JH in Draft 23/10/19 John Hood has still to measure the pressures across the door which is the Main entrance to 4B – near Rm 99, the Interdepartmental Corridor (which leads to the Facilities Corridor on Level 4) and the Corridor leading to the intersection with entrance to 4A and entrance to the Lifts.</p> <p>Please also see the updated Minute (by JH) of 24<sup>th</sup> September 2019. The complexity of the air movement between various wards at different intersections were documented and discussed.</p> <p><i>'The take home message is therefore that 4B needs better control of the air around the intersection with 4B/4C. 4C seems best in terms of a consistent flow of air outwards from both corridors. 6A is also problematic, particularly at the 6A/6B intersection but also to a lesser extent at the 6A/6D intersection. The above underlines the complexities of air pressures and air movement in this large and complex hospital. This also underlines the importance of controlling the air around 'at risk' patients and not merely by HEPA – filtering the air. (Added in Draft 15/10/19 by JH)'</i></p>	<p>JH</p> <p>SD</p> <p>SD</p>

Item	Action
<p><b>3. Update on Air Testing</b></p> <p>On page 4, Figure 1, the table has been updated to include another positive <i>C. diffluens</i> isolation from air sampling in September. John Hood reported that to date there have been 91 <i>Cryptococcus</i> isolates from air sampling since December 2018. Most of the isolates are <i>C. diffluens</i> and <b>not</b> <i>C. albidus</i>.</p> <p>Figure 2 has also been updated with nearly 400 samples taken most months (Jan to July) but the number of samples had decreased to 150 samples in August and 98 samples in September.</p> <p>A summary of results of the air sampling was distributed prior to the meeting. He noted that only three <b>rooms</b> in 4B had <i>Cryptococcus</i> spp. isolated from the air samples since December 2018. Two isolates of <i>Cryptococcus</i> spp. were also identified (since Dec 18) in the corridor near the door with the intersection with Ward 4C.</p> <p>With regards to the table in Figure 1 John Hood informed that two isolates identification to species level, have still not been confirmed, but they should be sent to the Reference Lab next week.</p> <p><b>Comparison of Air Counts in the Rooms (only) of 4B, 4C and 6A – percentage of zero counts (JH had circulated draft results just prior to the Meeting)</b></p> <p><b>Ward 4B</b></p> <p>There have been <b>223</b> samples from the rooms (but this excludes the corridors as these are not HEPA-filtered). Looking at the air counts he said that <b>63%</b> of these were 0 counts. Rooms 87, 88 and 89 had samples with counts of mostly 0 but they had also significantly fewer samples taken (1 to 3) compared to the other rooms (20 to 30). This was because they were only employed for the most ill paediatric cases – and so samplers advised not to disturb. Therefore JH proposed that these 3 room’s results should be taken out.</p> <p><b>Ward 4C</b></p> <p>There have been <b>270</b> samples from the rooms. However rooms 51 – 65, are Renal Rooms and not Haem-Oncology rooms. Therefore, John Hood intends to also remove these Rooms from the study. In Ward 4C - <b>57%</b> of the air counts were 0 counts.</p> <p><b>Ward 6A</b></p> <p>There have been <b>511</b> samples from the rooms. John Hood noted that like 4B and 4C their Rooms with numbers of samples significantly less than others – in the case of 6A – Rooms 13 to 19. These were identified as the Day Care Unit so with doors between it and the rest of 6A. Therefore, John Hood intends to also remove these Rooms from the study. In Ward 6A – <b>38%</b> of the air counts were 0 counts.</p> <p>(Inserted in Draft by JH – Note that in the Draft Comparison of Air Counts – that the proportion of Counts greater than zero is significantly higher in 6A than 4B or 4C (p&lt;0.001; Chi<sup>2</sup>) The proportion with counts greater than zero is not significantly different between Ward 4B and 4C)</p> <p>Peter Hoffman commented that in Ward 6A two of the rooms were at the top of the scale (highest counts in Rm 5 and Rm 1 inserted in Draft by JH). John Hood advised that Room 5, which is opposite the nurses station and near the entrance to the Ward at the 6A/6B intersection) Rm 5 was also where the [redacted] cryptococcal [redacted] - [redacted] had been. The two highest counts in Rm 5 were paired samples and identified as <i>Exophiala</i> spp.</p> <p>John Hood noted that many other Wards (6A, 4B, 4C and PICU) had high numbers of positive counts of <i>Exophiala</i> in air samples between February and April 2019 (see Table below taken from the Crypto Meeting Minute of the 10<sup>th</sup> April 2019) and updated and inserted on 24 Oct 2019 by John Hood.</p>	<p>JH</p>

Item			Action
1st February 2019	6A	0/57	
5th February 2019	6A	54/56	
6 <sup>h</sup> February 2019	4B	15/28	
8 <sup>h</sup> February 2019	PICU	1/14	
8 <sup>h</sup> February 2019	QE 1C	3/12	
12 <sup>th</sup> February 2019	6A	4/60	
13th February 2019	7B	0/14	
20 <sup>th</sup> February 2019	6A	4/30	
20 <sup>th</sup> February 2019	4B	0/6	
21 <sup>st</sup> February 2019	7D	0/14	
21 <sup>st</sup> February 2019	4C	1/14	
27 <sup>th</sup> February 2019	6A	17/26	
27 <sup>th</sup> February 2019	4C	11/14	
6 <sup>h</sup> March 2019	4B	0/28	
6 <sup>h</sup> March 2019	5B	3/28	
7 <sup>h</sup> March 2019	6A	5/16	
7 <sup>h</sup> March 2019	4C	0/14	
8 <sup>h</sup> March 2019	4B	0/8	
12 <sup>th</sup> March 2019	4B	0/12	
12 <sup>th</sup> March 2019	6A	6/18	
12 <sup>th</sup> March 2019	4C	0/14	
20th March 2019	6A	26/26	
20th March 2019	4C	8/8	
22 <sup>nd</sup> March 2019	4B	25/28	
22 <sup>nd</sup> March 2019	4C	5/6	
27 <sup>th</sup> March 2019	PICU	16/16	
28 <sup>th</sup> March 2019	6A	2/26	
28 <sup>th</sup> March 2019	7A	0/14	
28 <sup>th</sup> March 2019	4C	0/14	

In January 2019 there were 9 isolations of Exophiala in air samples, in February 111, in March 96, in April there were only 35 isolations, 14 in May, 13 in June, 15 in July, 3 in August and only 2 so far in September. We have no explanation for these variations and findings. However when compared to the results of Cryptococcal species (see Fig 1) there seems to be seasonal variation for these different fungi. (Added in Draft by JH, 25 Oct 2019)

Peter Hoffman stated that it will probably depend on the outside weather conditions etc.

Susie Dodd noted that the lower counts were in rooms in the middle of 6A but Peter Hoffman noted that there were few samples taken in these rooms (13 to 19). Rooms 13 to 19 are in the Day Care Unit – see above to be taken out.

John Hood said at the 6A/6B/Lifts intersection air is moving into Ward 6A even with all the doors (at that intersection) shut (6A is at under -3.5Pa, i.e. the air is being pulled into 6A). This negative pressure increases (so worsens) to -10 to -11Pa when the door to 6B is open (see Minute of 24 Sept, p2 para1). He said the nearest rooms to this area are 1, 2 and 3. He said therefore when the doors are open to Ward 6B it is likely that unfiltered air, or dirtier air, may be getting into 6A (e.g. from the Lift shafts etc). He noted that this issue is likely to be one reason why the air sampling results are poorer in Rooms 1 to 7 and in the Corridor near the Nurses Station.

Sandra Devine commented that when children were moved into Ward 6A modifications were made to that ward. John stated that because of the Chilled Beams that there are only three air changes an hour and only about 1 to 2 Pa positive pressure out of the room. Therefore the ward is not getting the same degree of protection compared to 9 to 10Pa positive pressure out of the room and 10 Air Changes Hour (ACH) as in 4B.

## Item

## Action

John Hood said that he will try and map the individual rooms to the Cryptococcus isolates and take out the rooms that are related to Renal and Day Care (etc). Peter Hoffman suggested that rather than comparing air sampling results by the percentage of zero counts that it might be better to do this by the mean and the median. He also asked if the chilled beams supply air or just recirculates the air. Colin Purdon replied that they supply air from the air handling units.

The table below on the air sampling results has been updated. Air sampling reports from July 1<sup>st</sup> to August 31<sup>th</sup> 2019.

Date taken	Area	Presumptive	Confirmed
03/07/19	Ward 6A Room 24		<i>C. diffluens</i>
03/07/19	Ward 6A Room 2		<i>C.uniguttulatus</i>
15/07/19	Ward 6A Room 24		<i>C. diffluens</i>
24/07/19	Ward 4C Corridor		<i>C.uniguttulatus</i>
24/07/19	Ward 6A Room 1	<i>C. albidus</i>	
08/08/19	Ward 6A Room 1	<i>C. albidus</i>	
08/08/19	Ward 6A Room 24		<i>C. curvatus</i>
20/08/19	Ward 4B Room 78 Bathroom		<i>C. curvatus</i>
20/08/19	Ward 4B Room 90		<i>C. curvatus</i>
20/08/19	L4 Labs Molecular Lab		<i>C.uniguttulatus</i>
20/08/19	L4 Labs BC room		<i>C. diffluens</i>
27/8/19	Ward 6A Room 5		<i>C. curvatus</i>
27/8/19	Ward 6A Room 5 i.e. both samples pos		<i>C. curvatus</i>
27/8/19	Ward 6A Room 6		<i>C. curvatus</i>
27/8/19	Ward 6A Room 26		<i>C. curvatus</i>
27/8/19	Ward 6A Room 8		<i>C. diffluens</i>
30/8/19	Ward 6A Room 4		<i>C. curvatus</i>
30/8/19	Ward 6A Room 4		<i>C. curvatus</i>
17/09/19	Ward 4B Room 81 (bathroom)		<i>C. diffluens</i>

Item

Action

FIGURE 1

<b>'Cryptococcal species' isolates from air sampling 21 Dec 2018 to Jun/Jul 2019</b>							
	<i>N. diffluens</i>	<i>N. albida</i>	<i>N. albido-similis</i>	<i>F.uniguttulata</i>	<i>Cutan. curvatus</i>	ID TBC	Total
<b>*Dec 21<sup>st</sup> 2018</b> n=53	13	0	1	0	1 Roof#	1	<b>16</b>
<b>Jan 19</b> n=422	24	3	0	0	0	0	<b>27</b>
<b>Feb 19</b> n=440	0	0	0	1	0	0	<b>1</b>
<b>Mar 19</b> n=320	4	0	0	1	0	0	<b>5</b>
<b>Apr 19</b> n=334	2	0	0	0	0	0	<b>2</b>
<b>May 19</b> n=420	7	3	0	3	0	0	<b>13</b>
<b>Jun 19</b> n=448	8	0	0	0	0	0	<b>8</b>
<b>Jul 19</b> n=419	2	?	0	2	0	1	<b>5</b>
<b>Aug 19</b> n=150	2	?	0	1	9	1	<b>13</b>
<b>Sept 19</b> n=98	1	0	0	0	0	0	<b>1</b>
<b>Total sf</b>	<b>63</b>	<b>6</b>	<b>1</b>	<b>8</b>	<b>10</b>	<b>3</b>	<b>91</b>

sf = so far

FIGURE 2

Positive Crypto spp. results by month and per number of samples

Month	No of positives	No of samples
<b>December 21<sup>st</sup> 2018 (1day)</b>	16	53
<b>Jan 19</b>	27	422
<b>Feb 19</b>	1	440
<b>March 19</b>	5	320
<b>April 19</b>	2	334
<b>May 19</b>	13	420
<b>June 19</b>	8	448
<b>July 19</b>	5	419
<b>August 19</b>	13	150
<b>September 19</b>	1	98



Item	Action
<p><b>4. Actions from 24 September 2019 Meeting</b></p> <p>Actions from 24/09/19 were updated during the meeting and noted in the minutes.  <b>Added in Draft: JH still to measure the air movement (pressures) across main door into 4B at intersection with Corridor to 4A and Interdepartmental Corridor.</b></p>	
<p><b>5. <u>Further Actions Required</u></b></p> <p>i. <b>21/06/19</b> - Continue to carry out air sampling in Wards 6A, 4B and 4C. <b>26/07/19 - Action ongoing. 09/0819</b> – Difficult to carry out air sampling due to the ongoing separate issues associated with Ward 6A. <b>16/08/19</b> Ward 4C has not been sampled recently and will be in the next few weeks. <b>23/08/19</b> Air sampling has not been carried out in Ward 4C due to the ongoing issues in Ward 6A. <b>02/09/19</b> There have been no new positive <i>Cryptococcus</i> species isolated. <b>16/09/19</b> Air sampling is still to be carried out in Ward 4C. <b>24/09/19</b> Air sampling is still to be carried out in Ward 4C. <b>16/10/19</b> Air sampling is still to be carried out in Ward 4C and is ongoing in Wards 6A and 4C. <b>Action ongoing.</b></p> <p>ii. <b>26/07/19:</b> John Hood referred to the tube system, and will need to discuss this with Colin Purdon in the next couple of weeks, who will in turn talk to the engineers from Swisslog. In order to understand and find out (Level 3) the possibility of air being dragged from the Plant Room to the PODs of areas such as in 6A, 4B and 4C. This is specimen transport tubes that should all, query, be under vacuum. John Hood however wants to confirm that air cannot be dragged in (e.g. from the Plant Rooms) and then pushed out into critical areas via the tube system. <b>09/08/19</b> - John Hood stated that he needs to understand how this system works and asked Colin Purdon to speak to the Swisslog engineers and arrange a meeting for him to discuss this. It is John Hood's view that we should probably not be putting the tube system into the heart of critical areas such as BMTU or Haemato-oncology areas with high risk patients. Peter Hoffman stated that he would like to retract what was said last meeting about the vacuum system and John Hood agreed to remove this comment. The issue of the tube system was also one of the original hypotheses. Was it possible that fungal/yeast spores might gain entry into the air of such critical areas via the Tube system?  <b>16/08/19</b> John Hood commented that if we think that the tube system is pushing (or pulling) air into these areas from the Plant Rooms then, we should consider this in individual critical wards (particularly BMTU, 6A and 4C etc) as the air being unfiltered, and therefore another potential route of airborne spores, so a possible risk. Mitigation will be required if above is correct.  <b>23/08/19</b> John Hood agreed to contact Adrian from Swisslog next week. <b>02/09/19</b> John Hood contacted Adrian from Swisslog on 26 August. He said that he received an email from Susie Dodd, HPS asking if there was a filter on the air intake in the Plant Room. It was confirmed there was a 'filter' on the intake in the Plant Room (made of wire mesh and plastic foam) i.e. will only keep large objects out, not fungal spores etc. He said there is air being sucked in and exhausted from the Plant Room and this then pushes the POD down the system to the Treatment/Prep Room of the Ward, however, this is where drugs are made up. We do have some air samples next to the pods in 4B, 4C and 6A – which John Hood will review. John Hood informed the Group that Adrian had stated that as the POD comes into the ceiling void above the Ward, the air pushing the POD is exhausted into this void. However John Hood was not sure if some 'dirty' air might still exhaust into the Treatment/Prep Room. Darryl wondered about this air exhausting into the void above the ceilings and the presence also of CVG's. Tom Steele commented that were was a smell detected in the Treatment/prep room in Ward 6A and asked if there was a CVG in the Treatment/prep room. Darryl advised that the smell was due to the adhesive used on the lino and the then use of actichlor which creates this smell. He said the fire compartment is split into 3 ways from top to bottom and if there is any discharge it would be into that space alone.</p>	<p>JH</p>

Item	Action
<p>ii. Susie Dodd stated that if this was a significant ingress of unfiltered air it would occur in all other Treatment/prep rooms, thinking that we would be seeing infective consequences related to these other Treatment/Prep rooms as well.</p>	
<p>contd Peter Hoffman felt that a small amount of unfiltered air coming into a Prep/Treatment room would have little effect on the air quality in a patient room, if the patients are in positive pressure rooms (with air uniformly leaking outwards) and ventilated with HEPA filtered air. Peter also said, with regards to the air, if microbe retentive filters could be fitted to the pneumatic transport system this would remove any airborne risk, though the significance carrying this out is dubious. He thought that this was an insignificant source of how the <i>C. neoformans</i> got into patients via the air.</p>	
<p>John Hood replied that if there are no HEPA filters in this area* (as in all wards, including 4B) this could still be a problem but reported that the counts in Ward 4B rooms are mostly 0 cfu's for fungi (but not always).</p>	
<p>* Correction added in draft of Minute of 24 Sept 2019 – on 15 Oct 2019: while 4B has no HEPA filtered air in the corridors (only spill over from the Rooms) – the Treatment/Prep Room is HEPA-filtered – but only that room.</p>	
<p>Tom Steele asked if there is any opportunity to improve the level of filtration at the Plant Room and Darryl replied that the Plant Room is not sealed from the outside therefore the air will be essentially be similar to the outside air. John Hood suggested that if further investigation surrounding the risk associated with the Tube system in High Risk areas that it should be taken over by the Specialist Ventilation Group/HFS. <b>16/09/19</b> It was agreed that this should be discussed with HFS and the Ventilation Group regarding the risks associated with the tube system to see if there is any indication that anything that is discharged into the ceiling void could leak into the corridor. The consensus from IMT is that the risk related to the pneumatic tube system is likely to be small. <b>24/09/19</b> John Hood spoke to Swisslog regarding the movement of PODs and Peter Hoffman asked if the ceiling is solid or suspended and was informed that it is tiled. Peter Hoffman asked if there was a constant flow of air or only when the tube goes through the system and Darryl Conner replied that the motor only engages when in use and does not go into patient rooms. The POD comes from the Lab to the station and pushes the POD to the department and there is only one second of discharge to void. Susie Dodd agreed to follow this up with HFS. The group discussed if the PTS system (Star Delta motors) needed to be at the station of the ward or if it could be situated outside. This can be done by changing the destination pipe and move this to an alternative site.</p>	
<p>It was agreed that this is something that can be discussed with the Specialist Ventilation Group and Project Team. Peter Hoffman suggested putting one filter before the pre compressor as this would take the microbes out but is maybe something to maybe discuss this with Swisslog. <b>16/10/19</b> Susie Dodd to forward information to Ian Storrar. <b>Action ongoing.</b></p>	SD
<p>iii. John Hood asked if anyone is putting together all the mitigation from all of the previous actions and hypotheses. Colin Purdon agreed to arrange to get the mitigation recorded. <b>23/08/19</b> Colin advised that he has started putting together the mitigation from all the previous actions. <b>02/09/19</b> Darryl updated that Colin Purdon has started this. <b>16/09/19</b> Colin confirmed that he has completed the mitigation from previous actions and will forward this to the group for return comments within a week. <b>24/09/19</b> Colin Purdon to add the air movement into 4B to the mitigation report. Susie Dodd also asked for the report to include what the actual problem was, if this requires to be maintained and what has been done. <b>16/10/19</b> John Hood to check the report that Colin Purdon has issued. <b>Action ongoing.</b></p>	JH

## Item

## Action

6. **Draft Report for Comments**

John Hood is currently working on the draft report and hopes to issue a draft to the group soon.

In the report he will include the biology and ecology relating to the pigeon ingress in the Plant Room and how unlikely this was to get into the air handling unit. He said the biology of *Cryptococcus* and pigeons is that they have a high temperature of 42. With regards to a view on a guano case John Hood stated that they think that the faeces was *Cryptococcus* which came from the soil to the guano and that is where it grew. A group from Sweden (in 1999) looked at pigeon guano and found that they could not grow *C. neoformans* but grew *C. uniguttulata* and *Candida famata* as we had from pigeon guano from this site in February 2019.

The report will also include the lack of HEPA-filtered rooms with positive pressure (and air leaking uniformly outwards) as one of the main conclusions [REDACTED] appropriate HEPA-filtered environment with air uniformly leaking outwards. Ian Storrar asked if there are any recommendations for the patients that are in Wards 6A and 4C. John Hood advised that the clinicians are aware that Ward 4B is like a BMT unit in terms of HEPA-filtered environment and the environment is not as good in Wards 6A and 4C. It is the clinicians that agree what patients are most at risk and decide what patients should go into what rooms. Susie Dodd recommended that further discussions take place regarding the placement of these patients and the rooms nearest the doors. John Hood said that other factors need to be taken into account e.g. if the room has a HEPA-filtered environment or if the patient requires to be near the nurses station.

The helipad was also looked into as there were initial thoughts that this could be a factor but John Hood (and the group) discounted this after the report was received from Quesada Solutions Ltd. on the Computational Fluid Dynamics Simulation of the External Flow Around Queen Elizabeth University Hospital.

The question was asked how far is the helipad to Ward 4B and it was noted that 4B is on the fourth floor and the helipad is on the 12<sup>th</sup> floor with multiple doors and steps from BMT up to the roof. John Hood also noted that there was access to the stairs (Core G) to the Helipad from the end of 4B – there were double doors (kept locked) and a lobby between 4B and this area. Ian Powrie and John Hood had checked that the Ward was 5 Pa positive to the lobby and that the lobby was 8-9Pa positive to the stairs (on 10 May 2019). Added in draft by JH 25/10/19.

**Closed / Completed Actions**

- **(06/06/19) p3: bp1:** Ian Powrie will discuss IPS panels being sealed with Darryl Conner as some of the underside of WHBs panels were not done. **(21/06/19)** Colin Purdon picked up with Darryl Conner and reported all have been re-checked and all sealed. There were 2 rooms unable to get access to and this is still the same position today but will be re-checked. **(28/06/19)** Darryl Conner confirmed all now done. Ian Powrie reported that of all the rooms checked, the 2 rooms were still to be checked one of which was Room 5. Darryl Conner will confirm by e-mail that Rooms A and B, and Ward 6A Room 5 is the only one not sealed on the underside. Ian Powrie and John Hood had inspected this area. **(09/08/19)** Darryl Conner confirmed as above. **Action complete.**
- **06/06/19** - Item in relation to Pest Control. **Action closed**
- **06/06/19** - It was confirmed that final inspection of Ward 6A Room 5 has taken place. Action complete - see Bp 6, below. **Action closed**

Item	Action
<ul style="list-style-type: none"> <li> <p>• <b>(06/06/19) p3: Item 4:</b> There is concern about the differences in the pressures in 4C Rooms 66-75. Rooms 66 to 74 are between 0.4 to 2.9 Pa from rooms to corridor but Room 75 at the end of the corridor is consistently negative at -0.3 (i.e. air moving from corridor to room). Colin Purdon to make adjustments to the ventilation to make this room slightly positive. <b>(28/06/19)</b> Ian Powrie clarified this was the room at the end of the corridor and is still to be done. Ian Powrie asked Darryl Conner to be careful not to affect the pressure regimes for the area when adjustments are made. <b>(26/07/19)</b> Darryl Conner agreed to make adjustments to the ventilation to make this room slightly positive. <b>(09/08/19)</b> It was noted that this action has gone to the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></p> </li> <li> <p>• <b>06/06/19</b> - transferred: Sandra confirmed IPC has investigated laundry storage and process. This action to be removed from the group's remit. <b>Action complete.</b></p> </li> <li> <p>• <b>06/06/19</b> - It was agreed and noted that overall ventilation design for Ward 2A is the responsibility of another forum therefore it has been removed as an action for this group. <b>Action closed - transferred</b></p> </li> <li> <p>• <b>06/06/19</b> - Estates are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he discussed this with Multiplex. He said that the green roof was part of the design and the sedum can be removed and an alternative ballast material installed. He said if we were to move the items from the roof we could cause further disturbance? John Hood said he would be concerned if <i>Haemato-oncology</i> patients were to go on to this roof but he was informed there is no access to it for these patients. Tom Steele said that he is of the opinion to maybe review this in the future but to leave it as is at the moment. <b>21/06/19</b> - no update. <b>26/07/19</b> - <b>Action closed meantime.</b></p> </li> <li> <p>• <b>21/06/19 - Action ongoing:</b> Ian Powrie asked Eddie McLaughlan for HFS to confirm endorsement that HFS and the authorised engineer agreement that CVG vents are no longer required. Ian Powrie has received background information about ventilation and gas leaks from Ian Storrar but needs confirmation of endorsement. Ian Powrie added that ventilation is only needed where there are mechanical joints on gas lines. Eddie McLaughlan reported that Ian Storrar is currently on annual leave. Eddie McLaughlan will arrange for HFS to confirm endorsement within this time. <b>28/06/19</b> – Ian Powrie reported that Ian Storrar is still to confirm. <b>26/07/19</b> - Darryl Conner reported that Ian Storrar was asked (by Ian Powrie) to confirm endorsement of removal of the CVGs. Annette Rankin stated that Ian Storrar is likely involved in the current ongoing issues in NHS Lothian and suggested he is reminded to take this action forward. Darryl Conner will contact Ian Storrar as suggested. <b>02/09/19</b> HFS to confirm endorsement of the removal of the CVGs. <b>16/09/19</b> Darryl updated that the Ventilation Group are happy to remove the CVGs as the risk of leakage or dilution required is minimal. This has not been formally signed off by HFS but they are happy if the Authorised Engineer has approved this. It was agreed that Darryl ask the Authorised Engineer to send him the re-endorsement again to close off this action. <b>24/09/19</b> Darryl Conner reported that these are already working in 4B and there was a plan to do this for 6A but this was stopped by the Specialist Ventilation Group. He said that to remove the CVGs in 6A would be beneficial and could alter the pressure cascade coming into the rooms. It was agreed to ask the Ventilation Group for their advice. <b>Action closed to ask the Specialist Ventilation Group for their advice.</b></p> </li> <li> <p>• <b>21/06/19</b> - On 29 May 2019, inspection above the ceiling of Room 5 in Ward 6A showed that the services coming into the space were well sealed and in good condition. The flexible duct to the chilled beam was found to be intact. <b>26/07/19 - Action closed.</b></p> </li> <li> <p>• <b>21/06/19</b> - Ian Powrie reported that fluid dynamics modelling around the helipad/QEUH/RHC report was now completed (see Report Rev 3). The IMT Expert Advisory Sub-Group accepted the findings of the CFD Report. <b>Action closed.</b></p> </li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li>• <b>21/06/19</b> : A problem with the chilled beams was identified and Ian Powrie explained this was a mechanical joint failure causing a leak. On this occasion it was a loss of low temperature hot water heating circuit that resulted in a change in temperature causing contraction of the pipework and fittings resulting in a slight leak. Colin Purdon added this was reported as a series of drips and although not for this group, it is being mentioned due to the mechanical failure. Colin Purdon has met with Teresa Inkster and Christine Peters. The ceiling tiles affected by water were replaced, and Actichlor was used to wash down. All appropriate IPC measures have been taken (Ward 6A children - x8 rooms). <b>Action complete</b></li> <li>• <b>21/06/19 p4: para2:</b> John Hood mentioned that a mechanical riser in 4B had a water leak this morning. Colin Purdon explained that this is the low temperature water return pipe, and that the valve body gland has a slight leak. The valve will be changed today. <b>(29/07/19)</b> Darryl Conner confirmed as done. <b>Action complete.</b></li> <li>• <b>21/06/19 p5: para3:</b> Ian Powrie asked if there is a risk between CF and haemato-oncology if there is air movement between them. John Hood agreed to discuss this with Teresa Inkster. <b>(09/08/19)</b> John Hood reported that Teresa Inkster has concurred: no significant risk. <b>Action complete.</b></li> <li>• <b>21/06/19 p5: para5:</b> Colin Purdon has advised that intumescent gasket seals would be fitted. <b>(26/07/19)</b> Darryl Conner confirmed that the intumescent gasket riser seals has been completed. The only action outstanding in relation to this is the installation of the false ceilings. <b>(09/08/19)</b> Darryl Conner reported that installation of the false ceilings is still to be done but that this action is for the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></li> <li>• <b>21/06/19 p7: item 7: para2:</b> On 25 July 2019, Colin Purdon to have walk round with Fire Safety Advisor shortly. <b>(26/07/19)</b> Colin Purdon will set-up a meeting with the Fire Officers soon. <b>(09/08/19)</b> Colin Purdon reported that a walk round with the Fire Advisor is still to be arranged. <b>(16/08/19)</b> Sandra Devine commented that she had met with clinical and managerial representatives from 4B and had walked the patient pathway through the ward. After due consideration it was felt that automatic door closures would impede the movement of patients through the ward especially in emergencies therefore the meeting with Colin and the Fire Officer is no longer required. <b>Action complete</b></li> <li>• <b>21/06/19 p8: item 13:</b> All but two IPS panels have been confirmed as complete. <b>(26/07/19)</b> <b>Action complete.</b></li> <li>• <b>21/06/19 - Action ongoing: Carry Forward</b> - Sandra Devine was then not in attendance to provide an update that a discussion is still to take place with Teresa Inkster and possibly Myra Campbell (Clinical Services Manager) in relation to self-closers on doors in Ward 4B, and that IPC team is making sure that staff understand the importance of keeping doors to patient rooms closed and also keeping doors to ancillary areas closed as much as possible. <b>28/06/19</b> - Darryl Conner asked about self-closers. Ian Powrie stated this is what Sandra Devine was going to discuss with clinical colleagues. <b>26/07/19</b> - Sandra Devine reported that two IPC Nurses visited Ward 4B to emphasise the importance of closing doors, and signage has also been put up. Sandra Devine is arranging to meet with Myra Campbell to discuss self-closers on doors and will explain the issue of the 4B corridor and how the problem exists. Darryl Conner pointed out that practically this may be difficult to put in place as every door is bespoke and takes around 8 weeks from order, effectively taking rooms out-of-use. Sandra Devine will make this a consideration. <b>Action ongoing. 09/08/19</b> - Sandra Devine met with Myra Campbell on 08/08/19 and they both visited Ward 4B. The overwhelming opinion was not to have self-closers on doors in Ward 4B therefore this action should not be taken forward. <b>Action complete.</b></li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li> <p>• <b>21/06/19 - Action ongoing: Carry Forward</b> – Colin Purdon will check with the contractors if the rooms have 30-minute fire doors fitted at present. Colin Purdon previously discussed self-closers on doors with local Fire Safety Advisors and reported there would be no issues with this proposal. It was noted that discussion with the clinical teams would need to be held in relation to beds being taken out etc. <b>26/07/19</b> - deferred until discussions with relevant parties have taken place as noted in the minutes and also as noted, a walk round with the Fire Advisor to be arranged.</p> <p><b>Action ongoing. 09/08/19</b> – Colin Purdon stated that in light of Sandra Devine’s update (previous action) this action is no longer relevant. Colin Purdon added that fire doors are fitted adjacent to the fire exit points. Sandra Devine added that ward staff are aware of why this was being asked. <b>Action complete.</b></p> </li> <li> <p>• <b>21/06/19 - Action ongoing: Flooring: Carry Forward</b> - Colin Purdon updated that the action plan has been prepared and is being used to programme and prioritise the issues previously identified. The report was put together by the flooring contractor and Ward 6A has some minor issues to be rectified. <b>26/07/19 – Action carry forward / ongoing. 09/08/19</b> – It was agreed this action should be taken to another forum. Colin Purdon added there is a programme ongoing for Level 7 managed by Kerr Clarkson. <b>Action complete.</b></p> </li> <li> <p>• <b>21/06/19 - Action ongoing:</b> It was confirmed that the engineering risers have been inspected however this action will be kept as ongoing until completion of the doors to risers’ rooms are sealed. Ian Powrie asked Colin Purdon to arrange to have the doors sealed over the next three weeks (by 27/06/19). Colin Purdon reported that the frames have been sealed. Darryl Conner is taking forward the action for the risers. <b>28/06/19</b> - On hold with Teresa Inkster as mentioned earlier (page 3 bp1). Ian Powrie asked Darryl Conner to check if the seals itself are fine to adjust the door, but if not, to put a gasket in. Ian Powrie added that only one was looked at in Ward 6, but asked that all of the doors are sealed air tight (sweep Wards 4B, 6A, 4C for all riser doors). <b>26/07/19</b> - Fire Advisor to endorse and if IPC can sanction, then this will be done. John Hood asked if Darryl Conner is in a position to comment.</p> <p>Darryl Conner reported that Teresa Inkster wanted this item discussed at the Specialist Ventilation Group and following discussion at the first meeting put forward their intentions and what was required to accommodate the work. However Teresa Inkster had responded that the downtime would cause more risk than what the existing risk is in relation to the risers. Darryl Conner stated that in the interim a control of the risers. The doors are sealed, but the adjacent ceilings and floors of the risers have not yet been done.</p> <p>Clarification from the Fire Advisor is required to ensure that there is no breach of fire integrity as they are horizontally sealed to each level. Darryl Conner stated this will need to be discussed at the Specialist Ventilation Group and will ask for this to be included as an agenda item for discussion. <b>Action ongoing. 09/08/19</b> – Darryl Conner reported that it was proposed at the Specialist Ventilation Group a level of modification and the process of sealing the risers, and the possibility of doing this at higher and lower floors. It was recognised that there would be disruption. Darryl Conner thinks the group might be satisfied with the intumescent seals and the doors are under lock and key therefore not regarded as an immediate risk.</p> <p>Peter Hoffman commented that if everything is adequately sealed at one point in time, there is no guarantee it is going to be like that in a few years (or less) from now, and is a temporary solution. So get things sealed but need to get the air flows correct and the air flow in the right direction. It was noted that Teresa Inkster has taken this over in the Specialist Ventilation Group. <b>Action closed and transferred to the Specialist Ventilation Group.</b></p> </li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li> <p><b>21/06/19 - Action ongoing:</b> Ian Powrie updated that priority has been given to Wards 6A and 4C for removal of the Ceiling Vent Grilles (CVG's). Ward 4B has been done. Timeline will be done, but Wards 6A and 4C is expected to be done in the next couple of weeks, ongoing for removal of CVGs in other clinical wards. <b>28/06/19 - SCRIBE</b> sitting with IPC. Ward 4B has been done. Wards 6A and 4C have yet to be done – <b>SCRIBE required.</b> <b>26/07/19 -</b> Darryl Conner has asked Teresa Inkster about replacing CVGs in Ward 4B with ceiling tiles. There was one action was to replace CVGs in Ward 4C, but there is a problem with increased permeability of the space. It has already been established that the notional average is <b>1.2 to 2 Pa</b> to replace CVGs. It has been suggested it might be possible to trim back the extract in the en suites, but the air change in the en suites would be reduced slightly. This information has gone to the Specialist Ventilation Group. Darryl Conner reported that the area from 4B into 4C, at time of measurement is showing negative, but on investigation and measurement outside 4C Room 75, it was recorded to be 1.2 to 2 Pa because of the opening and closing of the various doors and air moving into 4D (as door often can be kept open). Without installation of ward lobbies into mitigating areas, the closing or opening of any one door alters the pressure regimes.</p> <p>Darryl Conner has submitted SCRIBEs for the process for removal of CVGs, and all are the same apart from the level of protection for each department being moved. Ward 6A is next on the list, which requires feedback from Teresa Inkster, but can be actioned immediately if required.</p> <p>John Hood thought the SCRIBE employed in 4B could be used for the other areas as same work is being carried out and had been successfully used in a more critical area. Darryl Conner explained that effectively it is the same SCRIBE and is used as a template however each area requires sign-off. <b>Action ongoing – SCRIBE required. 09/08/19 -</b> Amendment as noted at the start of the minute, that the notional average is 1.2 to 2 Pa. Darryl Conner commented that Teresa Inkster may not be keen to have CVGs removed. <b>Action ongoing – SCRIBE required. Action ongoing and transferred to the Specialist Ventilation Group.</b></p> <p><b>N.B. Teresa must be happy before any CVG's removed she would rather have as much positive pressure in rooms as possible.</b></p> </li> <li> <p><b>21/06/19 p3: bp2:</b> Colin Purdon advised that the Fire Strategy required that the doors to be available for lateral evacuation of patients and staff in both directions, but he would review options of temporary seals with the site Fire Advisor. <b>29/07/19</b> Action outstanding. To be completed. <b>09/08/19</b> Darryl Conner reported that draft seals have been fitted on the Ward 4B door that is locked on the outside, through to the doctor's room and it is only Estates that go in and out of that area. Darryl Conner will discuss with the Fire Advisor. <b>23/08/19</b> Darryl confirmed that he has spoken to Frank Deacon, Fire Officer and he is reviewing this.</p> <p>He will provide an update at the next meeting. <b>02/09/19</b> Darryl updated that there is a meeting of the Specialist Ventilation Group next week and this will be discussed there, although he has had verbal agreement regarding this. <b>16/09/19</b> Darryl reported that this was taken to the Ventilation Group and endorsement was received from the Fire Officer as they are happy with the fire seals. The Fire Officer has asked for the ICDs agreement on this. <b>24/09/19</b> The group agreed to close this action as endorsement was received from the Fire Officer. <b>Action closed.</b></p> </li> <li> <p><b>28/06/19 p2: bp1:</b> There had been discussion around air in the corridor from Ward 4C into Room 75, and Ian Powrie had explained that the commissioning engineer will need to review all of the rooms and check that correction has not made things worse, with a view to increasing the pressure in Room 75 to the same range as the other rooms. <b>(26/07/19)</b> Darryl Conner confirmed he will do the pressure change but will ask <b>Ian McKenzie</b> to do the re-balance. <b>(09/08/19)</b> John Hood reported that the Specialist Ventilation Group will need to discuss the air pressures. Darryl Conner explained that the doors need to be closed because when the doors are open this could force the rooms into a negative state from the corridor.</p> </li> </ul>	

Item	Action
<p><b>(16/08/19)</b> It was noted that it is only through discussion at meetings that it was realised the effect of doors being left open affecting all of the pressures, therefore ward staff would definitely not be aware of these issues. <b>Action closed and transferred to the Specialist Ventilation Group.</b></p> <ul style="list-style-type: none"> <li>• <b>26/07/19</b> - Darryl Conner confirmed that Room 5 6A was done and has been told that the other room has also been done. Darryl Conner will check both have been sealed and will confirm this. <b>Action ongoing. 09/08/19</b> – Darryl Conner confirmed. <b>Action complete.</b></li> <li>• <b>26/07/19:</b> John Hood to continue doing walk round of Plant Rooms. Awaiting results of air samples from the Level 12 Plant Rooms tested on 25 July 2019. <b>09/08/19</b> – John Hood reported that walk round of <b>all</b> of the Plant Rooms has been done at QUEH and RHC. Plant Room 31 has AHUs marked both 21 and 31 – which is a little confusing as the first number (i.e. 2 or 3 should indicate which floor that Plant Room is on!). No evidence of pigeon ingress or droppings. Plant Room 22 is in the Adult QUEH and is huge! Again the only thing discovered there was some water on the floors but apparently this is from the heat exchangers (affected by the weather), in both QUEH and RHC. Plant Room 22 is very clean, with no evidence of pigeon ingress or droppings. There was water on the floor in Plant Room 21 and there was still some general debris in it but this will be cleaned this week. There was no evidence of pigeon ingress or droppings. Plant Room 41 (RHC), again, the floor needed a brush, but there was no evidence of pigeons or pigeon droppings. Some light ingress was noted but above the area of light ingress there is netting fitted so pigeons should not get in. Plant Room 41A (RHC) is a small plant room, with no evidence of any pigeon ingress or droppings. John Hood will visit the Plant Rooms serving the labs next because two areas in Floor 1 Lab Block have grown <i>Cryptococcus</i> spp. (one <i>C. albidus</i> and one <i>C. diffluens</i>). These Plant Rooms are completely separate from the Plant Rooms in either QUEH or RHC. <b>16/08/19</b> John Hood visited Plant Rooms on level 3, 2 and 4 and none of these areas had evidence of pigeon ingress or evidence that the pigeons are getting into these Plant Rooms (indeed very difficult to see how they could). Colin Purdon confirmed that there are F7s filters in the AHUs serving the Lab building. <b>Action closed.</b></li> <li>• <b>26/07/19:</b> Colin Purdon to get the GP Environmental (Pest Control Company) to give an update on their formal cleaning and ongoing identification of problems in the Plant Rooms. Darryl Conner will discuss this with Colin Purdon on 28/07/19. Of note, this will be required for part of the final discussion and Report. <b>09/08/19</b> – Colin Purdon will request a report from the pest control company as noted. <b>16/08/19</b> – Report from GP Environmental was received by Colin on 15<sup>th</sup> August 2019. Report to be sent round the group and discussed further at next meeting. <b>Action closed.</b></li> <li>• <b>26/07/19:</b> John Hood to inform Liz Johnson at the Reference Laboratory in Bristol of the cryptococcus isolates and will forward the breakdown of this, in order to discuss the implications and any views, and if these are valid surrogate markers for <i>C. neoformans</i>. <b>09/08/19</b> – John Hood will speak to Liz Johnson next week. <b>16/08/19</b> John discussed with Liz Johnson and she said that neither can really be considered as surrogate markers for <i>C. neoformans</i> but it was difficult to be dogmatic about it. <b>Action closed.</b></li> </ul>	



Item	Action
<ul style="list-style-type: none"> <li>• <b>06/08/19</b> An e-mail response was received from Eddie McLaughlan on 06/08/19 as noted below.</li> </ul> <p>Eddie McLaughlan offered in his e-mail to have a telephone discussion with John Hood to clarify anything further:</p> <p>“The first action on me was I think a double check with Ian Storrar about vents in ceilings containing medical gas pipework without joints, but he’s completely tied up at the moment. I think I said at the meeting that as you need to seal the ceiling for IC purposes and there are no joints in the pipework above the ceiling, it would take a major mechanical failure to compromise the pipework and as that seemed unlikely removing the vents and using a gas alarm seemed reasonable. That said, we are only a source of advice; the risk assessment should be done by the Board with advice from your Authorising Engineer as necessary.”</p> <p>‘I’ve read the second action twice and I’m not entirely clear what I’m commenting on but hopefully the following will cover it. The source of the continuing Cryptococcus can only really be the outside air or infiltration from within the building and, as it is being detected in non HEPA filtered spaces and not in HEPA filtered spaces (I presume this is still the case, then the outside air looks a likely candidate).’</p> <p>On the subject of guidance, there is a review of the ventilation guidance underway at present and whilst we have asked for more clarity around specialised ventilation for susceptible patients, it is not yet clear whether we will get it. If not we will need to do something specifically for Scotland, for which there is currently neither financial nor staff resource, and no progress is likely to be made on this whilst the RHCYP&amp;DCN review is ongoing. In the meantime, it is important that clinicians understand the level of protection available in the various environments within QEUH and place patients accordingly.’</p> <p><b>26/07/19:</b> Eddie McLaughlan to review the discussion noted in the minutes of 21/06/19 (page 8, item 7.1 - Hypotheses) and change as appropriate. <b>09/08/19</b> – As mentioned earlier John Hood will telephone/email Eddie McLaughlin and as part of that discussion will ask for re-wording from Eddie McLaughlin. <b>16/08/19</b> John forwarded the minute of 21<sup>st</sup> June for Eddie McLaughlan to comment on. <b>23/08/19</b> Eddie replied with the following:</p> <p>“Not sure this is from memory, but I am content with the text highlighted in yellow in your attachment, including your addition. I’d be thoughtful about any inferences beyond the text, particularly in reference to the case of additional guidance. The need for specialist ventilation guidance is on a very long list of priorities and although we are hopeful of being in a better position for resource in the future, nothing is guaranteed”.</p> <p><b>16/09/19</b> Susie Dodd confirmed that she spoke with Eddie McLaughlan and he forwarded wording below:-</p> <p><i>“I am content with the text attributed to me, however, none of it removes the need for the Board to take appropriate professional advice. In particular, the medical gas paragraph at the top requires advice from the Board’s Authorising Engineer to inform the risk assessment. On the subject of neutropenic patients, although the guidance is not as detailed as might be desirable, it does state that wards for these patients should be HEPA filtered with a 10pa pressure regimen, so any decisions should take that as the starting point.”</i> <b>Action closed.</b></p>	
<p><b>6. AOCB</b></p> <p>Nil to update.</p>	
<p><b>7. Date and Time of Next Meeting</b></p> <p>The next meeting will be held at 2.30pm on Tuesday 29<sup>th</sup> October 2019 in the Facilities Meeting Room 5, Ground Floor, Laboratory Building, QEUH.</p> <p>A47175206</p>	

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Facilities Meeting Room 5, Laboratory Building Queen Elizabeth University Hospital

**Tuesday 29 October 2019 at 2.30pm Final**

**Present:** Dr John Hood (chair), Colin Purdon, Darryl Conner Sandra Devine,  
Ann Lang (minutes)

**Teleconference:** Peter Hoffman, Susie Dodd

**Apologies:** Tom Steele, Ian Storrar

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting. Teleconference introductions were made and apologies were received from the above mentioned.</p> <p><b>2. Minutes of Previous Meeting held on 24 September 2019</b></p> <p>The final version of the minutes of the meeting held on 24 September 2019 were issued prior to the agenda. They were accepted with the following amendment:-</p> <ul style="list-style-type: none"> <li>- Delete second two bullet points under the Minutes of the Previous Meeting held on 16 September 2019.</li> </ul> <p><b>Minutes of Meeting held on 16 October 2019</b></p> <p>The minutes of the meeting held on 16 October 2019 were accepted with the following amendments:-</p> <ul style="list-style-type: none"> <li>- Page 2, Ward 4B section - should read "rooms 86, 87 and 88 had samples ..."</li> <li>- Page 3, last sentence should read – "positive pressure out of the room and 6 Air Changes Hour (ACH) as in 4B".</li> </ul> <p>• <b>Actions Update:</b></p> <p>With regards to the pressure across the door which is the Main (really the only functioning ) entrance to 4B – near Room 99 (in 4B), the Interdepartmental Corridor (which leads to the Facilities Corridor on Level 4), the Corridor leading to the intersection with the door to 4A and door to the Lifts. John Hood measured this last week and it was +3 Pa out of the door - meaning that there is not much positive pressure out of the Ward - meaning not so much protection from incoming air (not HEPA – filtered) into 4B from the corridor (compare this with the degree of positive pressure coming out of Ward 4C). Darryl Conner commented that with the exception of the end of the corridor out of 4B (nearest Room 76) which we know can intermittently become negative to the intersection between the entrance to 4C, the Facilities Corridor and the Medics Room, all the patient Rooms are positively pressurised to the corridor at around 9 to 10 Pascals. John suggested actually ventilating the corridor itself with HEPA filtered air (which it is not presently, and indeed is not 'ventilated' apart from the air coming spilling out of the Rooms themselves). Darryl replied that there is already an increase in pressure in the corridor with the removal of CVGs. Peter Hoffman asked if there were tiled ceilings or solid ceilings in 4B as this can contribute to a loss of air in these areas. Darryl replied that there is NOT a solid ceiling in the corridors of 4B, at present.</p> <p>John Hood noted that the air counts are not so good in Room 99 (next to Ward 4B's only functioning Entrance). This would probably fit with the door being frequently opened.</p> <p>A47175206</p>	

Item	Action
<p>He recommended that there should be some form of 'control of the air' at this point (and also controlled at the other 'entrance' near room 76) which would reduce the amount of non – HEPA – filtered air gaining access to 4B. It should be noted of the real complexity of the above and consequently this may be very difficult to attain easily (added and expanded in Draft by JH 15 Nov 2019)</p>	JH
<p>On page 4 the table has been updated with the addition of one more result.</p>	
<p>Susie Dodd confirmed that she contacted Ian Storrar, HFS (regarding the POD tube system in critical areas) and he said there is nothing in the guidance that mentions where baskets should be placed and it only mentions spillages.</p>	
<p>John Hood to go through the mitigation report that Colin Purdon sent him as well as going through all the minutes of the meetings for this group.</p>	
<p><b>3. Update on Air Testing – Ward Count Data ( JH:Add actual Document to this Minute)</b></p>	
<p>A summary of results for the air counts for the wards dated 25<sup>th</sup> October 2019 was distributed with the agenda. John Hood informed that he has taken out the rooms identified to be removed at the last meeting. These include the three rooms for Paediatrics in 4B, the day care units in 6A and the renal rooms in 4C.</p>	
<p>████████████████████ and John reported that there were outlying counts of 205 and 140. Peter Hoffman asked if John had counts in the corridor and if he could do a comparison and include this in the graphs as an extra bar. John reported that the entrance to 6A (near Room 1 and the intersection with 6B and the Lifts) depending on the configuration of which doors are open or closed has pressure across the door of 6A of between – 1.5 to -12 Pa .This means that mostly this part of 6A Corridor is under varying degrees of negative pressure i.e. there is no control of the air at this entrance, with potential for pulling air from the Lift shafts etc into the ward. At the other entrance which interacts with 6D and the Facilities Corridor; things are not as bad but if the door to 6D is open then Corridor in 6A is negatively pressurised to -1 to -2 Pa. The above ties in with the poor air sampling results for 6A generally and particularly in the rooms nearest the entrances.</p>	
<p>With regards to 4B rooms 86-88 have been removed from the list. John said that at either end of the ward there seems to be an issue, with room 99 having only 40% of its samples with a zero count – this would fit with the evidence that the end of that corridor may, under certain circumstances, become negatively pressurised and therefore pull non-HEPA filtered air into that Corridor. See also discussion about 4B, above, under Actions Update. Darryl Conner commented that the further you go into the ward the more protective it will be and the areas which will be most at risk are the rooms nearest the Entrances. John said that room 89 had 0 counts out of 12 samples taken (i.e. 100% of zero counts). Susie commented that at rooms 89 and 90 there are a set of doors but they are not either entrance or main doors. John H stated that there have only (so far) had <i>Cryptococcus</i> spp. isolated in air samples from the rooms in 4B on 3 occasions (Rms 78, 81 &amp; 90) and also twice in Corridor samples.</p>	
<p>The helipad area was looked into as at the end of 4B ('prong' near rooms 88 &amp; 89) there is a door with access to the stairs to the Helipad. The Ward however is protected by a lobby with two sets of doors where only one can be opened when the other is closed. The door from the Ward has electronic access, it can only be opened by authorised staff and is alarmed (see Minute of 9<sup>th</sup> May 2019) added in Draft by JH on 14<sup>th</sup> Nov 2019. JH also noted that he and Ian Powrie had checked the airflow across this lobby on 10 May 2019 with the pressure across the door from Ward to Lobby at + 5Pa and the pressure from the Lobby out to the Helipad stairs was + 8 to 9 Pa (which is good). It should be noted that Room 89 is near the helipad doors (above) and 100% of samples taken had 0 counts. But note that the large Storeroom next to the Lobby above had its air HEPA-filtered from early 2019 - which is likely to have influenced the good air sampling results from this area. (added in Draft by JH on 14<sup>th</sup> Nov 2019).</p>	

Item	Action
<p>In 4C the renal rooms were taken off the list. John reported that the rooms in 4C were better than 6A and nearly as good as 4B in terms of results. He said that the corridor in 4C is heavily pressurised and this probably resulting from both the door out of 4C being open (remember door to 4B opposite is locked and should hardly ever be opened unless in the event of a fire) and the outside weather conditions etc then the corridor in 4B can become negatively pressurised and therefore drag non-HEPA filtered air into the 4B corridor (see p3 of Minute of 22 May 2019) In relation to the distribution of the mean count in 4C, room 75 is the worst. In this room when the Ward door is closed the corridor air pressure easily overcomes the Room pressure of + 1 to 2 Pascals and air from the corridor will move into this Room. Only 42% of the counts were 0 in room 75. Darryl Conner stated that there is also a corridor supply grill outside room 75 which will also contribute to this.</p> <p>The counts for <i>Cryptococcus</i> in these wards were as follows:-</p> <ul style="list-style-type: none"> <li>- 6A – 15 /20 rooms have had at least a single isolation of <i>Cryptococcus</i> spp. With only 5/20 rooms with NO isolations.</li> <li>- 4B – there have been only 3 single isolations recently in 3 different rooms.</li> <li>- 4C – 7 isolations from rooms, 5 rooms positive with a single isolation and 2 rooms positive on 2 occasions.</li> </ul> <p>Darryl Conner asked why 4C seems to be almost as good as 4B and John Hood replied that 4B is better as the counts are better in this ward and that the Rooms have solid ceilings, they are positively pressurised at around +9 to 10 Pascals and are supplied with HEPA-filtered air. (Added in Draft by JH). Sandra Devine asked if we measured level 7 would this be significantly different to 4C. John Hood informed that this depends on the air flow and if the doors are open at each end of the ward. Added in Draft by JH on 14 Nov 2019 – only if say 7C is configured similarly ventilation-wise to 4C. You can also see that 4C and 6A are really quite differently configured with 6A clearly pulling air into the ward most of the time whereas 4C is pushing air out most of the time with 4B probably pulling in non-HEPA filtered air into the corridor some of the time. <u>The issue is the lack of control of these air movements and the sheer complexity of the air movements throughout the hospital.</u></p> <p>4C is (only) in some ways acceptable, there is pressure in the corridor and so no extraneous air can easily get in. John Hood noted that while 4C has positive pressure in the corridor, the room at the end appears to get corridor air pushing into it.</p> <p>In 6A, one end of the corridor can be (periodically) negatively pressurised so it is not controlling the air coming from the lifts, which come up and down from the ground floor. Sandra commented that 4B and 4C were designed differently from 6A and asked if it was normal for the counts to be 0. John Hood replied that in 6A there are more counts that are greater than 0 than 4B or 4C. Added in draft 19 Nov 19 – one would also expect more zero counts in 4B if it was a properly designed BMTU.</p> <p>Darryl advised that 6A and 4C were designed the same and it was 4B that was designed differently. He said 4C was a standard general ward and was modified and 6A was also modified in October 2018 to make the rooms more positively pressurised. John Hood reiterated that for proper protective isolation, the air must be HEPA filtered (rooms and corridor), positively pressurised and air uniformly leaking out the way.</p> <p>Peter Hoffman commented that we were looking at three different sub-optimal ventilation systems. As such, it makes little difference going to significant efforts to compare them. The optimal approach to safe ventilation would not be based on any of these three.</p> <p>Susie Dodd asked what all this means for the patients now sitting in 6A and if there is anything else we can do for this patient group. Also what learning can be taken into the upgrade of 2A. John Hood replied that the issue for this hospital is that it was not supposed to have had Adult BMT patients and was not designed for this group of patients. (JH note in Draft – of course Paediatric BMT patients were always going to come to RHC) Sandra stated that the board has done as much as they can for this group of patients transferring from the Beatson to QEUH. The plan for the Adults had been drawn up after the design and build</p>	

Item			Action
	stage of the QEUH. These wards were not originally designed nor built for these sort of patients, but designed as General Wards. It was consequently very difficult to attain the same degree of protection as in the Beatson Top Floor.		
	Darryl Conner agreed that they have done as much as they can and 6A is now a better facility with draught excluders and HEPA filters put in (both mobile and now en suite ceiling re-circulating HEPA filters). John asked if a lobby and a double set of doors can be put into each end of these wards but Darryl stated this would require a ward closure to do this.		
	With regards to the information about isolations of <i>Exophiala</i> spp, Peter Hoffman asked why specifically <i>Exophiala</i> spp. are being looked at? If one species or genus of fungal spores can enter a clinical area, all could: it just depends on the outdoor spore burden. John Hood said this will be included in the report to show that there are lots of different fungi in the outside air of the hospital at any given time - and we are not sure why this is, but probably due to the weather and environmental factors etc. He also stated that he wants to show whoever reads this report that some fungi seem to be in the air most of the time and that others come and go e.g. there was a single isolation of <i>Cryptococcus curvatus</i> in the air in December 2018 and then there were no further isolations until August when there were 9 in total. He said he will include the results from the outside air sampling to emphasise that some fungal species are around the hospital at all times and others only at certain times. Noting, why this is, will be exceedingly complex.		
	Isolation of <i>Exophiala</i> in Air Sampling of Various Wards Feb to end March 2019		
	1st February 2019	6A	0/57
	5th February 2019	6A	54/56
	6 <sup>th</sup> February 2019	4B	15/28
	8 <sup>th</sup> February 2019	PICU	1/14
	8 <sup>th</sup> February 2019	QE 1C	3/12
	12 <sup>th</sup> February 2019	6A	4/60
	13th February 2019	7B	0/14
	20 <sup>th</sup> February 2019	6A	4/30
	20 <sup>th</sup> February 2019	4B	0/6
	21 <sup>st</sup> February 2019	7D	0/14
	21 <sup>st</sup> February 2019	4C	1/14
	27 <sup>th</sup> February 2019	6A	17/26
	27 <sup>th</sup> February 2019	4C	11/14
	6 <sup>th</sup> March 2019	4B	0/28
	6 <sup>th</sup> March 2019	5B	3/28
	7 <sup>th</sup> March 2019	6A	5/16
	7 <sup>th</sup> March 2019	4C	0/14
	8 <sup>th</sup> March 2019	4B	0/8
	12 <sup>th</sup> March 2019	4B	0/12
	12 <sup>th</sup> March 2019	6A	6/18
	12 <sup>th</sup> March 2019	4C	0/14
	20th March 2019	6A	26/26
	20th March 2019	4C	8/8
	22 <sup>nd</sup> March 2019	4B	25/28
	22 <sup>nd</sup> March 2019	4C	5/6
	27 <sup>th</sup> March 2019	PICU	16/16
	28 <sup>th</sup> March 2019	6A	2/26
	28 <sup>th</sup> March 2019	7A	0/14
	28 <sup>th</sup> March 2019	4C	0/14

The table below has been updated to include another positive *C. diffluens* isolation from air sampling in September. John Hood reported that to date there have been 91 Cryptococcus isolates from air sampling since December 2018. Most of the isolates are *C. diffluens* and **not** *C. albidus*.

The table below is the air sampling results from July 1<sup>st</sup> to September 30<sup>th</sup> 2019.

Date taken	Area	Presumptive	Confirmed
03/07/19	Ward 6A Room 24		<i>C. diffluens</i>
03/07/19	Ward 6A Room 2		<i>C.uniguttulatus</i>
15/07/19	Ward 6A Room 23		<i>C. diffluens</i>
24/07/19	Ward 4C Corridor		<i>C.uniguttulatus</i>
24/07/19	Ward 6A Room 3	<i>C. albidus</i>	
08/08/19	Ward 6A Room 1	<i>C. albidus</i>	
08/08/19	Ward 6A Room 24		<i>C. curvatus</i>
20/08/19	Ward 4B Room 78 Bathroom		<i>C. curvatus</i>
20/08/19	Ward 4B Room 90		<i>C. curvatus</i>
20/08/19	L4 Labs Molecular Lab		<i>C.uniguttulatus</i>
20/08/19	L4 Labs BC room		<i>C. diffluens</i>
27/8/19	Ward 6A Room 5		<i>C. curvatus</i>
27/8/19	Ward 6A Room 5 i.e. both samples pos		<i>C. curvatus</i>
27/8/19	Ward 6A Room 6		<i>C. curvatus</i>
27/8/19	Ward 6A Room 26		<i>C. curvatus</i>
27/8/19	Ward 6A Room 8		<i>C. diffluens</i>
30/8/19	Ward 6A Room 4		<i>C. curvatus</i>
30/8/19	Ward 6A Room 4 i.e. both samples pos		<i>C. curvatus</i>
17/09/19	Ward 4B Room 81 (bathroom)		<i>C. diffluens</i>

Item

Action

FIGURE 1

<b>'Cryptococcal species' isolates from air sampling 21 Dec 2018 to September 2019</b>							
	<i>N. diffluens</i>	<i>N. albida</i>	<i>N. albido-similis</i>	<i>F.uniguttulata</i>	<i>Cutan. curvatus</i>	ID TBC	Total
<b>*Dec 21<sup>st</sup> 2018</b> n=53	13	?	1	0	1 Roof#	1	<b>16</b>
<b>Jan 19</b> n=422	24	3	0	0	0	0	<b>27</b>
<b>Feb 19</b> n=440	0	0	0	1	0	0	<b>1</b>
<b>Mar 19</b> n=320	4	0	0	1	0	0	<b>5</b>
<b>Apr 19</b> n=334	2	0	0	0	0	0	<b>2</b>
<b>May 19</b> n=420	7	3	0	3	0	0	<b>13</b>
<b>Jun 19</b> n=448	8	0	0	0	0	0	<b>8</b>
<b>Jul 19</b> n=419	2	?	0	2	0	1	<b>5</b>
<b>Aug 19</b> n=150	2	?	0	1	9	1	<b>13</b>
<b>Sept 19</b> n=98	1	0	0	0	0	0	<b>1</b>
<b>Total sf</b>	<b>63</b>	<b>6</b>	<b>1</b>	<b>8</b>	<b>10</b>	<b>3</b>	<b>91</b>

sf = so far

FIGURE 2

Positive Crypto spp. results by month and per number of samples

Month	No of positives	No of samples
<b>December 21<sup>st</sup> 2018 (1day)</b>	16	53
<b>Jan 19</b>	27	422
<b>Feb 19</b>	1	440
<b>March 19</b>	5	320
<b>April 19</b>	2	334
<b>May 19</b>	13	420
<b>June 19</b>	8	448
<b>July 19</b>	5	419
<b>August 19</b>	13	150
<b>September 19</b>	1	98

Item	Action
<b>4. <u>Further Actions Required</u></b>	
<p>i. <b>21/06/19</b> - Continue to carry out air sampling in Wards 6A, 4B and 4C. <b>26/07/19 - Action ongoing.</b> <b>09/0819</b> – Difficult to carry out air sampling due to the ongoing separate issues associated with Ward 6A. <b>16/08/19</b> Ward 4C has not been sampled recently and will be in the next few weeks. <b>23/08/19</b> Air sampling has not been carried out in Ward 4C due to the ongoing issues in Ward 6A. <b>02/09/19</b> There have been no new positive <i>Cryptococcus</i> species isolated. <b>16/09/19</b> Air sampling is still to be carried out in Ward 4C. <b>24/09/19</b> Air sampling is still to be carried out in Ward 4C. <b>16/10/19</b> Air sampling is still to be carried out in Ward 4C and is ongoing in Wards 6A and 4B. <b>29/1019</b> Sampling carried out in 4C last week (as detailed earlier in minutes) <b>Action ongoing.</b></p>	
<p>ii. <b>26/07/19:</b> John Hood referred to the tube system, and will need to discuss this with Colin Purdon in the next couple of weeks, who will in turn talk to the engineers from Swisslog. In order to understand and find out (Level 3) the possibility of air being dragged from the Plant Room to the PODs of areas such as in 6A, 4B and 4C. This is specimen transport tubes that should all, query, be under vacuum. John Hood however wants to confirm that air cannot be dragged in (e.g. from the Plant Rooms) and then pushed out into critical areas via the tube system. <b>09/08/19</b> - John Hood stated that he needs to understand how this system works and asked Colin Purdon to speak to the Swisslog engineers and arrange a meeting for him to discuss this. It is John Hood's view that we should probably not be putting the tube system into the heart of critical areas such as BMTU or Haemato-oncology areas with high risk patients. Peter Hoffman stated that he would like to retract what was said last meeting about the vacuum system and John Hood agreed to remove this comment. The issue of the tube system was also one of the original hypotheses. Was it possible that fungal/yeast spores might gain entry into the air of such critical areas via the Tube system?  <b>16/08/19</b> John Hood commented that if we think that the tube system is pushing (or pulling) air into these areas from the Plant Rooms then, we should consider this in individual critical wards (particularly BMTU, 6A and 4C etc) as the air being unfiltered, and therefore another potential route of airborne spores, so a possible risk. Mitigation will be required if above is correct.  <b>23/08/19</b> John Hood agreed to contact Adrian from Swisslog next week. <b>02/09/19</b> John Hood contacted Adrian from Swisslog on 26 August. He said that he received an email from Susie Dodd, HPS asking if there was a filter on the air intake in the Plant Room. It was confirmed there was a 'filter' on the intake in the Plant Room (made of wire mesh and plastic foam) i.e. will only keep large objects out, not fungal spores etc. He said there is air being sucked in and exhausted from the Plant Room and this then pushes the POD down the system to the Treatment/Prep Room of the Ward, however, this is where drugs are made up. We do have some air samples next to the pods in 4B, 4C and 6A – which John Hood will review. John Hood informed the Group that Adrian had stated that as the POD comes into the ceiling void above the Ward, the air pushing the POD is exhausted into this void. However John Hood was not sure if some 'dirty' air might still exhaust into the Treatment/Prep Room. Darryl wondered about this air exhausting into the void above the ceilings and the presence also of CVG's. Tom Steele commented that were was a smell detected in the Treatment/prep room in Ward 6A and asked if there was a CVG in the Treatment/prep room. Darryl advised that the smell was due to the adhesive used on the lino and the then use of actichlor which creates this smell. He said the fire compartment is split into 3 ways from top to bottom and if there is any discharge it would be into that space alone. Susie Dodd stated that if this was a significant ingress of unfiltered air it would occur in all other Treatment/prep rooms, thinking that we would be seeing infective consequences related to these other Treatment/Prep rooms as well.</p>	



- ii Peter Hoffman felt that a small amount of unfiltered air coming into a Prep/Treatment room would have little effect on the air quality in a patient room, if the patients are in positive pressure rooms (with air uniformly leaking outwards) and ventilated with HEPA filtered air. Peter also said, with regards to the air, if microbe retentive filters could be fitted to the pneumatic transport system this would remove any airborne risk, though the significance carrying this out is dubious. He thought that this was an insignificant source of how the *C. neoformans* got into patients via the air.

John Hood replied that if there are no HEPA filters in this area\* (as in all wards, including 4B) this could still be a problem but reported that the counts in Ward 4B rooms are mostly 0 cfu's for fungi (but not always).

\* Correction added in draft of Minute of 24 Sept 2019 – on 15 Oct 2019: while 4B has no HEPA filtered air in the corridors (only spill over from the Rooms) – the Treatment/Prep Room is HEPA-filtered – but only that room.

Tom Steele asked if there is any opportunity to improve the level of filtration at the Plant Room and Darryl replied that the Plant Room is not sealed from the outside therefore the air will be essentially be similar to the outside air. John Hood suggested that if further investigation surrounding the risk associated with the Tube system in High Risk areas that it should be taken over by the Specialist Ventilation Group/HFS. **16/09/19** It was agreed that this should be discussed with HFS and the Ventilation Group regarding the risks associated with the tube system to see if there is any indication that anything that is discharged into the ceiling void could leak into the corridor. The consensus from IMT is that the risk related to the pneumatic tube system is likely to be small. **24/09/19** John Hood spoke to Swisslog regarding the movement of PODs and Peter Hoffman asked if the ceiling is solid or suspended and was informed that it is tiled. Peter Hoffman asked if there was a constant flow of air or only when the tube goes through the system and Darryl Conner replied that the motor only engages when in use and does not go into patient rooms. The POD comes from the Lab to the station and pushes the POD to the department and there is only one second of discharge to void. Susie Dodd agreed to follow this up with HFS. The group discussed if the PTS system (Star Delta motors) needed to be at the station of the ward or if it could be situated outside. This can be done by changing the destination pipe and move this to an alternative site.

It was agreed that this is something that can be discussed with the Specialist Ventilation Group and Project Team. Peter Hoffman suggested putting one filter before the pre compressor as this would take the microbes out but is maybe something to maybe discuss this with Swisslog. **16/10/19** Susie Dodd to forward information to Ian Storrar. **29/10/19** Susie Dodd confirmed that she contacted Ian Storrar, HFS and he said there is nothing in the guidance that mentions where baskets should be placed and it only mentions spillages **Action ongoing. ? to close 15/11/19**

- iii. John Hood asked if anyone is putting together all the mitigation from all of the previous actions and hypotheses. Colin Purdon agreed to arrange to get the mitigation recorded. **23/08/19** Colin advised that he has started putting together the mitigation from all the previous actions. **02/09/19** Darryl updated that Colin Purdon has started this. **16/09/19** Colin confirmed that he has completed the mitigation from previous actions and will forward this to the group for return comments within a week. **24/09/19** Colin Purdon to add the air movement into 4B to the mitigation report. Susie Dodd also asked for the report to include what the actual problem was, if this requires to be maintained and what has been done. **16/10/19** John Hood to check the report that Colin Purdon has issued. **29/10/19** John Hood is going through the mitigation report and the minutes of the previous meeting. **Action ongoing.**

JH

Item	Action
<p><b>5. Draft Report for Comments</b> John Hood is currently working on the draft report and hopes to issue a draft to the group soon.</p> <p>Peter Hoffman stated that Cryptococcus did not come from the Plant Room and looks as if it is in the outside air. He said the spore of Cryptococcus is no different in dimension than any other fungus. In the report he recommended to John to put into the summary that if Cryptococcus is outside it can get into the hospital.</p> <p>The report will also include the lack of HEPA-filtered rooms with positive pressure (and air leaking uniformly outwards) as one of the main conclusions [REDACTED] appropriate HEPA-filtered environment with air uniformly leaking outwards. Ian Storrar asked if there are any recommendations for the patients that are in Wards 6A and 4C. John Hood advised that the clinicians are aware that Ward 4B is like a BMT unit in terms of HEPA-filtered environment and the environment is not as good in Wards 6A and 4C. It is the clinicians that agree what patients are most at risk and decide what patients should go into what rooms. Susie Dodd recommended that further discussions take place regarding the placement of these patients and the rooms nearest the doors. John Hood said that other factors need to be taken into account e.g. if the room has a HEPA-filtered environment or if the patient requires to be near the nurses station.</p> <p>The helipad was also looked into as there were initial thoughts that this could be a factor but John Hood (and the group) discounted this after the report was received from Quesada Solutions Ltd. on the Computational Fluid Dynamics Simulation of the External Flow Around Queen Elizabeth University Hospital.</p>	
<p><b>6. Closed / Completed Actions</b></p> <ul style="list-style-type: none"> <li>• <b>(06/06/19) p3: bp1:</b> Ian Powrie will discuss IPS panels being sealed with Darryl Conner as some of the underside of WHBs panels were not done. <b>(21/06/19)</b> Colin Purdon picked up with Darryl Conner and reported all have been re-checked and all sealed. There were 2 rooms unable to get access to and this is still the same position today but will be re-checked. <b>(28/06/19)</b> Darryl Conner confirmed all now done. Ian Powrie reported that of all the rooms checked, the 2 rooms were still to be checked one of which was Room 5. Darryl Conner will confirm by e-mail that Rooms A and B, and Ward 6A Room 5 is the only one not sealed on the underside. Ian Powrie and John Hood had inspected this area. <b>(09/08/19)</b> Darryl Conner confirmed as above. <b>Action complete.</b></li> <li>• <b>06/06/19</b> - Item in relation to Pest Control. <b>Action closed</b></li> <li>• <b>06/06/19</b> - It was confirmed that final inspection of Ward 6A Room 5 has taken place. Action complete - see Bp 6, below. <b>Action closed</b></li> <li>• <b>(06/06/19) p3: Item 4:</b> There is concern about the differences in the pressures in 4C Rooms 66-75. Rooms 66 to 74 are between 0.4 to 2.9 Pa from rooms to corridor but Room 75 at the end of the corridor is consistently negative at -0.3 (i.e. air moving from corridor to room). Colin Purdon to make adjustments to the ventilation to make this room slightly positive. <b>(28/06/19)</b> Ian Powrie clarified this was the room at the end of the corridor and is still to be done. Ian Powrie asked Darryl Conner to be careful not to affect the pressure regimes for the area when adjustments are made. <b>(26/07/19)</b> Darryl Conner agreed to make adjustments to the ventilation to make this room slightly positive. <b>(09/08/19)</b> It was noted that this action has gone to the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></li> <li>• <b>06/06/19</b> - transferred: Sandra confirmed IPC has investigated laundry storage and process. This action to be removed from the group's remit. <b>Action complete.</b></li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li>• <b>06/06/19</b> - It was agreed and noted that overall ventilation design for Ward 2A is the responsibility of another forum therefore it has been removed as an action for this group. <b>Action closed - transferred</b></li>   <li>• <b>06/06/19</b> - Estates are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he discussed this with Multiplex. He said that the green roof was part of the design and the sedum can be removed and an alternative ballast material installed. He said if we were to move the items from the roof we could cause further disturbance? John Hood said he would be concerned if <i>Haemato-oncology</i> patients were to go on to this roof but he was informed there is no access to it for these patients. Tom Steele said that he is of the opinion to maybe review this in the future but to leave it as is at the moment. <b>21/06/19</b> - no update. <b>26/07/19</b> - <b>Action closed meantime.</b></li>   <li>• <b>21/06/19 - Action ongoing:</b> Ian Powrie asked Eddie McLaughlan for HFS to confirm endorsement that HFS and the authorised engineer agreement that CVG vents are no longer required. Ian Powrie has received background information about ventilation and gas leaks from Ian Storrar but needs confirmation of endorsement. Ian Powrie added that ventilation is only needed where there are mechanical joints on gas lines. Eddie McLaughlan reported that Ian Storrar is currently on annual leave. Eddie McLaughlan will arrange for HFS to confirm endorsement within this time. <b>28/06/19</b> – Ian Powrie reported that Ian Storrar is still to confirm. <b>26/07/19</b> - Darryl Conner reported that Ian Storrar was asked (by Ian Powrie) to confirm endorsement of removal of the CVGs. Annette Rankin stated that Ian Storrar is likely involved in the current ongoing issues in NHS Lothian and suggested he is reminded to take this action forward. Darryl Conner will contact Ian Storrar as suggested. <b>02/09/19</b> HFS to confirm endorsement of the removal of the CVGs. <b>16/09/19</b> Darryl updated that the Ventilation Group are happy to remove the CVGs as the risk of leakage or dilution required is minimal. This has not been formally signed off by HFS but they are happy if the Authorised Engineer has approved this. It was agreed that Darryl ask the Authorised Engineer to send him the re-endorsement again to close off this action. <b>24/09/19</b> Darryl Conner reported that these are already working in 4B and there was a plan to do this for 6A but this was stopped by the Specialist Ventilation Group. He said that to remove the CVGs in 6A would be beneficial and could alter the pressure cascade coming into the rooms. It was agreed to ask the Ventilation Group for their advice. <b>Action closed to ask the Specialist Ventilation Group for their advice.</b></li>   <li>• <b>21/06/19</b> - On 29 May 2019, inspection above the ceiling of Room 5 in Ward 6A showed that the services coming into the space were well sealed and in good condition. The flexible duct to the chilled beam was found to be intact. <b>26/07/19 - Action closed.</b></li>   <li>• <b>21/06/19</b> - Ian Powrie reported that fluid dynamics modelling around the helipad/QEUH/RHC report was now completed (see Report Rev 3). The IMT Expert Advisory Sub-Group accepted the findings of the CFD Report. <b>Action closed.</b></li>   <li>• <b>21/06/19</b> : A problem with the chilled beams was identified and Ian Powrie explained this was a mechanical joint failure causing a leak. On this occasion it was a loss of low temperature hot water heating circuit that resulted in a change in temperature causing contraction of the pipework and fittings resulting in a slight leak. Colin Purdon added this was reported as a series of drips and although not for this group, it is being mentioned due to the mechanical failure. Colin Purdon has met with Teresa Inkster and Christine Peters. The ceiling tiles affected by water were replaced, and Actichlor was used to wash down. All appropriate IPC measures have been taken (Ward 6A children - x8 rooms). <b>Action complete</b></li>   <li>• <b>21/06/19 p4: para2:</b> John Hood mentioned that a mechanical riser in 4B had a water leak this morning. Colin Purdon explained that this is the low temperature water return pipe, and that the valve body gland has a slight leak. The valve will be changed today. <b>(29/07/19)</b> Darryl Conner confirmed as done. <b>Action complete.</b></li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li>• <b>21/06/19 p5: para3:</b> Ian Powrie asked if there is a risk between CF and haemato-oncology if there is air movement between them. John Hood agreed to discuss this with Teresa Inkster. <b>(09/08/19)</b> John Hood reported that Teresa Inkster has concurred: no significant risk. <b>Action complete.</b></li> <li>• <b>21/06/19 p5: para5:</b> Colin Purdon has advised that intumescent gasket seals would be fitted. <b>(26/07/19)</b> Darryl Conner confirmed that the intumescent gasket riser seals has been completed. The only action outstanding in relation to this is the installation of the false ceilings. <b>(09/08/19)</b> Darryl Conner reported that installation of the false ceilings is still to be done but that this action is for the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></li> <li>• <b>21/06/19 p7: item 7: para2:</b> On 25 July 2019, Colin Purdon to have walk round with Fire Safety Advisor shortly. <b>(26/07/19)</b> Colin Purdon will set-up a meeting with the Fire Officers soon. <b>(09/08/19)</b> Colin Purdon reported that a walk round with the Fire Advisor is still to be arranged. <b>(16/08/19)</b> Sandra Devine commented that she had met with clinical and managerial representatives from 4B and had walked the patient pathway through the ward. After due consideration it was felt that automatic door closures would impede the movement of patients through the ward especially in emergencies therefore the meeting with Colin and the Fire Officer is no longer required. <b>Action complete</b></li> <li>• <b>21/06/19 p8: item 13:</b> All but two IPS panels have been confirmed as complete. <b>(26/07/19) Action complete.</b></li> <li>• <b>21/06/19 - Action ongoing: Carry Forward</b> - Sandra Devine was then not in attendance to provide an update that a discussion is still to take place with Teresa Inkster and possibly Myra Campbell (Clinical Services Manager) in relation to self-closers on doors in Ward 4B, and that IPC team is making sure that staff understand the importance of keeping doors to patient rooms closed and also keeping doors to ancillary areas closed as much as possible. <b>28/06/19</b> - Darryl Conner asked about self-closers. Ian Powrie stated this is what Sandra Devine was going to discuss with clinical colleagues. <b>26/07/19</b> - Sandra Devine reported that two IPC Nurses visited Ward 4B to emphasise the importance of closing doors, and signage has also been put up. Sandra Devine is arranging to meet with Myra Campbell to discuss self-closers on doors and will explain the issue of the 4B corridor and how the problem exists. Darryl Conner pointed out that practically this may be difficult to put in place as every door is bespoke and takes around 8 weeks from order, effectively taking rooms out-of-use. Sandra Devine will make this a consideration. <b>Action ongoing. 09/08/19</b> - Sandra Devine met with Myra Campbell on 08/08/19 and they both visited Ward 4B. The overwhelming opinion was not to have self-closers on doors in Ward 4B therefore this action should not be taken forward. <b>Action complete.</b></li> <li>• <b>21/06/19 - Action ongoing: Carry Forward</b> – Colin Purdon will check with the contractors if the rooms have 30-minute fire doors fitted at present. Colin Purdon previously discussed self-closers on doors with local Fire Safety Advisors and reported there would be no issues with this proposal. It was noted that discussion with the clinical teams would need to be held in relation to beds being taken out etc. <b>26/07/19</b> - deferred until discussions with relevant parties have taken place as noted in the minutes and also as noted, a walk round with the Fire Advisor to be arranged. <b>Action ongoing. 09/08/19</b> – Colin Purdon stated that in light of Sandra Devine’s update (previous action) this action is no longer relevant. Colin Purdon added that fire doors are fitted adjacent to the fire exit points. Sandra Devine added that ward staff are aware of why this was being asked. <b>Action complete.</b></li> <li>• <b>21/06/19 - Action ongoing: Flooring: Carry Forward</b> - Colin Purdon updated that the action plan has been prepared and is being used to programme and prioritise the issues previously identified. The report was put together by the flooring contractor and Ward 6A has some minor issues to be rectified. <b>26/07/19 – Action carry forward / ongoing. 09/08/19</b> – It was agreed this action should be taken to another forum. Colin Purdon added there is a programme ongoing for Level 7 managed by Kerr Clarkson. <b>Action complete.</b></li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li> <p><b>21/06/19 - Action ongoing:</b> It was confirmed that the engineering risers have been inspected however this action will be kept as ongoing until completion of the doors to risers' rooms are sealed. Ian Powrie asked Colin Purdon to arrange to have the doors sealed over the next three weeks (by 27/06/19). Colin Purdon reported that the frames have been sealed. Darryl Conner is taking forward the action for the risers. <b>28/06/19</b> - On hold with Teresa Inkster as mentioned earlier (page 3 bp1). Ian Powrie asked Darryl Conner to check if the seals itself are fine to adjust the door, but if not, to put a gasket in. Ian Powrie added that only one was looked at in Ward 6, but asked that all of the doors are sealed air tight (sweep Wards 4B, 6A, 4C for all riser doors). <b>26/07/19</b> - Fire Advisor to endorse and if IPC can sanction, then this will be done. John Hood asked if Darryl Conner is in a position to comment.</p> <p>Darryl Conner reported that Teresa Inkster wanted this item discussed at the Specialist Ventilation Group and following discussion at the first meeting put forward their intentions and what was required to accommodate the work. However Teresa Inkster had responded that the downtime would cause more risk than what the existing risk is in relation to the risers. Darryl Conner stated that in the interim a control of the risers. The doors are sealed, but the adjacent ceilings and floors of the risers have not yet been done.</p> <p>Clarification from the Fire Advisor is required to ensure that there is no breach of fire integrity as they are horizontally sealed to each level. Darryl Conner stated this will need to be discussed at the Specialist Ventilation Group and will ask for this to be included as an agenda item for discussion. <b>Action ongoing. 09/08/19</b> – Darryl Conner reported that it was proposed at the Specialist Ventilation Group a level of modification and the process of sealing the risers, and the possibility of doing this at higher and lower floors. It was recognised that there would be disruption. Darryl Conner thinks the group might be satisfied with the intumescent seals and the doors are under lock and key therefore not regarded as an immediate risk.</p> <p>Peter Hoffman commented that if everything is adequately sealed at one point in time, there is no guarantee it is going to be like that in a few years (or less) from now, and is a temporary solution. So get things sealed but need to get the air flows correct and the air flow in the right direction. It was noted that Teresa Inkster has taken this over in the Specialist Ventilation Group. <b>Action closed and transferred to the Specialist Ventilation Group.</b></p> <p><b>21/06/19 - Action ongoing:</b> Ian Powrie updated that priority has been given to Wards 6A and 4C for removal of the Ceiling Vent Grilles (CVG's). Ward 4B has been done. Timeline will be done, but Wards 6A and 4C is expected to be done in the next couple of weeks, ongoing for removal of CVGs in other clinical wards. <b>28/06/19</b> - SCRIBE sitting with IPC. Ward 4B has been done. Wards 6A and 4C have yet to be done – <b>SCRIBE required.</b> <b>26/07/19</b> - Darryl Conner has asked Teresa Inkster about replacing CVGs in Ward 4B with ceiling tiles. There was one action was to replace CVGs in Ward 4C, but there is a problem with increased permeability of the space. It has already been established that the notional average is <b>1.2 to 2 Pa</b> to replace CVGs. It has been suggested it might be possible to trim back the extract in the en suites, but the air change in the en suites would be reduced slightly. This information has gone to the Specialist Ventilation Group. Darryl Conner reported that the area from 4B into 4C, at time of measurement is showing negative, but on investigation and measurement outside 4C Room 75, it was recorded to be 1.2 to 2 Pa because of the opening and closing of the various doors and air moving into 4D (as door often can be kept open). Without installation of ward lobbies into mitigating areas, the closing or opening of any one door alters the pressure regimes.</p> <p>Darryl Conner has submitted SCRIBES for the process for removal of CVGs, and all are the same apart from the level of protection for each department being moved. Ward 6A is next on the list, which requires feedback from Teresa Inkster, but can be actioned immediately if required.</p> </li> </ul>	

Item	Action
<p>John Hood thought the SCRIBE employed in 4B could be used for the other areas as same work is being carried out and had been successfully used in a more critical area. Darryl Conner explained that effectively it is the same SCRIBE and is used as a template however each area requires sign-off. <b>Action ongoing – SCRIBE required. 09/08/19</b> - Amendment as noted at the start of the minute, that the notional average is 1.2 to 2 Pa. Darryl Conner commented that Teresa Inkster may not be keen to have CVGs removed. <b>Action ongoing – SCRIBE required. Action ongoing and transferred to the Specialist Ventilation Group.</b></p> <p><b>N.B. Teresa must be happy before any CVG's removed she would rather have as much positive pressure in rooms as possible.</b></p> <ul style="list-style-type: none"> <li> <p><b>21/06/19 p3: bp2:</b> Colin Purdon advised that the Fire Strategy required that the doors to be available for lateral evacuation of patients and staff in both directions, but he would review options of temporary seals with the site Fire Advisor. <b>29/07/19</b> Action outstanding. To be completed. <b>09/08/19</b> Darryl Conner reported that draft seals have been fitted on the Ward 4B door that is locked on the outside, through to the doctor's room and it is only Estates that go in and out of that area. Darryl Conner will discuss with the Fire Advisor. <b>23/08/19</b> Darryl confirmed that he has spoken to Frank Deacon, Fire Officer and he is reviewing this.</p> <p>He will provide an update at the next meeting. <b>02/09/19</b> Darryl updated that there is a meeting of the Specialist Ventilation Group next week and this will be discussed there, although he has had verbal agreement regarding this. <b>16/09/19</b> Darryl reported that this was taken to the Ventilation Group and endorsement was received from the Fire Officer as they are happy with the fire seals. The Fire Officer has asked for the ICDs agreement on this. <b>24/09/19</b> The group agreed to close this action as endorsement was received from the Fire Officer. <b>Action closed.</b></p> </li> <li> <p><b>28/06/19 p2: bp1:</b> There had been discussion around air in the corridor from Ward 4C into Room 75, and Ian Powrie had explained that the commissioning engineer will need to review all of the rooms and check that correction has not made things worse, with a view to increasing the pressure in Room 75 to the same range as the other rooms. <b>(26/07/19)</b> Darryl Conner confirmed he will do the pressure change but will ask <b>Ian McKenzie</b> to do the re-balance. <b>(09/08/19)</b> John Hood reported that the Specialist Ventilation Group will need to discuss the air pressures. Darryl Conner explained that the doors need to be closed because when the doors are open this could force the rooms into a negative state from the corridor.</p> <p><b>(16/08/19)</b> It was noted that it is only through discussion at meetings that it was realised the effect of doors being left open affecting all of the pressures, therefore ward staff would definitely not be aware of these issues. <b>Action closed and transferred to the Specialist Ventilation Group.</b></p> </li> <li> <p><b>26/07/19</b> - Darryl Conner confirmed that Room 5 6A was done and has been told that the other room has also been done. Darryl Conner will check both have been sealed and will confirm this. <b>Action ongoing. 09/08/19 – Darryl Conner confirmed. Action complete.</b></p> </li> <li> <p><b>26/07/19:</b> John Hood to continue doing walk round of Plant Rooms. Awaiting results of air samples from the Level 12 Plant Rooms tested on 25 July 2019. <b>09/08/19 –</b> John Hood reported that walk round of <b>all</b> of the Plant Rooms has been done at QEUH and RHC. Plant Room 31 has AHUs marked both 21 and 31 – which is a little confusing as the first number (i.e. 2 or 3 should indicate which floor that Plant Room is on!). No evidence of pigeon ingress or droppings. Plant Room 22 is in the Adult QEUH and is huge! Again the only thing discovered there was some water on the floors but apparently this is from the heat exchangers (affected by the weather), in both QEUH and RHC. Plant Room 22 is very clean, with no evidence of pigeon ingress or droppings. There was water on the floor in Plant Room 21 and there was still some general debris in it but this will be cleaned this week. There was no evidence of pigeon ingress or droppings. Plant Room 41 (RHC), again, the floor needed a brush, but there was no evidence of pigeons or pigeon droppings. Some light ingress was noted but above the area of light ingress there is netting fitted so pigeons should not get in. Plant Room 41A (RHC) is a small plant room,</p> </li> </ul>	

Item	Action
<p>with no evidence of any pigeon ingress or droppings. John Hood will visit the Plant Rooms serving the labs next because two areas in Floor 1 Lab Block have grown <i>Cryptococcus</i> spp. (one <i>C. albidus</i> and one <i>C. diffluens</i>). These Plant Rooms are completely separate from the Plant Rooms in either QUEH or RHC. <b>16/08/19</b> John Hood visited Plant Rooms on level 3, 2 and 4 and none of these areas had evidence of pigeon ingress or evidence that the pigeons are getting into these Plant Rooms (indeed very difficult to see how they could). Colin Purdon confirmed that there are F7s filters in the AHUs serving the Lab building. <b>Action closed.</b></p>	
<ul style="list-style-type: none"> <li>● <b>26/07/19:</b> Colin Purdon to get the GP Environmental (Pest Control Company) to give an update on their formal cleaning and ongoing identification of problems in the Plant Rooms. Darryl Conner will discuss this with Colin Purdon on 28/07/19. Of note, this will be required for part of the final discussion and Report. <b>09/08/19</b> – Colin Purdon will request a report from the pest control company as noted. <b>16/08/19</b> – Report from GP Environmental was received by Colin on 15<sup>th</sup> August 2019. Report to be sent round the group and discussed further at next meeting. <b>Action closed.</b></li> <li>● <b>26/07/19:</b> John Hood to inform Liz Johnson at the Reference Laboratory in Bristol of the cryptococcus isolates and will forward the breakdown of this, in order to discuss the implications and any views, and if these are valid surrogate markers for <i>C. neoformans</i>. <b>09/08/19</b> – John Hood will speak to Liz Johnson next week. <b>16/08/19</b> John discussed with Liz Johnson and she said that neither can really be considered as surrogate markers for <i>C. neoformans</i> but it was difficult to be dogmatic about it. <b>Action closed.</b></li> </ul>	
<p><b>06/08/19</b> An e-mail response was received from Eddie McLaughlan on 06/08/19 as noted below.</p>	
<p>Eddie McLaughlan offered in his e-mail to have a telephone discussion with John Hood to clarify anything further:</p>	
<p>“The first action on me was I think a double check with Ian Storrar about vents in ceilings containing medical gas pipework without joints, but he’s completely tied up at the moment. I think I said at the meeting that as you need to seal the ceiling for IC purposes and there are no joints in the pipework above the ceiling, it would take a major mechanical failure to compromise the pipework and as that seemed unlikely removing the vents and using a gas alarm seemed reasonable. That said, we are only a source of advice; the risk assessment should be done by the Board with advice from your Authorising Engineer as necessary.”</p>	
<p>‘I’ve read the second action twice and I’m not entirely clear what I’m commenting on but hopefully the following will cover it. The source of the continuing Cryptococcus can only really be the outside air or infiltration from within the building and, as it is being detected in non HEPA filtered spaces and not in HEPA filtered spaces (I presume this is still the case, then the outside air looks a likely candidate).’ On the subject of guidance, there is a review of the ventilation guidance underway at present and whilst we have asked for more clarity around specialised ventilation for susceptible patients, it is not yet clear whether we will get it. If not we will need to do something specifically for Scotland, for which there is currently neither financial nor staff resource, and no progress is likely to be made on this whilst the RHCYP&amp;DCN review is ongoing. In the meantime, it is important that clinicians understand the level of protection available in the various environments within QUEH and place patients accordingly.’</p>	
<p><b>26/07/19:</b> Eddie McLaughlan to review the discussion noted in the minutes of 21/06/19 (page 8, item 7.1 - Hypotheses) and change as appropriate. <b>09/08/19</b> – As mentioned earlier John Hood will telephone/email Eddie McLaughlan and as part of that discussion will ask for re-wording from Eddie McLaughlan. <b>16/08/19</b> John forwarded the minute of 21<sup>st</sup> June for Eddie McLaughlan to comment on. <b>23/08/19</b> Eddie replied with the following:</p>	
<p>“Not sure this is from memory, but I am content with the text highlighted in yellow in</p>	

Item	Action
<p>your attachment, including your addition. I'd be thoughtful about any inferences beyond the text, particularly in reference to the case of additional guidance. The need for specialist ventilation guidance is on a very long list of priorities and although we are hopeful of being in a better position for resource in the future, nothing is guaranteed".</p> <p><b>16/09/19</b> Susie Dodd confirmed that she spoke with Eddie McLaughlan and he forwarded wording below:-</p> <p><i>"I am content with the text attributed to me, however, none of it removes the need for the Board to take appropriate professional advice. In particular, the medical gas paragraph at the top requires advice from the Board's Authorising Engineer to inform the risk assessment. On the subject of neutropenic patients, although the guidance is not as detailed as might be desirable, it does state that wards for these patients should be HEPA filtered with a 10pa pressure regimen, so any decisions should take that as the starting point."</i> <b>Action closed.</b></p>	
<p><b>7. AOCB</b></p> <p>Nil to update.</p>	
<p><b>8. Date and Time of Next Meeting</b></p> <p>The next meeting will be held at 10.30am on Friday 15<sup>th</sup> November 2019 in the Facilities Meeting Hub, CMB Building (behind clock tower), QEUH.</p>	



## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Facilities Meeting Hub, CMB Building Queen Elizabeth University Hospital

**Friday 15 November 2019 at 10.30am DRAFT 4**

**Present:** Dr John Hood (chair), Colin Purdon, Darryl Conner, Sandra Devine, Susie Dodd  
Ann Lang (minutes)

**Teleconference:** Peter Hoffman

**Apologies:** Tom Steele, Ian Storrar

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting. Teleconference introductions were made and apologies were received from the above mentioned.</p> <p><b>2. Minutes of Previous Meeting held on 29 October 2019</b></p> <p>The group confirmed that the minutes of the meetings held on 24<sup>th</sup> September and 16<sup>th</sup> October were an accurate record.</p> <p>The minutes of the meeting held on 29 October 2019 were accepted with the following amendment:-</p> <p>Page 3, last para – Add in comments from Peter Hoffman. Page 3, last para - Delete ? before Susie Dodd's name.</p> <p>Dr Hood stated that the Ward Count summary document that was issued at the last meeting should be included with these minutes.</p> <p><b>• Actions Update:</b></p> <p>John Hood asked if there were any further comments on the minutes of 29<sup>th</sup> October to let him know and Peter Hoffman confirmed he had no further comments.</p> <p>With regards to the Pod tube system Susie Dodds advised that 2A is not the same as 6A and the Pod terminates in another area. The group discussed what the risk would be for the Pod to remain where it is and as there is no literature available regarding this Susie Dodd confirmed that she has asked other colleagues and is waiting to hear back from them. John Hood suggested asking HFS for their comments on where the Pod should be situated. It was agreed that if this does not affect the pressure cascade in the ward and does not invade on the prep work area the Pod should remain where it is. Susie said that she will follow this up. (See also subsequent Minute of 28<sup>th</sup> November 2019).</p>	<p><b>Susie</b></p>

Item	Action
<p>John Hood to go through the mitigation report that Colin Purdon sent him as well as going through all the minutes of the meetings for this group. Colin commented that the report has not been updated since it was completed.</p> <p>Last week John reported that he had tried to get the clinical notes of [REDACTED] <i>Cryptococcus neoformans</i> infections, in order to confirm (among other things), exactly, which wards/rooms they had been in and exactly the duration that these patients were in these wards/rooms. He then wished to check and relate the maintenance Logs on the relevant AHU (s) involved (with the ventilation of these wards/rooms) to see if any AHU shutdowns with Final Filter changes had occurred [REDACTED] in a particular ward/room when such a change took place.</p> <p>He said that one of the original hypotheses was that the source of the <i>Cryptococcus neoformans</i> spores was from the 'Plant Room' air itself, related to ? ingress of pigeons and pigeon fouling. This hypothesis also suggested that [REDACTED] these rooms/wards that Estates might have shut down the relevant AHU/AHUs and changed the Final filter (s). The hypothesis then being that air from the Plant Room might contain cryptococcal spores and these might then enter the duct (minus the Final filter) and then pass down the duct and that these spores might then be inhaled [REDACTED]. The belief being that the duct at that point would suck air down it. In fact, as previously minuted (see Minute of 11th Crypto IMT Expert Advisory Meeting of 6<sup>th</sup> June 2019; also documented in my workbook dated 21<sup>st</sup> March 2019) when changing the final filter in AHUs (on Level 12), as soon as the Final filter is removed, rather than sucking air in from the Plant Room, there is a significant rush of air OUT of the duct and OUT of the AHU door. This is because of thermal currents i.e. 'hot air rises' and the building is tall.</p> <p>Darryl Conner stated that the <b>plenum*</b> (*see Peter Hoffman's update in Minute of Meeting of 28 Nov 2019) effect of the F7 switch would be that there is a space where the higher temperature of air going to this area so when the unit switches off it goes to the space in the ductwork. When the filter is removed the flush of air is large and Peter advised that the dust dispersal would be minimal.</p> <p>John said that he had previously looked at the maintenance spreadsheets of the Air Handling Units in all relevant areas to see if any maintenance / filter changes had been carried out at the time [REDACTED] in the various ward or wards. The outcome was that there appeared to be no maintenance (specifically removal and change of the Final filter) of the identified relevant Air Handling Unit (s) [REDACTED]. To check when the Air Handling Unit is opened Estates both document this on a PPM and also write and sign this information (date etc) on a sticker attached to the specific AHU itself. Darryl Conner reported that the side of the unit has the date etc and this is entered on the PPM. John Hood reported that he and Darryl had (recently) already cross checked the maintenance Logs attached to the relevant AHUs on Level 12. There was no evidence of an Air Handling Unit being opened at the relevant times [REDACTED]. <u>However it became clear that the paper spreadsheets held in Estates only give 'indicative' dates of when this AHU maintenance occurred - not the exact dates but... the exact dates are on the AHU itself.</u></p> <p>He had therefore arranged with Darryl about 10 days ago to check those AHUs on Level 4 Plant Rooms, serving 2A (PR 41, AHU 20A) and PICU (1D) (PR 41, AHUs: 13,14,15 and 16) for any significant discrepancies (between the spreadsheets and the documentation on each AHU).</p> <p>John said that last Monday (4<sup>th</sup> November) he and Darryl Conner looked at the Air Handling Units serving PICU (1D) and 2A in RHC. JH had also only recently (and importantly) discovered that [REDACTED] was in PICU (1D) not only between 18<sup>h</sup> November and 11 December [REDACTED] <u>but also between 27<sup>th</sup> October and 1<sup>st</sup> November 2018.</u> (Note in Draft by JH 21 Nov 2019 - these dates have been confirmed by documentation on ICNET. Please also see p1 of the Minute of Crypto IMT Expert Advisory Group no 1 of 14<sup>th</sup> Feb 2019 and PAG note of 18 Dec 2018).</p>	JH

Room 5 ( ) in PICU (which at that time was a non HEPA filtered PPVL room – served by PR 41, AHU 13). The maintenance Log attached to this AHU (13) shows that on 30 October 2018 this AHU was shut down and the Panel and Bag filters were both changed. On the 31<sup>st</sup> October 2018 we also have the documentation that this Room (5) had its Annual Critical Ventilation Verification & Inspection. It would therefore seem very unlikely Room 5 at either the time of the shut down and filter changes on 30<sup>th</sup> October or the Annual Ventilation Inspection on the 31<sup>st</sup> October 2018. Sandra Devine confirmed to Room 12 (Isolation Room) transfer back to Ward 6A on 1<sup>st</sup> November. The above is also confirmed on ICNET.

Peter Hoffman reported that the standard has been changed regarding the sub HEPA Air Filter. ISO 16890 is the new international standard introduced towards the end of 2016 relating to the testing and classification of air filters. The new test results will be based on the filter's ability to remove a range of particle sizes classified as: Particulate Matter, PM1, PM2,5 and PM10. There is a fourth classification, which is known as PM coarse, which is for filters that are less than 50% efficient at the PM10 particle size. Following the introduction of this new standard, the existing EN779:2012 standard will be phased out over a period of time and replaced by ISO 16890.

### 3. Update on Air Testing

John Hood reported that he has not been receiving the latest air sampling results and contacted Scott in the Labs to obtain these. He said that there are still three formal identifications of *Cryptococcus* spp. to come back from Bristol, hopefully he should receive these shortly. Sampling is still taking place in 6A, 4B and the corridors.

A copy of the mean counts for the corridor air sampling was issued to the group. John Hood reported that 6A had a mean count of 7\*, with 62 samples taken. 4B had a mean count of 1.6, with 104 samples taken and 4C had a mean count of 1.9\*, with 46 samples taken. \* [Please see correction of these data in Minute of 18<sup>th</sup> December 2019.](#) He said that 4B and 4C have similar mean counts, although there is the issue with the corridors in 4B as there is a lack of control regarding both the only entrance into the unit, with this likely to be opened and closed regularly, and the other door (opposite entrance to 4C). This is not for use except as an escape route during a fire. However we already know that sometimes the bottom of this corridor (70's) becomes negatively pressurised and therefore pulls non HEPA-filtered air into it. We also know that the Corridor in 4B is itself, not ventilated but has spill out air from the ventilated rooms. (see previous minutes). In 6A John Hood noted that 15 out of the 20 rooms have had at least a single isolation of *Cryptococcus* spp. i.e. only 5/20 rooms with no isolations. There have been no new isolations of *Cryptococcus* spp. since 17<sup>th</sup> September 2019.

When looking at the air sampling results John Hood reported that he had previously believed that the air in the Plant Rooms was much the same as the outside air – as the Plant Rooms are not sealed. However when looking at the results it looks like the number of fungal spores in the Plant Room are less when compared to the outside air (but yet to carefully look at this). He asked Darryl how we might explain this.

Darryl Conner said that there is likely to be leakage from the Air Handling Units after the air has passed through the primary filters and after the Fan, but before the Final filters. This would dilute the air in the Plant Rooms. He said this is to do with the large number of Air Handling Units on this site (in some huge Plant Rooms) which are leaking out after the Fan. Peter Hoffman commented that the air in the Plant Room is partly supplied by the outside air and leakage could be from the clinical areas (How?). He said there is an element of leakage on an Air Handling Unit but was not sure if ductwork would leak at this stage in the Plant Room. Peter asked how does air get into the Plant Room and Darryl replied that the Plant Room is almost neutral and there are louvres on the external of the building which run along the side of the building. Peter stated that it could be air that is blowing a lot outside and there is not a lot of movement in the Plant Room which allows fungal spores to settle.

Item	Action
Isolation of Exophiala in Air Sampling of Various Wards Feb to end March 2019	
1st February 2019	6A 0/57
5th February 2019	6A 54/56
6th February 2019	4B 15/28
8th February 2019	PICU 1/14
8th February 2019	QE 1C 3/12
12th February 2019	6A 4/60
13th February 2019	7B 0/14
20th February 2019	6A 4/30
20th February 2019	4B 0/6
21st February 2019	7D 0/14
21st February 2019	4C 1/14
27th February 2019	6A 17/26
27th February 2019	4C 11/14
6th March 2019	4B 0/28
6th March 2019	5B 3/28
7th March 2019	6A 5/16
7th March 2019	4C 0/14
8th March 2019	4B 0/8
12th March 2019	4B 0/12
12th March 2019	6A 6/18
12th March 2019	4C 0/14
20th March 2019	6A 26/26
20th March 2019	4C 8/8
22nd March 2019	4B 25/28
22nd March 2019	4C 5/6
27th March 2019	PICU 16/16
28th March 2019	6A 2/26
28th March 2019	7A 0/14
28th March 2019	4C 0/14

The table below has been updated to include another positive *C. diffluens* isolation from air sampling in September. John Hood reported that to date there have been 91 Cryptococcus isolates from air sampling since December 2018. Most of the isolates are *C. diffluens* and **not** *C. albidus*.

**Item** **Action**

The table below is the air sampling results from July 1 to Sept 17 2019.

Date taken	Area	Presumptive	Confirmed
03/07/19	Ward 6A Room 24		<i>C. diffluens</i>
03/07/19	Ward 6A Room 2		<i>C.uniguttulatus</i>
15/07/19	Ward 6A Room 24		<i>C. diffluens</i>
24/07/19	Ward 4C Corridor		<i>C.uniguttulatus</i>
24/07/19	Ward 6A Room 1	<i>C. albidus</i>	
08/08/19	Ward 6A Room 1	<i>C. albidus</i>	
08/08/19	Ward 6A Room 24		<i>C. curvatus</i>
20/08/19	Ward 4B Room 78 Bathroom		<i>C. curvatus</i>
20/08/19	Ward 4B Room 90		<i>C. curvatus</i>
20/08/19	L4 Labs Molecular Lab		<i>C.uniguttulatus</i>
20/08/19	L4 Labs BC room		<i>C. diffluens</i>
27/8/19	Ward 6A Room 5		<i>C. curvatus</i>
27/8/19	Ward 6A Room 5 i.e. both samples pos		<i>C. curvatus</i>
27/8/19	Ward 6A Room 6		<i>C. curvatus</i>
27/8/19	Ward 6A Room 26		<i>C. curvatus</i>
27/8/19	Ward 6A Room 8		<i>C. diffluens</i>
30/8/19	Ward 6A Room 4		<i>C. curvatus</i>
30/8/19	Ward 6A Room 4		<i>C. curvatus</i>
17/09/19	Ward 4B Room 81 (bathroom)		<i>C. diffluens</i>

Item

Action

FIGURE 1

<b>'Cryptococcal species' isolates from air sampling 21 Dec 2018 to September 2019</b>							
	<i>N. diffluens</i>	<i>N. albida</i>	<i>N. albido-similis</i>	<i>F.uniguttulata</i>	<i>Cutan. curvatus</i>	ID TBC	Total
<b>*Dec 21<sup>st</sup> 2018</b> n=53	13	0	1	0	1 Roof#	1	<b>16</b>
<b>Jan 19</b> n=422	24	3	0	0	0	0	<b>27</b>
<b>Feb 19</b> n=440	0	0	0	1	0	0	<b>1</b>
<b>Mar 19</b> n=320	4	0	0	1	0	0	<b>5</b>
<b>Apr 19</b> n=334	2	0	0	0	0	0	<b>2</b>
<b>May 19</b> n=420	7	3	0	3	0	0	<b>13</b>
<b>Jun 19</b> n=448	8	0	0	0	0	0	<b>8</b>
<b>Jul 19</b> n=419	2	?	0	2	0	1	<b>5</b>
<b>Aug 19</b> n=150	2	?	0	1	9	1	<b>13</b>
<b>Sept 19</b> n=98	1	0	0	0	0	0	<b>1</b>
<b>Total sf</b>	<b>63</b>	<b>6</b>	<b>1</b>	<b>8</b>	<b>10</b>	<b>3</b>	<b>91</b>

sf = so far

FIGURE 2

Positive Crypto spp. results by month and per number of samples

Month	No of positives	No of samples
<b>December 21<sup>st</sup> 2018 (1day)</b>	16	53
<b>Jan 19</b>	27	422
<b>Feb 19</b>	1	440
<b>March 19</b>	5	320
<b>April 19</b>	2	334
<b>May 19</b>	13	420
<b>June 19</b>	8	448
<b>July 19</b>	5	419
<b>August 19</b>	13	150
<b>September 19</b>	1	98

Item	Action
<b>5. <u>Further Actions Required</u></b>	
<p>i. <b>21/06/19</b> - Continue to carry out air sampling in Wards 6A, 4B and 4C. <b>26/07/19 - Action ongoing.</b> <b>09/08/19</b> – Difficult to carry out air sampling due to the ongoing separate issues associated with Ward 6A. <b>16/08/19</b> Ward 4C has not been sampled recently and will be in the next few weeks. <b>23/08/19</b> Air sampling has not been carried out in Ward 4C due to the ongoing issues in Ward 6A. <b>02/09/19</b> There have been no new positive <i>Cryptococcus</i> species isolated. <b>16/09/19</b> Air sampling is still to be carried out in Ward 4C. <b>24/09/19</b> Air sampling is still to be carried out in Ward 4C. <b>16/10/19</b> Air sampling is still to be carried out in Ward 4C and is ongoing in Wards 6A and 4B. <b>29/10/19</b> John Hood carried out sampling in 4C last week (as detailed earlier in minutes) <b>Action ongoing.</b></p>	
<p>ii. <b>26/07/19:</b> John Hood referred to the tube system, and will need to discuss this with Colin Purdon in the next couple of weeks, who will in turn talk to the engineers from Swisslog. In order to understand and find out (Level 3) the possibility of air being dragged from the Plant Room to the PODs of areas such as in 6A, 4B and 4C. This is specimen transport tubes that should all, query, be under vacuum. John Hood however wants to confirm that air cannot be dragged in (e.g. from the Plant Rooms) and then pushed out into critical areas via the tube system. <b>09/08/19</b> - John Hood stated that he needs to understand how this system works and asked Colin Purdon to speak to the Swisslog engineers and arrange a meeting for him to discuss this. It is John Hood's view that we should probably not be putting the tube system into the heart of critical areas such as BMTU or Haemato-oncology areas with high risk patients. Peter Hoffman stated that he would like to retract what was said last meeting about the vacuum system and John Hood agreed to remove this comment. The issue of the tube system was also one of the original hypotheses. Was it possible that fungal/yeast spores might gain entry into the air of such critical areas via the Tube system? <b>16/08/19</b> John Hood commented that if we think that the tube system is pushing (or pulling) air into these areas from the Plant Rooms then, we should consider this in individual critical wards (particularly BMTU, 6A and 4C etc) as the air being unfiltered, and therefore another potential route of airborne spores, so a possible risk. Mitigation will be required if above is correct. <b>23/08/19</b> John Hood agreed to contact Adrian from Swisslog next week. <b>02/09/19</b> John Hood contacted Adrian from Swisslog on 26 August. He said that he received an email from Susie Dodd, HPS asking if there was a filter on the air intake in the Plant Room. It was confirmed there was a 'filter' on the intake in the Plant Room (made of wire mesh and plastic foam) i.e. will only keep large objects out, not fungal spores etc. He said there is air being sucked in and exhausted from the Plant Room and this then pushes the POD down the system to the Treatment/Prep Room of the Ward, however, this is where drugs are made up. We do have some air samples next to the pods in 4B, 4C and 6A – which John Hood will review. John Hood informed the Group that Adrian had stated that as the POD comes into the ceiling void above the Ward, the air pushing the POD is exhausted into this void. However John Hood was not sure if some 'dirty' air might still exhaust into the Treatment/Prep Room. Darryl wondered about this air exhausting into the void above the ceilings and the presence also of CVG's. Tom Steele commented that were was a smell detected in the Treatment/prep room in Ward 6A and asked if there was a CVG in the Treatment/prep room. Darryl advised that the smell was due to the adhesive used on the lino and the then use of actichlor which creates this smell. He said the fire compartment is split into 3 ways from top to bottom and if there is any discharge it would be into that space alone. Susie Dodd stated that if this was a significant ingress of unfiltered air it would occur in all other Treatment/prep rooms, thinking that we would be seeing infective consequences related to these other Treatment/Prep rooms as well. Peter Hoffman felt that a small amount of unfiltered air coming into a Prep/Treatment room would have little effect on the air quality in a patient room, if the patients are in positive pressure rooms (with air uniformly leaking outwards) and ventilated with HEPA filtered air.</p>	

Peter also said, with regards to the air, if microbe retentive filters could be fitted to the pneumatic transport system this would remove any airborne risk, though the significance carrying this out is dubious. He thought that this was an insignificant source of how the *C. neoformans* got into patients via the air.

John Hood replied that if there are no HEPA filters in this area\* (as in all wards, including 4B) this could still be a problem but reported that the counts in Ward 4B rooms are mostly 0 cfu's for fungi (but not always).

\* Correction added in draft of Minute of 24 Sept 2019 – on 15 Oct 2019: while 4B has no HEPA filtered air in the corridors (only spill over from the Rooms) – the Treatment/Prep Room is HEPA-filtered – but only that room.

Tom Steele asked if there is any opportunity to improve the level of filtration at the Plant Room and Darryl replied that the Plant Room is not sealed from the outside therefore the air will be essentially be similar to the outside air. John Hood suggested that if further investigation surrounding the risk associated with the Tube system in High Risk areas that it should be taken over by the Specialist Ventilation Group/HFS. **16/09/19** It was agreed that this should be discussed with HFS and the Ventilation Group regarding the risks associated with the tube system to see if there is any indication that anything that is discharged into the ceiling void could leak into the corridor. The consensus from IMT is that the risk related to the pneumatic tube system is likely to be small. **24/09/19** John Hood spoke to Swisslog regarding the movement of PODs and Peter Hoffman asked if the ceiling is solid or suspended and was informed that it is tiled. Peter Hoffman asked if there was a constant flow of air or only when the tube goes through the system and Darryl Conner replied that the motor only engages when in use and does not go into patient rooms. The POD comes from the Lab to the station and pushes the POD to the department and there is only one second of discharge to void. Susie Dodd agreed to follow this up with HFS. The group discussed if the PTS system (Star Delta motors) needed to be at the station of the ward or if it could be situated outside. This can be done by changing the destination pipe and move this to an alternative site. It was agreed that this is something that can be discussed with the Specialist Ventilation Group and Project Team. Peter Hoffman suggested putting one filter before the pre compressor as this would take the microbes out but is maybe something to maybe discuss this with Swisslog. **16/10/19** Susie Dodd to forward information to Ian Storrar. **29/10/19** Susie Dodd confirmed that she contacted Ian Storrar, HFS and he said there is nothing in the guidance that mentions where baskets should be placed and it only mentions spillages **15/11/19** John Hood advised that 2A is not the same as 6A and terminates in another area. The group discussed what the risk would be for the pod to remain where it is and ask there is no literature available regarding this Susie Dodd confirmed that she has asked other colleagues and is waiting to hear back from them. John Hood suggested asked HFS for their comments on where the pod should be situated. It was agreed that if this does not affect the pressure cascade in the ward and does not invade on the prep work area the pod should remain where it is. Susie said that she will follow this up.

**Action ongoing.**

- iii. John Hood asked if anyone is putting together all the mitigation from all of the previous actions and hypotheses. Colin Purdon agreed to arrange to get the mitigation recorded. **23/08/19** Colin advised that he has started putting together the mitigation from all the previous actions. **02/09/19** Darryl updated that Colin Purdon has started this. **16/09/19** Colin confirmed that he has completed the mitigation from previous actions and will forward this to the group for return comments within a week. **24/09/19** Colin Purdon to add the air movement into 4B to the mitigation report. Susie Dodd also asked for the report to include what the actual problem was, if this requires to be maintained and what has been done. **16/10/19** John Hood to check the report that Colin Purdon has issued. **29/10/19** John Hood is going through the mitigation report and the minutes of the previous meeting. **Action ongoing.**

JH



Item	Action
<b>6. Draft Report for Comments</b>	
<p>John Hood is currently working on the draft report and will start this next week.</p>	
<p>Peter Hoffman stated that Cryptococcus did not come from the Plant Room and looks as if it is in the outside air. He said the spore of Cryptococcus is no different in dimension than any other fungus. In the report he recommended to John to put into the summary that if Cryptococcus is outside it can get into the hospital.</p>	
<p>The report will also include the lack of HEPA-filtered rooms with positive pressure (and air leaking uniformly outwards) as one of the main conclusions [REDACTED] an appropriate HEPA-filtered environment with air uniformly leaking outwards. Ian Storrar asked if there are any recommendations for the patients that are in Wards 6A and 4C. John Hood advised that the clinicians are aware that Ward 4B is like a BMT unit in terms of HEPA-filtered environment and the environment is not as good in Wards 6A and 4C. It is the clinicians that agree what patients are most at risk and decide what patients should go into what rooms. Susie Dodd recommended that further discussions take place regarding the placement of these patients and the rooms nearest the doors. John Hood said that other factors need to be taken into account e.g. if the room has a HEPA-filtered environment or if the patient requires to be near the nurses station.</p>	
<p>The helipad was also looked into as there were initial thoughts that this could be a factor but John Hood (and the group) discounted this after the report was received from Quesada Solutions Ltd. on the Computational Fluid Dynamics Simulation of the External Flow Around Queen Elizabeth University Hospital.</p>	

#### Closed / Completed Actions

- (06/06/19) p3: bp1:** Ian Powrie will discuss IPS panels being sealed with Darryl Conner as some of the underside of WHBs panels were not done. **(21/06/19)** Colin Purdon picked up with Darryl Conner and reported all have been re-checked and all sealed. There were 2 rooms unable to get access to and this is still the same position today but will be re-checked. **(28/06/19)** Darryl Conner confirmed all now done. Ian Powrie reported that of all the rooms checked, the 2 rooms were still to be checked one of which was Room 5. Darryl Conner will confirm by e-mail that Rooms A and B, and Ward 6A Room 5 is the only one not sealed on the underside. Ian Powrie and John Hood had inspected this area. **(09/08/19)** Darryl Conner confirmed as above. **Action complete.**
- 06/06/19** - Item in relation to Pest Control. **Action closed**
- 06/06/19** - It was confirmed that final inspection of Ward 6A Room 5 has taken place. Action complete - see Bp 6, below. **Action closed**
- (06/06/19) p3: Item 4:** There is concern about the differences in the pressures in 4C Rooms 66-75. Rooms 66 to 74 are between 0.4 to 2.9 Pa from rooms to corridor but Room 75 at the end of the corridor is consistently negative at -0.3 (i.e. air moving from corridor to room). Colin Purdon to make adjustments to the ventilation to make this room slightly positive. **(28/06/19)** Ian Powrie clarified this was the room at the end of the corridor and is still to be done. Ian Powrie asked Darryl Conner to be careful not to affect the pressure regimes for the area when adjustments are made. **(26/07/19)** Darryl Conner agreed to make adjustments to the ventilation to make this room slightly positive. **(09/08/19)** It was noted that this action has gone to the Specialist Ventilation Group. **Action closed and transferred to Specialist Ventilation Group.**
- 06/06/19** - transferred: Sandra confirmed IPC has investigated laundry storage and process. This action to be removed from the group's remit. **Action complete.**

Item	Action
<ul style="list-style-type: none"> <li>• <b>06/06/19</b> - It was agreed and noted that overall ventilation design for Ward 2A is the responsibility of another forum therefore it has been removed as an action for this group. <b>Action closed - transferred</b></li> </ul>	
<ul style="list-style-type: none"> <li>• <b>06/06/19</b> - Estates are awaiting a structural engineer's report to see if a suitable alternative can be found for the garden roof on Level 4. Tom Steele updated that he discussed this with Multiplex. He said that the green roof was part of the design and the sedum can be removed and an alternative ballast material installed. He said if we were to move the items from the roof we could cause further disturbance? John Hood said he would be concerned if <i>Haemato-oncology</i> patients were to go on to this roof but he was informed there is no access to it for these patients. Tom Steele said that he is of the opinion to maybe review this in the future but to leave it as is at the moment. <b>21/06/19</b> - no update. <b>26/07/19</b> - <b>Action closed meantime.</b></li> </ul>	
<ul style="list-style-type: none"> <li>• <b>21/06/19 - Action ongoing:</b> Ian Powrie asked Eddie McLaughlan for HFS to confirm endorsement that HFS and the authorised engineer agreement that CVG vents are no longer required. Ian Powrie has received background information about ventilation and gas leaks from Ian Storrar but needs confirmation of endorsement. Ian Powrie added that ventilation is only needed where there are mechanical joints on gas lines. Eddie McLaughlan reported that Ian Storrar is currently on annual leave. Eddie McLaughlan will arrange for HFS to confirm endorsement within this time. <b>28/06/19</b> – Ian Powrie reported that Ian Storrar is still to confirm. <b>26/07/19</b> - Darryl Conner reported that Ian Storrar was asked (by Ian Powrie) to confirm endorsement of removal of the CVGs. Annette Rankin stated that Ian Storrar is likely involved in the current ongoing issues in NHS Lothian and suggested he is reminded to take this action forward. Darryl Conner will contact Ian Storrar as suggested. <b>02/09/19</b> HFS to confirm endorsement of the removal of the CVGs. <b>16/09/19</b> Darryl updated that the Ventilation Group are happy to remove the CVGs as the risk of leakage or dilution required is minimal. This has not been formally signed off by HFS but they are happy if the Authorised Engineer has approved this. It was agreed that Darryl ask the Authorised Engineer to send him the re-endorsement again to close off this action. <b>24/09/19</b> Darryl Conner reported that these are already working in 4B and there was a plan to do this for 6A but this was stopped by the Specialist Ventilation Group. He said that to remove the CVGs in 6A would be beneficial and could alter the pressure cascade coming into the rooms. It was agreed to ask the Ventilation Group for their advice. <b>Action closed to ask the Specialist Ventilation Group for their advice.</b></li> </ul>	
<ul style="list-style-type: none"> <li>• <b>21/06/19</b> - On 29 May 2019, inspection above the ceiling of Room 5 in Ward 6A showed that the services coming into the space were well sealed and in good condition. The flexible duct to the chilled beam was found to be intact. <b>26/07/19</b> - <b>Action closed.</b></li> </ul>	
<ul style="list-style-type: none"> <li>• <b>21/06/19</b> - Ian Powrie reported that fluid dynamics modelling around the helipad/QEUH/RHC report was now completed (see Report Rev 3). The IMT Expert Advisory Sub-Group accepted the findings of the CFD Report. <b>Action closed.</b></li> </ul>	
<ul style="list-style-type: none"> <li>• <b>21/06/19</b> : A problem with the chilled beams was identified and Ian Powrie explained this was a mechanical joint failure causing a leak. On this occasion it was a loss of low temperature hot water heating circuit that resulted in a change in temperature causing contraction of the pipework and fittings resulting in a slight leak. Colin Purdon added this was reported as a series of drips and although not for this group, it is being mentioned due to the mechanical failure. Colin Purdon has met with Teresa Inkster and Christine Peters. The ceiling tiles affected by water were replaced, and Actichlor was used to wash down. All appropriate IPC measures have been taken (Ward 6A children - x8 rooms). <b>Action complete</b></li> </ul>	
<ul style="list-style-type: none"> <li>• <b>21/06/19 p4: para2:</b> John Hood mentioned that a mechanical riser in 4B had a water leak this morning. Colin Purdon explained that this is the low temperature water return pipe, and that the valve body gland has a slight leak. The valve will be changed today. <b>(29/07/19)</b> Darryl Conner confirmed as done. <b>Action complete.</b></li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li>• <b>21/06/19 p5: para3:</b> Ian Powrie asked if there is a risk between CF and haemato-oncology if there is air movement between them. John Hood agreed to discuss this with Teresa Inkster. <b>(09/08/19)</b> John Hood reported that Teresa Inkster has concurred: no significant risk. <b>Action complete.</b></li> <li>• <b>21/06/19 p5: para5:</b> Colin Purdon has advised that intumescent gasket seals would be fitted. <b>(26/07/19)</b> Darryl Conner confirmed that the intumescent gasket riser seals has been completed. The only action outstanding in relation to this is the installation of the false ceilings. <b>(09/08/19)</b> Darryl Conner reported that installation of the false ceilings is still to be done but that this action is for the Specialist Ventilation Group. <b>Action closed and transferred to Specialist Ventilation Group.</b></li> <li>• <b>21/06/19 p7: item 7: para2:</b> On 25 July 2019, Colin Purdon to have walk round with Fire Safety Advisor shortly. <b>(26/07/19)</b> Colin Purdon will set-up a meeting with the Fire Officers soon. <b>(09/08/19)</b> Colin Purdon reported that a walk round with the Fire Advisor is still to be arranged. <b>(16/08/19)</b> Sandra Devine commented that she had met with clinical and managerial representatives from 4B and had walked the patient pathway through the ward. After due consideration it was felt that automatic door closures would impede the movement of patients through the ward especially in emergencies therefore the meeting with Colin and the Fire Officer is no longer required. <b>Action complete</b></li> <li>• <b>21/06/19 p8: item 13:</b> All but two IPS panels have been confirmed as complete. <b>(26/07/19) Action complete.</b></li> <li>• <b>21/06/19 - Action ongoing: Carry Forward</b> - Sandra Devine was then not in attendance to provide an update that a discussion is still to take place with Teresa Inkster and possibly Myra Campbell (Clinical Services Manager) in relation to self-closers on doors in Ward 4B, and that IPC team is making sure that staff understand the importance of keeping doors to patient rooms closed and also keeping doors to ancillary areas closed as much as possible. <b>28/06/19</b> - Darryl Conner asked about self-closers. Ian Powrie stated this is what Sandra Devine was going to discuss with clinical colleagues. <b>26/07/19</b> - Sandra Devine reported that two IPC Nurses visited Ward 4B to emphasise the importance of closing doors, and signage has also been put up. Sandra Devine is arranging to meet with Myra Campbell to discuss self-closers on doors and will explain the issue of the 4B corridor and how the problem exists. Darryl Conner pointed out that practically this may be difficult to put in place as every door is bespoke and takes around 8 weeks from order, effectively taking rooms out-of-use. Sandra Devine will make this a consideration. <b>Action ongoing. 09/08/19</b> - Sandra Devine met with Myra Campbell on 08/08/19 and they both visited Ward 4B. The overwhelming opinion was not to have self-closers on doors in Ward 4B therefore this action should not be taken forward. <b>Action complete.</b></li> <li>• <b>21/06/19 - Action ongoing: Carry Forward</b> – Colin Purdon will check with the contractors if the rooms have 30-minute fire doors fitted at present. Colin Purdon previously discussed self-closers on doors with local Fire Safety Advisors and reported there would be no issues with this proposal. It was noted that discussion with the clinical teams would need to be held in relation to beds being taken out etc. <b>26/07/19</b> - deferred until discussions with relevant parties have taken place as noted in the minutes and also as noted, a walk round with the Fire Advisor to be arranged. <b>Action ongoing. 09/08/19</b> – Colin Purdon stated that in light of Sandra Devine’s update (previous action) this action is no longer relevant. Colin Purdon added that fire doors are fitted adjacent to the fire exit points. Sandra Devine added that ward staff are aware of why this was being asked. <b>Action complete.</b></li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li>• <b>21/06/19 - Action ongoing: Flooring: Carry Forward</b> - Colin Purdon updated that the action plan has been prepared and is being used to programme and prioritise the issues previously identified. The report was put together by the flooring contractor and Ward 6A has some minor issues to be rectified. <b>26/07/19 – Action carry forward / ongoing. 09/08/19 –</b> It was agreed this action should be taken to another forum. Colin Purdon added there is a programme ongoing for Level 7 managed by Kerr Clarkson. <b>Action complete.</b></li> <li>• <b>21/06/19 - Action ongoing:</b> It was confirmed that the engineering risers have been inspected however this action will be kept as ongoing until completion of the doors to risers' rooms are sealed. Ian Powrie asked Colin Purdon to arrange to have the doors sealed over the next three weeks (by 27/06/19). Colin Purdon reported that the frames have been sealed. Darryl Conner is taking forward the action for the risers. <b>28/06/19 -</b> On hold with Teresa Inkster as mentioned earlier (page 3 bp1). Ian Powrie asked Darryl Conner to check if the seals itself are fine to adjust the door, but if not, to put a gasket in. Ian Powrie added that only one was looked at in Ward 6, but asked that all of the doors are sealed air tight (sweep Wards 4B, 6A, 4C for all riser doors). <b>26/07/19 -</b> Fire Advisor to endorse and if IPC can sanction, then this will be done. John Hood asked if Darryl Conner is in a position to comment.</li> </ul> <p>Darryl Conner reported that Teresa Inkster wanted this item discussed at the Specialist Ventilation Group and following discussion at the first meeting put forward their intentions and what was required to accommodate the work. However Teresa Inkster had responded that the downtime would cause more risk than what the existing risk is in relation to the risers. Darryl Conner stated that in the interim a control of the risers. The doors are sealed, but the adjacent ceilings and floors of the risers have not yet been done.</p> <p>Clarification from the Fire Advisor is required to ensure that there is no breach of fire integrity as they are horizontally sealed to each level. Darryl Conner stated this will need to be discussed at the Specialist Ventilation Group and will ask for this to be included as an agenda item for discussion. <b>Action ongoing. 09/08/19 –</b> Darryl Conner reported that it was proposed at the Specialist Ventilation Group a level of modification and the process of sealing the risers, and the possibility of doing this at higher and lower floors. It was recognised that there would be disruption. Darryl Conner thinks the group might be satisfied with the intumescent seals and the doors are under lock and key therefore not regarded as an immediate risk.</p> <p>Peter Hoffman commented that if everything is adequately sealed at one point in time, there is no guarantee it is going to be like that in a few years (or less) from now, and is a temporary solution. So get things sealed but need to get the air flows correct and the air flow in the right direction. It was noted that Teresa Inkster has taken this over in the Specialist Ventilation Group. <b>Action closed and transferred to the Specialist Ventilation Group.</b></p>	

Item	Action
<ul style="list-style-type: none"> <li> <b>21/06/19 - Action ongoing:</b> Ian Powrie updated that priority has been given to Wards 6A and 4C for removal of the Ceiling Vent Grilles (CVG's). Ward 4B has been done. Timeline will be done, but Wards 6A and 4C is expected to be done in the next couple of weeks, ongoing for removal of CVGs in other clinical wards. <b>28/06/19 - SCRIBE</b> sitting with IPC. Ward 4B has been done. Wards 6A and 4C have yet to be done – <b>SCRIBE required.</b> <b>26/07/19 -</b> Darryl Conner has asked Teresa Inkster about replacing CVGs in Ward 4B with ceiling tiles. There was one action was to replace CVGs in Ward 4C, but there is a problem with increased permeability of the space. It has already been established that the notional average is <b>1.2 to 2 Pa</b> to replace CVGs. It has been suggested it might be possible to trim back the extract in the en suites, but the air change in the en suites would be reduced slightly. This information has gone to the Specialist Ventilation Group. Darryl Conner reported that the area from 4B into 4C, at time of measurement is showing negative, but on investigation and measurement outside 4C Room 75, it was recorded to be 1.2 to 2 Pa because of the opening and closing of the various doors and air moving into 4D (as door often can be kept open). Without installation of ward lobbies into mitigating areas, the closing or opening of any one door alters the pressure regimes. </li> </ul>	
<p>Darryl Conner has submitted SCRIBEs for the process for removal of CVGs, and all are the same apart from the level of protection for each department being moved. Ward 6A is next on the list, which requires feedback from Teresa Inkster, but can be actioned immediately if required.</p>	
<p>John Hood thought the SCRIBE employed in 4B could be used for the other areas as same work is being carried out and had been successfully used in a more critical area. Darryl Conner explained that effectively it is the same SCRIBE and is used as a template however each area requires sign-off. <b>Action ongoing – SCRIBE required.</b> <b>09/08/19 -</b> Amendment as noted at the start of the minute, that the notional average is 1.2 to 2 Pa. Darryl Conner commented that Teresa Inkster may not be keen to have CVGs removed. <b>Action ongoing – SCRIBE required. Action ongoing and transferred to the Specialist Ventilation Group. N.B. Teresa must be happy before any CVG's removed she would rather have as much positive pressure in rooms as possible.</b></p>	
<ul style="list-style-type: none"> <li> <b>21/06/19 p3: bp2:</b> Colin Purdon advised that the Fire Strategy required that the doors to be available for lateral evacuation of patients and staff in both directions, but he would review options of temporary seals with the site Fire Advisor. <b>29/07/19</b> Action outstanding. To be completed. <b>09/08/19</b> Darryl Conner reported that draft seals have been fitted on the Ward 4B door that is locked on the outside, through to the doctor's room and it is only Estates that go in and out of that area. Darryl Conner will discuss with the Fire Advisor. <b>23/08/19</b> Darryl confirmed that he has spoken to Frank Deacon, Fire Officer and he is reviewing this. </li> </ul>	
<p>He will provide an update at the next meeting. <b>02/09/19</b> Darryl updated that there is a meeting of the Specialist Ventilation Group next week and this will be discussed there, although he has had verbal agreement regarding this. <b>16/09/19</b> Darryl reported that this was taken to the Ventilation Group and endorsement was received from the Fire Officer as they are happy with the fire seals. The Fire Officer has asked for the ICDs agreement on this. <b>24/09/19</b> The group agreed to close this action as endorsement was received from the Fire Officer. <b>Action closed.</b></p>	
<ul style="list-style-type: none"> <li> <b>28/06/19 p2: bp1:</b> There had been discussion around air in the corridor from Ward 4C into Room 75, and Ian Powrie had explained that the commissioning engineer will need to review all of the rooms and check that correction has not made things worse, with a view to increasing the pressure in Room 75 to the same range as the other rooms. <b>(26/07/19)</b> Darryl Conner confirmed he will do the pressure change but will ask <b>Ian McKenzie</b> to do the re-balance. <b>(09/08/19)</b> John Hood reported that the Specialist Ventilation Group will need to discuss the air pressures. Darryl Conner explained that the doors need to be closed because when the doors are open this could force the rooms into a negative state from the corridor. <b>(16/08/19)</b> It was noted that it is only through discussion at meetings that it was realised the effect of doors being left open affecting all of the pressures, therefore ward staff would definitely not be aware of these issues. <b>Action closed and transferred to the Specialist Ventilation Group.</b> </li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li>● <b>26/07/19</b> - Darryl Conner confirmed that Room 5 6A was done and has been told that the other room has also been done. Darryl Conner will check both have been sealed and will confirm this. <b>Action ongoing. 09/08/19</b> – Darryl Conner confirmed. <b>Action complete.</b></li>   <li>● <b>26/07/19:</b> John Hood to continue doing walk round of Plant Rooms. Awaiting results of air samples from the Level 12 Plant Rooms tested on 25 July 2019. <b>09/08/19</b> – John Hood reported that walk round of <b>all</b> of the Plant Rooms has been done at QUEH and RHC. Plant Room 31 has AHUs marked both 21 and 31 – which is a little confusing as the first number (i.e. 2 or 3 should indicate which floor that Plant Room is on!). No evidence of pigeon ingress or droppings. Plant Room 22 is in the Adult QUEH and is huge! Again the only thing discovered there was some water on the floors but apparently this is from the heat exchangers (affected by the weather), in both QUEH and RHC. Plant Room 22 is very clean, with no evidence of pigeon ingress or droppings. There was water on the floor in Plant Room 21 and there was still some general debris in it but this will be cleaned this week. There was no evidence of pigeon ingress or droppings. Plant Room 41 (RHC), again, the floor needed a brush, but there was no evidence of pigeons or pigeon droppings. Some light ingress was noted but above the area of light ingress there is netting fitted so pigeons should not get in. Plant Room 41A (RHC) is a small plant room, with no evidence of any pigeon ingress or droppings. John Hood will visit the Plant Rooms serving the labs next because two areas in Floor 1 Lab Block have grown <i>Cryptococcus</i> spp. (one <i>C. albidus</i> and one <i>C. diffluens</i>). These Plant Rooms are completely separate from the Plant Rooms in either QUEH or RHC. <b>16/08/19</b> John Hood visited Plant Rooms on level 3, 2 and 4 and none of these areas had evidence of pigeon ingress or evidence that the pigeons are getting into these Plant Rooms (indeed very difficult to see how they could). Colin Purdon confirmed that there are F7s filters in the AHUs serving the Lab building. <b>Action closed.</b></li>   <li>● <b>26/07/19:</b> Colin Purdon to get the GP Environmental (Pest Control Company) to give an update on their formal cleaning and ongoing identification of problems in the Plant Rooms. Darryl Conner will discuss this with Colin Purdon on 28/07/19. Of note, this will be required for part of the final discussion and Report. <b>09/08/19</b> – Colin Purdon will request a report from the pest control company as noted. <b>16/08/19</b> – Report from GP Environmental was received by Colin on 15<sup>th</sup> August 2019. Report to be sent round the group and discussed further at next meeting. <b>Action closed.</b></li>   <li>● <b>26/07/19:</b> John Hood to inform Liz Johnson at the Reference Laboratory in Bristol of the cryptococcus isolates and will forward the breakdown of this, in order to discuss the implications and any views, and if these are valid surrogate markers for <i>C. neoformans</i>. <b>09/08/19</b> – John Hood will speak to Liz Johnson next week. <b>16/08/19</b> John discussed with Liz Johnson and she said that neither can really be considered as surrogate markers for <i>C. neoformans</i> but it was difficult to be dogmatic about it. <b>Action closed.</b></li> </ul>	

Item	Action
<ul style="list-style-type: none"> <li>● <b>06/08/19</b> An e-mail response was received from Eddie McLaughlan on 06/08/19 as noted below.</li> </ul> <p>Eddie McLaughlan offered in his e-mail to have a telephone discussion with John Hood to clarify anything further:</p> <p>“The first action on me was I think a double check with Ian Storrar about vents in ceilings containing medical gas pipework without joints, but he’s completely tied up at the moment. I think I said at the meeting that as you need to seal the ceiling for IC purposes and there are no joints in the pipework above the ceiling, it would take a major mechanical failure to compromise the pipework and as that seemed unlikely removing the vents and using a gas alarm seemed reasonable. That said, we are only a source of advice; the risk assessment should be done by the Board with advice from your Authorising Engineer as necessary.”</p> <p>‘I’ve read the second action twice and I’m not entirely clear what I’m commenting on but hopefully the following will cover it. The source of the continuing Cryptococcus can only really be the outside air or infiltration from within the building and, as it is being detected in non HEPA filtered spaces and not in HEPA filtered spaces (I presume this is still the case, then the outside air looks a likely candidate).’</p> <p>On the subject of guidance, there is a review of the ventilation guidance underway at present and whilst we have asked for more clarity around specialised ventilation for susceptible patients, it is not yet clear whether we will get it. If not we will need to do something specifically for Scotland, for which there is currently neither financial nor staff resource, and no progress is likely to be made on this whilst the RHCYP&amp;DCN review is ongoing. In the meantime, it is important that clinicians understand the level of protection available in the various environments within QEUH and place patients accordingly.’</p> <p><b>26/07/19:</b> Eddie McLaughlan to review the discussion noted in the minutes of 21/06/19 (page 8, item 7.1 - Hypotheses) and change as appropriate. <b>09/08/19</b> – As mentioned earlier John Hood will telephone/email Eddie McLaughlin and as part of that discussion will ask for re-wording from Eddie McLaughlin. <b>16/08/19</b> John forwarded the minute of 21<sup>st</sup> June for Eddie McLaughlan to comment on. <b>23/08/19</b> Eddie replied with the following:</p> <p>“Not sure this is from memory, but I am content with the text highlighted in yellow in your attachment, including your addition. I’d be thoughtful about any inferences beyond the text, particularly in reference to the case of additional guidance. The need for specialist ventilation guidance is on a very long list of priorities and although we are hopeful of being in a better position for resource in the future, nothing is guaranteed”.</p> <p><b>16/09/19</b> Susie Dodd confirmed that she spoke with Eddie McLaughlan and he forwarded wording below:-</p> <p><i>“I am content with the text attributed to me, however, none of it removes the need for the Board to take appropriate professional advice. In particular, the medical gas paragraph at the top requires advice from the Board’s Authorising Engineer to inform the risk assessment. On the subject of neutropenic patients, although the guidance is not as detailed as might be desirable, it does state that wards for these patients should be HEPA filtered with a 10pa pressure regimen, so any decisions should take that as the starting point.”</i> <b>Action closed.</b></p>	
<p><b>6. AOCB</b></p>	
<p>Nil to update.</p>	
<p><b>7. Date and Time of Next Meeting</b></p>	
<p>The next meeting will be held at 10.30am on Thursday 28<sup>th</sup> November 2019 in Facilities Meeting Room 5, Laboratory Building, QEUH.</p>	
<p>A47175206</p>	

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Facilities Meeting Room 5 Lab Building, Queen Elizabeth University Hospital

Thursday 28 November 2019 at 10.30am DRAFT 2

**Present:** Dr John Hood (chair), Sandra Devine, Colin Purdon, Tom Steele, Pauline Hamilton (minutes)

**Teleconference:** Peter Hoffman, Susie Dodd (joined at 10.55am)

**Apologies:** Ian Storrar, Darryl Conner, Eddie McLaughlan

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting. Teleconference introductions were made and apologies were received from the abovementioned.</p>	
<p><b>2. Minutes of Previous Meeting – 15 November 2019 (and 29 October 2019)</b></p> <p>The minutes of the previous meeting held on 15 November 2019 were accepted with amendments noted in <i>Actions Update</i> below.</p> <p>Dr Hood referred to the minutes of 29 October 2019 which have since been updated and will be re-sent to the group.</p>	<p>Secy</p>
<p><b>3. Actions Update (from 15/11/19):</b></p> <p><b>Page 1: Actions Update: Para 2:</b> John Hood asked Susie Dodd for clarification around the Pod tube system and where it should be situated. Susie provided an update when she joined the meeting at 10.55am - Ward 2A is not the same as Ward 6A although they are both prep rooms that they terminate in. In Ward 2A the room was not being used as a prep room, but in Ward 6A it was being used as a prep room. What Susie had asked for was clarity around what Ward 2A will be used for but a decision was already taken to move the Pod to outside the ward. Tom Steele stated that this was correct. <b>Susie has asked HPS colleagues where the Pod system should be placed in a high-risk unit and added that if it is outside the ward there is even more risk ???</b>. If not being used for prep then they do not have to use the Pod. Tom Steele can feedback to the Project Team that it would cost money to move the Pod and that it is not necessary to move it. Susie added that ultimately this decision rests with the clinical team and what they are going to use it for. If in agreement that it is only being used for drugs then there is no risk. Tom Steele agreed to check the use of rooms as they are now, and the intended use of the rooms for the future.</p> <p><b>Page 2: Actions Update: Para 2:</b> It was agreed that the "plenum effect" would not be understood by lay readers therefore by way of explanation Peter Hoffman amended the paragraph to read as noted.</p> <p>'This is likely to be due to a ventilation phenomenon commonly referred to as "the chimney effect". Whilst dampers are in place to isolate the AHU from the subsequent ductwork during filter changes, even if these were left open during</p>	<p>Susie</p> <p>TS</p> <p>TS</p>





Item	Action																																																																																							
<p><b>Page 3: Update on Air Testing: Last Para:</b> (last part of para highlighted yellow), in particular “clinical areas (how?)”. Peter Hoffman stated that this conversation is from a few meetings ago. It was related to the unexpected finding that John Hood had thought that the air in the Plant Rooms would be the same as the outside air.... but instead (looking at the data more closely) it seems that the Plant Rooms have lower fungal counts than the outside air (but not had time to carefully look at this yet).</p> <p>Darryl had thought a possibility was that there was leakage of cleaner air (post primary filters, but pre Final filters) from gaps in some/many of the AHU’s post Fan (e.g. around doors). Therefore with a large number of AHUs in many of the Plant Rooms on this site this could perhaps account for the lower counts in the Plant Rooms than in the outside air.</p> <p>Peter Hoffman agreed that this was possible but felt it would be a minor component. Peter thought it was more likely due to less velocity of the air (i.e. stiller) in the Plant Rooms therefore allowing the fungal spores to settle.</p>	JH																																																																																							
<p><b>4. Update on Air Testing</b></p>																																																																																								
<p><b>Isolation of Exophiala in Air Sampling of Various Wards Feb to end Mar 2019</b> (kept in these minutes for reference)</p> <table border="0"> <tbody> <tr><td>1st February 2019</td><td>6A</td><td>0/57</td></tr> <tr><td>5th February 2019</td><td>6A</td><td>54/56</td></tr> <tr><td>6<sup>th</sup> February 2019</td><td>4B</td><td>15/28</td></tr> <tr><td>8<sup>th</sup> February 2019</td><td>PICU</td><td>1/14</td></tr> <tr><td>8<sup>th</sup> February 2019</td><td>QE 1C</td><td>3/12</td></tr> <tr><td>12<sup>th</sup> February 2019</td><td>6A</td><td>4/60</td></tr> <tr><td>13th February 2019</td><td>7B</td><td>0/14</td></tr> <tr><td>20<sup>th</sup> February 2019</td><td>6A</td><td>4/30</td></tr> <tr><td>20<sup>th</sup> February 2019</td><td>4B</td><td>0/6</td></tr> <tr><td>21<sup>st</sup> February 2019</td><td>7D</td><td>0/14</td></tr> <tr><td>21<sup>st</sup> February 2019</td><td>4C</td><td>1/14</td></tr> <tr><td>27<sup>th</sup> February 2019</td><td>6A</td><td>17/26</td></tr> <tr><td>27<sup>th</sup> February 2019</td><td>4C</td><td>11/14</td></tr> <tr><td>6<sup>th</sup> March 2019</td><td>4B</td><td>0/28</td></tr> <tr><td>6<sup>th</sup> March 2019</td><td>5B</td><td>3/28</td></tr> <tr><td>7<sup>th</sup> March 2019</td><td>6A</td><td>5/16</td></tr> <tr><td>7<sup>th</sup> March 2019</td><td>4C</td><td>0/14</td></tr> <tr><td>8<sup>th</sup> March 2019</td><td>4B</td><td>0/8</td></tr> <tr><td>12<sup>th</sup> March 2019</td><td>4B</td><td>0/12</td></tr> <tr><td>12<sup>th</sup> March 2019</td><td>6A</td><td>6/18</td></tr> <tr><td>12<sup>th</sup> March 2019</td><td>4C</td><td>0/14</td></tr> <tr><td>20th March 2019</td><td>6A</td><td>26/26</td></tr> <tr><td>20th March 2019</td><td>4C</td><td>8/8</td></tr> <tr><td>22<sup>nd</sup> March 2019</td><td>4B</td><td>25/28</td></tr> <tr><td>22<sup>nd</sup> March 2019</td><td>4C</td><td>5/6</td></tr> <tr><td>27<sup>th</sup> March 2019</td><td>PICU</td><td>16/16</td></tr> <tr><td>28<sup>th</sup> March 2019</td><td>6A</td><td>2/26</td></tr> <tr><td>28<sup>th</sup> March 2019</td><td>7A</td><td>0/14</td></tr> <tr><td>28<sup>th</sup> March 2019</td><td>4C</td><td>0/14</td></tr> </tbody> </table>	1st February 2019	6A	0/57	5th February 2019	6A	54/56	6 <sup>th</sup> February 2019	4B	15/28	8 <sup>th</sup> February 2019	PICU	1/14	8 <sup>th</sup> February 2019	QE 1C	3/12	12 <sup>th</sup> February 2019	6A	4/60	13th February 2019	7B	0/14	20 <sup>th</sup> February 2019	6A	4/30	20 <sup>th</sup> February 2019	4B	0/6	21 <sup>st</sup> February 2019	7D	0/14	21 <sup>st</sup> February 2019	4C	1/14	27 <sup>th</sup> February 2019	6A	17/26	27 <sup>th</sup> February 2019	4C	11/14	6 <sup>th</sup> March 2019	4B	0/28	6 <sup>th</sup> March 2019	5B	3/28	7 <sup>th</sup> March 2019	6A	5/16	7 <sup>th</sup> March 2019	4C	0/14	8 <sup>th</sup> March 2019	4B	0/8	12 <sup>th</sup> March 2019	4B	0/12	12 <sup>th</sup> March 2019	6A	6/18	12 <sup>th</sup> March 2019	4C	0/14	20th March 2019	6A	26/26	20th March 2019	4C	8/8	22 <sup>nd</sup> March 2019	4B	25/28	22 <sup>nd</sup> March 2019	4C	5/6	27 <sup>th</sup> March 2019	PICU	16/16	28 <sup>th</sup> March 2019	6A	2/26	28 <sup>th</sup> March 2019	7A	0/14	28 <sup>th</sup> March 2019	4C	0/14	
1st February 2019	6A	0/57																																																																																						
5th February 2019	6A	54/56																																																																																						
6 <sup>th</sup> February 2019	4B	15/28																																																																																						
8 <sup>th</sup> February 2019	PICU	1/14																																																																																						
8 <sup>th</sup> February 2019	QE 1C	3/12																																																																																						
12 <sup>th</sup> February 2019	6A	4/60																																																																																						
13th February 2019	7B	0/14																																																																																						
20 <sup>th</sup> February 2019	6A	4/30																																																																																						
20 <sup>th</sup> February 2019	4B	0/6																																																																																						
21 <sup>st</sup> February 2019	7D	0/14																																																																																						
21 <sup>st</sup> February 2019	4C	1/14																																																																																						
27 <sup>th</sup> February 2019	6A	17/26																																																																																						
27 <sup>th</sup> February 2019	4C	11/14																																																																																						
6 <sup>th</sup> March 2019	4B	0/28																																																																																						
6 <sup>th</sup> March 2019	5B	3/28																																																																																						
7 <sup>th</sup> March 2019	6A	5/16																																																																																						
7 <sup>th</sup> March 2019	4C	0/14																																																																																						
8 <sup>th</sup> March 2019	4B	0/8																																																																																						
12 <sup>th</sup> March 2019	4B	0/12																																																																																						
12 <sup>th</sup> March 2019	6A	6/18																																																																																						
12 <sup>th</sup> March 2019	4C	0/14																																																																																						
20th March 2019	6A	26/26																																																																																						
20th March 2019	4C	8/8																																																																																						
22 <sup>nd</sup> March 2019	4B	25/28																																																																																						
22 <sup>nd</sup> March 2019	4C	5/6																																																																																						
27 <sup>th</sup> March 2019	PICU	16/16																																																																																						
28 <sup>th</sup> March 2019	6A	2/26																																																																																						
28 <sup>th</sup> March 2019	7A	0/14																																																																																						
28 <sup>th</sup> March 2019	4C	0/14																																																																																						

Item	Action
------	--------

The following table has been updated to include another positive *C. diffluens* isolation from air sampling in September 2019. John Hood reported that to date there have been 93 Cryptococcus isolates from air sampling since December 2018. Most of the isolates are *C. diffluens* and **not** *C. albidus*.

**28 November 2019 Update:** A couple of errors were identified in the table included in the minutes of 15/11/19. This has now been updated (15 and 24 July detail).

- The table below is the air sampling results from **July 1<sup>st</sup> to November 2019**.

Date taken	Area	Presumptive	Confirmed
03/07/19	Ward 6A Room 24		<i>C. diffluens</i>
03/07/19	Ward 6A Room 2		<i>C.uniguttulatus</i>
15/07/19	Ward 6A Room 23		<i>C. diffluens</i>
24/07/19	Ward 4C Corridor		<i>C.uniguttulatus</i>
24/07/19	Ward 6A Room 3		<i>C. diffluens</i>
08/08/19	Ward 6A Room 1		<i>C. diffluens</i>
08/08/19	Ward 6A Room 24		<i>C. curvatus</i>
20/08/19	Ward 4B Room 78 Bathroom		<i>C. curvatus</i>
20/08/19	Ward 4B Room 90		<i>C. curvatus</i>
20/08/19	L4 Labs Molecular Lab		<i>C.uniguttulatus</i>
20/08/19	L4 Labs BC room		<i>C. diffluens</i>
27/08/19	Ward 6A Room 5		<i>C. curvatus</i>
27/08/19	Ward 6A, Room 5 i.e. both samples pos		<i>C. curvatus</i>
27/08/19	Ward 6A, Room 6 Bathroom		<i>C. curvatus</i>
27/08/19	Ward 6A Room 26		<i>C. curvatus</i>
27/08/19	Ward 6A Room 8 Bathroom		<i>C. diffluens</i>
30/08/19	Ward 6A Room 4 Bathroom		<i>C. curvatus</i>
30/08/19	Ward 6A, Room 4 Bathroom i.e. both samples pos		<i>C. curvatus</i>
11/09/19	Ward 6A Nurses Station / Corridor		<i>C. diffluens</i>
17/09/19	Ward 4B Room 81 Bathroom		<i>C. diffluens</i>
06/11/19	Ward 4B Room 77		<i>C.uniguttulatus</i>

John Hood referred to *C. albidus* and *C. uniguttulatus*. *C. uniguttulatus* is the only one that grew from the samples of pigeon fouling taken from this site in February 2019 (3/18).

The ref Lab in Bristol had initially stated that *C. albidus* could be taken as a surrogate marker for *C. neoformans* but now they are very reticent.

Item	Action
------	--------

Also part of the issue is that some of the literature suggests that in the past some strains identified as *C. neoformans* were actually probably other strains of *Cryptococcus*.

John Hood referred to Figure 1) below and reported that 93 *Cryptococcal* species isolates has been isolated from the air sampling taken so far and all are marked out in the sheets along with ward (maps) configurations. As noted in previous Minutes it is clear that Ward 6A has the most *cryptococcal* isolates, and indeed there are only about 5 rooms, in 6A, that have not isolated a *Cryptococcus* spp. at some time. Tom Steele stated to bear in mind that above-ceiling HEPA units have been fitted in all of the en suites. Sandra Devine reported there were air testing results from last week for Ward 6A. John Hood stated that a major part of the problem in relation to 6A is that the air movement, in and around it, is simply not controlled. At the main entrance to 6A (near room 1) depending on the configuration of doors open/closed at the nearby intersection of 6A, 6B and Lifts, air is being pulled into 6A (at minus 1.5 to minus 12 Pascals) this is **not good**. The other entrance to 6A is not so bad as the main entrance but is still under negative pressure to its surroundings. Please see Item 3 of Minute of 29 October 2019.(added in draft by JH) The other problem is that, due to the presence of chilled beams, the 3 air changes per hour cannot be increased. These are two important factors. Sandra hypothetically asked if you could go to C-side rather than A-side if the issue is part of the original design. John Hood stated that the issues relate particularly to the main entrance to Ward 6A, entrance to Ward 6B, stairwell and lifts. John Hood added that the pressure changes all of the time due to the various door openings, and that some of the doors are wedged opened. JH added in Draft – he doubts that the designers would have been aware of the complex air movements across these large floors with multiple intersections and many doors – it is only important when control of the air movement is crucial. One way to control air is to fit double doors that cannot be opened at the same time – i.e. forming an airlock (added in draft by JH).

Note a drop in air sampling can be seen from the 3,156 air samples that have been done (Figure 2). Those not relevant have been removed. To date, 5,500 air samples altogether have now been done.

- **FIGURE 1**

<b>'Cryptococcal species' isolates from air sampling 21 Dec 2018 to Sept 2019</b>							
	<i>N. diffluens</i>	<i>N. albida</i>	<i>N. albido-similis</i>	<i>F.uniguttulata</i>	<i>Cutan. curvatus</i>	ID TBC	Total
<b>*Dec 21<sup>st</sup> 2018</b> n=53	14	0	1	0	1 Roof#	0	<b>16</b>
<b>Jan 19</b> n=422	24	3	0	0	0	0	<b>27</b>
<b>Feb 19</b> n=440	0	0	0	1	0	0	<b>1</b>
<b>Mar 19</b> n=320	4	0	0	1	0	0	<b>5</b>
<b>Apr 19</b> n=334	2	0	0	0	0	0	<b>2</b>
<b>May 19</b> n=420	7	3	0	3	0	0	<b>13</b>
<b>Jun 19</b> n=448	8	0	0	0	0	0	<b>8</b>
<b>Jul 19</b> n=419	3	0	0	2	0	0	<b>5</b>

Item	Action
------	--------

<b>Aug 19</b> n=150	3	0	0	1	9	0	<b>13</b>
<b>Sept 19</b> n=98	2	0	0	0	0	0	<b>2</b>
<b>Oct 19</b> n =	0	0	0	0	0	0	<b>0</b>
<b>Nov 19</b> n =	0	0	0	1	0	0	<b>1</b>
<b>Total sf</b>	<b>67</b>	<b>6</b>	<b>1</b>	<b>9</b>	<b>10</b>	<b>0</b>	<b>93</b>

sf = so far

- FIGURE 2**

**Positive Crypto spp. results by month and per number of samples**

Month	No of positives	No of samples
<b>December 21 2018</b> (1day)	16	53
<b>Jan 2019</b>	27	422
<b>Feb 2019</b>	1	440
<b>Mar 2019</b>	5	320
<b>Apr 2019</b>	2	334
<b>May 2019</b>	13	420
<b>Jun 2019</b>	8	448
<b>Jul 2019</b>	5	417
<b>Aug 2019</b>	13	136
<b>Sept 2019</b>	2	82
<b>Oct 2019</b>	0	84

**5. Further Actions Required**

No further actions required.

**6. Report from the Cryptococcus Incident Management Team Expert Advisory Sub-Group**

John Hood stated that the report, hopefully, can now start to be prepared as he thought that most or all of the information is now available. He added that he needs to ensure that all of the information and discussion regarding the hypotheses, (particularly regarding the possible source of Cryptococcal spores being from the Plant Room itself and related to the opening of AHUs – the original main hypothesis) is both accurate and clear.

Added in Draft by JH: the discussion around the hypotheses must also be (as clearly as possible) related to the findings from air testing, smoke testing and pressure testing etc.

**7. AOCB**

Sandra Devine reported that she and Tom Steele have been asked by the board to provide interim information and detail around hypotheses to date, until the Cryptococcus Report is available.

Item	Action
<p>Tom Steele has prepared a presentation broadly summarised using detail / information from previous Cryptococcus IMT Expert Advisory Sub-Group minutes, and asked John Hood to review the slides in preparation of any board request. John Hood agreed to review and update the presentation.</p> <p>Tom Steele will also e-mail the presentation to the group for review but stressed this is not for wider distribution, that it is an interim document prior to the final report being prepared. The presentation will only be used on request of the board.</p> <p>Lessons will be learned from discussions held with this group and the report once finalised.</p>	<p><b>JH</b></p> <p><b>TS</b></p>
<p><b>8. Date and Time of Next Meeting</b></p> <p>The next meeting will be held on 18/12/19. The group will be e-mailed the details of the next meeting.</p>	

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Meeting Room 0.14 Office Block, Queen Elizabeth University Hospital

**Wednesday 18 December 2019 at 2.00pm Draft 1**

**Present:** Dr John Hood (chair), Sandra Devine, Colin Purdon, Tom Steele, Darryl Conner, Ann Lang (minutes)

**Teleconference:** Peter Hoffman, Susie Dodd, Ian Storrar

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting. Teleconference introductions were made and apologies were received from the above mentioned.</p>	
<p><b>2. Minutes of Previous Meeting – 28 November 2019 (and 15 November 2019)</b></p> <p>The minutes of the previous meeting held on 28 November 2019 were accepted with the following amendments made by Susie Dodd.</p> <p>Page 1, item 3 – should read “.... that this was correct. Susie Dodd stated that HFS colleagues had confirmed that none of the existing guidance currently stipulates where the POD system should terminate within high risk settings. She suggested that if the prep room in which the POD system in 2A currently terminates is not used for preparing IV medications or any high risk procedures then there is probably little risk in leaving the POD system where it is (as per discussions in previous meetings). Moving the system outwith the ward may have unintended consequences for the users which would need to be discussed with them”.</p> <p>Page 6, item 7 – Add “Discussion also took place around the <i>Exophiala</i> counts in all rooms within Ward 4B which had been noted at the previous meeting. There was discussion around the investigations which took place and Tom was going to share a summary of the findings”.</p> <p>A final copy of the minutes of 15 November were agreed by the group.</p>	
<p><b>3. Actions Update (from 28/11/19)</b></p> <p><b>Page 2, Para 2:</b> Darryl Conner confirmed he was happy with the wording provided by Peter Hoffman.</p> <p><b>Page 2, Para 3:</b> John Hood asked why one of the dampers is closed manually. Darryl Conner replied that under the SOP for Isolation the discharge handler is a manual handler and this prevents the air coming back up. John Hood stated that no air could come down the duct but if it was opened by mistake a damper would be shut and the damper would come down. He said there is no way that <i>Cryptococcus</i> species could have got from the AHU or to the duct.</p> <p><b>Page 2, 2<sup>nd</sup> last para</b> – John Hood provided the following wording to the minute. The documentation [REDACTED] and by Estates that the Room for Filter Change and Verification at 14.10h on the same day. Therefore [REDACTED] was not in Room 5 during filter change or verification but in a HEPA filtered lobbied PPVL room (12).</p>	

Item	Action
<p><b>Page 5, 2<sup>nd</sup> para</b> – Further discussion on 18 Dec 2019: Tom Steele asked regarding the minus 12 Pascals (at main entrance to 6A), was this taken as routine or was this an exceptional day. John replied that it is to do with the complexity of air movements around the hospital and the lack of control of these. Darryl Conner mentioned that on another day that that corridor of 6A was pushing air out rather than pulling air in. <b>Added by JH in draft 7/1/20:</b> this is exactly a similar finding to that in 4B where we know that the Corridor (near rooms in the 70s) can pull air into 4B depending on the configuration of doors being open/closed to 4C etc and also likely to be affected by other parameters e.g. outside weather conditions etc. Please see the Minute of Meeting of 6 June 2019. Tom asked if it would be reasonable to anticipate that the same principles would apply in other wards. John said this is difficult to determine as the number of variables are huge and also the facilities corridor (that bisects these floors of the QUEH) has lots of doors off of this too which will also have an effect on the movement of air.</p> <p>Tom Steele asked if Ward 6A is different to any other ward entrances. John replied that we know that one of the entrances from 4B can behave like this (above) and that it was important to control the air around these entrances in order to prevent unfiltered air/dirtier air gaining access to these specific wards (4B, 4C and 6A). He suggested that Ward 6A (4B, 4C) i.e. any ward that requires 'protective isolation' should have air locks at each entrance. Ian Storrar asked if the staff in the opposite ward need to manage the situation by not keeping the door opened all the time but staff have informed that they do not have the staff to keep the door closed all the time. Sandra Devine agreed to speak to the General Manager for the ward. Tom Steele also commented that there was no hand gel in the dispenser to Ward 6B.</p> <p><b>Added by JH in draft 8 Jan 2020:</b> Please also see previous discussion and that later in this minute concerning Fig 1 and the issues with 6A.</p> <p><b>Also added in draft by JH 8 Jan 2020:</b> The take home message here is that we know how complex the air movements are likely to be around these Wards (4B, 6A and 4C). We could spend much time collecting more data on this, trying to understand the complexities of it (it would be hugely time consuming), but the point is, that we know that this is happening, at least intermittently, and we must mitigate its effect, i.e. <b>stopping</b> the ingress of unfiltered or dirtier air getting into these units by this route by having airlocks at each entrance. It is also important to understand that this is not the only problem that requires mitigation and improvement in these areas e.g. lack of HEPA filtration, only 3 ACH in 4C and 6A, lack of solid ceiling and HEPA filtration in corridor of 4B.....to mention a few.</p> <p><b>Recent Exophiala issue in 4B</b> Tom Steele confirmed that he had asked the Laundry if there were any quality issues and there have been no reports of poor quality from the linen team.</p> <p>It was agreed to check the DSR and ward kitchen to see if they have point of use filters and Colin Purdon agreed to do this.</p> <p>With regards to the air sampling: on 6 Nov 2019, 36 air samples were taken and around 20 cfu of <i>Exophiala</i> spp. were identified from room samples with a count of 86 cfu from one of the corridor samples and this was validated as accurate. Darryl Conner said he would expect to have an area of dampness or flood with these high counts. Sandra Devine stated that the ward were advised not to use the steamer and hydro boiler and also their micro dishwasher has been taken out of commission. John Hood reported that Ward 4B is the ward that gets formal air sampling done every month.</p> <p>Sandra Devine said the IMT should note that all actions have been carried out to show that it is not clear what happened and Tom Steele agreed with this. John Hood agreed to add this as an addendum to the minute of 28 November 2019.</p>	<p></p> <p><b>SDe</b></p> <p></p> <p><b>CP</b></p> <p></p> <p><b>JH</b></p>



## Item

## Action

#### 4. Update on Air Testing

The following table has been updated to include another positive *C. diffluens* isolation from air sampling in September 2019. John Hood reported that to date there have been 93 Cryptococcus isolates from air sampling since December 2018. Most of the isolates are *C. diffluens* and **not** *C. albidus*.

**28 November 2019 Update:** A couple of errors were identified in the table included in the minutes of 15/11/19. This has now been updated (15 and 24 July 2019 detail).

No new Cryptococcus isolates have been identified since the last meeting.

- The table below is the air sampling results from **July 1<sup>st</sup> to November 2019**.

Date taken	Area	Presumptive	Confirmed
03/07/19	Ward 6A Room 24		<i>C. diffluens</i>
03/07/19	Ward 6A Room 2		<i>C.uniguttulatus</i>
15/07/19	Ward 6A Room 23		<i>C. diffluens</i>
24/07/19	Ward 4C Corridor		<i>C.uniguttulatus</i>
24/07/19	Ward 6A Room 3		<i>C. diffluens</i>
08/08/19	Ward 6A Room 1		<i>C. diffluens</i>
08/08/19	Ward 6A Room 24		<i>C. curvatus</i>
20/08/19	Ward 4B Room 78 Bathroom		<i>C. curvatus</i>
20/08/19	Ward 4B Room 90		<i>C. curvatus</i>
20/08/19	L4 Labs Molecular Lab		<i>C.uniguttulatus</i>
20/08/19	L4 Labs BC room		<i>C. diffluens</i>
27/08/19	Ward 6A Room 5		<i>C. curvatus</i>
27/08/19	Ward 6A, Room 5 i.e. both samples pos		<i>C. curvatus</i>
27/08/19	Ward 6A, Room 6 Bathroom		<i>C. curvatus</i>
27/08/19	Ward 6A Room 26		<i>C. curvatus</i>
27/08/19	Ward 6A Room 8 Bathroom		<i>C. diffluens</i>
30/08/19	Ward 6A Room 4 Bathroom		<i>C. curvatus</i>
30/08/19	Ward 6A, Room 4 Bathroom i.e. both samples pos		<i>C. curvatus</i>
11/09/19	Ward 6A Nurses Station / Corridor		<i>C. diffluens</i>
17/09/19	Ward 4B Room 81 Bathroom		<i>C. diffluens</i>
06/11/19	Ward 4B Room 77		<i>C.uniguttulatus</i>

## Item

## Action

John Hood referred to *C. albidus* and *C. uniguttulatus*. *C. uniguttulatus* is the only one that grew from the samples of pigeon fouling taken from this site in February 2019 (3/18).

The Ref Lab in Bristol had initially stated that *C. albidus* could be taken as a surrogate marker for *C. neoformans* but now they are very reticent. Also part of the issue is that some of the literature suggests that in the past some strains identified as *C. neoformans* were actually probably other strains of *Cryptococcus*.

John Hood referred to Figure 1) below and reported that 93 *Cryptococcal* species isolates has been isolated from the air sampling taken so far and all are marked out in the sheets along with ward (maps) configurations. As noted in previous Minutes it is clear that Ward 6A has the most *cryptococcal* isolates, and indeed there are only about 5 rooms, in 6A, that have not isolated a *Cryptococcus* spp. at some time.

Tom Steele stated to bear in mind that above-ceiling HEPA units have been fitted in all of the en suites. Sandra Devine reported there were air testing results from last week for Ward 6A. John Hood advised that a major part of the problem in relation to 6A is that the air movement, in and around it, is simply not controlled. At the main entrance to 6A (near room 1) depending on the configuration of doors open/closed at the nearby intersection of 6A, 6B and Lifts, air is being pulled into 6A (at minus 1.5 to minus 12 Pascals) this is **not good**. The other entrance to 6A is not so bad as the main entrance but is still under negative pressure to its surroundings. Please see Item 3 of Minute of 29 October 2019. (added in draft by JH) The other problem is that, due to the presence of chilled beams, the 3 air changes per hour cannot be increased. These are two important factors. Sandra hypothetically asked if you could go to C-side rather than A-side if the issue is part of the original design. John Hood stated that the issues relate particularly to the main entrance to Ward 6A, entrance to Ward 6B, stairwell and lifts. John Hood added that the pressure changes all of the time due to the various door openings, and that some of the doors are wedged opened. JH added in Draft – he doubts that the designers would have been aware of the complex air movements across these large floors with multiple intersections and many doors – it is only important when control of the air movement is crucial. One way to control air is to fit double doors that cannot be opened at the same time – i.e. forming an airlock (added in draft by JH).

Note a drop in air sampling can be seen from the 3,156 air samples that have been done (Figure 2). Those not relevant have been removed. To date, 5,500 air samples altogether have now been done.

- **FIGURE 1**

<b>'Cryptococcal species' isolates from air sampling 21 Dec 2018 to Sept 2019</b>							
	<i>N. diffluens</i>	<i>N. albida</i>	<i>N. albido-similis</i>	<i>F.uniguttulata</i>	<i>Cutan. curvatus</i>	ID TBC	Total
<b>*Dec 21<sup>st</sup> 2018</b> n=53	14	0	1	0	1 Roof#	0	<b>16</b>
<b>Jan 19</b> n=422	24	3	0	0	0	0	<b>27</b>
<b>Feb 19</b> n=440	0	0	0	1	0	0	<b>1</b>
<b>Mar 19</b> n=320	4	0	0	1	0	0	<b>5</b>
<b>Apr 19</b> n=334	2	0	0	0	0	0	<b>2</b>

Item	Action
------	--------

<b>May 19</b> n=420	7	3	0	3	0	0	<b>13</b>
<b>Jun 19</b> n=448	8	0	0	0	0	0	<b>8</b>
<b>Jul 19</b> n=419	3	0	0	2	0	0	<b>5</b>
<b>Aug 19</b> n=150	3	0	0	1	9	0	<b>13</b>
<b>Sept 19</b> n=98	2	0	0	0	0	0	<b>2</b>
<b>Oct 19</b> n =	0	0	0	0	0	0	<b>0</b>
<b>Nov 19</b> n =	0	0	0	1	0	0	<b>1</b>
<b>Total sf</b>	<b>67</b>	<b>6</b>	<b>1</b>	<b>9</b>	<b>10</b>	<b>0</b>	<b>93</b>

sf = so far

- FIGURE 2**

**Positive Crypto spp. results by month and per number of samples**

Month	No of positives	No of samples
<b>December 21 2018</b> <b>(1day)</b>	16	53
<b>Jan 2019</b>	27	422
<b>Feb 2019</b>	1	440
<b>Mar 2019</b>	5	320
<b>Apr 2019</b>	2	334
<b>May 2019</b>	13	420
<b>Jun 2019</b>	8	448
<b>Jul 2019</b>	5	417
<b>Aug 2019</b>	13	136
<b>Sept 2019</b>	2	82
<b>Oct 2019</b>	0	84

**5. Further Actions Required**

No further actions required.

**6. Report from the Cryptococcus Incident Management Team Expert Advisory Sub-Group**

John Hood stated that he is working on the report and most or all of the information is now available.

He said that one of the main issues in December 2018 was the number of pigeons around the site at that time. Pest Control were called in for 6 weeks to deal with the pigeons. Colin Purdon informed that Pest Control would expect to reduce the pigeon numbers by 80% but did not say what the baseline was.

Item	Action
<p><b>7. AOCB</b></p> <p>Discussion took place regarding the hypotheses and Tom Steele stated that we can say with regards to hypothesis 1 (to insert description here)* that we do not believe this to be a credible hypothesis i.e. the source of <i>C. neoformans</i> was the Plant room air which then gained access to the AHU during a final filter change but our findings suggest that this is technically infeasible. Peter Hoffman commented that when the IMT first started it was clear that this was a logical possibility with the description of pigeon ingress and fouling of Plant Rooms on level 12 of the QEUH. However looking further into this it is not the case.</p> <p>Sandra Devine reported that she and Tom Steele have been asked by the board to provide interim information and detail around hypotheses to date, until the <i>Cryptococcus</i> Report is available. Tom advised that the Health &amp; Safety Executive are interested to know of our findings from this group. He asked if the maintenance of the Plant Room compromised the ventilation system and John Hood replied that this is highly unlikely. John Hood said he will need to ensure that all explanations of the likely cause (s) are detailed in the report. One of the main points he said is (certainly as far as Adult patients were concerned) that this hospital (QEUH) was designed to be a General Hospital and not (originally) to have a BMT unit in it. This made it very difficult to essentially retrofit these specialist ward environments (essentially providing robust 'protective isolation') but Tom Steele said there are ongoing works and this is being addressed.</p> <p>Sandra Devine asked if it was acceptable to answer hypothesis 1 and that the other hypotheses are being investigated and will form part of the larger report. John Hood advised that the report should hopefully be available by the end of January 2020.</p> <p>Tom Steele issued a draft report of 5 other hypotheses and asked if someone could enter a few paragraphs at the beginning of the report regarding the complexity of this incident. Any comments are to be forwarded to Tom Steele and it was agreed that this would be the collective findings of this IMT and could be shared with HSE if need be. He said HSE want to conclude their inspection and this will include this incident.</p> <p><b>8. Date and Time of Next Meeting</b></p> <p>The next meeting will be held on 9<sup>h</sup> January 2019 at 3.00pm.</p>	

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in Meeting Room 0.14 Office Block, Queen Elizabeth University Hospital

**Wednesday 18 December 2019 at 2.00pm (? Final)**

**Present:** Dr John Hood (chair), Sandra Devine, Colin Purdon, Tom Steele, Darryl Conner, Ann Lang (minutes)

**Teleconference:** Peter Hoffman, Susie Dodd, Ian Storrar

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>Dr Hood welcomed everyone to today's meeting. Teleconference introductions were made and apologies were received from the above mentioned.</p>	
<p><b>2. Minutes of Previous Meeting – 28 November 2019 (and 15 November 2019)</b></p> <p>The minutes of the previous meeting held on 28 November 2019 were accepted with the following amendments made by Susie Dodd.</p> <p>Page 1, item 3 – should read “... that this was correct. Susie Dodd stated that HFS colleagues had confirmed that none of the existing guidance currently stipulates where the POD system should terminate within high risk settings. She suggested that if the prep room in which the POD system in 2A currently terminates is not used for preparing IV medications or any high risk procedures then there is probably little risk in leaving the POD system where it is (as per discussions in previous meetings). Moving the system outwith the ward may have unintended consequences for the users which would need to be discussed with them”.</p> <p>Page 6, item 7 – Add “Discussion also took place around the <i>Exophiala</i> counts in all rooms within Ward 4B which had been noted at the previous meeting. There was discussion around the investigations which took place and Tom was going to share a summary of the findings”.</p> <p>A final copy of the minutes of 15 November were agreed by the group.</p>	
<p><b>3. Actions Update (from 28/11/19)</b></p> <p><b>Page 2, Para 2:</b> Darryl Conner confirmed he was happy with the wording provided by Peter Hoffman.</p> <p><b>Page 2, Para 3:</b> John Hood asked why one of the dampers is closed manually. Darryl Conner replied that under the SOP for Isolation the discharge handler is a manual handler and this prevents the air coming back up. John Hood stated that no air could come down the duct but if it was opened by mistake a damper would be shut and the damper would come down. He said there is no way that Cryptococcus species could have got from the AHU or to the duct.</p>	

Item	Action
<p><b>Page 2, 2<sup>nd</sup> last para</b> – John Hood provided the following wording to the minute. The documentation clearly shows that [REDACTED] and Estates that the Room for Filter Change and Verification at 14.10h on the same day. Therefore [REDACTED] was not in Room 5 during filter change or verification but in a HEPA filtered lobbied PPVL room 12.</p> <p><b>Page 3, 1<sup>st</sup> para</b> – John Hood thought that the air in the Plant Rooms would be the same as the outside air but Peter Hoffman said that it is more likely that there is less velocity of air in the Plant Room.</p> <p><b>Page 5, 2<sup>nd</sup> para</b> – Further discussion on 18<sup>th</sup> Dec 2019: Tom Steele asked regarding the minus 12 Pascals (at main entrance to 6A) was this taken as routine or was this an exceptional day. John replied that it is to do with the complexity of air movements around the hospital and the lack of control of these. Darryl Conner mentioned that on another day that that corridor of 6A was pushing air out rather than pulling air in. <i>Added by JH in draft on 7/1/20:</i> this is exactly a similar finding to that in 4B where we know that the Corridor (near rooms in the 70s) can pull air into 4B depending on the configuration of doors being open/closed to 4C etc and also likely to be affected but other parameters e.g. outside weather conditions etc. Please see the Minute of Meeting of 6<sup>th</sup> June 2019. Tom asked if it would be reasonable to anticipate that the same principles would apply in other wards. John said this is difficult to determine as the number of variables are huge and also the facilities corridor (that bisects these floors – including those on Levels 4 and 6 of the QEUH) has lots of doors off it too which will also have an effect on the movement of air.</p> <p>Tom Steele asked if Ward 6A is different to any other ward entrances. John replied that we know that one of the entrances from 4B can behave like this (see above) and it was important to control of the air around these entrances in order to prevent unfiltered air/less well filtered air, gaining access to these specific wards (4B, 4C and 6A). He suggested that Ward 6A (4B, 4C) i.e. any ward that requires 'protective isolation' should have air locks at each entrance. Ian Storrar asked if the staff in the opposite ward need to manage the situation by not keeping the door opened all the time, but staff have informed that they do not have the staff to keep the door closed all the time. Sandra Devine agreed to speak to the General Manager for the ward. Tom Steele also commented that there was no hand gel in the dispenser to Ward 6B.</p> <p>Added by JH in draft 8 Jan 2020.</p> <p>Please also see previous discussion, later in this minute concerning Fig 1 and the issues with 6A.</p> <p>Also added in draft by JH 8 Jan 2020</p> <p>The take home message here is, that now we know how complex the air movements are likely to be around these Wards (4B, 6A and 4C), we could spend much time collecting more data on this. Essentially trying to understand the complexities of it (it would be hugely time consuming), but ... the point is, that we know that this is happening, at least intermittently, and we must mitigate its effect i.e. <b>stopping</b> the ingress of unfiltered or dirtier air getting into these units by this route by having airlocks at each entrance. It is also important to understand that this is not the only problem that requires mitigation and improvement in these areas e.g. lack of HEPA filtration, only 3 ACH in 4C and 6A, lack of solid ceiling and HEPA filtration in corridor of 4B.....to mention a few.</p>	<p><b>SDe</b></p>

Item	Action
<p>Recent Exophiala issue in 4B</p> <p>Tom Steele confirmed that he had asked the Laundry if there were any quality issues and there have been no reports of poor quality from the linen team.</p> <p>It was agreed to check the DSR and ward kitchen to see if they have point of use filters and Colin Purdon agreed to do this.</p> <p>With regards to the air sampling: on 6<sup>th</sup> Nov 2019, 36 air samples were taken and around 20 cfu of <i>Exophiala</i> spp. were identified from room samples with a count of 86 cfu from one of the corridor samples and this was validated as accurate. Darryl Conner said he would expect to have an area of dampness or flood with these high counts. Sandra Devine stated that the ward were advised not to use the steamer and hydro boiler and also their micro dishwasher has been taken out of commission. John Hood reported that Ward 4B is the ward that gets formal air sampling done every month.</p> <p>Sandra Devine said the IMT should note that all actions have been carried out to show that it is not clear what happened and Tom Steele agreed with this. John Hood agreed to add this as an addendum to the minute of 28<sup>th</sup> November.</p>	<p>CP</p> <p>JH</p>
<p><b>4. Update on Air Testing</b></p> <p>The following table has been updated to include another positive <i>C. diffluens</i> isolation from air sampling in September 2019. John Hood reported that to date there have been 93 Cryptococcus isolates from air sampling since December 2018. Most of the isolates are <i>C. diffluens</i> and <b>not</b> <i>C. albidus</i>.</p> <p><b>28 November 2019 Update:</b> A couple of errors were identified in the table included in the minutes of 15/11/19. This has now been updated (15 and 24 July detail).</p> <p>No new Cryptococcus isolates have been identified since the last meeting.</p>	

- The table below is the air sampling results from July 1<sup>st</sup> to November 2019.

Date taken	Area	Presumptive	Confirmed
03/07/19	Ward 6A Room 24		<i>C. diffluens</i>
03/07/19	Ward 6A Room 2		<i>C.uniguttulatus</i>
15/07/19	Ward 6A Room 23		<i>C. diffluens</i>
24/07/19	Ward 4C Corridor		<i>C.uniguttulatus</i>
24/07/19	Ward 6A Room 3		<i>C. diffluens</i>
08/08/19	Ward 6A Room 1		<i>C. diffluens</i>
08/08/19	Ward 6A Room 24		<i>C. curvatus</i>
20/08/19	Ward 4B Room 78 Bathroom		<i>C. curvatus</i>
20/08/19	Ward 4B Room 90		<i>C. curvatus</i>
20/08/19	L4 Labs Molecular Lab		<i>C.uniguttulatus</i>
20/08/19	L4 Labs BC room		<i>C. diffluens</i>
27/08/19	Ward 6A Room 5		<i>C. curvatus</i>
27/08/19	Ward 6A, Room 5 i.e. both samples pos		<i>C. curvatus</i>
27/08/19	Ward 6A, Room 6 Bathroom		<i>C. curvatus</i>
27/08/19	Ward 6A Room 26		<i>C. curvatus</i>
27/08/19	Ward 6A Room 8 Bathroom		<i>C. diffluens</i>
30/08/19	Ward 6A Room 4 Bathroom		<i>C. curvatus</i>
30/08/19	Ward 6A, Room 4 Bathroom i.e. both samples pos		<i>C. curvatus</i>
11/09/19	Ward 6A Nurses Station / Corridor		<i>C. diffluens</i>
17/09/19	Ward 4B Room 81 Bathroom		<i>C. diffluens</i>
06/11/19	Ward 4B Room 77		<i>C.uniguttulatus</i>

John Hood referred to *C. albidus* and *C. uniguttulatus*. *C. uniguttulatus* is the only one that grew from the samples of pigeon fouling taken from this site in February 2019 (3/18).

The Ref Lab in Bristol had initially stated that *C. albidus* could be taken as a surrogate marker for *C. neoformans* but now they are very reticent. Also part of the issue is that some of the literature suggests that in the past some strains identified as *C. neoformans* were actually probably other strains of *Cryptococcus*.

John Hood referred to Figure 1) below and reported that 93 *Cryptococcal* species isolates has been isolated from the air sampling taken so far and all are marked out in the sheets along with ward (maps) configurations. As noted in previous Minutes it is clear that Ward 6A has the most *cryptococcal* isolates, and indeed there are only about 5 rooms, in 6A, that have not isolated a *Cryptococcus* spp. at some time.



Tom Steele stated: to bear in mind that above-ceiling HEPA units have been fitted in all of the en suites. Sandra Devine reported there were air testing results from last week for Ward 6A. John Hood advised that a major part of the problem in relation to 6A is that the air movement, in and around it, is simply not controlled. At the main entrance to 6A (near room 1) depending on the configuration of doors open/closed at the nearby intersection of 6A, 6B and Lifts, air is being pulled into 6A (at minus 1.5 to minus 12 Pascals) this is **not good**. The other entrance to 6A is not so bad as the main entrance but, is still under negative pressure to its surroundings. Please see Item 3 of Minute of 29 October 2019 (added in draft by JH). The other problem is that, due to the presence of chilled beams, the 3 air changes per hour cannot be increased. These are two important factors. Sandra hypothetically asked if you could go to C-side rather than A-side if the issue is part of the original design. John Hood stated that the issues relate particularly to the main entrance to Ward 6A, entrance to Ward 6B, stairwell and lifts. John Hood added that the pressure changes all of the time due to the various door openings, and that some of the doors are wedged opened. JH added in Draft – he doubts that the designers would have been aware of the complex air movements across these large floors with multiple intersections and many doors – it is only important when control of the air movement is crucial. One way to control air is to fit double doors that cannot be opened at the same time – i.e. forming an airlock (added in draft by JH).

Note a drop in air sampling can be seen from the 3,156 air samples that have been done (Figure 2). Those not relevant have been removed. To date, 5,500 air samples altogether have now been done.

- FIGURE 1**

<b>'Cryptococcal species' isolates from air sampling 21 Dec 2018 to Sept 2019</b>							
	<i>N. diffluens</i>	<i>N. albida</i>	<i>N. albido-similis</i>	<i>F.uniguttulata</i>	<i>Cutan. curvatus</i>	ID TBC	<b>Total</b>
<b>*Dec 21<sup>st</sup> 2018</b> n=53	14	0	1	0	1 Roof#	0	<b>16</b>
<b>Jan 19</b> n=422	24	3	0	0	0	0	<b>27</b>
<b>Feb 19</b> n=440	0	0	0	1	0	0	<b>1</b>
<b>Mar 19</b> n=320	4	0	0	1	0	0	<b>5</b>
<b>Apr 19</b> n=334	2	0	0	0	0	0	<b>2</b>
<b>May 19</b> n=420	7	3	0	3	0	0	<b>13</b>
<b>Jun 19</b> n=448	8	0	0	0	0	0	<b>8</b>
<b>Jul 19</b> n=419	3	0	0	2	0	0	<b>5</b>
<b>Aug 19</b> n=150	3	0	0	1	9	0	<b>13</b>
<b>Sept 19</b> n=98	2	0	0	0	0	0	<b>2</b>
<b>Oct 19</b> n =	0	0	0	0	0	0	<b>0</b>
<b>Nov 19</b> n =	0	0	0	1	0	0	<b>1</b>
<b>Total sf</b>	<b>67</b>	<b>6</b>	<b>1</b>	<b>9</b>	<b>10</b>	<b>0</b>	<b>93</b>

sf = so far

- **FIGURE 2**

**Positive *Crypto* spp. results by month and per number of samples**

Month	No of positives	No of samples
<b>December 21 2018 (1day)</b>	16	53
<b>Jan 2019</b>	27	422
<b>Feb 2019</b>	1	440
<b>Mar 2019</b>	5	320
<b>Apr 2019</b>	2	334
<b>May 2019</b>	13	420
<b>Jun 2019</b>	8	448
<b>Jul 2019</b>	5	417
<b>Aug 2019</b>	13	136
<b>Sept 2019</b>	2	82
<b>Oct 2019</b>	0	84

**5. Further Actions Required**

No further actions required.

**6. Report from the *Cryptococcus* Incident Management Team Expert Advisory Sub-Group**

John Hood stated that he is working on the report and most or all of the information is now available.

He said that one of the main issues in December 2018 was the number of pigeons around the site at that time. Pest Control were called in for 6 weeks to deal with the pigeons. Colin Purdon informed that Pest Control would expect to reduce the pigeon numbers by 80% but did not say what the baseline was. In relation to *Cryptococcus neoformans* Peter Hoffman commented that the early concern was regarding the pigeon droppings but this does not seem to be relevant to this as John Hood stated that the pigeon gut does not allow the growth of *Cryptococcus neoformans*. Also *Cryptococcus neoformans* seems very difficult to grow from the environment or air.

**7. AOCB**

Discussion took place regarding the hypotheses and Tom Steele stated that we can say with regards to **Hypothesis 1** that we do not believe this to be a credible hypothesis i.e. the source of *C. neoformans* spores was the Plant room air which then gained access to the AHU during a final filter change. However our findings suggest that this is technically infeasible. Peter Hoffman commented that when the IMT first started it was clear that this was a logical possibility with the description of pigeon ingress and fouling of Plant Rooms on level 12 of the QEUH. However looking further into this it is not the case.

Sandra Devine reported that she and Tom Steele have been asked by the board to provide interim information and detail around hypotheses to date, until the *Cryptococcus* Report is available. Tom advised that the Health & Safety Executive are interested to know of the findings from this group. He asked if the maintenance of the Plant Room compromised the ventilation system and John Hood replied that this seems highly unlikely. John Hood said he will need to ensure that all explanations of the likely cause (s) are detailed in the report.

One of the main points he said is (certainly as far as Adult patients were concerned) that this hospital (QEUH) was designed to be a General Hospital and not (originally) to have a BMT unit in it. This made it very difficult to essentially retrofit these specialist ward environments (essentially providing robust 'protective isolation') but Tom Steele said there are ongoing works and this is being addressed.

Sandra Devine asked if it was acceptable to answer Hypothesis 1 and that the other hypotheses are being investigated and will form part of the larger report. John (jokingly) advised that the report should hopefully be available by the end of January 2021.

Tom Steele issued a draft report of 5 other hypotheses and asked if someone could enter a few paragraphs at the beginning of the report regarding the complexity of this incident. Any comments are to be forwarded to Tom Steele and it was agreed that this would be the collective findings of this IMT and could be shared with HSE if need be. He said HSE want to conclude their inspection and this will include this incident.

#### **8. Date and Time of Next Meeting**

The next meeting will be held on 9<sup>h</sup> January 2019 at 3.00pm.

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in

**Meeting Room 0.14, Office Block, Queen Elizabeth University Hospital**

**Thursday 9 January 2020 at 3.00pm**

**Present:** Dr John Hood (chair), Colin Purdon, Tom Steele, Pauline Hamilton (minutes)

**Teleconference:** Peter Hoffman, Susie Dodd, Ian Storrar

**Apologies:** Sandra Devine, Darryl Conner, Eddie McLaughlan **DRAFT ? FINAL redone**

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>John Hood welcomed everyone to today's meeting. Teleconference introductions were made and apologies were received from the abovementioned.</p>	
<p><b>2. Minutes of Previous Meeting – 18 December 2019</b></p> <p>The minutes of the previous meeting held on 18 December 2019 were accepted with the following update/amendment:</p> <p><b>Page 2 para 6 (and min 28/11/19 - page 6 item 7)</b> in relation to the recent Exophiala issue in Ward 4B. Tom Steele will check with Sandra Devine around subsequent tests and then e-mail this detail to Pauline Hamilton for inclusion in the minutes.</p> <p><b>Page 2 para 3</b> – Darryl Conner to review wording around the manual or automatic shutting of the dampers in the AHU prior to final filter change.</p> <p><b>Page 2 para 1 (action from 28/11/19 – page 5 para 2)</b> John Hood added a post meeting note (08/01/20) explaining why this is worse than would be expected for air sampling results (uncontrolled unfiltered air). Lack of control of the air around entrances to wards.</p>	<p><b>TS/ Secy</b></p>
<p><b>3. Actions Update (09/01/20)</b></p> <p><b>28/11/19:</b> Tom Steele asked if Ward 6A is different to any other ward entrances. John Hood replied that we know that one of the entrances from 4B can behave like this (opposite to 4C) and that it was important to control the air around these entrances in order to prevent unfiltered air/dirtier air gaining access to these specific wards (4B, 4C and 6A). He suggested that Ward 6A (4B, 4C) i.e. any ward that requires 'protective isolation' should have air locks at each entrance. Ian Storrar asked if the staff in the opposite ward need to manage the situation by not keeping the door opened all the time but staff have informed that they do not have the staff to keep the door closed all the time. Sandra Devine agreed to speak to the General Manager for the ward.</p> <p><b>28/11/19:</b> With respect to the recent issues with Exophiala in 4B: Tom Steele confirmed that he had asked the Laundry if there were any quality issues and there have been no reports of poor quality from the linen team. It was agreed to check the DSR and ward kitchen to see if they have point of use filters and Colin Purdon agreed to do this.</p> <p><b>28/11/19:</b> Sandra Devine said the IMT should note that all actions have been carried out to show that it is not clear what happened and Tom Steele agreed with this. John Hood agreed to add this as an addendum to the minute of 28 November 2019.</p>	<p><b>SDe</b></p> <p><b>CP</b></p> <p><b>JH</b></p>

Item	Action
------	--------

#### 4. Update on Air Testing

The following table has been updated to include 3 new isolates of *Cryptococcus* species; 1 presumed *C. uniguttulatus* on 15/11/19 Ward 4B Corridor at Room 77 (9 days beforehand, the same room (Room 77) had *C. uniguttulatus*); and 2 *C. albidus* that were taken on 11/12/19 in Ward 6A in Rooms 26 and 27 - both presumptive *C. albidus* in each room.

- The table below is the air sampling results from **July 1<sup>st</sup> to December 2019**.

Updated by JH 25 Feb 2020

Date taken	Area	Presumptive	Confirmed
03/07/19	Ward 6A Room 24		<i>C. diffluens</i>
03/07/19	Ward 6A Room 2		<i>C.uniguttulatus</i>
15/07/19	Ward 6A Room 23		<i>C. diffluens</i>
24/07/19	Ward 4C Corridor		<i>C.uniguttulatus</i>
24/07/19	Ward 6A Room 3		<i>C. diffluens</i>
08/08/19	Ward 6A Room 1		<i>C. diffluens</i>
08/08/19	Ward 6A Room 24		<i>C. curvatus</i>
20/08/19	Ward 4B Room 78 Bathroom		<i>C. curvatus</i>
20/08/19	Ward 4B Room 90		<i>C. curvatus</i>
20/08/19	L4 Labs Molecular Lab		<i>C.uniguttulatus</i>
20/08/19	L4 Labs BC room		<i>C. diffluens</i>
27/08/19	Ward 6A Room 5		<i>C. curvatus</i>
27/08/19	Ward 6A, Room 5 i.e. both samples positive		<i>C. curvatus</i>
27/08/19	Ward 6A, Room 6 Bathroom		<i>C. curvatus</i>
27/08/19	Ward 6A Room 26		<i>C. curvatus</i>
27/08/19	Ward 6A Room 8 Bathroom		<i>C. diffluens</i>
30/08/19	Ward 6A Room 4 Bathroom		<i>C. curvatus</i>
30/08/19	Ward 6A, Room 4 Bathroom i.e. both samples positive		<i>C. curvatus</i>
11/09/19	Ward 6A Nurses Station / Corridor		<i>C. diffluens</i>
17/09/19	Ward 4B Room 81 Bathroom		<i>C. diffluens</i>
06/11/19	Ward 4B Room 77		<i>C.uniguttulatus</i>
15/11/19	Ward 4B Corridor at Room 77		<i>C.uniguttulatus</i>
11/12/19	Ward 6A Room 26		<i>C. diffluens</i>
11/12/19	Ward 6A Room 27		<i>C. diffluens</i>

Item	Action
<p>Tom Steele asked about the air sampling done in 6A rooms 26 and 27. John Hood explained we have been doing 500L samples of air – taking 3 minutes each since late 2018 in 6A and 4C (4B has always had routine monthly air counts). In other words 3 minute air counts are but a snapshot in time, compared to a patient who is essentially ‘sampling’ the air all the time. Rooms 26 and 27 are near the entrance opposite 6D not near the main entrance (which is opposite 6B) Tom asked if this means that samples are not being taken in any other rooms. John replied no, air samples from Rooms 1- 12 and Rooms 20 – 27 are taken in rotation in 6A. Most of the positive cryptococcal samples are in the Rooms near the main entrance (1 – 5) and in the Corridor near the Nurses station, opposite Room 5. There are also positives in Rooms 20 – 27 along from the other entrance. This also ties in with the other fungal counts and the fact that the entrance at Room 5 seems to be a large proportion of the time under negative pressure to the Core Lobby outside 6B, up to minus 11 Pascals. This means that depending on which doors are opened in this lobby air is being pulled into 6A. The problem is not so bad at the other entrance but still present. This fact in not controlling air movement around 6A is why the fungal and cryptococcal counts are so poor compared to 4C and 4B. Added in draft by JH on 25.2.20. The question was asked if there was any other way other than air that Cryptococcus could be present but John Hood does not believe there is. In other words comparing <i>Cryptococcus neoformans</i> with e.g. <i>Aspergillus</i> spp.</p> <p>Tom Steele asked about the particle size and is it something that can be caught in the filters. John replied if you require a filter that takes out just under 99.9% of particles of 0.5 microns (ie size of fungal spores that will reach deep into the lung) it needs to be a HEPA filter (added in draft by JH 25.2.20 and also 13 March 20).</p> <p>John Hood reported on the totals of Cryptococcus isolates in the wards (Dec 2018 – Dec 2019) being 96, of which 69 are <i>N. diffluens</i>. Of the 96 isolates there are only 6 <i>N. albida</i>, 10 <i>F. uniguttulata</i> and 10 <i>Cutan curvatus</i> (which only appeared in Aug 2019).</p> <p>John Hood welcomed questions about the further sample testing. John Hood added that Figure 2 below shows months and positive results, to include 2 new in Nov 2019 and 2 new in Dec 2019, as shown in the updated table Figure 1 below (21 Dec 2018 to Dec 2019).</p>	

Item Action

<b>'Cryptococcal species' isolates from air sampling 21 Dec 2018 to Dec 2019</b>							
	<i>N. diffluens</i>	<i>N. albida</i>	<i>N. albido-similis</i>	<i>F.uniguttulata</i>	<i>Cutan. curvatus</i>	ID TBC	Total
<b>*Dec 21<sup>st</sup> 2018</b> n=53	14	0	1	0	1 Roof#	0	<b>16</b>
<b>Jan 19</b> n=422	24	3	0	0	0	0	<b>27</b>
<b>Feb 19</b> n=440	0	0	0	1	0	0	<b>1</b>
<b>Mar 19</b> n=320	4	0	0	1	0	0	<b>5</b>
<b>Apr 19</b> n=334	2	0	0	0	0	0	<b>2</b>
<b>May 19</b> n=420	7	3	0	3	0	0	<b>13</b>
<b>Jun 19</b> n=448	8	0	0	0	0	0	<b>8</b>
<b>Jul 19</b> n=419	3	0	0	2	0	0	<b>5</b>
<b>Aug 19</b> n=150	3	0	0	1	9	0	<b>13</b>
<b>Sept 19</b> n=98	2	0	0	0	0	0	<b>2</b>
<b>Oct 19</b> n =	0	0	0	0	0	0	<b>0</b>
<b>Nov 19</b> n =	0	0	0	2	0		<b>2</b>
<b>Dec 19</b> n=	2	0	0	0	0		<b>2</b>
<b>Total sf</b>	<b>69</b>	<b>6</b>	<b>1</b>	<b>10</b>	<b>10</b>	<b>0</b>	<b>96</b>

- FIGURE 2**

**Positive Crypto spp. Results by month and per number of samples**

Month	No of positives	No of samples
<b>December 21 2018 (1day)</b>	16	53
<b>Jan 2019</b>	27	422
<b>Feb 2019</b>	1	440
<b>Mar 2019</b>	5	320
<b>Apr 2019</b>	2	334
<b>May 2019</b>	13	420
<b>Jun 2019</b>	8	448
<b>Jul 2019</b>	5	417
<b>Aug 2019</b>	13	136
<b>Sept 2019</b>	2	82
<b>Oct 2019</b>	0	84
<b>Nov 2019</b>	2	
<b>Dec 2019</b>	2	

Item	Action
<p><b>5. Further Actions Required</b></p> <p>Nil of note.</p>	
<p><b>6. Report from the Cryptococcus Incident Management Team Expert Advisory Sub-Group</b></p> <p>John Hood updated that the report will include detail around all of the hypotheses. There was a power point presentation shared on 29<sup>th</sup> November 2019 which contained 4 hypotheses followed by a position statement shared on 18<sup>th</sup> December 2019. The position statement did not contain the 4 hypotheses.</p> <p>Tom Steele reported that an SBAR has been prepared, developed from the PowerPoint presentation and although all 4 hypotheses were included, hypothesis 1 was primarily concentrated on. John Hood referred to the final draft sent by Tom Steele on 07/01/20. Those in attendance confirmed they had received this.</p> <p>Susie Dodd sent a query by email prior to the meeting. She noted that within the SBAR, it was stated that only one single isolate of <i>Cryptococcus</i> species had been detected from outside air sampling yet the SBAR also states that sampling results strongly suggest that <i>Cryptococcus</i> spores are most likely to be present in the incoming air. SD noted that to the lay person reading this it would not make sense and appears contradictory. John Hood agreed this was a good point but added that to provide detailed explanation would require extensive reading of the available research. This led to discussion around spores of <i>Cryptococcus neoformans</i> that must (if present) be coming in (? periodically) with the outside air. However, we have been unable to grow it in either the outside or inside air. Susie Dodd asked if the volume of testing is the same for outside and inside. John Hood replied that it is more for the outside sample and added that from Mar/Apr 2019 outside air samples have been one cubic metre (1000L) of air and inside air is 0.5 of a cubic metre or 500L. Again doing 3 or 6 minute air sample is only a snapshot in time.</p> <p>Susie Dodd asked if there was anywhere else in the hospital that <i>Cryptococcus</i> could be found, not just in the plant rooms. Peter Hoffman stated it has been established it would be in the air. There was then a discussion around whether <i>Cryptococcus neoformans</i> could behave like e.g. <i>Aspergillus</i> spp. i.e. could it be associated (like aspergillus and other fungi) with water damage? (e.g. plaster board, fire retardant material etc). JH explained that <i>C. neoformans</i> was not believed to behave in this way.</p> <p>John Hood asked the group to read the document from Tom Steele and return comments. Susie Dodd asked if HSE has reviewed this document. Tom Steele reported that he had met with HSE yesterday on an unrelated matter and this opportunity was used to have some discussion around <i>Cryptococcus</i>. Tom Steele had explained and described what the investigations have revealed and also that the hypothesis on the Plant Room, as the source, as while not being completely excluded was very very unlikely to have been the source. He also noted that remedial action was taken throughout the campus in relation to the pigeons and the Plant Rooms. HSE now have a better understanding of the wider environmental issues. The conversation with HSE led into talking about the paper, in particular around the theory of contaminated Plant Room air getting into the air handling unit and then the ductwork, and HSE accepted this. (TS to confirm he is happy with the above paragraph)</p> <p>It was noted however that protection for the most vulnerable patients ultimately needs HEPA filtered air with the correct air changes and rooms that are positively pressurised to their surroundings where the air uniformly leaks outwards i.e. 'protective isolation'. Inserted in draft by JH 25 Feb 20.</p>	<p>SD</p> <p>SD and PH</p> <p>TS</p>



Item	Action
<p>John Hood referred to Ward 4B being the nearest to 'protective isolation' we have and added that periodically, it too is not good. We know, (see previous minutes) that the Corridor in 4B* near Rooms in the 70's can be at times negatively pressurised and draw 'less clean' air into it, and the other 2 Wards 6A and 4C only have only 3 air changes/hour (with chilled beams). The air around these wards is not sufficiently controlled (no airlocks). 6A and 4C are not HEPA filtered and Ward 4B does not have complete HEPA filtration – not in Corridor and corridor does not have a solid ceiling. Tom Steele has discussed this with Darryl Conner to get a better understanding of HEPA filtration, and also the cascade from room to corridor with no other supply in the corridor. John Hood explained that one particular door is an issue (opposite 4C entrance – noted above*) and the other door is not controlled, main entrance. In addition to this, the doors are opening and closing a number of times. It was noted that although there is good positive pressure from the individual rooms, this pressure drops when a door is opened – therefore becoming less protective. Unfortunately the ward staff are not keen on having self closers on these doors (added in draft by JH). Colin Purdon confirmed that the corridors are extracted only.</p> <p>Tom Steele commented that a recommendation from this work would be how to improve and control entrance/exit points. The modified Ward 2A will be done, but Ward 4B may be technically challenging with patients still in the environment. Again, it was stated that 'protective isolation' is a must for those patients who require it.</p> <p>Tom Steele referred back to his discussion with HSE and to the improvement notice served on Ward 4C in December 2019. [REDACTED]</p> <p>[REDACTED] The question was then asked about the particular strains [REDACTED] not being the same. John Hood stated that were hat they are different genotypes. The only other <i>C. neoformans</i> isolated (in 2018, and also genotyped) was from [REDACTED] in Glasgow. They were even more different from the QE ones and also different from each other. The problem is that we have no idea (nor are we likely to be able to answer this question) what the strains of <i>C. neoformans</i> that predominate in the pigeons/air around this hospital let alone in different geographic areas within Glasgow (added in draft by JH 25.2.20).</p> <p>Peter Hoffman stated <i>Cryptococcus neoformans</i> is not thought to be transmitted from patient to patient and that these infections were by a common route not a common source.</p> <p>Tom Steele asked that any further comments required for the paper, are included in the main text of the report.</p> <p>In relation to the report John Hood intends to go through all of the Minutes to marry detail and to ensure that all of the actions have been completed. John Hood will also check over the biology/ecology of <i>C. neoformans</i> and the complex detail around this. Another meeting will need to be held but not for another few weeks.</p> <p>John Hood referred to the corridor air sampling and stated that the mean count has been done on each of the corridors but the statistics have still to be done (for Wards 4B, 4C and 6A, i.e. from best to worse). The final analysis table will include all of the samples.</p> <p>Susie asked if it is known that <i>Cryptococcus neoformans</i> is in the air everywhere and are 6A and 4C particularly vulnerable to outside air compared with any other general wards on site. Tom Steele replied that generally speaking, NHSGGC ventilation systems are significantly better than most. Susie also asked, if spores from outside air are getting into the wards within QEUH/RHC site more so than any other hospital sites i.e. is this problem of outside air reaching patients inside the hospital without</p>	<p>PH</p> <p>SD</p>

Item	Action
<p>harmful spores being removed by standard ventilation systems first, particular to this building or would we find this to be the case on other sites. John Hood replied that if looked into, Cryptococcus would probably be found in the air everywhere, but it was only from December 2018 that NHSGGC started looking for these yeasts, likely to be Cryptococcus. Added in Draft by JH 25.2.20 – interestingly two air samples in Beatson Ward 7B bathrooms were recently found to be growing <i>C. diffluens</i>. Prior to December 2018 these would not have been identified!</p>	
<p>Tom Steele added, notwithstanding hospital credibility, there are water/sewage facilities located next to the QEUH site. Again John Hood referred back to 'protective isolation' and if available whatever is present in the air around this hospital would not be an issue.</p>	
<p>Susie stated that patients, staff and the public will all quite rightly be seeking an explanation to this incident in the final report. They will want to understand the source from which the patients acquired the cryptococcal infections but, like with most outbreak investigations it is often not possible to prove exactly where the source was. They will also want to know if the immunocompromised patients are safe, and NHSGGC will need to demonstrate what measures have been taken to mitigate any risk identified from this group. There may be a bigger question of the general safety of all patients on the site (in relation to the ventilation) and it is important to be clear on the standard and function of the ventilation. Tom Steele stated that in a general ventilation system large volumes of air are drawn in, and this is then filtered and sent around the hospital. This should be about 80% better, as a minimum than outside, however this may not be understood by the public, in that this is significantly better ventilation. This would need to be explained in full within the report.</p>	SD
<p>Tom Steele asked if it would be useful to ask Darryl Conner to provide context of what the ventilation system does. John Hood agreed this would be helpful.</p>	TS/DC
<p>Tom Steele asked Ian Storrar, in terms of quality of filtration for general wards, if there is any narrative within the documentation that describes what filters needs to be in place. Colin Purdon provided some detail and stated that Iso1690 gives performance so a 1/7, and for a 10 it is 85 then goes coarse. The current HTML 0301 does not reflect the standards as it is the old standard that Peter Hoffman refers to and describes. Colin Purdon offered to find out the detail of the above and update Ian Storrar with this information.</p>	CP
<p>Susie asked if the draft report will be available before works are completed in Ward 2A so that lessons learned can be shared. Tom Steele stated that works in Ward 2A are currently ongoing with no completion date, but that it will likely be a few more months before Ward 2A is commissioned.</p>	
<p>John Hood stated that a first draft of the report will hopefully be available in a month's time. Tom Steele will consider the front context of the report alongside Darryl Conner and Colin Purdon, to include the differences between the ventilation systems and the specialist ventilation systems.</p>	JH TS/DC /CP
<p><b>7. AOCB</b></p>	
<p>Nil of note.</p>	
<p><b>8. Date and Time of Next Meeting</b></p>	
<p>The next meeting will be held on Wednesday 26 February 2020 at 3.00pm on the QEUH site, room to be confirmed. A diary request will be sent for this meeting. It was noted that a meeting may be called prior to this depending on the report.</p>	

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held in

**Meeting Room 5, Laboratory Building, Queen Elizabeth University Hospital**

**Wednesday 26 February 2020 at 3.00pm**

**Present:** Dr John Hood (chair), Colin Purdon, Darryl Conner, Gerry Cox, Ann Lang (minutes)

**Teleconference:** Peter Hoffman, Susie Dodd, Ian Storrar

**Apologies:** Sandra Devine, Tom Steele **DRAFT 2**

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>John Hood welcomed everyone to today's meeting. Teleconference introductions were made and apologies were received from the above mentioned.</p>	
<p><b>2. Minutes of Previous Meeting – 9 January 2020</b></p> <p>The minutes of the previous meeting held on 9 January 2020 were accepted with the following updates/amendments:</p> <p><b>Page 2 para 3</b> – John Hood and Darryl Conner to discuss wording regarding the manual or automatic shutting of the dampers in the AHU prior to final filter change.</p> <p><b>Page 3, para 2</b> – sentence should read “.... about the particle size and is it something that can be caught in the filter”.</p> <p><b>Page 3, para 2</b> – delete sentence “... (ie size of fungal spores that will reach deep into the lung)”.</p> <p><b>Page 5, Item 6, para 1</b> – should read “... detail around all of the hypotheses. There was a powerpoint presentation shared on 29<sup>th</sup> November 2019 which contained 4 hypotheses followed by a position statement shared on 18<sup>th</sup> December 2019. The position statement did not contain the 4 hypotheses”.</p> <p><b>Page 6, para 4</b> – should read “Peter Hoffman stated that he thought that these infections were by a common route and not a common source”.</p>	
<p><b>3. Actions Update (09/01/20)</b></p> <p><b>28/11/19:</b> John Hood added in the wording “opposite to 4C”.</p> <p><b>Page 2, Item 4</b> - The table includes the three new isolates from the Reference Lab. John Hood reported that 69 out of 96 samples taken were <i>C. diffluens</i> and from the literature reviews this is commonly found in house dust (the implication being that it got there via the outside air).</p> <p><b>Page 3, para 2</b> – Peter Hoffman commented that anything at or below 10 microns will get into the alveoli.(JH in draft 16 Mar 20 – probably 5 microns or less to get into the alveoli) Fungal spores are about 3.5 to 4.5 microns and HEPA filters are tested at each filter's most penetrating particle size which is usually around 0.2 microns. Ian Storrar recommended that this is stated in this paragraph and John Hood agreed to add this.</p>	<p><b>PH</b></p> <p><b>JH</b></p>

Item	Action
<p><b>Page 5, para 4</b> – Discussion took place regarding this paragraph as Susie Dodd said that when they were talking about the SBAR the question was asked if there was anything else other than the building it came from. Peter Hoffman said as the pigeon faeces generated from the Plant Room he was not sure how this could get from there to the patient areas. He thought it must have tracked from outside to inside and stated that <i>Cryptococcus</i> would be in the air just like many other fungal species. Ian Storrar commented that he discussed this with Gerry Cox this morning and asked if this could be grown from mould and Peter Hoffman replied that this can be found in rotting wood (this wood being e.g. in tree stumps or tree cavities) Inserted in draft by JH 160320. John Hood stated that older papers suggest that if the pigeon faeces is wet then cryptococcal spores will not aerolise easily. Aerosolisation seems to take place more efficiently when pigeon guano is ‘weathered’ and dry. He said there is no evidence that ‘rotting wood’ within the structure of buildings/hospitals is a likely source of <i>C. neoformans</i>. (Inserted in draft by JH) Water damage would much more likely to cause issues with <i>Aspergillus</i> species related to damp plaster board or fire retardant material. rather than issues with the wooden supports.</p> <p>Susie Dodd stated that there was a lot of water damage in the showers in Ward 6A in December 2018 but work was carried out to fix this. If dampness was found John Hood said it would be <i>Aspergillus</i> that would be likely to be identified (as noted in insert above or perhaps <i>Exophiala</i> spp.) but Darryl Conner said that there would also need to be a breach in the fabric. John Hood reported that he has not (so far) found a relationship between <i>Cryptococcus neoformans</i> and the presence of dampness in the literature (rather a relationship with ‘weathered and dry’). Ian Storrar asked if there were any areas of mould tested for <i>Cryptococcus</i>. Darryl Conner informed that if a patient could have been potentially exposed to <i>Cryptococcus</i> there had been no fabric altered in these rooms and no further problems were identified. He said the fabric in the general rooms are in a good state of repair. <b>DC to check.</b></p> <p>Inserted by JH in Draft 16 Mar 20. John Hood believes that there was at this point a discussion about why we cannot grow <i>C. neoformans</i> in either the outside or inside air. He described that those groups studying the ecology of inside and outside air flora (bacterial or fungal) are now using molecular genomic methods rather than air sampling techniques to look at this – some species are only found by one but not the other method but genomic methods are generally more informative. This work is also elucidating concepts of e.g. ‘dispersal limitation’ i.e. where the sources of specific fungi are and how far they can travel (spores or propagules) from that source to a given indoor air environment. Susie Dodd stated that if <i>Cryptococcus</i> can grow in rotting wood could the wood outside contaminate with the pigeon faeces. Added in draft by JH - in the outside environment yes. Gerry Cox advised that the structure of the building is a metal tower and Colin Purdon advised that the structure has timber in the IPS panels and the timber is behind these panels. <b>SD to check</b></p> <p><b>Page 5, para 5</b> – With regards to the comments from Tom Steele, Susie Dodd pointed out that the Plant Room had not been ‘excluded’ but was unlikely to be the source. John Hood said that air from the voids and risers could have been a potential source of contaminated air. John Hood said that prior to the opening of PICU in (?2015) there were high counts of <i>Aspergillus</i> found in the PPVL rooms and on investigation it was clear the void was under positive pressure to the room with unfiltered air coming in from behind the IPS panels (these were subsequently sealed).</p> <p>In Ward 6A they (John Hood/Ian Powrie) found last summer at least one riser was pushing unfiltered air out into the ward. Colin Purdon confirmed that the seals around this riser have been corrected.</p>	

Gerry Cox asked why was the void positive pressurised and Colin advised that there was no separation to each of the floors and it is a shaft effect. From Level 4 to 11 Darryl Conner confirmed that there is a seal in the bottom floor and there did not appear to be any breaches in Level 12. **Darryl Conner stated that there is designated ventilation to rooms at a colder temperature to the ward.** He asked if the risers had been tested for Cryptococcus and John Hood replied that a few of these were tested in 6A and had Cryptococcus growing in them **and high counts of Aspergillus with 60+ isolates.** Susie Dodd said she is keen for the hypothesis to say that the Plant Room is very unlikely but the group have not ruled out other hypotheses as yet e.g. risers **DC to clarify and check above.**

Darryl Conner mentioned that there is variable pressure cascade and wondered how it could get there in the first place. John Hood commented that it may not be going through the filter infiltration as there are 3 doors and lift shafts in this area and it will depend on what is happening in the air outside. **DC to clarify.**

Peter Hoffman asked if all the air to the building is filtered and Darryl Conner replied that there is G4 primary filtration with the lowest filtration being F7 and the building is under positive pressure. Ian Storrar disagreed with this due to the atrium and the external doors which will be bringing in unfiltered air from the outside. Darryl Conner informed that there are over 100 air handling units driving pressure collectively which is likely to make the building positively pressurised. John Hood said this is a very complex issue as there are four different wards on each floor which all have different air handling units serving different areas. Darryl did point out that if outside air pressure is higher than inside the building then that could cause a problem. Susie Dodd asked if this complex dynamic of air movement is due to the atrium in Queen Elizabeth University Hospital and John Hood said that part of the issue at the QEUH/RHC is indeed a very complex dynamic of air movement that no one really understands fully (nor fully realised at the outset) and our work has exposed these issues and complexities. He also noted that some older hospital buildings in Glasgow (e.g. old part of GRI) simply have opening windows (pulling in unfiltered outside air) as their only means of ventilation. The patients are not affected by this as they are not likely to be at risk (specifically not immunocompromised). She said maybe this should be included in the report that this would not affect other hospitals as immunocompromised patients need specialised ventilation, i.e. the crucial importance of the provision of 'protective isolation'.

#### Page 6, para 3

and did not have more than two clinical isolates, and no environmental isolates. The two community acquired cases in GRI are each different and also different from the cases at QEUH.

**Page 6, para 8** – Susie Dodd asked that as we were finding higher counts in Ward 6A compared to 4C and 4B and with this ward being a general ward why is this ward more vulnerable compared to the other wards. John Hood stated that Ward 6A was selected for a decant to 2A/B and if we had the information we have at this time he is not sure we would have selected this ward due to the significant traffic in and out of here and the complexities of the air flows and lack of control of these air flows around these wards (as documented in previous minutes). He said that Ward 2A/B was moved due to water issues and Darryl Conner informed that to decant this ward to any other area would have resulted in the same result due to the water issues. John Hood said there was no evidence that any other ward was different to 6A until we compared the air testing results between it and the other wards. Darryl Conner reported that Ward 6A is better in comparison to a standard general ward as there has been significant fabric installation, draught excluders and there are both mobile HEPA filters and HEPA scrubbers in the ensuites. He said this ward was selected due to the specific patient cohort and also its proximity to PICU.

Item	Action
<p>At the time, the top floor of the Beatson was discounted as a possible alternative as there was no ICU on site. Susie Dodd said that Ward 6A was the best option at that point. John Hood informed that the standard ventilation at QEUH/RHC hospitals is of a higher standard compared to other hospitals with the exception of the Beatson Cancer Centre. Darryl Conner stated that 6A and 4C have been fitted with F9s rather than F7's (JH in draft but is still not up to standard for 'protective isolation).</p> <p><b>Page 7, para 4</b> – Colin Purdon confirmed that he sent the document and Ian Storrar agreed the information was sufficient.</p> <p><b>Page 7, para 5</b> – John Hood is still working on the report.</p> <p><b>4. Update on Air Testing</b></p> <p>The following table has been updated to include 3 new isolates of <i>Cryptococcus</i> species; 1 presumed <i>C. uniguttulatus</i> on 15/11/19 Ward 4B Corridor at Room 77 (9 days beforehand, the same room (Room 77) had <i>C. uniguttulatus</i>); and 2 <i>C. albidus</i> that were taken on 11/12/19 in 6A in Rooms 26 and 27 - both presumptive <i>C. albidus</i> in each room.</p>	

## Item

## Action

- The table below is the air sampling results from **July 1<sup>st</sup> to December 2019**.

John Hood reported that the table was updated on 25 February 2020 and the number of samples have been added until November but unfortunately there is no data available for November onwards as Tony Speekenbrink has retired. He advised that in Ward 4B sampling is ongoing.

Date taken	Area	Presumptive	Confirmed
03/07/19	Ward 6A Room 24		<i>C. diffuens</i>
03/07/19	Ward 6A Room 2		<i>C.uniguttulatus</i>
15/07/19	Ward 6A Room 23		<i>C. diffuens</i>
24/07/19	Ward 4C Corridor		<i>C.uniguttulatus</i>
24/07/19	Ward 6A Room 3		<i>C. diffuens</i>
08/08/19	Ward 6A Room 1		<i>C. diffuens</i>
08/08/19	Ward 6A Room 24		<i>C. curvatus</i>
20/08/19	Ward 4B Room 78 Bathroom		<i>C. curvatus</i>
20/08/19	Ward 4B Room 90		<i>C. curvatus</i>
20/08/19	L4 Labs Molecular Lab		<i>C.uniguttulatus</i>
20/08/19	L4 Labs BC room		<i>C. diffuens</i>
27/08/19	Ward 6A Room 5		<i>C. curvatus</i>
27/08/19	Ward 6A, Room 5 i.e. both samples positive		<i>C. curvatus</i>
27/08/19	Ward 6A, Room 6 Bathroom		<i>C. curvatus</i>
27/08/19	Ward 6A Room 26		<i>C. curvatus</i>
27/08/19	Ward 6A Room 8 Bathroom		<i>C. diffuens</i>
30/08/19	Ward 6A Room 4 Bathroom		<i>C. curvatus</i>
30/08/19	Ward 6A, Room 4 Bathroom i.e. both samples positive		<i>C. curvatus</i>
11/09/19	Ward 6A Nurses Station / Corridor		<i>C. diffuens</i>
17/09/19	Ward 4B Room 81 Bathroom		<i>C. diffuens</i>
06/11/19	Ward 4B Room 77		<i>C.uniguttulatus</i>
15/11/19	Ward 4B Corridor at Room 77		<i>C.uniguttulatus</i>
11/12/19	Ward 6A Room 26		<i>C. diffuens</i>
11/12/19	Ward 6A Room 27		<i>C. diffuens</i>

Item	Action
<p>John Hood explained we have been doing 500L samples of air – taking 3 minutes each since late 2018 in 6A and 4C (4B has always had routine monthly air counts).</p> <p>In other words 3 minute air counts are but a snapshot in time, compared to a patient who is essentially 'sampling' the air all the time. Rooms 26 and 27 are near the entrance opposite 6D not near the main entrance (which is opposite 6B). Air samples from Rooms 1- 12 and Rooms 20 – 27 are taken in rotation in 6A. Most of the positive cryptococcal samples are in the Rooms near the main entrance (1 – 5) and in the Corridor near the Nurses station, opposite Room 5. There are also positives in Rooms 20 – 27 along from the other entrance. This also ties in with the other fungal counts and the fact that the entrance at Room 5 seems to be a large proportion of the time under negative pressure to the Core Lobby outside 6B, up to minus 11 Pascals. This means that depending on which doors are opened in this lobby air is being pulled into 6A. The problem is not so bad at the other entrance but still present. This fact in not controlling air movement around 6A is likely why the fungal and cryptococcal counts are so poor compared to 4C and 4B. Added in draft by JH on 25.2.20. The question was asked if there was any other way other than air that Cryptococcus could be present but John Hood does not believe there is.</p> <p>John Hood reported on the totals of Cryptococcus isolates in the wards (Dec 2018 – Dec 2019) being 96, of which 69 are <i>N. diffluens</i>. Of the 96 isolates there are only 6 <i>N. albida</i>, 10 <i>F. uniguttulata</i> and 10 <i>Cutan curvatus</i> (which only appeared in Aug 2019).</p>	



<b>'Cryptococcal species' isolates from air sampling 21 Dec 2018 to Dec 2019</b>							
	<i>N. diffluens</i>	<i>N. albida</i>	<i>N. albido-similis</i>	<i>F.uniguttulata</i>	<i>Cutan. curvatus</i>	ID TBC	Total
<b>*Dec 21<sup>st</sup> 2018</b> n=53	14	0	1	0	1 Roof#	0	<b>16</b>
<b>Jan 19</b> n=422	24	3	0	0	0	0	<b>27</b>
<b>Feb 19</b> n=440	0	0	0	1	0	0	<b>1</b>
<b>Mar 19</b> n=320	4	0	0	1	0	0	<b>5</b>
<b>Apr 19</b> n=334	2	0	0	0	0	0	<b>2</b>
<b>May 19</b> n=420	7	3	0	3	0	0	<b>13</b>
<b>Jun 19</b> n=448	8	0	0	0	0	0	<b>8</b>
<b>Jul 19</b> n=419	3	0	0	2	0	0	<b>5</b>
<b>Aug 19</b> n=150	3	0	0	1	9	0	<b>13</b>
<b>Sept 19</b> n=98	2	0	0	0	0	0	<b>2</b>
<b>Oct 19</b> n =	0	0	0	0	0	0	<b>0</b>
<b>Nov 19</b> n =	0	0	0	2	0		<b>2</b>
<b>Dec 19</b> n=	2	0	0	0	0		<b>2</b>
<b>Total sf</b>	<b>69</b>	<b>6</b>	<b>1</b>	<b>10</b>	<b>10</b>	<b>0</b>	<b>96</b>

- FIGURE 2**

**Positive Crypto spp. Results by month and per number of samples**

<b>Month</b>	<b>No of positives</b>	<b>No of samples</b>
<b>December 21 2018 (1day)</b>	16	53
<b>Jan 2019</b>	27	422
<b>Feb 2019</b>	1	440
<b>Mar 2019</b>	5	320
<b>Apr 2019</b>	2	334
<b>May 2019</b>	13	420
<b>Jun 2019</b>	8	448
<b>Jul 2019</b>	5	417
<b>Aug 2019</b>	13	136
<b>Sept 2019</b>	2	82
<b>Oct 2019</b>	0	84
<b>Nov 2019</b>	2	
<b>Dec 2019</b>	2	

## Item

## Action

5. Update on Airborne Fungal Count Data in 6A, 4B, 4C and also including Beatson B8 and B9 (Previous BMTU)

Previously John Hood said they looked at the fungal counts in individual rooms to see what rooms are better than others and the table below details this:

	Total samples*	Total counts	Mean count (95% CI)	Median count	No. (%) of samples with counts > 0
4B rooms	217	238	1.10 (0.80 – 1.40)	0	82 (38%)
4B corridors	47	153	3.25 (2.73 - 3.77)	2	37 (79%)
4C rooms	126	325	2.58 (1.54 – 3.62)	1	75 (60%)
4C corridors	22	112	5.09 (3.44 - 6.74)	2	19 (86%)
6A rooms (outlier removed)	240	1181	4.92 (3.98 – 5.86)	2	192 (80%)
6A rooms	241	1526	6.33 (3.41 – 9.25)	2	193 (80%)
6A corridors	24	345	14.4 (10.95 – 17.87)	13	24 (100%)
Beatson	218	120	0.55 (0.24 - 0.86)	0	21 (18%)

At the Beatson, John Hood said the counts that were taken were actually from the BMT unit (B8 and B9) and the samples were taken were from 2016 – 2018. In the Beatson 80% of samples taken had 0.0 counts, 4B had 60%, 4C had 40% and 6A had 20% of counts of 0.0. Susie Dodd said she is concerned with the difference in the results for the Beatson and 4B and John Hood said this could be that 4B was not designed to the same standard as the Beatson which Susie says supports what we have discussed at a number of meetings. Darryl Conner asked why 4C is 20% better than 6A and if this is due to the difference in the number of samples taken. John Hood said that this difference was not due to less samples being taken. He replied that a certain number of rooms in 4C are for haem-onc patients and so there are less rooms to test. 4C has positive pressure in the corridor and pushing air out and the air coming out of 4C is at times going into 4B. Darryl Conner mentioned that there are similar size Plant Rooms for 6A and 4C yet 4C has positive air coming out and breaching 4B at times. 6A does not have this as there is not the same amount of air in the corridor.

With regards to Aspergillus counts in 4B there were 217 samples taken, 9 counts with Aspergillus growing, 4C had 126 samples taken and 7 counts had Aspergillus and in 6A there were 241 paired samples with 62 counts of Aspergillus with a mixture in them (24 with *Asp. versicolor*)

The cryptosporidium counts in the air samples were significantly higher in 6A and 4C than in 4B as noted below.

Proportion of samples with cryptosporidium

Ward	No. samples	No. crypto	% samples with crypto
4B	217	3	1.4
4C	126	7	6.0
6A	240	25	10

Item	Action
<p>John Hood commented that Ward 4B has adequate air changes,(6 ACH) with air uniformly leaking out from the rooms (9 to 10 Pascals) but there are no HEPA filters in the corridor or a solid ceiling in the corridor and he said this needs to be addressed.</p> <p>Peter Hoffman commented that he cannot see why there should be fungal counts at all in 4B rooms. He asked if samples were taken with doors to the corridors closed and this was confirmed that they were. Ian Storrar asked if it was standard practice for the ward to work with the door open but Colin Purdon advised that if the door is left open for two minutes an alarm goes off at the nurses station.</p> <p>Peter Hoffman suggested to compare counts in the room to the corridor as they should be higher in the corridor. (Inserted in Draft by JH – this has been done – see above Table 'Update on Airborne Fungal Count Data in 6A, 4B, 4C and also including Beatson B8 and B9 (Previous BMTU)' where Corridor counts are clearly higher than Rooms in 4B) <b>PH to comment</b></p> <p>Darryl Conner advised that in the rooms (6A and 4C) the air is delivered to the chilled beams and that is the air supply (with only 3 ACH as opposed to 6-10 ACH (in e.g. 4B or Beatson B8/9). <b>Ian Storrar asked if there was infiltration from outside and Darryl confirmed there was none as there is 2m per second to overcome 10pc barrier. He said they would need to carry out a permeability test which has not been done since the commission of the hospital.</b></p> <p><b>Darryl Conner commented that it would be helpful to see what the counts would be on an unoccupied site. DC to check and clarify.</b></p> <p>Peter Hoffman asked could there be a problem with samples being contaminated on transfer to the Lab and John Hood replied that sampling is carried out by the same staff that had done the testing previously at the Beatson top floor (BMTU). John Hood confirmed that he had every confidence in the staff carrying out the air testing who were very experienced and competent (and were those testing at the Beatson in 2016-2018).</p> <p>With regards to the information received today Susie Dodd asked if there is an action for the group for the next meeting regarding the results received. John Hood advised that he will have a look at the results up to November 2019 and will look at the results for 4B. Darryl Conner said that it would be interesting to see if 6A had improved as rooms should be better as they <b>have higher pressure to previous.</b></p>	<p>JH</p>
<p><b>6. Update on Pigeon Ingress in Plant Room 123, Level 12 in November/December 2018</b></p> <p>In Plant Room 123 there was a significant ingress of pigeons with associated faeces and John Hood agreed to send the pictures of the Plant Room to the group. These had been taken by a contractor on the 28<sup>th</sup> November 2018 and the problem relayed to Darryl Connor early on 29<sup>th</sup> November 2018. (Note in Draft by JH 9<sup>th</sup> March 20) He said the pigeons had gained access through a hole in the roof and the area of the floor affected looks like it certainly had been wet/damp (?still damp). The most likely time of any aerolisation of the pigeon faeces was likely to be on 5<sup>th</sup>-6<sup>th</sup> December when Pest Control were carrying out the cleaning of this area. It is difficult to know how significant the degree of pigeon guano was in this Plant Room and for how long it had been present. John wondered if no one was actually going into the Plant Room how this could have been aerosolised – let alone then got into the air in an AHU, to be breathed in by a patient. <b>Peter Hoffman replied that Cryptococcus has its own way of landing in the air and yeast from this may not aerolise but would give off spores.</b> John Hood specifically asked if anyone (including from Estates) had attempted to clean this area up before Pest Control did on 5<sup>h</sup>/6<sup>h</sup> December. Colin Purdon advised</p>	<p>JH</p> <p><b>PS comment clarify</b></p>

Item	Action
<p>that only Pest Control would have been engaged in carrying out this task.</p>	
<p><b>7. Statements minuted, concerning the findings of this Group at two other Trust Management meetings</b></p> <p>Minutes of both the Finance &amp; Performance Committee and of the Management Team (paper 20/04) concerning QEUH and RHC Update, were presented at the GGC Board Meeting of 25<sup>th</sup> February 2020.</p> <p>Finance and Performance Committee  ‘Mr Steele went on to provide an overview of the work carried out in respect of <i>Cryptococcus neoformans</i>. He described 6 hypotheses, considered and the outcomes of investigations of each of these. Mr Steele advised that all of the hypotheses considered <b>were ruled out</b> due to a number of factors and it was concluded that the likely source was that the spores were brought into the building from the incoming outside air’  Note that ‘were ruled out’ emboldened here by JH</p> <p>QEUH &amp; RHC Update  Paper no 20.04, para 3.4.5</p> <p>‘The hypothesis that the air from the plant rooms, via the AHU’s, was the likely source of the cryptococcal spores, specifically those of <i>C. neoformans</i>, which was then breathed in by the case patients, has subsequently been <b>categorically ruled out</b> as it is not technically possible.</p> <p>Note that ‘<b>categorically ruled out</b>’ emboldened here by JH</p> <p>John Hood has formally raised his concern about both of these formal, but incorrect, statements likely to now be in the Public Domain, with the Director of Infection Prevention &amp; Control.  Gerry Cox asked why John was not consulted regarding the update and he said this was feedback given to a senior management meeting.  He (JH) would have preferred if the wording had said that the postulated source of the Plant Room air and thence into the air handling units (AHUs) during a filter change etc is very very unlikely but that we cannot definitively exclude the Plant Room air as a possible source via the Risers and Voids.</p> <p>It is also untrue to say that all other hypotheses have been excluded. At least 3 are still possible. As mentioned: the Risers/Voids, plus the Cylinder Room near PICU and ? the most likely hypothesis: simply the lack of adequate ‘protective isolation’ in 6A and 4C that could have allowed passage of incoming air/unfiltered air with <i>C. neoformans</i>, if present, through non HEPA filtered air and uncontrolled air movement around the entrances/exits of 6A and 4C etc.  Susie Dodd reported that hypothesis 1 (Plant Room via AHU) was shared to the group by Tom Steele to comment on and it would have been better to say there was no source found regarding this hypothesis but there could be a common route. <b>SD happy?</b></p>	
<p><b>8. Update on Report from the Cryptococcus Incident Management Team Expert Advisory Sub-Group</b></p> <p>John Hood updated that he is working on the report and following several lines [REDACTED] to see if there is a link and at what point [REDACTED] Cryptococcus.</p>	

Item	Action
<p>Darryl Conner asked what the likelihood of a immunocompromised patient being identified with <i>Cryptococcus</i> outwith a HEPA filtered environment. He was informed that this is a very rare infection full stop but also that this is even rarer in children but [REDACTED]</p> <p>[REDACTED] John Hood commented that [REDACTED] could also have had been exposed to this before they were admitted to hospital but, again, this is very difficult to prove and [REDACTED]</p> <p>In relation to the report Ian Storrar asked for the timescale for completion of this. John Hood said that he has still to look at the ecology/biology of <i>Cryptococcus neoformans</i> (needless to say quite complex) and well as other areas that need pursued/checked.</p>	
<p><b>9. AOCB</b></p> <p>Nil of note.</p>	
<p><b>10. Date and Time of Next Meeting</b></p> <p>There was no confirmed date set for the next meeting but John Hood suggested to maybe have one in approximately two weeks time. A diary request will be sent for this meeting.</p>	

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held

**Thursday 26 November 2020 at 1.00pm  
Via Microsoft Teams**

**Present:** Dr John Hood (chair), Tom Steele, Colin Purdon, Darryl Conner, Sandra Devine, Peter Hoffman, Susie Dodd, Ann Lang (minutes) Draft 2

**Apologies:** Ian Storrar

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>John Hood welcomed everyone to today's meeting.</p>	
<p><b>2. Update on Cases</b></p> <p>John Hood reported that Drs Inkster and Peters believe that [REDACTED] of the cases [REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	
<p><b>3. Update on Report from the Cryptococcus Incident Management Team Expert Advisory Sub-Group</b></p> <p>A copy of the draft report was issued to the group in late September for comments. John Hood reported that he received many comments on the report and is working his way through these.</p> <p>Peter Hoffman commented that there may need to be a structural change required to the document and said it would be helpful to define what 'protective isolation' is.</p> <p>Darryl Conner recommended that with regard to Hypothesis 4 - the Cylinder Room, to put in that this is relevant that the Cylinder Room is at the opposite side of the ward. Colin Purdon stated that the report could state that the room is nearby but not immediately adjacent. Susie Dodd also commented that it would be helpful to the reader to show the distance from PICU to Ward 6A. Check</p> <p>At Hypothesis 5 – Helipad Peter Hoffman suggested to put in the report from Quesada Solutions Ltd. regarding the helipad and not go into detail about this.</p> <p>John Hood said that he could put in the biology of the <i>C. neoformans</i> but important to note that <i>C. neoformans</i> was not found in any of the air sampling of any Plant Room.</p>	

Item	Action
<p>There were no issues of having opened the air handling units serving the rooms [REDACTED]</p> <p>[REDACTED]</p> <p>'Peter Hoffman stated that there is no control of air in the rooms and where it came from.</p> <p>Check wording/sense of above (JH).</p> <p>With regard to the effect of water/rain John Hood reported that the Group from the University of Oklahoma, in the late 1970's – early 1980's did a series of studies to look at the effect of water on both aerosolisation and on increasing the size of the capsule. He said if there is rain it makes it less likely that the spores would be aerosolised easily and the size of <i>Cryptococcus</i> would increase, making it less likely that the spores would reach the alveoli of the human. Peter Hoffman commented that if it rains for 15 minutes and then one hour later is there increase chance of aerosolisation.</p> <p>Clarify above</p> <p>John Hood replied at the time of [REDACTED] in the QEUH it rained for most of the first week of [REDACTED] admission and suggested that aerosolisation of any spores would be less likely as was larger spores getting into [REDACTED] alveoli.</p> <p>John Hood reported that he talked to the [REDACTED] regarding Hypothesis No 1: Plant Room Source. (added in Draft by JH)</p> <p>'The hypothesis was that air from a Plant Room (postulated to contain aerosolised spores of <i>Cryptococcus neoformans</i>, from the postulated presence of pigeon guano) could possibly gain access to the patients via the Air Handling Units (AHUs) when they were shut down and opened to replace the Final Filter – thus allowing aerosolised spores (if present in the Plant Room air) down the then 'filter-less' duct. The theory was that the air would be pulled into the AHU through the open door and proceed down the duct to the patients. In reality the OPPOSITE happens. When the AHU is shut down and the door opened – and the Final Filter removed - air is driven at some force, OUT of the duct INTO the Plant Room – a presumed thermal effect – NOT down the duct to the patients.</p> <p>Perhaps more importantly, in terms of [REDACTED]: NO AHUs that served any of the Wards/individual PICU rooms <b>were shut down and opened</b>, during the time that [REDACTED] were present in these Wards/individual rooms in PICU'</p> <p>After discussion with Peter H this paragraph was also added to the response to the relatives:</p> <p>It is also important to point out that when the ventilation system is operational (i.e. when the AHU is ON) that the part of the AHU from the fan onwards (about half way down the Unit) is all under positive pressure i.e. the air within the Unit can leak OUT but air CANNOT leak IN. Next the air goes through the fine filter (Final Filter) prior to entering the duct work which takes the air to the wards and rooms that it serves. It is also important to realise, that from that fine (Final Filter) in the AHU to the Ward/room, that the duct work is also under positive pressure, therefore as above, filtered air can leak OUT of the duct, BUT unfiltered air cannot leak INTO the duct.</p> <p>Therefore in summary: both outside air via the air intakes and any ingress of Plant Room air gaining access prior to the fan in the AHU (as this part of the AHU is under negative pressure, so air can leak IN) – will BOTH be met by the <b>same</b> Final filter. Air after passing the Final filter and entering the duct work is under positive pressure, so that air will always leak OUT not IN and therefore this gives the protection of preventing ingress of unfiltered air into all of that duct work'.</p>	

## Item

## Action

The following update was provided by Estates.

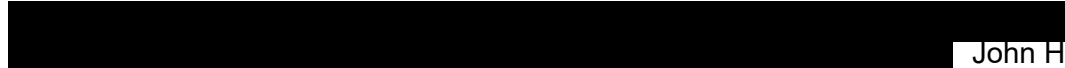
Colin Purdon said maybe not to use the word “fail” at the beginning of the report when it states that “we failed to grow *C. neoformans* from outside air”. John Hood updated that we were not growing Cryptococci in outside air but could grow other species e.g. *C. uniguttulatus* etc. in air in the hospital and wondered why not growing *C. neoformans* in these rooms. (Added in draft by JH: Of course, it may be simply because there was no *C. neoformans* in the air to grow) Colin also queried if we should include the “Staib’s Medium” and to maybe change the wording. The group agreed to use the word “unfeasible” (to describe Hypothesis 1 – added in draft by JH) in the report.

On looking at the ventilation in Wards 4B and 4C John Hood reported that 4C has ventilation in the corridors but 4B does not and such is the volume of air in 4C’s corridor is that it pushes air into the last room of the Ward. He said this is the complexity of the systems in the hospital. There is lack of control of the air of key wards at the entrances /exits. It is extremely difficult to determine the air flows around different ward entrances/exits with nearby doors to the facilities corridor (on each floor), door to the next Ward and door to the Lifts. The air movement depends on which of at least 3 doors are open or closed and this varies depending on which ward i.e.4B,4C or 6A. Peter Hoffman commented that when the ventilation was put into the building it did not achieve any controlled air flow pattern. Discussions previously included to have double doors to these areas to protect the area as much as possible.

Darryl Conner confirmed that the only defined ventilation was in 4B and they have 25 designated HEPA- filtered, positive pressure rooms and with air uniformly leaking outwards. Also note no actual ventilation in 4B corridor – only spill out from rooms. Also note issue in 4B discussed in next paragraph. (JH in draft). Tom Steele advised that the standards we have now are better. It was noted that there are no standards for protective isolation and there are various examples of good practice and Peter Hoffman felt this should be included in the report.

With regards to Hypothesis 3 – Lack of Protective Isolation (added by JH) Darryl Conner reported that there is no defined pressure cascade in 4C and 6A, but stated there is nothing to constitute a defined cascade. In 4C John Hood stated that the ventilated corridor is pushing air out of the ward and air counts are not significantly different from 4B (this is more of a worry for 4B) JH. Indeed, at the 4B/4C entrance/ exit interface which are opposite each other and the 4B entrance/exit is sealed up – but it is a fire exit so cannot be completely sealed off. If given the right configuration of nearby opened or closed doors/external conditions we have clearly found that periodically, air is pushed into 4B from the surrounding area. This is confirmed with air testing of the rooms at the end of that corridor. This is a worrying and clear example of lack of control of the air around this critical area.

Darryl said that there is a variability of traffic in the two wards and there is a higher air change rate in 4B and more leakage in the room. DC to clarify. Where 4C is it is measured as positive and the orientation of the mechanical ventilation has a supply grill near to the door at Room 79. He said there could be variable and could have a situation where various barriers are moving. This is highlighted as there is not a designated defined pressure cascade for the doorway which is not definitive. DC to clarify

 John Hood advised that he looked at the patients who had Cryptococcus in the last 10 years to relate their address to their proximity to parks and all 18 cases were close to parks but John said this is circumstantial.



Item	Action
<p>John Hood concluded that it is unlikely whether it can be proven [REDACTED] [REDACTED] contracted Cryptococcus in the hospital or not.</p>	
<p><b>4. AOCB</b></p>	
<p>Over the past 10 years John Hood reported that some years there have been no cases of Cryptococcus at all with 6 out of the 10 years maybe having one case (3) or 0 cases (3).</p>	
<p><b>C. neoformans cases in GGC over last 10 years</b></p>	
<p>On looking at patients in GGC over the last 10 years John Hood reported that some of these patients had alcohol liver disease etc and these patients are not as immuno-compromised as Haematology/Oncology patients. He said HIV people are probably the most at risk of getting Cryptococcus as they have very low levels of the appropriate T cells to respond to this. Sandra commented that a large group of patients in QEUH are vulnerable to contracting Cryptococcus. This will be discussed at the next meeting JH</p>	
<p><b>Genomics</b></p>	
<p>[REDACTED]</p>	JH
<p>[REDACTED] In the UK and in Glasgow we just do not have that sort of information.</p>	JH
<p>[REDACTED] He will also ask the Reference Lab in Bristol if they keep all the Cryptococcus isolates sent from Glasgow for confirmation. If so, he can give them a list of the patients (and the underlying risk factor) from 2009 – 2018 (about 12 excluding the 2018) cases. The next question would be if the Broad Institute might agree to doing these 12 genomic sequences. This hopefully would give an idea of the genomic types in the patients in GGC and consequently those types which must be present in the environment here.</p>	
<p><b>5. Date and Time of Next Meeting</b></p>	
<p>It was agreed to have a further meeting to go through the comments from HPS. The next meeting will be held on Thursday 3<sup>rd</sup> December at 11.00am via Microsoft Teams.</p>	

**Cryptococcus IMT Expert Advisory Sub-Group****Notes of Meeting held on****Thursday 10 December 2020 at 1.30pm**

**Present:** Dr John Hood (chair), Colin Purdon, Darryl Conner, Sandra Devine, Susie Dodd, Annette Rankin, Tom Steele, Ian Storrar, Peter Hoffman, Ann Lang (minutes)

Minutes of Previous Meetings – 26/11/20 and 03/12/20

The notes of the meetings of 26<sup>th</sup> November 2020 and 3<sup>rd</sup> December 2020 were issued to the group prior to the meeting. John Hood stated that the changes are highlighted in red. If there are any further comments on these minutes the group are to let John know.

Comments Received on Draft Report from HPS/HFS

## 1. Comment 11

‘Pigeon ingress and fouling was found in Plant Room number 123’

‘Is this correct designation?’

Yes it is.

Ian Storrar said it is fair to say there was fouling in other Plant Rooms but John Hood informed that there was significant amount in Plant Room 123. He said he was taken round all the Plant Rooms on site and did not see significant amount of pigeon iguano in other Plant Rooms. Ian Storrar commented that when he was on site late January there was bird ingress and from a timeline point of view he said we need to be accurate regarding this.

## 2. Comment 12

‘... no air handling units were shut down and opened, any any time during the time that

‘Are we saying that essentially the air handling systems are closed circuits and shutting an AHU down for filter change is opening the circuit to potentially allow spores to contaminate the system’

The theory put by a couple of Consultant Microbiologists was that spores were down the duct but John Hood said this was not the case. He said to refer to the minute of 26<sup>th</sup> regarding the reason why the theory was pigeon ingress in the Plant Room that got into the AHU when shut down. Susie Dodd advised that if the content of the minute of 26<sup>th</sup> is included in the report she is happy with this wording.

3. Comment 13

'These positive air samples are NOT related to obvious pigeon ingress / faecal contamination of any of the Plant Rooms'

'Why is it not related to the Plant Rooms'

*Cryptococcus neoformans* has never been found from air samples. John Hood said that Cryptococci samples were taken after cleaning was done and they are still finding Cryptococci species which might be due to ingress of outside air, the lack of protective isolation and dirty unfiltered air getting into the ward areas. Ian Storrar recommended that this is clarified/articulated in the report from the reader's perspective.

4. Comment 14

'Suggests that the *Cryptococcus neoformans* could be present in the incoming air itself'

'Would/should filters on AHU be removing any incoming Cryptococci'

John Hood said F7s likely to remove fungi.

5. Comment 15

'Cryptococci (including *C. Neoformans*) is most likely to be periodically present ...'

'What does the literature say about this?'

John Hood updated that there is not much literature available in the UK but more in the States.

6. Comment 16

'Cryptococci (including *C. Neoformans*) is most likely to be periodically present ...'

'Should it be filtered out?'

Unless fit HEPA filters take everything out.

7. Comment 17 and 18

'Filtration of air destined for 'general wards' (including 6A and 4C is of F7 standard (80% filtered ...'

'This requires some background as to why these patients are in wards which have ventilation systems designed for general wards.'

'Air filter classifications have changed and need to reference ISO16890 or EN779...'

When building the Beatson it was designed to an American standard but clinicians found that this would not work with BMT and Haemato-oncology patients with no ITU on the Beatson site. At the QEUH site it was found that the same system that was previously in the Beatson could not be installed as this was late on in the building stage to change the ward. This meant there was a lack of HEPA filtered air in Haemato-oncology and did not have positive pressure air.

Susie Dodd said this will not be understanding to the reader when patients would not be in a general ward and suggested that it is more descriptive in the meaning. Annette Rankin also commented that we need to be clear when saying a general ward. She said to look at the hypothesis gathered and explored then give a view but not go into individual clinical views.

John Hood [REDACTED]

[REDACTED] Sandra Devine

[REDACTED] the board can take legal advice regarding this. John Hood said he will discuss with Peter Hoffman the possibility of exposure to air outside of the hospital as there is Cryptococci in the air.

#### 8. Comment 19

'In areas where protective isolation is required e.g. Bone Marrow Transplant Units (BMTU/Haemato-oncology ward), filtration should be of a HEPA filter standard, i.e. 99.9%'

'As above, the reader would naturally ask [REDACTED] HEPA filtered wards'

John Hood reported that HEPA filtered air and positive pressure air in room is leaking outwards. Susie Dodd said [REDACTED] not in a protective isolation ward but not said why. In Ward 4B John said that they have HEPA filtered air but the ventilation in the corridor is a spill over as at either end of the ward they have doors which means the area is not sealed completely with the air coming out of Ward 4C. Tom Steele stated that [REDACTED] was considered to require a specialist ventilated room. He said the vast majority of the campus enjoys good class of air and some areas have a high quality of air. John Hood commented that Ward 4B is not a protective environment but Tom Steele said this is better than a general environment.

Ian Storrar suggested that this is articulated why [REDACTED] not in a protective isolation room, why they were put in a general ward and what the risk factor is. Sandra Devine said this would be a clinical decision where the patients are placed. Darryl Conner confirmed that that this patient cohort is definitely served by terminal filtered air. Sandra Devine reported that it was MD Group with a commissioner of BMT that looked at the unit as knew it was not 10 air changes with 10 pascals and was not what was wished for. The process was then to look at the risk from the board's point of view and the board decided that patients could not be left at the Beatson as no ITU was available. Darryl Conner stated that Ward 4B is the best environment for neutropenic patients and asked if the decision making process was available for this group. Susie Dodd advised that an Options Appraisal was carried out regarding this.

In relation to all the comments received on the report Annette suggested that the comments are tabulated and the group can then accept or reject these as there are still a few comments to look at.

John Hood said his preference would be to go through the individual comments for the group to discuss. It was agreed that John would look at all the comments and enter in the responses received for discussion at the next meeting.

Susie Dodd said that they could offer assistance to look at any literature reviews but John Hood informed that he has already done this.

Annette Rankin recommended that the membership for the Terms of Reference is updated to reflect the members on the group as of today. Ann Lang to forward the Terms of Reference to John Hood.

#### Date of Next Meeting

The next meeting has been arranged for 12 noon on 17<sup>th</sup> December via Microsoft Teams.

**Cryptococcus IMT Expert Advisory Sub-Group****Notes of Meeting held on****Thursday 17 December 2020 at 12 noon**

**Present:** Dr John Hood (chair), Colin Purdon, Darryl Conner, Sandra Devine, Susie Dodd, Annette Rankin, Tom Steele, Peter Hoffman, Ann Lang (notes)

John Hood reported that the comments regarding numbers 1 – 10 from HPS/HFS were discussed at the previous meeting. From these discussions he confirmed that there were four *Cryptococcus neoformans* cases as two were identified in the community.

Sandra Devine asked if this was classed as a cluster or data exceedance as the typing does not match. John Hood replied [REDACTED] there is no evidence to suggest [REDACTED] did not get this from the hospital.

With regards to Comment 9 Susie Dodd stated that the report states in the text BMT patients when it should be Haematology-Oncology patients. John Hood commented that he did not realise that BMT patients can get *Cryptococcus neoformans* until he read the literature. Susie Dodd also stated that what is mentioned in some of the minutes from previous meetings are not included in the report.

Comments Received on Draft Report from HPS/HFS1. Comment 11

‘Plant Room number 123 is this correct designation?’

Yes it is.

John Hood reported that this Plant Room had the most pigeon ingress but did not serve the [REDACTED] Ward 6A and then in PICU.

2. Comment 12

‘... no air handling units were shut down and opened, any any time during the time that [REDACTED] patients in any of the wards that they were admitted to’

‘ This doesn’t explain to the reader what the significance of shutting down an air handler is. Are we saying that essentially the air handling systems are ‘closed circuits’ and shutting an AHU down for filter change is opening the circuit to ‘potentially’ allow spores to contaminate the system?’

No as John Hood discussed previously.

3. Comment 13

'These positive air samples are NOT related to obvious pigeon ingress / faecal contamination of any of the Plant Rooms'

'Can we say this is an absolute? Need to summarise/explain – why is it not related to the plant rooms, all of which have had routine inspection and routine cleaning since late December 2018 / January 2019?'

John Hood said yes we can. Susie Dodd asked if we can say it is very unlikely based on A, B, C? Testing was done after pigeon area was cleaned up. Air sampling is only a snapshot of the place in time. John Hood said the [REDACTED] are not the place in time and after the beginning of 2019 there was no evidence that pigeons had anything to do with this as not grown *Cryptococcus neoformans*. Susie Dodd replied we could say highly unlikely but cannot say absolutely not.

With regards to the air supply Peter Hoffman reported that any air that got into the supply would not get through without going through the air filter. The arrangement of components in the air handling unit were that there were no ingress of unfiltered air in the air handling unit. He suggested to put wording in as "unfeasible route of transmission".

4. Comment 14

'All this suggests that the *Cryptococcus neoformans* could be present in the incoming air itself and **NOT** from pigeon guano in the Plant Rooms'.

'Would/should filters on AHU be removing any incoming Cryptococci?'

Agreed.

5. Comment 15

'Cryptococci (including C. Neoformans) is most likely to be periodically present ...'

'What does the literature say about this?'

John Hood updated that there is not much literature available in the UK. Darryl Conner asked where does the risk exist when the filter is removed. John Hood commented that the air in the Plant Room is not responsible [REDACTED] is impossible when moving the air handling unit for air to get into the duct. This was carried out in Plant Room 12 as this is the area that had problems with the pigeons. Darryl Conner say to note that every air handling unit serves the area below it and it will always be a stack effect. Susie Dodd asked if it can be explained to the reader what the filter does, what it should filter out and if *Cryptococcus neoformans* can get through the filter.

Darryl Conner recommended that a new paragraph be added regarding the comparison of previous efficiency measures. E.g the previous F7 bag filter was 80% efficient as opposed to the AP1 rating. To also relate the previous F7 filter to the actual % filtration to certain particle sizes.

6. Comment 16

'...enter the AHU's and then subsequently some may still be present in the air filtered by them.

'Should it be filtered out?'

As the BMT Unit at the Beatson had to transfer to the QEUH as there was going to be no ITU situated there John Hood stated that there was not the same number of beds available. Annette Rankin reported that at the start of the new build the BMT Unit could not be replicated at QEUH as the project was too advanced to build a purpose BMT Unit. She recommended that what upgrade and work was carried out at QEUH for this to be reflected in the report.

7. Comment 17

'Filtration of air destined for 'general wards' (including 6A and 4C is of F7 standard (80% filtered ...'

'This requires some background as to why these [REDACTED] are in wards which have ventilation systems designed for general wards.'

Air filter classifications changed after this incident and need to reference ISO16890.

8. Comment 18

'Filtration of air destined for 'general wards' (including 6A and 4C is of F7 standard (**80% filtered ...'**

'Old standard stated here should be 80% at 4 microns'

Peter Hoffman stated that he is not sure of any guidance and what would be the result of the risk assessment. Darryl Conner said he can provide context regarding the efficiency rate as the F7 filter should be  $\geq 80\%$  of 0.4 microns. The standard installation is  $\geq 50\%$  efficiency at 1 micron.

9. Comment 19

'In areas where protective isolation is required e.g. Bone Marrow Transplant Units (BMTU/Haemato-oncology ward), filtration should be of a HEPA filter standard, i.e. 99.9%'

'As above, the reader would naturally ask why these [REDACTED] such HEPA filtered wards'

Presuming [REDACTED] were not protected in hospital. Peter Hoffman commented that the point is what protection did the hospital provide [REDACTED].



10. Comment 20

'Therefore a possible route is that cryptococcal spores are entering through the outside air ...'

Susie Dodd said we have ruled out the air handling units and *Cryptococcus Neoformans* could have come from other routes. She did query why did we have two cases in a short period of time and why we think two cases in close proximity have other reasons. John Hood replied that he can add in the possibility but not sure of the reasons why.

11. Comment 21

'... addressed which will be expanded in the final report ...'

'Will the next draft of this report be in full including the content to be addressed here?'

Agreed.

12. Comment 22

'Hypothesis – 3 – Protective Isolation'

'Why is this in the title? Patients weren't in protective isolation'.

It was agreed that the report needs to include [REDACTED] *Cryptococcus Neoformans* should have been in isolation.

13. Comment 23

'Air testing has also revealed the presence of other types of fungi, e.g. *Aspergillus* species'

'Need to expand – why is a risk to the BMT patient group and were they at more risk because they weren't in protective isolation? Need to also reflect the building not being a sealed environment (it's not meant to be) and this would be expected in other healthcare facilities'.

This covers the BMT group.

14. Comment 24

'Hypothesis – 4 - The Cylinder Room'

'More detail required for this section. Any air sampling? Surface sampling? Would a diagram of the ward layout be helpful here?'

A diagram of the area will be included in the report.

15. Comment 25

██████████ was in a PPVL (Positive Pressured Ventilated Room) room in PICU (nearby). This is therefore a possible but less likely route ...'

'Why is it possible if PPVL room functioning correctly?'

Agreed. John Hood informed that air can enter a PPVL room. These rooms will leak and not to be at neutral pressure and either have slight positive or negative pressure. If there is negative pressure air can get out of the PPVL rooms.

16. Comment 26

'Computational Fluid Dynamics model was commissioned by GGC. There was no evidence to suggest the Helipad contributed to the problem'.

'Will the findings of this report be in the next draft?'

Agreed will be put on as Appendices in the report.

17. Comment 27

'Discussed at length in Expert Group the consensus of which was that the 'risk related to the pneumatic tube system is likely to be small'.

Need to state more about what was discussed for transparency and the discussion around this needs expanded.

18. Comment 28

'NEW HYPOTHESIS: 7- DORMANCY/LATENCY and the PROBLEM of the INCUBATION PERIOD'

'Need to bring in time/place/person link here and discuss probability of dormancy/latency on that background'.

John Hood informed that the incubation period could be 5 – 7 days to over 100 days and cannot rely on how long exposure takes.

19. Comment 29

In other words the hypothesis is that, ██████████ could have acquired the *C. neoformans* prior to their admission into the QEUH/RHC. Presently I believe that would be more likely in the ██████████ (see later).

It was agreed to delete the wording 'I believe' from the sentence.

20. Comment 36

‘DIFFICULTY IN DETERMINING THE ACTUAL TIME OF EXPOSURE TO *Cryptococcus neoformans* AND RELATING THAT TO WHEN THE SYMPTOMS OF THE DISEASE FIRST OCCUR i.e THE INCUBATION TIMES’

‘Need to discuss the relevance of HIV/AIDS – that the majority of the literature is largely focused on this patient group and that it is also a disease associated with immunosuppression like patients undergoing BMT’.

If literature is to be reviewed need to know methodology was approved and Susie Dodd asked how would we know if the papers are relevant or too old. John Hood replied that he is happy if HPS want to look at the literature.

21. Comment 39

‘While this work is on SOT patients, it shows how variable and complex the incubation period in *Cryptococcus neoformans* can be, and that this is also likely to be the case [REDACTED] in the QEUH/RHC’.

It was agreed to develop this section further.

22. Comment 40

‘Substantial evidence establishes a link between the worldwide distribution of *C. neoformans* and pigeons’.

‘How substantial? Do we need to verify this?’

Paper written a while ago to suggest this. Peter Hoffman advised that *Cryptococcus neoformans* is also found in rotten wood. He suggested not go into such detail in the report.

23. Comment 41

‘...that the fungus could originate in the soil and flourish in this particular environment after the soil is contaminated with bird guano’.

‘Think we need to note whether there is any soil around the site as well as the pigeons themselves?’

John Hood said that he is still not sure if the site is capable of growing *Cryptococcus neoformans* as he would expect to see more cases in the outside air. He confirmed that he will look at the wording relating to this.

24. Comment 42

‘These lines of evidence indicate that the environment in the gastrointestinal tract of pigeons does not favour multiplication of the fungus, and pigeons are not likely to be systemic carriers of *Cryptococcus* in nature. This contradicts the paragraphs above’.

Comment – *Cryptococcus* does not grow or infect the pigeons.

25. Comment 43

'As well as the above paper the following other Review articles are informative'.

'Assume these will be fully critiqued and summarised in final version of report?'

HPS to look at these.

26. Comment 45

'I will deal with the

[REDACTED]

It was agreed to reword this section.

27. Comment 46

'I refer to the work done, particularly in children, with respect to childhood exposure and dormancy/latency/reactivation. See the Section on Cryptococcosis in Children. Also note that childhood *C. neoformans* is a rare event compared to the disease in adults which in itself is a rare disease'.

'Ensure there is no identifiable data in final report. Should be identified as 'case 1/case2' for example'.

Agreed.

28. Comment 47

'Information, discussed below, gleaned from the Significant Clinical Incident: Investigation Report – Confidential and interrogating the Haematology Results'.

'If the findings of this report impact on the discussion contained within this report, can it be shared with the group?'

Sandra Devine agreed to check if the Investigation Report for the Significant Clinical Incident can be shared with the group.

29. Comment 48

'Note that we already know from Public Health that there were three other cases of *C. neoformans* infections, from different areas, within the GGCHB in 2018. Therefore it is highly likely that they contracted this from breathing air containing *C. neoformans* spores while in the community (need however to check if they were on holiday etc, visited other places etc, before and during this period)'.

'We know very little about the case histories of these [REDACTED] and therefore it is difficult to fully understand the relevance to 2 suspected HCAIs?'

Annette Rankin updated that the Environmental Sub Group asked to look [REDACTED] need to seek clarity if the group needs to investigate these, although this was not escalated anywhere. She said that the remit of this IMT was to look at the potential of these [REDACTED] and now we are saying they may potentially be [REDACTED]. It was noted that Teresa Inkster was the chair of the Cryptococcus IMT and will be looking at the report and Iain Kennedy carried out an epidemiological review and presumed this was discussed at the IMT. John Hood advised that he has to explain about the [REDACTED] and the relation to the air handling units and felt this should be in the report

30. Comment 62

'The other relevant information [REDACTED] – which would possibly be/have been a likely environmental source'.

'How so?'

Looked at when rain was falling at [REDACTED].

-----  
Comment 61 (from your notes)

Darryl Conner and Tom Steele to discuss.

Comment 63 (from your notes)

In what way – needs to be schematic

Comment 66 (from your notes)

Discuss with Darryl Conner and Tom Steele

Comment 67 (from your notes)

Removed.

Comment 69 (from your notes)

Susie Dodd asked what methodology was used for review and chosen for report. Usually date is picked and to exclude papers prior to the date chosen.

Comment 71 (from your notes)

Discuss with Tom Steele and Darryl Conner.

Comment 73 (from your notes)

No relationship between soil and Cryptococcus. Susie Dodd asked how were Plant Rooms checked, who did this and how was it done? Need to clarify this to the reader.

Comment 76 (from your notes)

To be part of literature research.

Date of Next Meeting

The next meeting has been arranged for 12 noon on 14<sup>th</sup> January via Microsoft Teams.

## Cryptococcus IMT Expert Advisory Sub-Group

### Notes of Meeting held

**Thursday 14 January 2021 at 12 noon  
Via Microsoft Teams**

**Present:** Dr John Hood (chair), Colin Purdon, Darryl Conner, Sandra Devine, Annette Rankin, Peter Hoffman, Susie Dodd, Ann Lang (minutes)

**Apologies:** Ian Storrar

Item	Action
<p><b>1. Welcome and Introductions</b></p> <p>John Hood welcomed everyone to today's meeting.</p>	
<p><b>2. Previous Minutes 26<sup>th</sup> November 2020</b></p> <p>The minutes of the meeting held on 26<sup>th</sup> November 2020 were issued to the group prior to the meeting.</p> <p>John Hood said that he had issued these as he had not received any comments. Susie Dodd confirmed that she had sent comments back on 15<sup>th</sup> December regarding the minutes of 26<sup>th</sup> November and 3<sup>rd</sup> December. Susie agreed to resend these.</p> <p>In the minutes John Hood said the red details what he has amended from the original minutes and any updates or discussion required from members.</p>	SD
<p><b>3. Previous Minutes 3<sup>rd</sup>, 10<sup>th</sup> and 17<sup>th</sup> December 2020</b></p> <p>At the meeting of 3<sup>rd</sup> December John Hood said the group discussed the comments received regarding numbers 1 – 5 of the draft report.</p> <p>On 10<sup>th</sup> December the group discussed numbers 6 – 10 of the draft report at the meeting. John Hood reported that there will be additions to what was previously issued as he has added in references.</p> <p>The meeting of 17<sup>th</sup> December discussed numbers 11 onwards of the draft report.</p> <p>It was agreed that Ann Lang will rename the documents that were issued with clear names and forward this to the group for return comments by 26<sup>th</sup> January. This will allow John Hood to update the report prior to the next meeting scheduled for 28<sup>th</sup> January.</p> <p>John Hood said that he will be in contact with people directly if he requires further clarification or updates on any points.</p>	AL  JR
<p><b>5. Date and Time of Next Meeting</b></p> <p>It was agreed to have a further meeting to go through all the comments received on the draft report.</p> <p>The next meeting will take place on Thursday 28<sup>th</sup> January at 12 noon via Microsoft Teams.</p>	

## QEUH/ RHC Cryptococcus IMT – Expert sub-group

### Draft Terms of Reference



#### **Purpose of the Group:**

The primary purpose of the sub-group is to:-

- Provide expert advice and evidence to the Incident Management Team on the current and any further hypotheses relating to the Cryptococcus Incident within QEUH/ RHC.

#### **Role & Remit:**

- Review the current main hypotheses relating to the presence of Cryptococcus species within air samples at QEUH and RHC.
- Review the associated engineering and microbiology data informing the main hypotheses.
- Consider all potential sources through review of the full ventilation system, outdoor areas/ courtyards and the helipad.
- Develop and advise IMT on current hypotheses and any further hypotheses identified through review
- Advise on related control measures including airflow changes, HEPA filtration, enhanced cleaning and building management.

#### **Accountability:**

The group will be chaired by Dr John Hood, Consultant Microbiologist.

The group will report to, and take direction from, the Incident Management Team through the IMT Chair.



**Membership:**

Dr John Hood (Chair)	Consultant Microbiologist
Tom Steele	Facilities Director
Colin Purdon	Senior Estates Manager
Ian Powrie	Deputy General Manager - Estates
Annette Rankin	Nurse Consultant, HPS
Ian Storrar	Head of Engineering, HFS
Dr Peter Hoffman	Public Health England (on advisory basis)
Dr Andrew Seaton	Consultant Physician Infectious Diseases
Darryl Conner	Authorised Engineer
Tom Walsh	Board Infection Control Manager



SCOTTISH HOSPITALS INQUIRY  
**Bundle of documents for Oral hearings commencing from 19 August 2024 in  
relation to the Queen Elizabeth University Hospital and the Royal Hospital for  
Children, Glasgow**  
**Bundle 9 - QEUH Cryptococcus Sub-Group Minutes**