SCOTTISH HOSPITALS INQUIRY

Bundle of documents for Oral hearings commencing from 12 June 2023 in relation to the Queen Elizabeth University Hospital and the Royal Hospital for Children, Glasgow

Bundle 4 – NHS Greater Glasgow and Clyde: Situation, Background, Assessment, Recommendation (SBAR) Documentation

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NHS Greater Glasgow & Clyde **Infection Prevention and Control Team**	
Purpose:	Update Paper
From:	Infection Prevention and Control Team
To:	Board Infection Control Committee
Date:	19 January 2015
Subject:	HAI Education Strategy NHSGGC

Background:	NHSGGC is required to comply with the following national policies in relation to Healthcare Associated Infections (HAI) education: **Mandatory Induction:** All Staff are required to complete HAI Mandatory Induction training as per NHS Education for Scotland Revised Framework for Mandatory Induction Training in Healthcare Associated Infection (HAI) 2012 (this replaces CMO (2004)18). This is available via learnPro and is delivered face-to-face during the nursing induction programme, and is administered via Learning and Education. This is essentially Standard Infection Control Precautions (SICPs). **Mandatory Update Training:** As per QIS Standard 5 (2008) each member of staff is required to attend or show evidence of HAI education undertaken on an ongoing basis. The content and frequency are not defined in the Standard however in NHSGGC this interval was defined as three years or less. There has been a rolling face-to-face programme of mandatory update training ongoing in NHSGGC Acute for several years. Face-to-face training is based on SICPs. The following are some of the types of HAI training offered via learnPro. **Cleanliness Champions – HDL (2005)7:** It was a requirement in this letter that all G-grade sisters / charge nurses (now Senior Charge Nurses) undertake the Cleanliness Champions Programme. NHSGGC has a total of 2982 members of staff who have completed this training programme. **NB** not all are SCNs. The following IPC Modules are available on learnPro: • Aseptic Technique • Antibiotic Prescribing • Bacterial Resistance • BBV's • *Clostridium difficile* - Clinical Scenario • *Clostridium difficile* - Online Tutorial • Food Hygiene • HAI Clinical Induction • Helping Patients Cope with Isolation in Hospital • Hospital Outbreak Management • Infections in Older Persons • Influenza • IV Medicines Administration • Management of Legionella Incidents • Microbiology • MRSA - Clinical Scenario

NHS Greater Glasgow & Clyde **Infection Prevention and Control Team**	
Purpose:	Update Paper
From:	Sandra McNamee
To:	Board Infection Control Committee
Date:	19 January 2015
Subject:	HAI Education Strategy NHSGGC

Situation	There are currently two issues within the context of HAI education that require to be addressed and although the IPC Education Strategy sets out the broad principles, the operational implications of this may be significant and are outwith the remit of the strategy document :
	
	• The HEI Inspectorate require update training to be completed in three-yearly cycles but are unable to articulate a specific topic or topics (ref HAI standard 5, 2006). The implication from the Inspectorate is that this should be based on SICPs but there are wide-ranging and arguably more relevant subjects for specific staff groups, e.g. prevention of surgical site infection, prevention of infection due to intravascular devices, aseptic technique etc. Clarity on what we accept as update training should be agreed and stated in the strategy.
	
	• Vale of Leven Report Recommendation 42 "*Health Boards should ensure that **all those** working in a healthcare setting have mandatory infection prevention control training that includes CDI on appointment and regularly thereafter . Staff records should be audited to ensure that such training has taken place*. This is sub-divided into two issues:
	
	  • It is possible to add basic information about CDI into general induction training and update training but this would be extremely limited. The second option is to request staff complete the CDI module on learnPro on commencement and every three years. If this approach is taken it is possible that other specific education requirements may be omitted in favour of satisfying the requirements of Recommendation 42. The HoN have agreed a suite of topics to be completed every three years but this does not apply to other staff groups.
	  • How the Board will record training and collate training records in order for these to be audited and reports on compliance returned to specified governance groups. This may have significant implications for medical staff, specifically senior medical staff.

Action	• BICC are asked to determine what GGC would consider to be update HAI training. • BICC to consider how training records might be captured for all staff groups and how this information can be made available during inspections and also be submitted to the correct committees and be amenable to an audit process.
Recommendation	• NHSGGC to determine what level of CDI training is required. • NHSGGC to determine what should be considered appropriate update training. • Engage with Learning and Education colleges to establish what information is available to address the requirement in Recommendation 42 VoL Report.

NHS Greater Glasgow and Clyde	**NHS Greater Glasgow & Clyde** **Infection Prevention and Control Team**
Purpose:	Update Paper
From:	IPCT NHSGGC
To:	Board Infection Control Committee
Date:	08.05.15
Subject/ situation:	Final Update on the 2014/15 Infection Prevention and Control Implementation Plan (IPCIP)
Background:	Each year the IPC Implementation plan lists the actions required to ensure that the elements contained within the Infection Prevention and Control Programme are in place in NHSGGC. Some are ongoing actions which are required year on year, others are new initiatives normally required due to changes in Government Policy or Guidance. This is an update on actions that were not completed in the year 14/15 and what further actions have been taken to ensure these are put in place going forward into 15/16. **Actions Not Completed (as of 31st March 2015)** • Develop new infection prevention and control audit based on clinical priorities. Due date – MARCH 2015. Status Not Complete. **Update** – UAT complete, training in progress. Date for 'go live' confirmed for 25.05.15. • South Glasgow Hospitals – Review of patient pathway for high risk infected patient. Not complete. Update – IPCT and Director of South Sector met and agreed appropriate pathway through hospital. Work ongoing to procure isolation unit. • Review of ventilation standards in lobbied single rooms (adult and paediatrics). Not complete. Update – reviewed by Prof Williams; action now complete. • On the move, migration of staff. Not complete. Update – SGH and VIC IPCNT s now located in new office accommodation on SGH campus. Migration of teams at WIG still to be confirmed.
Action	Continue to monitor outstanding actions and report to the BICC when all have been completed.
Recommendation	That the BICC accept that the 014/15 IPCIP is complete with the understanding that the action recommended above is implemented.

Situation

The South Glasgow clinical haematology and Scottish adult allogeneic transplant in patient service have moved into potentially unsafe accommodation, for this particular patient group, in the new facilities at the Queen Elizabeth University Hospital, Glasgow. This is following on from advice given by Consultant Microbiologists Dr Theresa Inkster and Dr Christine Peters, that the safety of the environment for immune-compromised patients in terms of water and air quality cannot be guaranteed in the new accommodation on Ward 4B1, QEUH.

Background

All haemato-oncology patients are potentially at risk because of a poor quality environment, but the patients at highest risk are those undergoing allogeneic transplant, closely followed by those receiving high dose chemotherapy with stem cell rescue and acute leukaemia induction. There are a number of standards set for these patient groups and the following are pertinent to the current situation.

The CDC guidelines for management of the immunocompromised are the most detailed setting out pressure requirements, air exchanges etc..

The NICE guidelines for Improving Outcomes for haematological cancer (2003) states that acute leukaemia patients should have access to

- In-patient unit that minimises airborne microbial contamination.
- For isolation: a number of single rooms with en-suite facilities. All patients receiving induction therapy or other high-dose chemotherapy should be housed in single rooms with en-suite facilities.
- Full haematology and blood transfusion laboratories on site. Rapid availability of blood counts and blood products including products such as CMV seronegative and gamma-irradiated blood components

The Bone Marrow Transplant standards are set by JACIE in the 6th edition standards

- *B2.1 There shall be a designated inpatient unit of appropriate location and adequate space and design that minimizes airborne microbial contamination.*
- *B2.6 There shall be written guidelines for communication, patient monitoring, and prompt transfer of patients to an intensive care unit or equivalent when appropriate.*
- *B2.13 There shall be an intensive care unit or equivalent coverage available.*
  Explanation: The Clinical Program must have documentation that there is ready access to an ICU or equivalent coverage in an immediate fashion for its patients when appropriate. This requires the ability to provide multisystem support including assisted respiration. Ordinarily, this would be within the institution but contractual arrangements with another institution may be considered if transfer procedures are in place to ensure prompt service and patient safety.

The SGH team moved at the end of April from old suboptimal accommodation with 14 beds on ward 24 to purpose built single rooms with en suite facilities.

The transplant team moved on June 6 from the Beatson, which had a long track record of excellent accommodation in terms of patient support, air and water quality. The team knew that following the move there would be some compromise in environmental quality, due to lack of negatively pressured anterooms. However, the transplant team were assured that the quality of environmental care provided would be sufficient for their populations needs and met regulatory standards. After consideration, the BMT team felt that the move provided a significant gain in quality of care for transplant patient's due to co-location with acute specialties and critical care support. In addition, the award of national service designation for allogeneic transplantation meant that the transplant team required additional bed spaces which were not available in the Beatson facility. It was understood that, prior to the move of the 2 services, the accommodation had the appropriate specifications for the allogeneic BMT patient population and during commissioning validation had had been carried out to ensure that these specifications had been met,. There was no indication at any time prior to the move, to either team or Regional Services management, that there were any problems with the specification or post commissioning validation. The team were reassured during a visit to the ward that the air handling system had central monitoring and was fit for purpose.

The first indication of possible problems was in the week of June 8th when an email was received by Dr Anne Parker, indicating that the 2 rooms with ante-rooms in the renal unit were not functioning to the expected level of air quality. On review, neither room was being used appropriately with doors shut, but the BMT team were not intending to use the rooms and no concerns about other areas were raised. However, this was not the case after the meeting on Wednesday July 1st, when it became clear that none of the rooms on ward 4B1 came close to the standards required to provide a safe environment for highly immuno-compromised patients. It was agreed that remedial action would be taken and the meeting reconvened on Friday July 3rd at 4pm. At this meeting it became clear that neither water nor air quality of an appropriate standard could be guaranteed, and that major works would be required to achieve this.
As part of the move all allogeneic in-patients had an increase in the intensity of their antifungal prophylaxis and were switched from itraconazole to posaconazole to cover the move maximise prophylaxis cover during the transition. Following information about overall air quality the high dose chemotherapy with stem cell rescue patients were changed from fluconazole to itraconazole to give aspergillus cover.

Analysis

- The current accommodation at QUEH is not fit for high risk haemato-oncology patients to remain in safely, and would not pass the JACIE inspection planned for the Autumn 2015.
- There are no immediate measures available to promptly remedy the faults at the QUEH.
- Suitable accommodation, which meets environmental standards, is available at the Beatson, West of Scotland Cancer Centre, however, there are only 20 beds rather than the 24 available in the QEUH.
- The current provision of critical care support at the Beatson, WOSCC, is inadequate to meet the needs of this vulnerable population and the lack of co-location of other acute specialties and laboratory support is a cause for concern
- Antifungal prophylaxis measures had been taken for some patients prior to the concerns being raised and for other subsequently increased once the problem was identified.

Recommendations

1) Move all high risk patients, currently in ward 4B1, to the Beatson, West of Scotland Cancer Centre, wards B8 and B9 where water and air quality are compliant with requirements. This would include all allogeneic transplant recipients, patients receiving high dose chemotherapy with stem cell rescue, very severe aplastic anaemia and all acute leukaemias undergoing induction chemotherapy.
2) Refine protocols already in place to provide immediate access to critical care assessment at the Beatson, West of Scotland Cancer Centre site with rapid transfer to the Queen Elizabeth University Hospital, Glasgow for critical care monitoring as required.
3) Discuss as soon as possible with patients, relatives and friends the implications of the above for them and explain the remedial action already taken and plans for the move.
4) Put in place a plan to remedy the faults in the accommodation at QEUH to allow a speedy return.
5) Review GG&C haemato-oncology in patient and day case practise as the move will reduce the number of in-patient beds available for GG&C
6) Work in close partnership with colleagues from other disciplines and all management teams to ensure the resolution of this situation promptly and safely to ensure best patient care.

-------- Original message --------
From: "Mathers, Alan" [redacted]
Date: 15/09/2015 8:27 PM (GMT+00:00)
To: "Redfern, Jamie" [redacted]
Cc: "Armstrong, Jennifer" [redacted]
Subject: RE: Bmt

Dear Jamie,

Here are my thoughts about all that has been discussed / debated over past weeks.
They are simplified to what are the pertinent matters and informed by listening to all of the opinions and not being unduly influenced by any.
There will be details below that I need to have corrected (if wrong)

2 SBARs to follow

Situation 1 ; Pressing and Acute

We have to determine if BMT is viable treatment option in the current service at RCH for a critically time dependent case that has been through MDT process and has a BM donor available

Background

The service has no track record because it has moved. Two cases have successfully undergone treatment. Apart from moving Facilities the rest of the service including clinicians (doctors-nurses-paramedical) are the same as are their hygiene SOP's etc.
The facilities are at least as good as the RHSC and are believed to be built to a higher spec. They are NOT identical. They are not as high spec as the Beatson Adult system. This does not mean that they are a suboptimal standard. Testing of particle counts and fungi have been put in place. There is no agreed national standard requiring such testing and no agreed interpretation of wht the testing means and how it correlates with actual risk of clinical harm to a patient. Some units do not do any such testing. It appears that there was no standardised approach between GGC units.

When fungi were detected and there were concerns about various estate issues these have been discussed and where possible immediate corrective measures put in place into two rooms to ensure "sealed" and positive pressure ventilation and extraction

Subsequent test results are of limited utility (see above) but have to be seen as the current *post corrective* measure assessment. There is therefore a need to consider the "sealing" and cleaning measures as "controls" and any subsequent testing as a way of assessing if these have altered the paradigm in a positive way : i.e. less particles, fewer or no fungi.

There is published evidence that suggest that complete elimination of growths, etc . is a noble aspiration and an appropriate goal to use as a marker of cleaning, ventilation and sealing performance and should be used in conjunction with clinically measureable auditable standards such as actual infection rates in patients, etc (these need to be determined)

There are short term solutions (sealing rooms / cleaning regimes / emphasis on rigorous application of SOP's, etc).

There are longer term options (seal all rooms and consider further Estates work on extraction/ ventilation air flow).

These options are seem as expanding treatment area options, standardising each room and building in a security measure in case of primary failure to provide a 10 pa positive air flow.

There is a pressing need to treat a child [redacted]

There may be limited scope, if any, to identify and refer for treatment elsewhere given: the time-critical situation, the further inherent delays in the inevitable "re-assessment" of the diagnosis and preferred treatment, the availability of the donor.

There is a variety of opinion about how the environmental tests should be interpreted, how often they should be done, what risk to he patient the results actually mean (increased, neutral or reduced) and there is no certain way of addressing these in the foreseeable future (and without a National standard this may be an aspiration to far).

There is a reputational, media and related risk: I note this but my primary consideration is what the balance of risks are for this child in context that they have an *a priori* mortality risk.

So the narrow question is whether we have any *evidence* that treating the child in the current environment poses more of a threat than not treating [redacted] taking all of the related risks into account (donor loss, deterioration, delay in another centre accommodating case-if option- infection, etc)

Assessment

Without a clearly defined "show stopping" finding (ege pending results), if Brenda and Craig concur, then I would support treatment at RHC.

Rationale is that the clinical team are the same and therefore that expertise is unchanged, there is on site PICU (critical adjacency) there is a pressing clinical need and no viable local alternative option. Whilst much uncertainty has been introduced about environmental matters and tests have been conducted there are no actual standards and conflicting literature about utility of the tests.

Response

A final decision is required from BMD and COO given the risks involved. This paper is to help form that view.

I sense there is NOT going to be any more useful debate. As ever the patient outcome will be binary.

SBAR 2.

Situation

There are cases in train , one of which can wait ([redacted] and another that may well become time critical ([redacted]).

Background

As above.

Any enhanced work may not be completed / tested in time frame for the latter case.

Further testing could be available but given caveats about the utility we may be in similar situation.

Assessment

We should progress Estates Work ASAP to build contingency and infrastructure options ASAP.

Response

Decision to refer (or not) the potential time critical case and inform family ASAP given potential for further work-up, etc. The other case also requires family contact.

Hope the above helps inform debate.
Note that it needs to be corrected if there are factual or interpretational issues.
Have cc to Jennifer Armstrong as a Rough Draft so that she knows my take on this.
Brenda and Craig's views obviously critical (I am not the expert here is specifics) but I have not copied to them at present.

Kind regards

Alan

Dr Alan M Mathers
Chief of Medicine Women and Children
Consultant Obstetrician and Gynaecologist
Greater Glasgow and Clyde Health Board
[redacted]

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NHS Greater Glasgow and Clyde	**NHS Greater Glasgow & Clyde** **Infection Prevention and Control Team**
Purpose:	To answer the question posed by HAI Policy unit in the e mail sent to NHS greater Glasgow and Clyde on the 19 November 2015, specifically: [redacted]"
From:	Infection Prevention Control Team
To:	Dr. Jennifer Armstrong Board Medical Director
Date:	24 November 2015
Subject/ situation:	[redacted]– interpretation and Implementation of National Policy in the Decision Making Process surrounding an isolated case of bacteraemia in the Neonatal Intensive Care Unit (NICU). Queen Elizabeth Campus.
Background	The NICU in the maternity block is a 64 bedded unit with 50 of these beds currently in use. This unit cares for both medical and surgical neonates. As part of the acute services review the existing unit was merged with paediatric ICU in June 2015. During an ongoing investigation into an outbreak of *serratia marcescens* in the unit a request was made by SGHD to submit the previous 6 months of microbiological results from the unit to Health Protection Scotland for analysis. [redacted] The rationale for not reporting this incident via the CNO Algorithm is that this was not considered to be either an incident or an outbreak at the time. The HPS SOP which was intended to support the implementation of the HIIAT defines an exceptional infection episode as follows, *" In practical terms this is not every individual patient who, for example, develops a severe Clostridium difficile infection, but infections that are exceptional to any given patient or within a given clinical environment"*. The clinical environment in which this occurred is a large highly complex intensive care unit which has no contemporary in Scotland. This unit deals with babies with complex clinical needs who are acutely unwell. [redacted] The HPS [redacted] guidance was followed in that the case had been reported as an alert to the IPCT and the [redacted] audit was completed and actions identified and put in place. The guidance tells us to consider this an 'alert' but not that it should be considered a significant incident which would require a HIIAT. All [redacted] isolated are not referred to IPCT – it is not part of the National IPC

	Manuals list of alert organisms that require action. This is a summary of the decision making process that resulted in the CNO algorithm not being evoked on this occasion.
Reference Documents	CNO Algorithm, http://www.documents.hps.scot.nhs.uk/hai/infection-control/guidelines/cno-algorithm-v2-2015-10.pdf HPS HIIAT SOP http://www.documents.hps.scot.nhs.uk/hai/infection-control/toolkits/hiia-sop-2009-12.pdf [redacted] HPS IPC Manual http://www.documents.hps.scot.nhs.uk/hai/infection-control/ic-manual/ipcm-p-v2.4.pdf
Actions	• [redacted], a system will be put in place in the unit to clinically review all babies who have a positive BC. This system once developed will be approved by the Womens and Childrens Clinical Governance Committee and summary reports and surveillance reports will be submitted to this group. In addition all positive BC will be reported on Datix by the clinical team and joint review undertaken by IPCT and clinical team. • HAIOIRT will be completed retrospectively for this incident.
Recommendations	We would ask you to support the above action for implementation.

B9

SITUATION	Two HAI Pseudomonas aeruginosa positive patients attributable to Ward 1D. [redacted]
BACKGROUND	The IPC SMT agreed that following 1 case of Pseudomonas aeruginosa the local IPCT will undertake the Water Safety Critical Control Checklist / Assessment Tool and review with the ward / dept team to resolve issues. If issues cannot be resolved then this will be escalated to the IPC SMT.
ASSESSMENT	A member of the IPCT visited the ward to undertake the Water Safety Critical Control Checklist / Assessment Tool. There were issues highlighted at the time and fed back to Charge Nurse Linda Brown: • Expressed breast milk in fridge labelled with dates in November - some patients are no longer in the unit.
RECOMMENDATIONS	IPCN has discussed issues with SCN Meechan and the following has been agreed. **SCN will remind staff at safety brief:** • **Use fresh EBM within 48 hours of expressing** • **Label EBM with date removed from freezer and discard within 24 hours** • Senior IPCN will discuss the SBAR with SCN Meechan and will visit the ward in approximately 1 month's time to review the actions / recommendations and repeat the Water Safety Critical Control Checklist / Assessment Tool.

NHS Greater Glasgow and Clyde	**NHS Greater Glasgow & Clyde** **Infection Prevention and Control Team**
Purpose:	Update Paper
From:	NHSGGC Infection Prevention and Control Team
To:	Board Infection Control Committee
Date:	5 April 2016
Subject / Situation:	Final Update on the 2015/2016 Infection Prevention and Control Work Plan (IPCWP)
Background:	Each year the IPCWP plan lists the actions required to ensure that the elements contained within the IPC Programme are in place in NHSGGC. Some are actions which are mandatory and in place permanently. Others are new initiatives required due to changes in Government Policy or Guidance. This is an update on actions that were not completed in the year 2015/2016 and further actions that have been taken to ensure these are put in place going forward into 2016/2017. **Actions Not Completed (as of 31 March 2016)** • **Undertake surveillance and quality improvement programmes in addition tothe mandatory requirements of HDL (2006)38:** DL(2015)19 was issued in July 2015 and outlined expectations that each board would begin collecting surveillance data on the incidence of surgical site infection (SSI), in patients undergoing colorectal and vascular surgery. Protocols and start dates for this surveillance programme have yet to be issued by Health Protection Scotland (HPS) so this initiative has yet to start. • **Ensure that CAAS Link Nurses have the correct training and support to fulfil their role as IPC Link Nurses: Update**: RAG rated **AMBER**. Objectives and training agreed but this initiative is yet to be fully implemented. The Nurse Consultant IPC (NCIPC) will continue to work with CAAS leads to implement in all areas. • **Vale of Leven Inquiry Report:** Action plans continue to be updated and refined however some information from the SGHD regarding clarification of the scope some of the recommendations have yet to be issued. **Update**: RAG rated **AMBER**. Recommendations not fully implemented.
Action	Continue to monitor outstanding actions and report to the BICC when all have been completed via the IPCWP.
Recommendation	That the BICC accept that the 2015/2016 IPCWP is complete with the proviso that outstanding issues are carried forward and implemented in the 2016/2017 plan.

NHS Greater Glasgow and Clyde	**NHS Greater Glasgow & Clyde** **Infection Prevention and Control Team**
Purpose:	Update Paper /Timeline
From:	IPCT NHSGGC
To:	Dr J Armstrong – Board Medical Director
Date:	26th April 2016
Subject/ situation:	Timeline re:correspondence regarding the move of the ID unit to the QEUH
Background:	This is a summary of the timeline of decisions made and issues raised (that the IPCT were aware of) with regard to the move of the ID Unit from GGH to the QEUH. **11th August 2014** (Fiona McCluskey(FMcC)to S McNamee (SM)) Summary Some issues had been raised by the Lead Nurse for ID regarding the proposed move specifically in relation to the flow of patients into the unit and the use of the pneumatic tube system – FMcC contacted SM for advice. SM pointed out that IPC advice on this move had not been obtained (late decision) and that she had significant concerns regarding the management of highly infectious patients in the proposed area. FMcC advised SM that this was not a project decision and that there were no lobbied rooms within the tower and that the only lobbied rooms were in ITU/HDU Craig Williams (CW) then contacted FMcC to support SM concerns regarding the move and to ask for a meeting to discuss. Ann Harkness (AH) was on annual leave but Joyce Brown was cc in and responded to say that this issue was being discussed at the ECMS SMT meeting on the 13th August. CW responded directly to Joyce “One of my concerns is the total number of lobbied isolation rooms available within the NSGH. The addition of the adult bone marrow transplant unit and the brownlee to the specialties on site will increase this” **15th August 2014 (AH to CW)** AH responded to CW: “happy to meet at your convenience with one of the ID team. They are content with access to 2 dedicated isolation rooms within the medical HDU cluster and we are agreeing protocols for access to others if necessary with our critical care colleagues - we agreed this before we made the decision to move them as it was clearly a deal breaker for the clinicians if it had not been possible.” ...”The sgh ED has a decontamination area that we could use as necessary but in reality most people will come via ED / IAU as at present and we take no special precautions other than in very

	few cases" SM responded "I confess I don't have major concerns regarding the pathway through the building, we can put controls in to manage this; my concern is about the co-location of these patients with our most vulnerable. I will wait and see what Craig come back with but I guess if the ID physicians have signed this off they must think the risk to others in critical care is low". **BICC Minutes 6th October 2014** Dr Seaton commented that the adult Infectious Diseases Unit was late in the planning of being moved to the new hospital. He said the high isolation rooms will be on different floors from where other patients will be based. He is concerned that because of this the nursing expertise will not be aligned to beds where patients will be and will be nursed by a different cohort of nurses. Joyce Brown replied that she is looking into this. Dr Seaton asked Fiona if there was any chance the IDU beds could be co-located but Professor Williams said there would need to be a massive airflow change for this to happen. Dr Armstrong asked if maybe IDU should stay at Gartnavel but Dr Seaton said this would be inadequate for managing the patients. With regards to the MDRTB Regulations Professor Williams said that the technical team are looking at the ITU wards and asked Fiona if there had been any update. Fiona agreed to contact Brookfield. **BICC December 2014** Professor Williams commented that in relation to the new build update at the last meeting from Fiona McCluskey he has still not received word regarding the issue with transplant patients and if a contingency plan is in place with regard to the MDRTB Regulations Dr Armstrong suggested writing a letter to David Louden asking for an update on these issues and Professor Williams agreed to do this. Letter sent 22 December 2014 asking the following questions re NSGH: 1. Whether the lobbied side rooms meet the current guidance for housing bone marrow transplant patients. 2. Whether the lobbied side rooms meet the DH guidance for housing Multi-Drug resistant TB patients. Response was by e mail on the 5th January 2015 (Colin Grindlay Brookfield to David Hall Director Curry and Brown) "Please see attached correspondence from Wallace Whittle advising the isolation rooms throughout the hospital have been designed in line with SHPN 04 supplement 1. Wallace Whittle sees no reason as to why the isolation rooms cannot be used under the

guidance issued previously by NHS"

David Hall then e mails David Louden(DL) and DL forwards to CW

The message from David Hall is as follows:

"I tasked Brookfield and their design team with reviewing the guidance document The prevention and Control of TB in the UK with particular reference to ANNEX D Environmental Control – Ventilation. As you will note below then have confirmed that in their professional opinion they see no reason as to why the isolation rooms cannot be used under the guidance as they have been designed in accordance with SHPN 04 supplement 1, attached"

CW replied to David and again and raised his concern regarding the exclusion of ID and BMTU from the guidance docs.

Meeting arranged to discuss by DL.

BICC 26 January 2015

Professor Williams reported that in relation to the MDRTB Regulations the rooms in IDU are compliant.

Looking at the patient pathway from the Emergency Department Professor Williams advised that this was satisfactory. Dr Seaton stated that the ID Physicians commented that if there was a VHF patient the ante room should be adequately sized to deal with this eventuality and required to be assessed. He said as a group the ID Physicians would like to see the beds and ante rooms to be used for these type of patients. Dr Armstrong stressed that the keys for the new hospital were being handed over tomorrow and this would need to be discussed with David Louden as a matter of urgency. She suggested a small group meet after this meeting and she would contact David Louden to see if the ID Physicians would be able to look at this area today.

In the Infectious Diseases Unit Dr Seaton advised that there are only two beds for VHF type of patients and the rest of the unit is for managing all other patients. In the Brownlee he stated that a VHF patient would be admitted via the fire exit.

Dr Kennedy advised that a sub group is commencing to look at VHF type of patients

27th January -2nd February 2015

Andrew Seaton (AS) sent a message to CW asking to confirm the type of ventilation available. If confimed as appropriate AS noted that these rooms "should be appropriate for short term patient management (VHF) before transfer to Royal Free".

Response from CW is as follows: (cc in was David Louden, Ann Harkness, Ian kennedy & SM)

This is broadly what we have been discussing at BICC for the last while. The positive

	pressure ante-room prevents ingress and egress of organisms from the room and can be used for source or protective isolation without the need to flip any switches. The problem has been that in Scottish Health Planning note 04 there is an Exclusion which states "This Supplement does not describe the specialist facilities required in infectious disease units or on wards where severely immuno-compromised patients are nursed. Guidance for these facilities will follow in a further Supplement to SHPN 04.However the planning team and HFS have been unable to locate further definitive guidance. This being the case I asked David Louden and his team to specifically cross reference our lobbied rooms with the DH guidance on rooms for MDRTB. At a meeting last week he confirmed that their view is that the lobbied isolation rooms at the NSGH provide equivalent protection, he will confirm this by e mail. As such I have no concerns about the suitability of the rooms for MDRTB etc. In terms of the Ebola, following your comments at BICC Sandra about the size of the ante-rooms, Iain Kennedy, Sandra and I met with Emma Thompson, who was nominated by the ID physicians to represent them. I explained that we were content that the lobbied side rooms at NSGH are sufficient under the ACDP guidance to manage an Ebola patient prior to transfer to a designated secure unit, but, that they are not sufficient for anything other than short term management, in particular my understanding was that GGC is not planning to act as a referral unit or accept transfers of these patients. If a severely unwell patient requires to be managed in Glasgow the view was that this would constitute a Major Incident and be managed accordingly. She expressed concern about the transfer of patients through the NSGH to the designated room and suggested that an isolator may be required to support the transfer. We agreed that she or other ID physicians would walk the route and take up their concerns through the directorate. I hope this gives you sufficient detail to address your concrens but if there is anything else please let me know. **1st February 2015** AS e mailed CW again “if they are signed off as safe and appropriate then we’re all content. Just to check suspected MERS, SARS, Avian Flu etc. Same specification as MDRTB? Presume all ok for paediatric facility as well?” This went to Kevin Hill via AH and Jamie Redfern (GM) followed up on behalf of paediatrics. CW response was as above. **24th April 2015** (Jackie Barmanroy NC IPC on the project e mailed Frances Wrath with the following question about the RHC) I'm looking for your help regarding the following concerns Lynne has raised in regard to the new build - 1. Can we have assurance that the theatre ventilation has been commissioned?

2. Can we have assurance that the dialysis lines/outlets have been commissioned /flushed ?

3. That estates will be responsible for the helix monitors for Schiehallion's BMT rooms?

Response from Frances on the 5th May re the RHC was as follows:

"Sorry I was on leave for most of last week. All areas have been commissioned in line with contract ER's and all legislative requirements. The Board's Estate

s Team have access to all commissioning data and any specific questions are better addressed to them".

15th August 2015

Not clear what triggered this e mail but AH sent e mail to Joyce Brown and AH responded:

SM sent

"i confess i don't have major concerns regarding the pathway through the building, we can put controls in to manage this; my concern is about the co-location of these patients with our most vulnerable. I will wait and see what Craig comes back with but i guess if the ID physicians have signed this off they must think the risk to others in critical care is low.

AH Responded

"happy to meet at your convenience with one of the ID team. They are content with access to 2 dedicated isolation rooms within the medical HDU cluster and we are agreeing protocols for access to others if necessary with our clinical colleagues – we agreed this before we made the decision to move them as it was clearly a deal breaker for the clinicians if it had not been possible. The separate access to the brownlee off the carpark was designed because of the likelihood of admissions out of hours when the main doors were shut – not due to any infection risk.

4th September (AH to ID consultants cc in CW)

Just to confirm that we have had confirmation that the isolation rooms tested in critical care have passed the full range of tests , so there is no longer any need to have to admit elsewhere. The rooms in medical HDU are not tested yet – so patient placement will be in the ICU area until the full test programme is complete. Emma – in terms of your elective day case – that can now be planned for admission

	Ian Powrie to Sandra McNamee 30/09.15 Two rooms meet the agreed commissioning criteria: Isolation Bed 50 (Disc CCW-165) & • Isolation Bed 31 (Disc CCW-078) Both rooms have supply and extract HEPA filtration and meet the agreed air permeability test requirements set out in SHTM 04-01 supplement 1. However I would recommend confirming that Craig agreed that these rooms are suitable for ID patients, at our meeting last week he was still reviewing the status of the CCW rooms to define which rooms would be allocated for ID patients?
Action	None
Recommendation	Note the paper and timeline.

NHS Greater Glasgow and Clyde	**NHS Greater Glasgow & Clyde** **Infection Prevention and Control Team**
Purpose:	Outbreak Report
From:	IPCT NHSGGC
To:	HAI Policy Unit Scottish Government Health Directorates
Date:	29th April 2016
Subject/ situation:	Report of the outbreak of *Serratia marcescens* in the Neonatal Intensive Care Unit (NNICU). Maternity Block. South Glasgow University Hospital Campus.
Summary of Outbreak	18 patients were found to be positive for *Serratia marcescens* from screening specimens obtained between the 27th July 2015 and the 15th February 2016. 16 patients were colonised, two patients were considered to be infected with the organism [redacted] The incident was managed locally unti[redacted] The incident was then HIIAT assessed as Red by NHSGGC and the NHSGGC Outbreak Communication Chain was implemented. HPS were informed of the revised HIIAT rating on the [redacted]. On Tuesday 3rd November 2015, SGHSCD contacted HPS to invoke formally the National Support Framework CNO (2015) HPS were partners in the control of the outbreak from this point forward. 17 meetings were held and a rolling action plan was developed and actions implemented (appendix 1). Five different strains of Serratia were identified; 10 patients had 04, 5 patients had 05 and 3 patients had unique strains. NHS GGC followed the extant guidance on managing outbreaks and incidents considered applicable to this type of incident. NHS GGC welcomes the current review of this guidance to ensure clarity for future incidents.
Background	The NICU is a 64 bedded unit with 50 of these beds currently in use. This unit cares for both medical and surgical neonates. The unit is both a Regional and National referral center and admits babies from all over Scotland. As part of the acute services review the existing unit was merged with paediatric NICU in June 2015. Every baby who has Serratia isolated from a specimen is reviewed by a member of the IPCT to determine the baby's condition, whether they are colonised or infected and if there is any obvious common links. A time line was developed in August when four cases were found to be linked. Movement of babies in the unit is frequent, as their condition improves or deteriorates or if they need intervention by specialist colleagues. These babies have interaction with neonatologists, neonatal surgeons, AHPs, parents and siblings and nursing staff numerous times per day. Determining a single source is extremely complex and is often never identified.

	Epidemiology In adults and occasionally infants *Serratia marcescens* can be naturally occurring in the gut and its presence on or in the body (colonisation) is not harmful in healthy people. Neonates can aquire Serratia from their parents in whom it is part of normal gut flora, from the environment or from cross transmission. Given the vulnerability of premature babies, *Serratia marcescens* infections, where the colonised bacteria gets into the bloodstream, can occur.
	Background epidemiology into this outbreak has been problematic for several reasons: • This is a regional unit and accepts babies from all Health Boards Areas in the West of Scotland it is also a National referral centre for neonatal cardiothoracic surgery. The number of cots in the unit doubled in June 2015 as the unit in the Royal Hospital for Sick Children (RHSC) in Yorkhill merged with the existing unit on the South Glasgow University Hospitals Campus. • Screening regime (weekly) which was in place in RHSC was extended to include the babies in NICU in the maternity Unit from June 2015. • Microbiological analysis of samples was extended beyond the accepted norm of gram negative resistance to species level. The normal screening processes in these types of units is aimed at identifying resistant gram negative organisms and the majority of units conduct microbiological analysis to this point; this informs antimicrobial therapy. In the paediatric NICU in the Royal Hospital for Children, screening went beyond that to species level and this was adopted by the South Glasgow NICU. • It is accepted in the literature that exposure to antibiotics during treatment and the NICU background flora may contribute to single organisms becoming more prevalent in this environment. • It is highly likely that some cases were due to cross transmission on the unit with two or possibly three clusters. Five different sub types have been identified but 10 were confirmed as a single type i.e. 04.
Summary of actions taken to control the outbreak **(full list of action is contained in appendix 1)**	• The Compliance with hand hygiene is continually monitored. The unit engages with and teaches parents about hand hygiene but this was reviewed during the outbreak, with literature and posters developed to reinforce this message. • New personal protective equipment guidance was developed to ensure consistency of practice. This has been reinforced during the daily visits to the unit. • The Housekeeper role on the unit was reviewed and the decontamination of near patient equipment was prioritised. • Cleaning of equipment, specifically breast pumps, was reviewed and mothers were given specific instructions regarding this equipment. This has been subsequently audited and compliance with this was found to be good.

	• Additional domestic services have been allocated to the unit and the national audit has returned scores of 96 and 97% in the past several months. • All taps have been replaced to the same type used in the Royal Hospital for Children. • Patient screening continues weekly. • Isolation of patients in single rooms with TBP is in place. • A dedicated equipment store is now in place. • Audit of compliance with SICPs was carried out at several points during the outbreak. • Daily double cleaning with a chlorine based detergent of all hand hygiene sinks was implemented. • 200 environmental swabs were done (including sinks) all were negative. • Staff in the unit was referred to the Occupational Health Service who ran sessions to promote skin health (hands). • Review of ventilator circuit condensate complete – samples all negative. • Single use bowls are now used for washing babies. • Breast milk sampled to exclude a source – samples were all negative. • Unit was visited daily ICNs to promote SICP and TBP – the frequency of visits has now returned to normal. • Sampling of water outlets – all samples were negative for Serratia.
Additional Actions	• NHSGGC will conduct a retrospective review of antimicrobial usage in the unit in the past 12 months. • All screening samples will be analysed to species level. The NHS Scotland review of screening in NNICU may necessitate changing this protocol but this will be our position meantime. • All babies who are colonised or infected with Serratia will be isolated and if this is unavailable or inappropriate due to their clinical condition, a risk assessment will be competed. • Serratia samples in NNICU and PICU are now considered an 'alert organism' and as such IPCT are now able to monitor trends and promptly respond to any clusters (two cases linked in time and place). • SICPs will be carried out by IPCT as per audit schedule. This will also be done

	locally by the SCNs. An audit tool has been provided to facilitate this. • The IPCT reported this outbreak based on their understanding of HPS alert incident reporting. When the HIIAT escalated to RED in November, HPS were notified as per HIIAT reporting tool but it became apparent that the NHSGGC IPCTs interpretation of the HIIAT assessment was different to that of HPS. The Board welcomes the current review of existing HPS outbreak and incident reporting policies / tools. Since 1 April 2016 all HIIAT assessment are reported weekly to HPS, not just amber and red as previously requested. • NHSGGC will participate in a proposed HPS learning event/workshop to share experience across neonatal units. • Local infection control team learning event will be arranged. • NHSGGC will participate in a meeting with UK neonatal and IPC colleagues to review screening in NNICUs. • Review actions when escalating incident to HIIAT amber or red and discuss with HAI policy unit and clinicians around prudence and impact of proactive press statement. • All babies who have a positive BC and subsequently die will now trigger a clinical review. This has been agreed with the Chief of Medicine for the Directorate. All these cases will involve the clinical risk manager and reviewed at the meeting of the Directorate Clinical Governance meeting. • Paediatric bundles to manage invasive devices will be developed by the directorate. This is a highly specialist area and will be clinically lead by the Chief Nurse who is a SPSP fellow. • Six random hand hygiene audits will be carried out by the Boards Hand Hygiene Co-ordinator over the next 6 months to ensure compliance.
Recommendation	We would ask that this report and action plan is accepted as a record of this incident.
Lessons learned	<u>NHSGGC</u> 1) Outbreak detection – late declaration of the outbreak. Actions • Serratia is now an alert organism in NICUs for IPCT. • A single case of Serratia will now be isolated with TBPs in place. • 2 HAIs will trigger a review by the IPCT. • Definition of a Serratia outbreak will be ' 2 infected cases or 3 cases of colonisation ' – this has been agreed by ICDs and based on

	literature reviews. 2) Typing- late declaration of outbreak while waiting for typing results Actions • As above there will be an early response to an increase in cases without waiting for typing results. • Typing will be interpreted with caution as multiple strains often co exist in outbreaks resulting from environmental organisms • Late screening of the healthcare environment for a possible source • In subsequent outbreaks screening will be undertaken early and in a coordinated fashion <u>HPS</u> Following the meeting chaired by the CNO at St Andrew's House and subsequent meeting of HPS and NHSGG&C, the management of the HAI incidents and outbreaks process was highlighted for lessons learned, including: HIIAT assessment and reporting; completion of the Healthcare Infection Associated Incident and Outbreak Reporting Template (HAIORT); role of the IMT; formation and agreement of case definition(s); incident investigation, epidemiological outputs and data presentation. To address this, a Consensus Group facilitated by HPS, chaired by Dr Teresa Inkster with representation from all NHS Boards has been established to review all guidance and tools pertaining to the management of HAI incidents and outbreaks in Scotland. The delivery date for this revised guidance is March 2017.

Appendix 1 - Increased Incidence of Serratia marcescens - ACTION PLAN

Topic	Actions Identified	Lead	Actions taken	Completion Date
Hand Hygiene	Hand Hygiene audit to be carried out Hand hygiene auditors to be identified Hand hygiene training for auditors Ward based HH audits to be re-commenced Speak to Occ health re high number of staff using Dermol 500	1 Hand Hygiene co-ordinator Stefan Morton. 2 P. Friel, Lead Nurse 3 Hand Hygiene co-ordinator Stefan Morton 4 P Friel, Lead Nurse 5 C Mitchell/Stefan Morton	Audit carried out 20/08/15. Additional auditors identified. 3. Training carried out to 4 members of staff. Additional training to be requested by A Muir for SCBU. 4 Recommenced for August HH score 95%. September 75% opportunities; 65% overall score (combined opportunities & technique) October HH score 90% overall. 5. Rona Wall Lead Occ Health Nurse contacted 28/08/15. Stefan Morton meeting R Wall 03/09/15 6. HH audit by HHC: 90% compliance 7. HH audit by HHC: 100% compliance 8. hand hygiene audit 28/01/16 Opportunity 100% Technique 80% Combined 95%	Report : 27/08/15 03/09/15 25/08/15 August /Sept 2015 audit 02/11/15 audit 13/11/15 28/01/16

PPE	Agree the use of PPE for NICU staff	C Mitchell, Lead IPCN	Lead Nurses met to discuss level of PPE for NICU 26/08/15. Sent to Lead for NICU 02/09/15. Discussed and agreed at NICU/QI Group. Out for comment.	18/09/15
House keepers	The role of the Housekeeper to be clarified	P Friel, Lead Nurse	House keepers role clarified. Additional housekeeping hrs identified.	03/09/15

Topic	Actions Identified	Lead	Actions taken	Completion Date
Knowledge of use and Decontamination of breast pumps.	Ensure staff and parents are aware of how to safely use and decontaminate the breast pumps and breast milk collection sets. Written checklists should be available. Staff will be reminded to ensure checklist signed. Poster/photos to be displayed to demonstrate cleaning process.	Breast feeding facilitators/ Neonatal staff P Friel J Barnett D Barnett/M Liddell	Parents receive checklist as part of admission pack. This is explained to mums and signed off. Staff reminded to obtain ensure checklist signed.	03/09/15 18/09/25
	Audit of compliance with parent checklists to be carried out	M.Liddell	18.09.15 – audit of compliance with breastpump /equipment checklist ([redacted])	18/09/15 Being carried out weekly

			[redacted] Breast pump continues on SCN weekly assurance cleaning checklist	

Topic	Actions Identified	Lead	Actions taken	Completion Date
Cleaning of equipment	Cleaning checklist to be implemented for shared patient equipment out-with the cot spaces and kept for 1 month.	M Liddell	Staff in NICU have agreed a cleaning schedule which will be kept up to date by Housekeepers. Each piece of equipment to have a laminated sign to record when cleaned by Housekeepers.	03/09/15
Posters	Provide posters for educational purposes, such as bacteria on hands. Include possible vehicles for transmission e.g. mobile phone Poster to state- 'please wash hands before accessing fridge or freezer'	IPCT. Lead ICN C Mitchell/ S Morton M Liddell	Medical Illustrations contacted by S Morton on 28/08/15. Draft produced 29/09/15 for comment. Sent out for comment on 15/10/15. Comments to be sent to Stefan Morton by users and ICN's. Poster produced and placed on fridges.	 28/09/15
Environmental cleaning	Terminal clean Twice daily clean of ward and bed spaces with Actichlor plus Increased monitoring Concerns re sufficient hrs from evening domestic and sign off. (Domestic only observed Monday-Friday)	Domestic Staff Domestic Staff S Leighton / J Donaldson S Leighton / J Donaldson	Terminal clean of ward Twice daily Actichlor plus clean put in place. DMT scores: 97% for August 96% for September Sign off required from evening domestic (5pm – 9pm) with exceptions recorded. SCN to sanction access to clean pendants daily.	14/08/15 20/08/15 Stopped 07/09/15 03/09/15 17/09/15 17/09/15

	Pendants to be cleaned daily.	S Leighton / J Donaldson		

Topic	Actions Identified	Lead	Actions taken	Completion Date
Hand hygiene education for staff. For parents	Provide powerpoint presentation for staff 'self-learning' on hand hygiene. Stefan Morton will look into developing a DVD for parents on hand hygiene.	A Johnson J Barmanroy S Morton/ Medical Illustrations	Presentation provided to staff Education session for medical staff carried out. S Morton contacted medical Illustrations 28/08/15.	16/09/15 03/09/15
Cleaning of Vents	Vents to be cleaned regularly	Estates (C Purdon)	Meeting with Estates to discuss how to proceed with cleaning programme on 08/10/15 . J.Barmanroy & A.Muir met with C.Purdon – vents were assessed as clean at time of inspection. C.Purdon will produce a PPM & liaise with the SCN to gain access (preferably a room emptied of patients).	08/10/15
Patient's information	Review of parent information leaflet	SCN M Liddell/SCM A Muir	Information leaflet updated and placed in pack for every parent. This includes hand hygiene.	03/09/15
Radiology staff compliance with SICPs and shared patient equipment	Lead Nurse for Radiology/Radiographers to be contacted.	C Mitchell	K McGugan contacted 27/08/15. Superintendant radiographer, M Pirie provided information – sent to NICU staff.	11/09/15
Cleaning of the Ultrasound Machine	Laminated poster to be placed on top of ultrasound to remind staff to clean after each and every use.	F Scott	Sign on ultrasound	03/09/15

Decontamination of Laryngoscope handles	Laryngoscope handles to be cleaned with detergent, dried then disinfected with alcohol wipe and allowed to dry.	M Liddell/P Friel	SOP provided to P Friel	17/09/15
Topic	**Actions Identified**	**Lead**	**Actions taken**	**Completion Date**
Decontamination of humidity tank for giraffe incubator	Clarify manufacturers guidance (currently cleaned in antibacterial detergent – no specific concentration)	M.Liddell	Manufacturer's instructions unclear. Discussed at the decontamination meeting on 15/10/15. Kate Hamilton provided advice. Written guidance to be agreed by the decontamination group and disseminated to NICU.	Complete
Damage to incubator port hole doors	Staff to pursue replacement of doors.	Medical physics	Medical physics to organise replacement of 32 doors. Glen Dobson has a system to identify all incubators and commenced replacement of port hole doors from 05.10.15. Update on 29.10.15 from Shona Gaffney – 6 incubators completed; 4 incubators outstanding. 9 out of 10 complete. 1 incubator outstanding.	12/11/15

October / November 2015

Topic	Actions identified	Lead	Actions taken	Completion date
Equipment Storage – Two patient rooms are being used for equipment storage at present since transfer. Equipment is also stored behind pendants.	Morag Liddell agreed to take forward finding more storage for clinical equipment in a room without a hand hygiene sink. Morag will also identify and remove equipment that is not required in the neonatal unit.	Morag Liddell, SCN	Seminar room will become an equipment store room as of 06/11/15 Room 8 will revert to patient room and equipment removed	09/11/15
Neonatal Transport Room Equipment being stored in patient room as a store room.	Morag Liddell will speak to estates regarding the removal of the hand hygiene sink in the room where the neonatal transport equipment is being stored	Morag Liddell, SCN	Room 11 will remain a store room for this equipment and domestic service will continue to clean the sink daily.	09/11/15
Gloves & Apron Dispensers : Dispensers are located at the	Morag Liddell will look at relocating dispensers for gloves	Morag Liddell, SCN	Estates visited 05/11/15 to review alternative location for	Ongoing

back of bed spaces and are difficult to access. Apron dispensers are located at sinks	and aprons from their current location behind the pendants and also remove the purple aprons from the top of the rear shelf surface of the trough sinks so that they are easily accessible in an apron holder in a dry location.		dispensers. Roll of aprons and box of gloves now available on trolley at front of bed space which will be discarded on discharge of baby	
Exception Reports for cleaning. Are staff using the exception reporting form to identify any issues with meeting cleaning specification	Sheenagh Leighton is to review the reports to ensure that clean is being achieved within the allocated hours	Sheenagh Leighton, GS Manager	Exception reporting form in place in unit kept in DSR	05/11/15
Access Issues Sometimes difficult to access bed bays for cleaning when ward rounds etc in progress	Clinical Team are to liaise with Sheenagh Leighton regarding the best times for accessing the clinical area for cleaning purposes.	Morag Liddell, SCN / Sheenagh Leighton, GS Manager Jamie Redfern, GM	Heather Dawes and Sheenagh Leighton have discussed hours to access unit possibly 7.30 – 9am . Breast feeding rooms will be included in this early clean.	09/11/15 *

Topic	Actions Identified	Lead	Actions taken	Completion Date
Cleaning Issues Process required to escalate any cleaning issues immediately and to appropriate personnel.	Any issues with cleaning are to be escalated by the Senior Charge Nurse to facilities immediately.	Morag Liddell, SCN	Escalation process in place. Domestic service staff have been encouraged to inform nurse-in-charge where cleaning cannot be completed.	05/11/15
Flushing of hand hygiene sinks: Sinks in patient rooms not being flushed as rooms being used as storage	A sign off sheet to document tap flushing is to be reintroduced. Morag Liddell will provide Sheenagh Leighton with a former sign off sheet used in Yorkhill for flushing taps throughout the department.	Morag Liddell, SCN	All CWHB in unit now receiving a daily clean as a minimum.	05/11/15
Twice daily clean of all hand hygiene sinks Sinks appear very wet, stained with soap etc	Increase the cleaning of the hand hygiene sinks to twice daily throughout the department.	Morag Liddell, SCN, Sheenagh Leighton	Now in place	09/11/15 *
Domestic Duties Unit and domestic staff (cover) not clear on expectation on what gets cleaned when	- Sheenagh Leighton is to clarify the expectations that the neonatal unit has of the General Services Assistant and what the GSA's are actually required to do, and the actions around this.	Sheenagh Leighton, GS Manager	Both domestic staff now doing level 1 first	05/11/15
Ventilator Circuits Fabian circuit increased 'rain out' • Not all babies have this circuit	Microbiology are taking samples of one used ventilator circuit, including the humidifier and are currently waiting on the results.	Carol Lucas, Microbiology / Angela Johnson, SIPCN	Results: 2 colonies of Gram +ve Further 4 circuits to be sampled.	26/10/15
Foil Bowls IPCT observed parent using	Morag Liddell is introducing water wipes for washing small babies.	Morag Liddell, SCN	Foil bowls now single use disposable	05/11/15

foil bowl for washing baby, emptied water into HH sink and stored wet foil bowl in bedspace trolley	Staff will be informed that foil bowls will only be used for older babies and are to be single once only use.			

Topic	Actions Identified	Lead	Actions taken	Completion Date
Hand hygiene education for parents	PJ is to request assistance from Stefan Morton, Hand Hygiene Co-ordinator to carry out education for parents. Morag Liddell will investigate the use of the volunteer service to assist with and maintain teaching of hand hygiene to parents. **Hand hygiene for parents/visitors** – Infection Prevention & Control team will provide HAI education programme for parents	Morag Liddell, SCN IPCT (Pamela Joannidis, NC-IPC, Angela Johnson, SICN and Stefan Morton, HH Co-ordinator)	Meeting 10/11/15 to agree programme	Ongoing programme
Hand Hygiene audit for staff	IPCT will provide additional HH education sessions for unit / visiting staff	IPCT (Pamela Joannidis, NC-IPC, Angela Johnson, SICN and Stefan Morton, HH Co-ordinator)	HH audit completed on 02/11/15: • Opportunities taken score 90%, Combined Compliance 60% • Two failures to carry out HH, one Medical, one Nursing group • Six further failures with correct technique, two were timed at <5 seconds, four were not bare below the elbows as wristwatches worn • Overall, seven wristwatches in unit - six Medical and one Porter All staff including visiting	Ongoing Monthly of local audit by staff

			medical and AHP groups have been notified of results Meeting to discuss sessions 10/11/15 Education undertaken 06/11/15 with new nursing staff.	
SABs & Care Bundles -	Patricia Friel and Dr Anne Marie Heuchan are to explore a role for the Neonatal Nurse Practioners regarding educating new medical staff to adhere to the SAB care bundles. Jennifer Rodgers is to contact SPSP for Quality Improvement support.	Jennifer Rodgers, Chief Nurse /Anne Marie Heuchan, Neonatal Consultant / Pamela Joannidis, NC-IPC	Meeting planned to be arranged. Meeting 17/11/15. Review of skin antisepsis to be undertaken to ensure consistency across 3 units in GGC. SCN to undertake PVC and CVC sweep as part of local audit with compliance. PJ to forward sweep forms.	17/11/15 Ongoing
Review of sensor taps	Sensor taps on trough sinks create a lot of water splashing. Replacement taps and option?	Morag Liddell, SCN, Heather Dawes, CSM, Iain Powrie, Estates Manager	Iain has undertaken walk round unit with staff. He will identify alternative sensor taps that do not create water splashing around sink and floor if possible.	Work ongoing to replace taps with HAI SCRIBE agreed: 02/12/15
Audit of cleaning of equipment to ensure process is being followed	Request by HPS to review actual real time cleaning of patient equipment to ensure process is robust	IPCT	Cleaning practice observed. Items washed and left on draining board while other equipment being washed. Recommended to wash and dry 1 piece at a time. Towel used on draining board. Suggested to remove. Antibacterial detergent not measured. Recommended	17/11/15

			manufacturers dose. Rubber rings on portholes being hung up on tap to dry. now stopped. Training required for housekeeper on cleaning of incubator.	

Topic	Actions Identified	Lead	Actions taken	Completion Date
All positive patients should be isolated in a single room where possible or document a risk assessment in their notes	Agreed at IMT on 05/11/15. PJ discussed with Fiona Aitken and Dominic Cochrane	Morag Liddell, SCN, J Coutts, and A Heuchan Consultant Neonatologists	Where patient cannot be isolated in a single room, reasons should be documented in the patient notes and the bed space should be treated as an isolation space i.e. x 2 daily clean with chlorine based detergent, PPE, no equipment sharing where possible.	Ongoing: all cases isolated in single room or incubator with risk assessment : At 02/12/15 all cases isolated in single rooms
Staff training to support merger of teams	Team / culture OD Unified policy and procedure	Tricia Friel, Lead Nurse/ Pamela McGoldrick Tricia Friel, Lead Nurse	Meeting with Senior OD advisor complete.	12/11/15
Staff training to support SICPs practice	Training on SICPs application and monitoring	Morag Liddell, SCN Morag Campbell, CD Neonatology IPCT	Meeting to be arranged with IPCT and Morag Liddell (as above)	17/11/15
Staff communications training	Staff should receive all communications on any incident and be given support to handle all enquiries	Tricia Friel, SCN Morag Campbell, CD	All staff being kept up to date via daily safety briefs	12/11/15 (ongoing)
Observational audit of domestic cleaning by IPCT requested at IMT	IPCNs to provide assurance that the methodology used for daily cleaning of the unit is in line with National specifications and that chlorine based detergent is used in addition for all cleaning daily plus hand hygiene sinks twice per day.	Angela Johnson / Pamela Joannidis	Observations of cleaning carried out on each visit by IPCN. Confirmed chlorine based detergent being used daily. No exceptions reported.	Complete
Observational audit of Milton use requested by IMT	IPCN to undertake audit of Milton preparation, and cleaning of tanks (bottles) / cups (dummies)	Angela Johnson / Pamela Joannidis	Audit completed. Report for IMT being prepared	03/12/15

Drip trays for condensate from pipes in ceiling void to be sampled.	IPCN to undertake sampling of condensate, in particular in rooms 1, 4 and 5. HAI-SCRIBE to be completed prior to lifting tiles.	Pamela Joannidis / Ian Powrie	Difficulty lifting ceiling tiles while bed bays occupied. So far those checked have no trays.	Complete
Sample breast pump and collecting kit from new patient case.	IPCN to swab pump expressing kit	Angela Johnson / Pamela Joannidis	Environmental swabs taken. Container and kit in single room with dedicated breast pump	No serratia isolated 03/12/15
Topic	**Actions Identified**	**Lead**	**Actions taken**	**Completion Date**
[redacted]	[redacted]	[redacted]	[redacted]	03.12.15
Environmental sampling: Frequently touched surfaces and sinks to be swabbed in rooms where last two new cases have been (1,4 and 5)	IPCNs to undertake screening swabs and deliver to lab	Angela Johnson / Pamela Joannidis	Swabs completed	02.12.15
Undertake complete review of case notes of last two cases with clinical and IPC team, create hypothesis and test.	IPCNs to review case notes of both latest cases in parallel to determine any commonality / single source	Pamela Joannidis / Morag Liddell and Consultant neonatologist	Ongoing discussion with HPS re definitions. LR will send electronic version of possible and probable case definitions for consultation	Comp;lete

Undertake complete review of data gathered on line listing with HPS.	HPS would like to ensure that the IPCT line listing data is robust and that nothing significant has been missed.	Pamela Joannidis / Lisa Ritchie	Review of NHS GGC Line Listing and specific data to be added	11/12/15 Ongoing
Undertake peer review of care in unit with SCN from other NICU	Neonatal expert (SCN Clark) to undertake peer review of baby care to determine any risk factors for acquisition of Serratia	Tricia Friel / Marjory Clarke		Complete

SBAR – Isolation rooms critical care
Dr T Inkster – May 2016

<table>
<tr><td>Situation</td><td>NHSGGC Infectious disease physicians at QEUH have written to the Lead ICD to express concern re the suitability/safety of isolation rooms in critical care for patients with multi-drug resistant Tuberculosis (MDRTB) and Middle east respiratory syndrome coronavirus (MERs-CoV)</td></tr>
<tr><td>Background</td><td>There are ten positive pressure ventilated lobbied (PPVL) rooms in Critical care at QEUH. Infectious diseases have access to two of these rooms for the isolation of patients with confirmed or suspected airborne infections.

Access to these PPVL rooms for ID patients can be difficult due to the competing need for critical care beds.

There are no negative pressure rooms in the QEUH.</td></tr>
<tr><td>Assessment</td><td>Guidance on the use of PPVL rooms for MDRTB is conflicting (see table below)
<table>
<tr><th>Guideline</th><th>Year</th><th>Recommendation</th></tr>
<tr><td>The Interdepartmental working group on Tuberculosis</td><td>1998</td><td>Minimum requirement for an infectious MDRTB patient is a negative pressure room</td></tr>
<tr><td>HBN 0401 Suppl 1 and SHPN 04-01 Suppl 1 Isolation facilities in acute settings</td><td>2005/2008</td><td>‘Airborne infection’ – no examples. Exclusion – does not describe isolation facilities required in an ID unit. Guidance will follow..</td></tr>
<tr><td>HBN 04-01 Suppl 1 Isolation facilities for infectious patients in acute settings</td><td>2013</td><td>PPVL suitable for chickenpox , measles and ‘some forms of pulmonary tuberculosis’</td></tr>
<tr><td>SHTM 03-01 Ventilation for healthcare premises Part A</td><td>2014</td><td>Infectious disease isolation room – negative pressure room -5PA, 10 ACH</td></tr>
<tr><td>NICE Tuberculosis</td><td>2016</td><td>Negative pressure room</td></tr>
</table></td></tr>
</table>

MERs- CoV

MERs- CoV is a new and emerging pathogen therefore not considered in HBNs or SHTMs.

Guideline	Year	Recommendation
Health Protection Scotland	2015	Patients should be admitted to a negative pressure isolation room. If not possible a single room with ensuite facilities should be used
CDC	2015	Patients should be placed in AIIR – single patient rooms at a negative pressure and minimum 6 ach/hour

Conclusion - There is no guidance which definitively states that PPVL rooms are suitable for either MDRTB or MERs – CoV. Negative pressure rooms are the preferred option.

Room design

PPVL rooms in critical care at QEUH have been modified slightly to the original design criteria e.g. extracts are present in patient rooms . In addition verbal report on ACH/hr in en-suites is 3 , recommendation is at least 10 ACH/hr

HBN 0401 suppl1 – ' **modifying** or failing to provide one element of the system will jeopardise the performance of the system as a whole'

Risks

The risks associated with PPVL rooms not being deemed suitable for MDRTB or MERs-CoV or having been modified against original design criteria are

1) Cross transmission or outbreaks of serious airborne infections in patients
2) Cross transmission or outbreaks of serious airborne

	infections in staff members who have not been adequately protected.
Recommendations	1) External review by Health Facilities Scotland as to the suitability of PPVL rooms in critical care for MDRTB and MERs- CoV patients , preferably to incorporate an opinion from the Department of Health 2) External review by Health Facilities Scotland of the design specification and validation with a view as to whether modifications represent an ongoing risk. Consideration given to contacting Malcolm Thomas for an opinion , the original designer of the PPVL concept. 3) Consider ring fencing two critical care beds for use by Infectious diseases department so that they have access to two rooms at all times Note this SBAR excludes recommendations for VHF.

SBAR – Air changes , patient rooms , QEUH
Dr Teresa Inkster, June 2016

Situation	During an investigation into Mycobacterium abscessus cases in Cystic fibrosis patients at QEUH the ICT were alerted to reduced air changes in patient rooms.
Background	Recommended air changes for a single room on a ward are 6 air changes / hour as per HTM 03-01 (Specialised ventilation for healthcare premises). This would not normally have infection control sign off. A decision was made to reduce air changes to 3 ACH/hr in the renal dialysis unit for energy efficiency. This decision was then extrapolated to the rest of the hospital. Sufficient negative pressure of the rooms was not obtained to make this a safe option. Rooms are currently at a neutral pressure. There is therefore both reduced dilution of microbial contamination and escape of air out of the rooms into surrounding areas.
Assessment	Placement of patients with airborne infections in these rooms represents a risk of cross transmission to other patients and staff via the airborne route. High risk areas in the QEUH have been identified as; 1) Level 7 Respiratory wards 2) Outpatient respiratory clinics 1st floor clinic B rooms 77-85 3) Physio department – Room 16 , Ground floor 4) Renal transplant , level 4 5) ID unit , level 5 6) During winter months and respiratory virus season other wards will be high risk
Recommendations	1) Doors to rooms should remain closed 2) For aerosol generating procedures in in-patients 2 hours should be left before non- essential personnel enter the room and before a new patient is admitted. 3) For aerosol generating procedures 2 hours should be left between patients in the outpatient setting 4) Staff should continue to wear appropriate PPE 5) Renal transplant patients should where possible be nursed in ward 4C until 12 months post transplant. 6) ICT should be made aware of any renal transplant patients with PCP. 7) This information should be reviewed in conjunction with the HFS review of isolation rooms. Contingency planning may be required for patients with active pulmonary tuberculosis.

<table>
<tr><td>NHS Greater Glasgow and Clyde</td><td>Infection Prevention and Control Team</td></tr>
<tr><td>Purpose</td><td>Review of trough sinks in trolleys bays</td></tr>
<tr><td>From</td><td>South Glasgow Paediatrics IPCT</td></tr>
<tr><td>To</td><td>Senior Management Team, Women and Children’s Directorate</td></tr>
<tr><td>Date</td><td>17/10/16</td></tr>
<tr><td>Situation</td><td>Following an increased incidence of Serratia marcescens, the IPCT and clinical staff reviewed the use of sinks in the unit. The trough sinks in the trolley bays are very close to a number of procedure trolleys. This adds a risk of water splashing from tap water and also soap scum onto the procedure trolleys during scrub.</td></tr>
<tr><td>Background</td><td>Ward 1D, PICU, has two trolley bays that each have a trough sink. The rational was that these sinks would be used to undertake surgical scrub if a surgical procedure was required in one of the single rooms, since none of the single rooms have trough sinks. The trough sinks in the trolley bays are not used very often and therefore pose a risk. Removal of little-used outlets is recommended by HPS as good practice to reduce the risk to patients from water borne organisms [1]</td></tr>
<tr><td>Action</td><td>The clinical team have no objection to the trough sink being removed if a trough sink for surgical scrub is provided in the single rooms. Consideration is required to the size of the trough sink in the ante room and the space required for a patient bed and equipment to enter and exit the patient bed room via the ante room. The following table outlines the changes required:
<table>
<tr><td>Trolley bay</td><td>CCW-056</td><td>Remove trough sink</td></tr>
<tr><td>Single room with AR (18)</td><td>CCW-104</td><td>Replace CWHB in ante room with trough sink</td></tr>
<tr><td>Single room with AR (17)</td><td>CCW-100</td><td>Replace CWHB in ante room with trough sink</td></tr>
<tr><td>Trolley bay</td><td>CCW-066</td><td>Remove trough sink</td></tr>
<tr><td>Single room with AR (12)</td><td>CCW-067</td><td>Replace CWHB in ante room with trough sink</td></tr>
<tr><td>Single room with AR (15)</td><td>CCW-084</td><td>Replace CWHB in ante room with trough sink</td></tr>
<tr><td>Single room no AR (6)</td><td>CCW-085</td><td>Replace CWHB in room with trough sink?</td></tr>
<tr><td>Single room no AR (7)</td><td>CCW-086</td><td>Replace CWHB in room with trough sink?</td></tr>
</table></td></tr>
<tr><td>Recommendation</td><td>The IPCT recommends the following:
1. The estates / clinical team work together to assess the size and placement of trough sinks in the ante rooms which will not impede the movement of the patient bed /equipment in and out of the cubicle.
2. If this is feasible, then the estates/ clinical team/IPCT work together to plan a programme of replacement troughs in the single rooms and the removal of the trough sinks in the trolley bays.</td></tr>
</table>

[1] Health Protection Scotland (2014) Guidance for neonatal units (NNUs) (levels 1, 2 & 3), adult and paediatric intensive care units (ICUs) in Scotland to minimise the risk of Pseudomonas aeruginosa infection from water.

NHS Greater Glasgow and Clyde	**NHS Greater Glasgow & Clyde** **Infection Prevention and Control Team**
Purpose:	**Briefing Paper - Requested by Board Medical Director & HAI Executive Lead**
From:	**Infection Prevention and Control Team**
To:	**Non-executive Board Members**
Date:	**15/11/2016**
Subject / Situation:	**Roles and Responsibilities of the Infection Prevention and Control Team (IPCT)**
Background	The Infection Prevention and Control Team (IPCT) primary role is the prevention of healthcare-associated infections (HAI). Patients are more vulnerable to infections and therefore any contact they have with the healthcare environment or healthcare workers (HCW) has the potential to cause harm to the individual. The scope of IPC therefore encompasses a wide and highly complex environment, set against a background of increasing resistance of micro-organisms to antibiotics. Set out here is some of the actions / initiative the IPCT are currently undertaking to prevent and control HAI.
Structure of the Teams	**Infection Prevention and Control Teams** There are IPCTs based on all main sites in NHSGGC and each team has the responsibility for a geographical area. A separate IPCT provides a service to Mental Health in-patient areas and Health and Social Care Partnerships (HSCP). Each IPCT comprises an Infection Control Doctor (ICD) and Infection Prevention and Control Nurses (IPCNs). **IPC Surveillance Team** A separate IPC Surveillance Team (nurses and data managers) lead on the monitoring and prevention of surgical site infections (SSIs) and the monitoring of all HAI referred to or identified by the IPCTs. Trend information is crucial in order to prioritise areas for improvement. The reporting structure for this information is detailed in **Appendix 1**. **IPC Senior Management Team** The IPCTs are co-ordinated by the Infection Control Manger (ICM) and direct reports who include the Lead Infection Control Doctor (LICD) and the Associate Nurse Director for IPC (ANDIPC). This structure ensures that a consistent approach is taken across all sites and services.
Key areas	**Patient Management** All patients with alert organisms or conditions (AO/AC) are referred to the IPCTs directly from the laboratories. AO/AC are generally micro-organisms / infections which could potentially cause harm to others, e.g. Tuberculosis, meningitis, or that have the potential to be a risk to the wider public health, e.g. multi-resistant organisms (MRSA). They are referred specifically, so that additional precautions can be implemented, i.e. Transmission Based Precautions (TBPs). Patients with AO/AC are visited by an IPCN who explains the condition and the precautions necessary to prevent spread, e.g. the requirement for isolation. Written information is left with the patient / relative and the patient / relative is advised that if they require further information the IPCN will visit again. Ward staff are given care plans or check lists with the precautions required to prevent the spread of infection and are asked to review this daily. Advice on the correct antibiotics to administer to patients is given by the ICD or Antimicrobial Pharmacist.

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Key areas (cont/…)	**Surveillance of AO/CD – IC NET** In the past several years an electronic patient management system (ICNet) has been introduced into NHSGGC. This system links information from hospital systems, e.g. laboratory, theatre, TrakCare. This ensures that results are received in real time (every 15 minutes) by the IPCTs who in turn can act upon this promptly. A full record of patient diagnosis and management is included in the system which facilitates documentation audit. Direct links to microbiology and theatre systems makes surveillance of less complex surgical procedures possible, e.g. cataract surgery, with minimal manpower. The system allows the IPCT SMT to view the records of any patient referred via this system in any hospital across the board. **Outbreak Management** The IPCT reviews every AO/CD for any place / time contact with other patients with the same infection and if two HAI cases occur in any ward in a two-week period this is considered a 'trigger' for additional action and the ward is visited daily until the cases are discharged or are well. In addition to the two cases, the numbers of MRSA and *C. difficile* infection are monitored daily by the IPCT SMT. If after review an outbreak is declared, a process is set in motion as per the Outbreak Standard Operating Procedure (SOP). **Surveillance of Surgical Site Infections (SSIs)** Surveillance of SSI is the process of reviewing patient information to determine the number of patients who present with SSI as a post operative complication. NHSGGC are required to carry out mandatory surveillance on the following surgical procedures: • Caesarean section • Hip arthroplasty • Knee arthroplasty • Reduction of long bone fracture • Repair of neck of femur • Vascular • Colorectal This information also allows us to determine trends, so if a site or surgeon has a higher than expected number of post operative infections, a review of cases can be undertaken to establish if there are any reasons this may have occurred. The links established with the introduction of ICNet allows the IPCT to undertake surveillance in less complex procedures, e.g. cataract surgery, with minimal data management / surveillance nursing input (cataracts have very low infection rates and therefore as soon as a specimen is received in the laboratory an alert goes immediately to the IPCT and a review of the case is undertaken). **Advice on New Builds and Renovation Projects** The design of the healthcare environment plays a fundamental role in IPC. IPCTs must therefore be involved at all stages of a project; from the initial planning through to completion and handover. ICDs are involved in the design of ventilation for all specialist ventilated areas as defined by SHTM 03-01.

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Key areas (cont/…)	**Patient Experience** Patient Experience formerly known as Public Focus Patient Involvement remains a key priority area within the IPC programme with public members continuing to participate fully in the Board Infection Control Committee (BICC) and Partnerships Infection Control Support Group (PICSG). Public partners also contribute the monitoring of cleaning services and carry out IPC audits during these reviews. Education sessions for our partners are carried out by the IPCT. In 2016 IPC participated in the '*what matters to me*' project in which IPCNs spoke to patients about their experience of isolation and the types of information they have been given, and how both could be improved. The report on this initiative is currently being compiled. **Audit -Infection Prevention & Control Audit Tool (IPCAT)** Audit is a way to assess the application in practice of national policies and standards to prevent infection. It allows the IPCT to target specific areas for support or education. The IPCAT focuses on four main areas of clinical practice: • Standard Infection Control Precautions (SICPS)* • Transmission Based Precautions (TBPs) - precautions required when a patient has a known infection • Safe Patient Environment (SPE) includes audit of any issues in the physical environment which could cause infection, e.g. cleanliness of the environment • Application of Improvement Bundles. Bundles are four or five actions based on robust scientific evidence that if put in place will prevent infections associated, in this case, with three specific invasive devices, i.e. peripheral vascular cannula (PVC), central venous cannula (CVC) and urinary catheters. Following completion of IPCAT, results and an action plan generated can be accessed via the Infection Control dashboard. Actions highlighted as a critical non-compliance must be addressed within 24 hours of completion of IPCAT with a period of one-month allowed for all other actions to be completed. Chief Nurses and Senior Managers all have access to the dashboard and can view their wards and implement additional actions if required. *** Standard Infection Control Precautions (SICPS)** SICPs are intended for use by all healthcare staff in all healthcare settings whether infection is known to be present or not, to ensure the safety of patients, staff and visitors to the healthcare environment. They are the basic IPC measures necessary to reduce the risk of transmission of micro-organisms from both recognised and unrecognised sources of infection. There are ten elements of SICPs:

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Key areas (cont/…)	• patient placement • hand hygiene • respiratory hygiene and cough etiquette • management of care equipment • control of the environment • safe management of linen • management of blood and body fluids • safe disposal of waste • occupational exposure management (including sharps) • personal protective equipment **Policy / Standard Operating Procedures (SOP) Development** NHSGGC has a comprehensive manual of board wide policies and SOPs for IPC. All policies / SOPs are developed and disseminated for consultation through the Acute Infection Control Committee (AICC) and PICSG, and subsequent approval at the BICC. Since 2012 a link to the IPC Manual has been available on the desk top of all PCs and tablets in NHSGGC allowing staff to have access to current IPC policies and guidance documents. The National IPC Manual chapters 1 (Standard Infection Control Precautions - SICPs) and 2 (Transmission Based Precautions - TBPs) were placed on the NHSGGC IPC website in January 2013 and all NHS Boards have been required to monitor compliance with SICPs since. NHSGGC has now made SICPs monitoring at ward level available to all acute Senior Charge Nurses (SCNs) to provide assurance on SICPs application. **Education** The IPCT provides a comprehensive programme of education and training in IPC. This is based on the IPC Education Strategy. Key components include: • NHS Scotland Cleanliness Champions Programme • Development of LearnPro modules in response to the introduction ofnew guidelines after the identification of a new or emerging pathogen. • Induction and face-to-face training - IPCTs developed a standard induction presentation which is delivered across the Acute Division as part of NHSGGC mandatory training. • Education to undergraduate medical and nursing students throughout NHSGGC. • Training of volunteers working within NHSGGC premises. • Mandatory Education Update Training. • IPC have developed a single system induction checklist which will facilitate the manager / reviewer through this process and an HAI Education Matrix lists the mandatory and recommended HAI modules which staff should undertake and update 3-yearly.

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Key areas (cont/…)	**Decontamination of Medical Devices** The NHSGGC Decontamination Sub-Group continues to address any decontamination issues outwith the areas of endoscopy and central decontamination of instruments. The remit of the group is: • To provide technical expertise and a consensus on the ideal best practice of decontamination for any given issues. • To participate and assist in risk assessments by NHSGGC on decontamination issues. • A dedicated e-mail address has been established to allow staff to contact the Decontamination Sub-Group. A webpage within the NHSGGC IPC site allows responses to queries to be centrally stored and available to all staff. **Governance and Reporting** The NHSGGC Board Clinical Governance Forum and the Acute Services Committee receive bi-monthly reports on key performance indicators on HAIs. These reports are designed to: • Ensure visibility on HAI data and issues for the NHS Board, Clinical Governance Forum, Acute Services Committee and Infection Control Committee members. • Facilitate assurance and awareness around HAI prevalence within NHSGGC. • Demonstrate performance against Infection Control HEAT targets, mandatory surveillance programmes and agreed key performance indicators (KPIs). • Place hospital specific information on HAIs in the public domain in the context of an open Board meeting and on the Board website thereafter. **Governance Relating to IPC within the Acute Operating Division** The AICC and each of the acute directorates receive comprehensive monthly reports on KPIs on HAI. IPC is a standing agenda item on each Sector / Directorate's Senior Management Team and/or Governance Forums, and IPC elements are integrated within the performance review process within the Acute Operating Division. A Lead IPCN and ICD are aligned to each of the sectors / directorates. Each ward and department receives monthly Statistical Process Control Charts (SPCs) or interval charts for MRSA and CDI together with regular IPCAT audit reports and hand hygiene compliance data.
	Governance Relating to IPC within Partnership Organisations The PICSG oversees the implementation of the NHSGGC IPC Programme within non-acute service delivery areas. Specific governance arrangements within our Partnership organisations are:

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Key areas (cont/…)	• Governance for non-acute in-patient beds is delivered and overseen through the Director of Nursing for Mental Health Services (MHS). • Accountability for IPC within HSCPs rests with local managers. • The Director of Nursing for MHS chairs the PICSG and represents the PICSG atthe BICC. • Each HSCP has a nominated member of their Senior Management Team as their lead for HAI and representative on the PICSG. **Implementation of National Policy on HAI** Prevention and the control of infection continues to have the highest priority within NHSGGC and this reflects the significant focus placed on IPC at a national level by both the Scottish Government and Health Protection Scotland (HPS). The IPCT are required to lead on the implementation of numerous national policy initiatives within NHSGGC. The most recent and significant policy initiatives were communicated in DL(2015) 19. DL(2015) 19 was a particularly challenging directive in that four major new initiatives required to be implemented in a relative short time scale and all had resource implications. The process for implementation is as follows: • Initial impact assessment is undertaken in order to articulate the fullresource implications. • Plans for implementation are developed by the IPCT SMT for consultation • The implications together with the plans for implementation are taken to the appropriate IPC and Governance committees. • When approved the actions required are included in the IPC annual work programme. • Implementation of the work programme is monitored through the IPC committees. This Government letter required the following developments to be implemented during 2016/17: • CPE Screening • The extension of Surgical Site Surveillance to include Colorectal and Vascular Surgery • Completion of a National HAI Point Prevalence Study over a 3-month period. • Surveillance of E-coli bacteraemia. All the elements of DL(2015) 19 have been implemented in NHSGGC and progress is reviewed and monitored regularly at the relevant committees. **Website** The NHSGGC IPCT has a website which can be accessed freely by both staff and the public. http://www.nhsggc.org.uk/your-health/infection-prevention-and-control/

Investigation of *Mycobacterium abscessus* Cross transmission in CF services in GGC

Dr Christine Peters 19/01/2016

Situation

An increase in the incidence of *M abscessus* infections in adult CF patients has been the subject of investigation by Dr Christine Peters, as Microbiologist for Adult CF (May2015 – present), and ICD for QEUH (August 2014 – October 2016). It has become clear that this investigation has been hampered by the withholding of relevant information by members of the infection control team and microbiology colleagues**,** and that key interventions regarding decontamination of equipment were not taken in a timely manner.

Background

Mycobacterium abscessus is a bacterium that is present in the environment globally and has been identified as an increasing problem for patients with the genetic disease cystic fibrosis. Incidence of infection has increased globally in this patient group and evidence has accumulated that clones have spread across different countries with a number of outbreaks in CF centres requiring increased infection control precautions. The consequences of acquisition of this bacterium are increased morbidity and mortality , with a contraindication to lung transplant which can have severe life limiting implications.

The CF Trust issued a warning regarding *M abscessus* and cross transmission in 2013 to CF centres and stringent Infection Control Guidance was published.

In GGC the CF service has been run separately as a paediatric service at Yorkhill , moving to the RHC in May 2015, and Adult CF at Gartnavel General Hospital, moving to QEUH in June 2015. As a tertiary referral centre GGC has shared care of patients with Wishaw General Hospital, Crosshouse, Dumfries, and RAH with patients occasionally being admitted from these centres and staff and equipment being shared with the Glasgow Paediatric service over the past decades.

Microbiology liaison was provided to both adult and paediatric services by Professor Craig Williams until June 2015 when Christine Peters took over the clinical MDT liaison for the adults , and April 2016 when he left GGC. There was a gap in consultant Microbiology cover until October 2016 when Christine took on the role. Carol Lucas, a Clinical Scientist covered CF from a laboratory point of view and kept data pertaining to paediatric patients until her retirement in June 2016.

For infection Control advice Professor Williams was the Lead ICD until his departure in April 2016 and oversaw the CF infection Control liaison.

Since then Teresa Inkster has had ICD responsibility for the paediatric service and Dr Christine Peters for the Adult CF service.

The issue of an increase in cases of *M abscessus* was raised with Christine Peters in March 2016 and an initial audit indicated that 25 adults had *M abscessus* in total, with 6 new cases since the opening of the new building.Paediatric data was not forthcoming.

A paper published in November 2016 in the journal Science concludes on the basis of Whole Genome sequencing that cross transmission of *M abscessus* has occurred in GGC. This paper was known about in February 2016, and a paper with the decoding of the original samples verifies that this is the case – which was part of Carol's files which were sent to us in August. This information was discussed by a mother of a child with CF with Professor Flotto , and this mother has been raising her concerns regarding infection control procedures in the adult and paediatric services.

Assessment (Evidence appended)

After piecing together the information which has appeared piecemeal to date, it now seems that there has been a total of 61 CF patients since 2001 in GGC who have have had *M abscessus* and that investigations into cross transmission were undertaken in 2005, 2014, 2015 and at the start of 2016. Posters and an abstract were published which presented data on typing and referred to the fact that WGS had been carried out in 2015 , but his data was not known by Dr Inkster or Dr Peters until August 2016 and the provenance of the information has taken some time to discern. A timeline with relevant documents and quotes is presented as an appendage. My conclusions are:

1. It is clear that there is evidence of historical cross transmission of *M abscessus* within the CF paediatric and adult services. The magnitude and timescale is not fully elucidated to date.
2. There were omissions of key patients in the timelines and typing results when the issue of cross transmission was investigated previously, and the information regarding those investigations was not shared with myself , despite raising the issue repeatedly with the Microbiology and Infection Control teams.
3. Whole Genome sequencing was carried out which was highly conclusive of cross transmission in 2015, this information is mentioned in a Poster at an international conference (although it states that WGS ruled out cross transmission), however was not shared with SMT, and neither was its existence mentioned to Dr Inkster or myself. This was only discovered when Carol's files were forwarded by Dr Wilkinson in August 2016. Two of the patients were in the adult cohort at the time of the investigations.
4. Deficiencies in the decontamination of respiratory equipment has been investigated over a number of years however at present there is no proper decontamination facility for either the adult or paediatric respiratory laboratories and the SOPs are requiring a complete overhaul. This can only be viewed as a clear risk for the possibility of cross transmission of adapted *M abscessus* clones within the CF population. I had been informedthat this

matter was in hand and was dealt with by the decontamination group yet the outputs are still outstanding and Dr Inkster has had to re-initiate the process.

5. Data which pertained to current paediatric and adult patients were held by Carol Lucas , and there was no arrangement in place for this to be handed over to the remaining paediatric microbiology consultants despite her retirement being known about for a number of months . These files were deleted and only reappeared after I raised it as a data governance issue. The consultants at the QEUH had repeatedly asked regarding the arrangements for the handover from both Professor Williams and Carl Lucas prior to their departure and how the gap would be managed.
6. Files regarding all aspects of the *M abscessus* investigations by the IPCT had been deleted from the common folder, and have reappeared over the recent months, some seem to have been altered, although it has been hard to keep abreast of what has been happening to these.

Recommendation

1. Senior management investigate the evidence presented to assess professional probity issues of those involved with regard to publications, and withholding information from colleagues both in Microbiology and Infection Control.
2. Clear policies are developed for Microbiology staff regarding the handover of data on leaving the organisation with data governance prioritised.
3. The infection Control team consider organisational means to prevent the loss of important decisions and actions over time.
4. There is an investigation into the governance of information stored on the shared Infection Control Drive with regard to altering of records and deletion and appearance of key files with regard to *M abscessus* and CF patients.
5. There is an organisational consideration of the messages that have been communicated to CF patients and their parents with regard to previous investigations of *M abscessus* cross transmission.
6. The infection control remit over research facilities is clarified.

References

Cystic Fibrosis Trust (2013). Cystic Fibrosis Our Focus. Mycobacterium abscessus – Suggestions for the infection prevention and control (interim guidance – October 2013) *Report of the Cystic Fibrosis Trusts Mycobacterium abscessus Infection Control Working group.* Available at: http://www.cysticfibrosis.org.uk/news/latest-news/draft-interim-ntm-guidelines

Saiman L and Siegel J (2004). Infection Control in Cystic Fibrosis. Clinical Microbiology Reviews: 17 (1); 57-71.

Bryant *et al* (2013). Whole-genome sequencing to identify transmission of *Mycobacterium abscessus* between patients with cystic fibrosis: a retrospective cohort study. Lancet: 381(9877):1551-60.

Griffith et al (2007). An Official ATS/IDSA Statement: Diagnosis, Treatment, and Prevention of Nontuberculous Mycobacterial Diseases. Am J Respir Crit Care Med: 175; 367–416 brosis: a retrospective cohort study'. *The Lancet* vol 381 May 4 2013, p 1551-1560.

Bryant et al (2016) Emergence and spread of a human-transmissible multidrug-resistant non tuberculous mycobacterium Science 354 6313 751-757

Evidence

Time line	When I knew	Information	Issues
2005	Files from JW Sept 2016	[redacted]	No evidence of IC investigations available
2013 CF Trust Issue Guidelines for infection Control		CC15 - NTM guidelinesv3.pdf	
CF Unit Policy	12/2015	QEUH Adult Cystic Fibrosis Protocol June	Infection control mentioned in different parts ,but does not sit as an infection control policy
8/1/2014 Infection Control Decontamination Subgroup Meeting Decontamination of Respiratory Research Equipment	December 2016 : Shared drive ? recently added	Agenda available but no minutes seen : Specifically to discuss : Sonix 2000 Ultrasonic Nebuliser Omron Micro Air Pocket Nebuliser Carefusion Microlab Spirometer Vitalgraph Model 6000 Spirometer	[redacted]
18/01/2013 Request for Advise on Decontaminating medical devices : Spiro Air Machine Susie Dodd	December 2016 Shared drive, not seen before,	Tubing noted to be used for 1 week the removed and washed in detergent and left to air dry. Incomplete	Variable files appearing on shared drive in regard to decontamination

21/01/2014 Yorkhill Time lines AND visit to OPD, PHYSIO DEPARTMENT: Angela and Clare	December 2016	• [redacted]) • [redacted]	[redacted]
Email Clare to Angela and Peter Anderson	On shared drive December 27/12/16	• FW Physiotherpay Percussionaire equipment.msg	
29/01/2014 Infection Control SMT Chair :Tom Walsh		• Clare Mitchell reported had been asked to look into M abscessus in Paediatric CF patients. Equipment brought for trial in November but there appears to to be little decontamination of the equipment. Asked to stop using until further investigation •	Note previous documents done in feb 2014 and feb 2015 it now seems from shared drive.
MICRO TYPING VNTR results available02/14	December 2016	[redacted]	
17/04/2014 Decontamination Subgroup Chair Sarah Whitehead Apologies Dr Balfour		• Under matters arising: • Respiratory Research Equipment _ Margaret Ann stated the trial has now come to an end and the equipment is no longer in use. The group advice is in future any respiratory equipment purchased should use single – use filters	

26/03/2014 and 30/04/2014 Infection Control SMT Chair Tom Walsh		• Not mentioned	
SWInfection Control Team (weekly) Chair Clare Mitchell	Present	• Katrina Black mentions Decontamination Group Update:"Decontamination room for respiratory medicine does not have a clinical wash hand basin"	
23/04/15 Decontamination Subgroup Chair Craig Williams Present Alison Balfour Katrina Black		• Assistant director of clinical research to discuss governance of department. • KD asked in terms of infection control what is expected when purchasing new equipment. CW gave advise	
[redacted]	[redacted]	• [redacted]	[redacted])
10/07/2014 Decontamination SubGroup Chair Sarah Whitehead Apologies Alison Balfour Jackie Barmanroy present		• JB highlighted a query raised in the SW ICT relating to a Percussionaire product purchased by respiratory physiotherapy department without seeking IC advice. The device is used on CF patients to help bring up mucus secretions. The tubing which is attached between the handset and the machine can become contaminated with the patients own secretions. JB tabled the local decontamination protocol written by Clare Mitchell and the respiratory physiotherapists for the unit which was passed by the group. The protocol states after each patient use the tube should be sent to CSSD to be cleaned and dried. The group agreed this procedure will need to be passed via Alan Stewart at CSSD. JB will update the group on progress made.	

20/06/14 ICD meeting Chair Craig Williams		• Not mentioned	
25/06/14 Infection Control SMT Chair Tom Walsh		• Not mentioned	
SGH Poster Event August 2014 C Lucas, C Williams A Balfour	December 2016	• [redacted] • States that until epidemiological investigation it is premature to exclude cross infection except in the unique strains	
14/08/14 Decontamination sub group Chair Sarah Whitehead Present Alison Balfour Katrina Black	Read December 2016	• Percussionaire (Respiratory Physiotherapy) • This device is used on CF patients to help bring up sticky mucus seretions. The SOP is in place for the decontamination of this equipment however there is still an issue with the cleaning of a small piece of tubing that can possibly become contaminated . The manufacturer states it is not viable for them to produce single –use tubing . JB advised the group Clare Mitchell had previously discussed decontamination solutions with Ian McIvor at Cowlairs CDU. Alan Stewart will follow this up with Ian McIvor. ALsion Balfour will discuss this with Jane Wilkinson the CF Specialist at Yorkhill Hospital.	? outcomes of these discussions
27/08/14 Infection Control SMT Chair Tom Walsh First attendance after appointment	Present at meeting	• NO mention • Updates from Decontamination Group by Alison Balfour	

by Christine Peters			
08/09/14	December 2016	• Respiratory Medicine ICN visit	Clear attendance on same day

			[redacted]
9/10/2014 IClead Nurses Chair Sandra McNamee	Dec 2016	• "Yorkhill has a cluster of Mycobacterium abscessus in CF patients. An incident meeting was held on 9/9/14 chaired by Craig Williams. Timeline shows there are no apparent links in time or place . Clare explained that the organism is not that common however iti is a problem in a patient with CF as they are then taken off the transplant list. Clare will look into the possibility that the problem may lie with equipment which is shared between yorkhill and wishaw general. Respiratory Medicine have an excellent date and time record for this shared equipment however it also shoes very little time allowed between patient use. Another meeting will be arranged.	
21/10/2014 Incident meeting 2 Craig Williams Jane Wilkinson Clare Mitchell	December 2016	Updated timeline, overlap in 3A identified Pneumotach identified as issue and further meetings arranged w=for Clare Mitchell and respiratory Audit of respiratory equipment raised at Leads ICN meeting - no decision as no Sandra Further Typing is mentioned To investigate ward overlap	Hospital overlap not considered Not declared outbreak despite VNTR typing linking 4 patients and overlaps found Leads Meeting Minutes same day state no links in time or place, no audit mentioned [redacted]

		Further Case identified Craig to meet with Dr Davies re respiratory Equipment decon ? HIATT discussed at SMT	[redacted]
23/10/2014 Decontamination Sub group Chair Sarah Whitehead		• Sarah had contacted the physiotherapy department . SW updated there is a lot of parental pressure to continue using this device. CDU have stated they cannot clean/dry the small piece of tubing that is problematic and the manufacturer state it is not viable for them to provide single use tubing. The group need to ensure that the department maintain best practice. Both SW and AS will look at the device again post meeting	
24/10/2014 Infection Control SMT Chair Craig Williams	Present at meeting	• Craig states Clare is working with Jane re M abscessus in CF • Stated that looking at typing in paeds and no common factor and no cross infection • Meeting arranged for Friday to see respiratory equipment to look how these are decontaminated	Common factor is respiratory equipment with concerns re decontamination , as well as cross overs in hospital
7/11/14 Visit to Respiratory Medicine	December 2016	• issues identified : contamination keyboards • Issues with previous kit going to Wishaw for decontamination • Pneumotach ultrasonic machine • Looking into washer disinfector • Dumfries shared equipment • AA share equipment	
11/11/2014 Incident Meeting 3		[redacted] Spirometry of MAB patients to be carried out in bedrooms	Numbers not updated Still consider no epidemiological link

Jane Wilkinson Carol Lucas Peter Anderson Linda Cassidy Clare Mitchell		No conclusions noted re SPirometry and Pneumotach WGS of 4 isolates requested from PHE	Note WGS is done as outbreak investigation , not research
9.12.14 Incident Meeting 4 Jane Wilkinson Carol Lucas James Paton Paul Burns Clare Mitchell	December 2016	Incomplete minutes Awaiting WGS Ventilation in the NEW Hospital – CM to discuss with Craig Williams re respiratory labs, physio and patient rooms	[redacted]
18/12/14 Decontamination Sub Group Chair Craig Williams Present Alison Balfour Clare Mitchell	December 2016 read through minutes	Cm will contact Anderson Caledonia to enquire if they can clean/dry the piece of tubing that Cowlairs cannot process. The group agreed if this is not a viable option the tube should be purchased as single patient use. CM will also enquire if the handset can be autoclaved at CSSD	This entire process has had to be revisited in December 2016 by Dr Ash Despande as the procedures were not followed in Paediatric CF physio, 2 years after this decision of the decontamination group was made.
6/1/2015 ICD meeting Chair Craig Williams	Present	Not mentioned	
17/02/2015 ICD Meeting Chair Craig Williams	Present		
28/01/15 Infection Control SMT Chair Tom Walsh Craig Williams	Present	No mention	
12/02/2015 Decontamination Subgroup Chair Craig Williams		• CM contacted Andersen Caledonia CDU who will decontaminate the equipment by ethylene oxide. They will charge per box of equipment. The department will purchase more equipment as there will ne a 2-3 week	Clear decision re Percussionaire – followed in adults but not paediatric service – unsure how this discrepancy could have arisen?

Present Alison Balfour		turnaround for this method of decontamination . Katherine Sharp has taken over the management of this and will update the decontamination policy . The department plan to use this equipment of more patients but only if a robust decontamination process is in place	
17/02/2015 ICD Meeting Chair Craig Williams Alison Balfour present	Present	"Craig explained there are potential problems in relation to Chapter 2 of the National IPC Manual and what constitutes AGPs. Meetings to be arranged the first couple of weeks in March with physiotherapists, IPCTs ad CF clinicians to cross reference against the CF guidelines. PJ and SM will have the response to Chapter 2 by the end of March and this response will be included in the CF Guidelines. Linda will forward the Clyde protocol to Christine	
25/02/2015 Infection Control SMT Chair Tom Walsh Craig Williams	Present	Craig Noted ICD meeting discussed need for CF Unit policies to belong to Infection Control , he said a meeting had been arranged with infection control and clinicians to consider the policy	What is not minuted is that I asked to be involved as the CF unit was coming over to QEUH where I was ICD . I was told CF was Craig's remit.
25/03/2015 Infection Control SMT Chair Tom Walsh Craig Williams	Present	No mention	
17.04.2015 CF Microbiology Meeting J Wilkinson Craig Williams Carol Lucas Claire Mitchell Linda Cassidy	December 2016	Equipment – asthma boxes to be checked by CM Air Exchanges re New build physio noted to be 7 ACH, and that clinic rooms have 3.5 ACH , to be kept on agenda UPDATE NTM : Colindale reculturing " Clusters 1 and 2"	This information was not incorporated into policy regarding leaving empty for longer post M abscessus patients

21.04.2015 Key Policies Meeting for Cystic Fibrosis Jane Wilkinson Karen Cassidy Jane Young Clare Mitchell	April 2015 Tried to attend but dates were made on holiday time , no notes sent to me, verbally told this was not my remit	Prof Williams to be involved to the group Hands, Aprons and Gloves discussed Aim to standardise CF infection control across adults and Paeds prior to entry into new build ? RAH to be included – Clare to discuss with Craig	
29/04/2015 Infection Control SMT Chair Tom Walsh	Present	No mention	
[redacted]	[redacted]	[redacted]	[redacted]
10/05/15 Cystic Fibrosis Microbiology Meeting Jane Wilkinson Pamela Joannidis Angela Johnson Carol Lucas And others	December 2016	RHC CF Infection Control Policy Update: To incorporate guidance from the GGC CF infection Control Document PJ/AJ – infection control to update Note meeting chaired by me 29/04/16 re draft GGC CF IC Policy Noted by PJ that the gowns currently being proposed for use with CF patients with NTM are not currently used with TB patients . This will be discussed with Dr Peters at next GGC CFC infection control meeting Dumfries Lung function equipment – need to look at how this is	Note TB is not droplet/fomite spread , but airborne.

		handled and cleaned. NTM update 7 CF patients with current M abscessus PJ has looked at timelines from 2011-2016 in patients with Cluster 1 types. No evidence of cross infection seen on spread sheet.	
12/05/15 Craig Williams Alison Balfour present	Present	Not discussed	
April/May 2015		NEW HOSPITAL OPENS Christine Peters takes on Clinical Microbiology role for CF – although unclear re CF IC responsibilities	
27.05.2015 IC SMT Chair Tom Walsh	Present	No Mention	
3/6/15 Lead ICn Meeting Chair Sandra Macnamee Lynn Pritchard present	December 2016	• Paediatric decontamination room (respiratory medicine) has no sink so they plan to move to another physiotherapy area. Clare has advised that they consider disposable kit.	
9/06/2015 ICD Meeting CW	Present	Not discussed	
		•	
Abstract Conference; June 2015 Published C Lucas, J Wilkinson, C Mitchell, D Kenna, J Turton, N Mustafa, C Williams http://www.sciencedirect.com/scien		• 13 Paediatric patients referred to • [redacted] • No epidemiological evidence of periods when cross infection could have occurred • WGS was performed on 5 patients • Conclusion states WGS may required to exclude	Again – no mention of ward cross over, equipment and decontamination issues WGS mentioned as being done however the detail of low SNP number differences NOT

ce/article/pii/S1569199315302320		possibility of hospital acquisition.	reported [redacted]
24/06/15, 26/08/2015 SMTS Chair Tom Walsh	Present	No Mention	
POSTER SGH Event ?August 2015 Alison Balfour, Carol Lucas Craig Williams	December 2016	• Published VNTR data • Epidemiological investigation has not identified a conclusive link " cross infection seems unlikely" • States 2 patients overlapped in hospital but on different wards • Mentions WGS is underway	More overlaps in hospital than noted and shared equipment and decontamination issues not mentioned 2 patients actually overlapped on same ward as per incident meeting minutes
30/9/15 SMT Chair Tom Walsh	Present	"In Paediatrics they have asked for a small decontamination room to be identified and Clare said that Katrina is looking into this"	AT the height of all the other concerns re the building
01/10/2015 South ICT meeting Chair Clare Mitchell Angela Johnstone present	Not present	"Clare is to obtain a list of the agreed items to be decontaminated in the proposed decontamination room in RHC"	

5/10/15 Paper on Decontamination Room for Paediatric Therapies Centre RHC	December 2016 – not seen before	Notes that "currently the dirty utility is being used but this is an inadequate facility as there is no cleaning sink available for washing equipment and there is a macerator present for disposal of body fluids which is not required." Summary of Scottish Health Planning requirements form HFS 2008 Notes the respiratory lab and physiotherapy departments will provide a list of equipment to be decontaminated and frequency for decontamination. The department to provide SOP /guidance for cleaning and decontamination .	? where is the follow through and action?
6/10/2015South IPCT Meeting	Present	Clare and Katrina are to visit the respiratory team regarding the asthma boxes to make sure they are following the guidance that was agreed at the decontamination group	
15th October 2015 Decontamination subgroup Chair Craig Williams Alison Balfour Katrina Black		"CPET equipment: CW stated that a generic departmental SOP needs to be drafted for respiratory equipment that cannot be sterilised at CDU Respiratory Research Decontamination On the back of the CPET query the respiratory Labs at QEUH and RHSC were visited by the South Glasgow IPCT and several issues were raised with the area/methods that the department were using to decontaminate equipment. The need to identify safe and effective areas to decontaminate respiratory equipment has been noted GGC wide as the current practices are not up to HEI standards and this should be	

		added to the risk register . There is a plan to establish a decontamination area in the children's hospital and the adult site will also be looked at. Alan Stewart stated any plans should go through the HFS Decontamination Services. It was also noted many decontamination issues raised by respiratory research need input from Procurement department and their representation on this group needs to be reviewed.	
28/10/15 IC SMT Chair Sandra McNamee Criag WIlliams 28/01/16 IC SMT Chair Anne Cruikshank 25/02/2016 Chair Tom Walsh	Present Present Present	No mention	
1/12/2015 South IPCT Chair Lynn Pritchard	Present	"A risk register of all areas that locally decontaminate equipment and have a risk assessment set up is being proposed. Lynn suggested that this is a large piece of work, perhaps a short life working group should be formed"	
ICN Leads Meeting 13/01/2016 Chair Pamela Joannidis Lynn Pritchard present	December 2016	Lynn updated today in relation to decontamination of respiratory equipment in the south that she has contacted CSM of the area but has had no response to date. Lynn will send a follow up email at the end of the week if necessary. Pamela will discuss the paediatric plan already prepared with Craig Williams on his return 18/01/15 and if he agrees Pamela will then forward the plan to Geraldine O'Brien at HFS for approval.	
19/01/2016 SGIPCT Meeting	Present	" Dr Peters has requested that an ICN attends the	

Chair Lynn Pritchard		weekly CF meeting on the 7th floor on Wednesday at 9 am Dr Peters has requested a patient journey of CF patient of when they attend the respiratory out patients	
21/01/2016 Decontamination Sub Group Chair Craig Williams Katrina Black		As contacted Procurement . Head of Procurement added to email list. The respiratory Department at QEUH and RHC to send plans for reconfiguration to HFS KB to ask for Peak Flow meter SOP . Can be used up to 50 times.	
2/02/2016 SG ICPT Meeting	Present	Under Decontamination Group Katrina is meeting the lead nurse of respiratory to discuss peak flow meters Nargis Mustaffa is working on a risk register of equipment that is decontaminated locally in the respiratory lab	
17/02/2016 ICN Leads Meetings Chair Sandra McNamee Pamela and Lynn also present		Lynn updated that she has contacted someone else in relation to decontamination of respiratory equipment across NHSGGC but is waiting on a response	Who? I was never told about this
Email From Craig to Christine		 Re Mycobacterium Abcessus.msg • I ask for information from Craig re Floto paper and Cf patient mothers complaints	. Uninformative communication
CF MICRO MEETING 08/03/16 Jane Wilkinson Anne Devenny Linda Cassidy	28/12/16	 CF Microbiology Meeting 080316.doc	Craig decides to carry out timelines for those with most similar results apparently <10% cut off . ? does he mean SNPS?

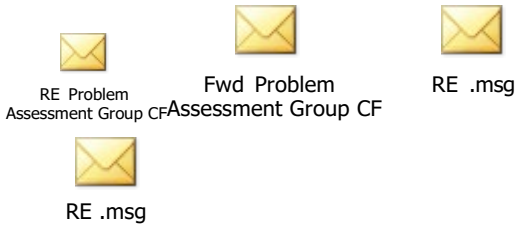
Jane Davis Craig William Pamela Joannidis Carol Lucas Kirstin Marchbanks Triggered by Email from Craig to Carol Lucas, Pamela and Jane that WGS much awaited is back		Update on NTM typing [redacted]	Dr Denney to discuss with Lothian M abscessus policy Dr Devanney to contact Flotto re advice given to patients [redacted] [redacted] NOTE AIRECHANGES not mentions Not clinic template discussed – not seen these and not shared with adults
ICD Meeting 08/03/16 Craig Williams Alison Balfour present [redacted]	Present [redacted]	"Christine asked if there was any further development in relation to the recent audit in both adult and paediatric respiratory labs . Craig believes Ian Powrie is seeking advice from HFS and the labs will be audited against new build standards for sign off by HFS. [redacted]	[redacted]

[redacted]		[redacted]	[redacted]
10/03/2016 Chair Craig Williams	Not present	No mention	
23/3/16 Sofie Singn and Christine Peters	Report walk around	CF Outpatient Clinic Walkround (04.03.16	
23/3/2016		Draft of Science paper shared – clearly implies cross transmission in GGC	
31/03/2016ICSMT Chair Tom Walsh	Not present	Not mentioned	
4/04/2016 email		FW Infection Control Guidance on Forwarded to Anne Cruikshank to highlight the need for Craig to handover the information	The WGS at HPA was NEVER handed on to me until we got Jane's files

5/4/16 I request data from ref lab re all M abscessus			
5/04/16 Cyftic Fibrosis Microbiology Meeting J Wilkinson Craig Williams Carol Lucas Pamela Joannidis Caroline King Fiona Collins Linda Cassidy Angela Johnstone	September 2016 Found on common drive	Note a meeting I had attended 30/03/16, when Flotto paper was discussed Craig to contact FLotto today and advised Philip Davies be informed Pamela's Time line demonstrated no cross over Note re updating CF infection Control Policy , Caroline king to contact Dumfries re decontamination there	[redacted] [redacted] [redacted] [redacted] ,
5/04/2016	19/09/2016	Fw M abscessus cross infection.msg Emails from Andre Flottto to Craig explaining why clones can spread despite apparently no epidemiological links . Pamela, Jane and Carol copied in Craig states "VNTN then WGD and have 4 patients with strains indistinguishable using WGS but we are unable to nd an epidemiological link"	It is hard to believe that this conversation was not shared with me at the time.
6/04/2016 Lead ICN Meeting Chair Sandra McNamee Lynn Pritchard Present	December 2016	Pamela attended a CF meeting on 5/4/16 to discuss M abscessus . This was a combined adults and paediatrics meeting . From 2011 there has been a cluster in the paediatric population. There had been 6 cases from 2 crossed-over however these were different types but there are 4 that look similar so these have been sent for further typing and a timeline is currently being done. It was noted however that there was no apparent crossover . The concern seems to be supported by a paper referred to at the meeting . These concerns were raised by the adult team that IPC are not robust. Craig Williams has	I was never informed about this meeting , however the ICNS and Craig and Carol Lucas were fully aware. Minutes do not make sense [redacted]

		explained how the general environment and fomites are the source of this contaminant. It was noted that this may impact on the South Glasgow Adults IPCT and Pamela will let Lynn know if she should attend any future meetings .	Not a contaminant – its a pathogen with serious consequences. Understanding the importance of fomites actually brings into question the entire validity of the ruling out of cross infection by the timelines produced
18/04 2016 Medical student Audit provisional results		Identified 25 patients in adult services who previously had M abscessus	
20/04/2016 Noted that JA was not included in WGS		 RE j ashe m abs 1605035467 .msg	
19/04/2016ICD Meeting Chair Teresa Inkster Alison Balfour present	Present	"Christine reported re paper about to be published in relation to cross-transmission of M abscessus in CF patients. Christine explained that the author had obtained anonymised data from the ref lab which suggests cross transmission. Christine stated that the CF Trust did provide guidance about a year ago but is unsure if it is being adhered to. Previously Craig Williams, Pamela Joannidis and Clare Mitchell worked on an IPC policy document and Pamela has agreed to work more on this for both adults and paediatrics. There is expected to be more detailed looking at organism bas. Christine will forward the draft document to Linda . Also a meeting is being arranged for both adult and paediatric CF staff. Of note respiratory wards are neutral pressure in QEUH therefore a lot of work is still to be done around CF isolation. Teresa asked about OPD clinics. Christine described how patients are organised to attend clinic and that OPD do not have completely separate clinics . The main issue is it is unknown how long exchanges are	Alison Balfour did not mention any information regarding previous VNTR typing and WGS of CF M abscessus isolates, despite a lengthy discussion regarding this .

20/04/2016 Noted that JA was not included in WGS		RE j ashe m abs 1605035467 .msg	
28/04/16 IC SMT Chair Teresa Inkster amela Joannidis present	Present	Not mentioned	
6/05/16 Multiple email threads relating to CF and infection control		FW Infection Control Guidance on Re Query CF and M abscessus.msg FW Query CF and M abscessus.msg RE Query CF and M abscessus.msg RE Query CF and M abscessus.msg RE Query CF and M abscessus.msg	
10/05/2016 ICD meeting Chair Teresa Inkster Alison Balfour	Present	Christine reported that she had undertaken to write the CF policy by the end of June 2016 for the recently amalgamated paediatric/adult CF group. The policy will be presented to the SOP group in the first instance ad will then go to the IPC SMT for full discussion and agreement . The policy will then need to go through the policy process ie distributed to the IPC committees for wider consultation.	
10/05/16 Medical student audit reports NTM audit results for Adult CF patients Steve Bicknell and Christine Peters supervising		Respiratory Medicine SSC - Audit Report A Identified 26 patients who ever had M abscessus, [redacted]	Abscessus and MAC Patients Info.msg Conference on Mycobacterium absce Actioned in lab to ensure new cases can be rapidly identified
17/05/2016 emails trail form Pamela to Teresa		FW NM AAFB.msg	Pamela denies knowledge of Cluster 1
17/05/2016 emails from Carol Lucas		NTM CHIs.msg RE NTM CHIs.msg	I asked on many occasions for information from Carol regarding M abscessus in paediatrics but this

			was all the information I was given.
18/05/16 PAg is organised			
23/05/16 Lisa Morrison			
[redacted]		[redacted]	[redacted]
[redacted]		[redacted]	
26/05/2016ICSMT	Present	"Pamela reported that CF Paeds team have been monitoring M	Note all IC policy for CF paeds and

Chair Tom Walsh		abscessus for a number of years and have a segregation policy . At no time have patients been in the same room or clinic at the same time. Alison commented that there may be a breakdown when a patient transfers from paeds to adult care and the patients may not have the same screening carried out. Christine advised that a policy is being prepared for adult and paeds and for a process to be agreed as there is no joint policy at present . The policy will go to the policy group to discuss nd then to the committees for approval and Tom suggested that there may be a recommendation that this policy is not owned by infection control"	adult prior to Craig leaving had been Craig's remit, including any screening. No mention made of WGS investigations , or incident meetings as recently as October, as well as discussions at the CF Paediatric CF Microbiology meetings in April where Pamelas timelines had been discussed
6/06/2016 Information re Flotto paper	December 2016	Dr Ian Laurenson send data re the Flotto paper to Christine, Carol Lucas, Jim McMennimin and Gordon McGregor  FW Confidential M abscessus in CF patients..htm Carol responds to this but excludes my name form the group .	The data is non-sensical to me as the names do not relate to adult patients that I have on my database and it is too complex to decode.
14/06/2016 ICD meeting Chair Teresa Inkster Alison Balfour	Present	Discussions are ongoing in CF in relation to \m abscessus	
13/06/2016 HPS rapid literature review	 Rapid Review - Decontamination c	 M abscessus literature review requ  RE M abscessus literature review requ	
22/06/2016 Draft CF document for M abscessus	 CF Patients and abscessus (2).do	 FW CF Patients and M abscessus.msg  CF Patients and M abscessus.msg	

Reference lab involved	RE fyi .msg		
29/07/2016 CF Adult Abscessus policy finalised	CF Patients and abscessus finaldra	CF Patients and M abscessus finaldraft 2 Interim Infection Control Procedures f	
28/07/2016 IC SMT Chair Tom Walsh Sandra MacNamee Alison Balfour	Present	"CF Meetings ongoing"	
19/082016 Discussion re use of medicinema for m abscessus patients		RE Medicinema infection control ques	
19/9/2016 email Christine to Tom Walsh		FW Mycobacterium Abcessus.msg Raises my concerns re IPCT with holding and information	Meeting not held till December after I repeatedly asked for a date.
21/09/2016 emails from Lynn Pritchard		RE M abscessus.msg	Loss of knowledge and record of Katrina and Clare's work on Respiratory decontamination
26/08/2016 CF Society Meeting in Dunblane – co-organised by C Peters, HPS reps present and Ian Laurenson from ref lab.		SCFG Abscessus Meeting 110716.doc	

30/08/2017 email sent requesting data for CF paediatrics		CF data.msg RE CF data.msg RE CF data.msg RE CF data.msg RE CF data.msg	
31/08/2016 email for Jane Wilkinson with Carols files		RE CF data.msg RE CF data.msg	This was the first access I had to a whole lot of data and it has been very difficult to understand all the different data sets .
12/09/2016 Paediatric team asked to review adult M abscessus policy		FW Interim Infection Control Procedures f	
13/09/16 discover on shared drive notes from meetings re 2014 incident		Cystic Fibrosis Microbiology Meeting	
16/09/2016 Report Issued By Teresa Inkster re M ABscessus	September 2016	Concludes that there is Evidence of cross transmission based on 2 sets of WGS and links in time and place. Fw report.msg FW Interim Infection Control Procedures f FW Abscessus WGS.msg [redacted]	
4/10/2016 SGIPCT Chair Lynn Pritchard	Present	"Genome sequencing of the 28 M abscessus in CF patients should be completed within the next few weeks. Dr Peters informed the group that [redacted] of the patients acquired the abscessus while in paediatric care. Lynn has been sent a list of all equipment that is decontaminated within the respiratory	

		area and is going to visit the decontamination area some time this week	
Letter written to Tom Walsh re concerns		 FW Mycobacterium Abcessus.msg I raise my concerns re information not being available to me and issues with the IPCT	
21/09/2016 Information from local team lost		 RE M abscessus.msg	
10/2016 Trying to set up a new meeting		 RE Paediatric & Adult Cystic Fibrosis  FW Interim Infection Control Procedures f  PAG M abscessus Meeting Notes.msg  RE Paediatric & Adult Cystic Fibrosis  Greater Glasgow and Clyde Health Board C  RE Paediatric & Adult Cystic Fibrosis  Draft CF Action List.msg  FW PAG M abscessus Meeting N  FW Cystic Fibrosis Action Plan.msg	
11/2016 Science paper is published		 2016 Science Bryant et al abscessus trans  2016 Science Bryant-Supplementar  science 2016 comment abscessus c	
		 RE Paediatric & Adult Cystic Fibrosis	
19/12/2016	Information WGS from St Andrews	Early indications confirm Flotto paper conclusions.	

Ash Table of Actions

No.	Department/Area	S E
1.	Respiratory Research, QEUH	R fu e
2.	NICU, PRMH	G O In H
3.	Respiratory Research, QEUH	P &

SBAR – Isolation rooms critical care - meeting 02/02/17

Situation	NHSGGC Infectious disease physicians at QEUH wrote to the Lead ICD to express concern re the suitability/safety of isolation rooms in critical care for patients with multi-drug resistant Tuberculosis (MDRTB) and Middle east respiratory syndrome coronavirus (MERs-CoV).
Background	There are ten positive pressure ventilated lobbied (PPVL) rooms in Critical care at QEUH. Infectious diseases have access to two of these rooms for the isolation of patients with confirmed or suspected airborne infections. There are no negative pressure rooms in the QEUH. GRI have negative pressure rooms in ward 7 and ICU. In light of the concerns expressed a report into the suitability of the rooms was commissioned from Health Facilities Scotland. (HFS)
Assessment	The two main recommendations from the HFS report were; 1) That the isolation rooms with positive pressure lobbies and ensuites are not used for highly infectious patients 2) The isolation rooms in critical care at QEUH have been modified slightly to the original design criteria e.g. extracts are present in patient rooms . In addition verbal report on ACH/hr in en-suites is 3 , recommendation is at least 10 ACH/hr. This should be rectified and extracts placed in the en-suite. **<u>Risks</u>** The risks associated with PPVL rooms not being deemed suitable for MDRTB or MERs-CoV or having been modified against original design criteria are 1) Cross transmission or outbreaks of serious airborne infections in patients 2) Cross transmission or outbreaks of serious airborne infections in staff members who have not been adequately protected. 3) Failure to adequately protect immunosuppressed patients
Recommendations	1) HSE review of the HFS report and provide opinion re the suitability of these rooms for airborne infections and the risk assessment below in items 2-5.

	2) Pulmonary TB patients – will be nursed in ward 5D. PPE will be applied and the 2 hour rule post AGPs due to air changes of 3/hour 3) Suspected TB patients – risk assessment is that PPVL rooms might offer more protection than a room on 5D . Staff to wear PPE .No immunuosuppressed patients should be nursed in the vicinity. 4) Confirmed MDRTB patients – will be transferred to a negative pressure room in ward 7 at GRI 5) Suspected MERs – case by case risk assessment by on call ID physician. Phoned ahead high probability cases to go to Monklands DGH ID unit.

Dr Teresa Inkster , Lead ICD
Dr Erica Peters, ID Physician
Prof Tom Evans, ID Physician
Dr Mark Cotton, Respiratory Physician
Dr Brian Choo-Kang, Respiratory Physician

SBAR –Water coolers
Dr T Inkster 02/03/17

Situation	The microbiological quality of water from coolers may be of a poor standard and therefore pose a risk to patients , particularly those who are immunosuppressed. Historically there have been concerns over maintenance and cleaning of water coolers and over who has responsibility for them .
Background	There are two types of water cooler used in hospital settings; 1) Plumbed in mains fed coolers 2) Stand alone coolers which use commercially available bottles of water.
Assessment	Draft guidance from HFS (SUP 05 Provision of drinking water) highlights the responsibility of the NHS to protect patients/staff/relatives/visitors from waterborne bacteria that occur in drinking water and water dispensers. The guidance advises against free standing bottled water coolers due to infection risk . Low water flow risks stagnation and proliferation of bacteria . Positioning of coolers and poor stock control also contribute to the risk. Mains water is of a superior microbiological quality and these coolers are acceptable in a hospital setting. For installation of mains fed water coolers SUP 05 differentiates clinical areas into high, medium and low risk settings . Mains fed coolers should not be situated in adult or paediatric ICU settings, oncology and transplant units, surgical wards and operating theatres, labs and toilets. It is recommended that sanitisation and maintenance of mains fed coolers should be undertaken by trained personnel a minimum of every 3 months

Recommendations/ Conclusions	NHSGGC should apply the draft document SUP 05. Whilst only in draft from this is based on expert opinion and the advice is in keeping with policies in England. Water coolers already in the high risk areas listed above can remain but may be removed if deemed an infection control risk i.e. implicated in an outbreak. No new mains coolers should be installed in high risk areas. IPCT and estates should be alerted to purchases of new water coolers. Mains coolers should be subject to regular quarterly maintenance and weekly cleaning. Users should ensure that water is not consumed directly from the cooler and that drip trays are kept clean and dry on a daily basis. Water should not be allowed to pool as this will create stagnant conditions. Stand alone water bottle coolers should be removed .The only agreed exception should be maternity USS clinics or urology clinics where patients may be required to drink water pre procedure and no mains fed cooler is in the vicinity. These coolers should be identified and a cleaning regime should be agreed with the IPCT.

References

1) Provision of drinking water SUP 05 , Health Facilities Scotland 2015
2) Health Technical Memorandum 04-01
3) Baumgartner A, Grand M . Bacteriological quality of drinking water from dispensers(coolers) and possible control measures. *J Food Prot* 2006;**69**:3043-6

SBAR – Air sampling , BMT units
Dr T Inkster 09/03/17

Situation	Air sampling has been performed on a monthly basis in B8/9 as a quality assurance check. There is no requirement as such to air sample and no agreed standards or guidance for interpretation of air sampling for UK BMT units. Practice is variable across the UK and three units which meet a high ventilation specification do not routinely air sample. The ventilation spec in 4B, QEUH is less than that of B8/9 therefore it is unclear what interpretative criteria to apply and what actions to take when results are elevated. Currently medical patients are housed in 4B with positive pressure ventilation turned off
Background	Particle counts and air sampling are undertaken in B8/9 unit on a monthly basis. Particle counts < 1000 are deemed acceptable limits (ISO standard for clean rooms) and fungal air sampling results <0.1 CFU/m3. Particle count results are available in real time however it is important to note the environmental conditions while sampling. Particles are not just fungus or bacteria but can be skin, dust, hair, cosmetics etc The commonest explanation for high particle counts are people in the vicinity of sampling or failure of the sampling to be carried out remotely. Particle counts can be higher when rooms have just been cleaned . If the aforementioned factors have been excluded high particle counts can alert infection control teams early to possible air quality issues and fungal contamination. They cannot be used in isolation as an accurate indicator or air quality. Air sampling results and fungal culture take 7 days to initial identification and a further 7 days for species identification .
Assessment	Literature review; **<u>Indications for air sampling</u>** Indications for air sampling are listed in the table below from Morris *et al*.[1] Note that regular maintenance is considered more important than air sampling. Air sampling is only one parameter of many with regards to assessment of the efficacy of a ventilation system.

Table I *Objectives of air sampling*

To correlate outbreaks of invasive aspergillosis with hospital construction/demolition
To identify potential sources of nosocomial aspergillosis, eg. potting soil, damp ceiling voids, damp fire proofing material, carpeting, etc.
To predict environmental spore contamination from outside sources
To identify defects/breakdown in hospital ventilation/filtration systems*
To monitor cleaning procedures that may release bursts of airborne *Aspergillus conidia*
To determine the efficacy of HEPA filters in laminar flow facilities
To monitor efficacy of procedures to contain hospital building work from hospital wards and other areas where high-risk patients are managed
To determine level of contamination prior to initial occupancy of special controlled environments

*regular engineering maintenance of the air supply system (whether HEPA-filtered or not) is more important than regular air sampling

Result interpretation

Interpretation of results can be difficult. The table below gives some recommendations. [1] For BMT rooms the HEPA filtered air value would apply i.e. <0.1 CFU/m^3

Table III Interpretation of air sampling data and recommendations

Levels of fungal spores vary by several orders of magnitude during the course of a day due to:
- Activity levels in any one particular area
- Fluctuations in temperature
- Fluctuations in humidity
- Fluctuations in air flow
- Changes in light level

A single air sample will often underestimate the fungal contamination in the air: multiple air sampling has to be performed
No strict numerical guidelines are available which are appropriate for assessing whether the contamination in a particular location is acceptable or not but the following threshold levels have been recorded:
- Outdoor air: total fungal count: 10^3 to 10^5 CFU/m^3
  - Aspergillus: 0·2–3·5 conidia/m^3
  - Note: seasonal variation recognised
- HEPA filtered air (> 95% efficiency and > 10 air changes per hour): < 0·1 CFU/m^3
- No air filtration: 5·0 conidia/m^3
- Construction/defective ventilation: 2·3–5·9 conidia/m^3
- If total fungal count exceeds 1·0 CFU/m^3 on several occasions the air systems or procedural practice in patient areas requires intensive evaluation.

There is no agreed level at which the risk can be numerically defined for Invasive Aspergillosis . Vonberg et al state that concentrations below 1 cfu/m^3 were sufficient in high risk patients. [2] It is best to conduct a series of samples over time to detect trends. [3]

Burst phenomenon

Understanding the burst phenomenon of fungi particularly Aspergillus is

	important. Spores can be released in bursts and the difficulty is capturing these bursts .No amount of air sampling will yield a preventative response to this phenomenon. [4]Negative air sampling may provide false reassurance. Striefel et al suggest that the emphasis should be on maintaining environmental controls and minimising the in house release of spores[4]
Recommendations/ Conclusions	1. In the absence of any definitive guidance the BOC parameters could be applied to level 4B, QEUH i.e. particle counts <1000/m^3, fungal counts <0.1/m^3 2. Air sampling has been performed on a monthly basis in BOC as a quality assurance check, however, this would not be an accurate indicator of air quality in an area where we know that the ventilation is of a lesser specification. The specified parameters are less reliable in an area where we expect to encounter higher counts. 3. Difficulties are likely to arise in the management of sustained elevated particle counts and repeated fungal growth with no obvious source should they occur – this is a possible scenario given the ventilation specification in 4B and the inability to HEPA filter all air entering the unit 4. Negative air sampling may provide false reassurance due to the burst phenomenon 5. To enable a period of monitoring prior to BMT patients moving in to 4B medical patients would have to be vacated and the positive pressure reinstated. 6. Ideally a minimum period of 4-6 weeks monitoring prior to BMT patients occupying the ward should be undertaken

References

1. Morris G et al Sampling of Aspergillus spores in air. Journal of Hospital infection 2000;44:81-92

2. Vonberg RP, Gastmeier P. Nosocomial aspergillosis in outbreak settings. Journal of Hospital Infection 2006;63:246-254

3.Humphreys H. Positive pressure isolation and the prevention of invasive aspergillosis. What is the evidence? Journal of Hospital Infection 2004;56:93-100

4. Falvey DG, Striefel A. Ten year air sample analysis of Aspergillus prevalence in a University hospital. Journal of Hospital Infection 2007; 67: 35-41

NHS Greater Glasgow and Clyde	**NHS Greater Glasgow & Clyde** **Microbiology**
Purpose:	Briefing paper
Date:	27/06/2017
Subject/ situation:	Analysis of whole genome sequencing of *Mycobacterium abscessus* isolates indicates that cross transmission is highly likely to have occurred within the NHSGGC CF patient cohort.
Background	*Mycobacterium abscessus* is an emerging pathogen in the CF population. It is ubiquitous in the environment. Infection with *M abscessus* is often resistant to treatment and has an associated increase in morbidity and mortality. It is considered to be a contra-indication to lung transplantation. Routes of transmission are unclear. Cross transmission of *M. abscessus* directly via the airborne route has been suggested but patients may also acquire the organism via the environment or contaminated equipment. The organism survives well in the environment and biofilm formation can protect it from disinfection. The CF Trust issued infection control guidance in 2013 in order to minimise nosocomial spread of this pathogen.
Actions	A perceived increase in the numbers of adult CF patients colonised and infected with *Mycobacterium abscessus* triggered a PAG in May 2016. It was apparent that the epidemiology and routes of transmission required clarification. To investigate this the SMRL (Scottish Mycobacterial Reference Laboratory) agreed to send all CF and non-CF M abscessus isolates from GGC for whole genome sequencing to Professor Stephen Gillespie's group in St Andrews University in 2016. An SBAR was sent to HPS at that time, and a national CF clinical group was initiated to discuss the implications at a national level. In addition to this detailed typing, the infection control policies for both adult and paediatric wards and clinics as well as decontamination of respiratory equipment were reviewed and recommendations implemented in NHSGGC. **WGS results** • Analysis on 64 genomes has been reported dating back to 2001, 38 of these being from GGC patients. • There is evidence of multiple episodes of cross transmission • The route of transmission is unclear

	There have been no new clustered cases in NHSGGC since the PAG held in May 2016 • 7 new cases were identified since the opening of the QEUH and RHC – 1 in paediatrics and 6 in adult CF which triggered the initial PAG  
Recommendations	1. An Incident Management Team (IMT) is convened and led by the Head of Microbiology to consider the recent results and any implications for further action within NHSGGC. 2. HPS are invited to participate in the IMT to : • Provide further epidemiological analysis and support • Consider epidemiological analysis for other geographical areas • Ensure lessons learned are shared across NHS Scotland. 3. Ensure measures implemented following the 2016 PAG are fully implemented and adhered to. 4. BICC and AICC are appraised of the situation and receive the report from the IMT.

NHS Greater Glasgow and Clyde	**NHS Greater Glasgow & Clyde** **SBAR Appendix 13, NIPCM NHS Scotland Alert organism list**
From	Pamela Joannidis, Nurse Consultant IPC Infection Prevention and Control SOP sub-group
To	IPC AICC, PICSG and BICC
Date	August 2017
Subject	Application of Appendix 13 of the National Infection Prevention and Control Manual

Situation

Local Infection Prevention and Control Teams (IPCT) within health boards in NHS Scotland are advised of a list of alert organisms within Appendix 13 of the National Infection Prevention and Control Manual (NIPCM) which may require further investigation. Where national guidance for the management of these organisms exists, e.g. MRSA, CPE etc, the IPCT have instigated the recommended control measures. This SBAR proposes a management summary for those organisms listed where national guidance does not exist, within in-patient settings in NHS GG&C in the categories of environmental bacteria; resistant bacteria and exceptional resistance phenotypes of Gram positive and Gram negative bacteria.

Background

Multi drug resistance in all potential pathogens is of growing public health concern. The list of alert organism and conditions provided in the NIPCM includes significant organisms that are emerging as pathogens. There is an expectation that local IPCT will manage cases of these organisms by undertaking a review and advising Standard Infection Control Precautions (SICPs) and Transmission Based Precautions (TBPs) as appropriate. Included are environmental bacteria, resistant bacteria and extensively resistant phenotype bacteria (for reference). National guidance for IPCTs exists for the majority of but not all of these organisms.

Actions/Assessment

<u>Environmental bacteria</u>

The following organisms will be referred to the IPCNs via ICNet for action:

Stenotrophomonas maltophilia in high risk units*

Serratia marcescens in high risk units*

Acinetobacter baumanii in high risk units*

(High risk units = adult ICUs, NICUs, PICU, BMT (Wards 8&9, BOC) and 2a (RHC))

Pseudomonas aeruginosa (as per SOP and RA for Pseudomonas aeruginosa)

<u>Action to be taken</u>

The IPCNs will reinforce SICPs and monitor for further cases. In the event of a trigger, a problem assessment group (PAG) will be held to review cases and IPC precautions.

Trigger = same organism with same antibiogram in:

- 2 patients in sterile body site e.g. blood, CSF
- 3 patients colonised any body site
- 2 patients with a combination of 1 sterile body site and 1 colonisation

Resistant organisms

Multi-drug resistant bacteria are bacteria that are resistant to at least three different antibiotics.

These include:

- Carbapenem resistant enterobacteriaceae (CPE)
- Carbapenem resistant *Pseudomonas aeruginosa*
- Extended – spectrum beta-lactamase (ESBL) producers
- Vancomycin –resistant Enterococci (VRE)
- Multi-drug resistant (MDR) or extensively drug resistant (XDR) *M tuberculosis* complex

Action to be taken

The microbiology department will notify clinicians and IPC nurses of a specimen result which includes any of the above. The organism will also come across on ICNet for action. Two or more cases will be a trigger. In the event of a trigger, the IPCT will decide if a problem assessment group (PAG) is to be held to review cases and IPC precautions with the clinical team. SIPCs and appropriate TBPs will be advised based on a risk assessment of patient condition, ward and specimen type.

Resistant bacteria of exceptional phenotype

Appendix 13 of the NIPCM provides a list of organisms (Appendix 1) which are described as being Gram positive or Gram negative bacteria with exceptional resistance phenotypes. Individual confirmed cases will be notified to the IPCT by the microbiology department and a PAG will be held to review the case(s) with the clinical team to determine further actions. SIPCs and contact precautions will be advised and an individual IPC care plan for each patient will be agreed with the ICD, IPCN and clinical team.

Recommendations

The recommendations of the IPCT are that NHS GG&C approve this proposal for management of specific organisms as listed above in the categories of environmental bacteria; resistant bacteria and exceptional resistance phenotypes of Gram positive and Gram negative bacteria.

References

European Committee on Antimicrobial Susceptibility Testing (2017) Guideline on detection of resistance mechanism v 2.0

National Infection Prevention and Control Manual (2017) Appendix 13 – NHS Scotland Alert organism /Condition list

National Services Scotland (2016) Healthcare Associated Infection, Annual Report

Appendix 1

Organisms	Exceptional phenotypes
Exceptional resistance phenotypes of Gram-negative bacteria	
Any Enterobacteriaceae	Resistant to colistin[1] (except Proteae and *Serratia marcescens*), Resistant to meropenem and/or imipenem (except Proteae – *Proteus spp, Providencia spp and Morganella spp*)
Salmonella typhi	Resistant to fluoroquinolones and/or carbapenems
Pseudomonas aeruginosa and *Acinetobacter spp.*	Resistant to colistin
Acinetobacter baumannii	Resistant to any carbapenem
Haemophilus influenzae	Resistant to any third-generation cephalosporin, carbapenems, fluoroquinolones
Moraxella catarrhalis	Resistant to any third-generation cephalosporin and/or fluoroquinolones
Neisseria meningitidis	Resistant to any third-generation cephalosporins and/or fluoroquinolones
Neisseria gonorrhoeae	Resistant to spectinomycin and / or azithromycin and/or third-generation cephalosporins
Exceptional resistance phenotypes of Gram-positive bacteria	
Staphylococcus aureus	Resistant to vancomycin, teicoplanin, televancin, dalbavancin, oritavancin, daptomycin, linezolid, tedizolid, quinupristin-dalfopristin and/or tigecycline, ceftaroline or ceftobiprole.
Coagulase-negative staphylococci	Resistant to vancomycin, telavancin, dalbavancin, oritavancin, daptomycin, linezolid, tedizolid, quinupristin-dalfopristin and/or tigecycline.
Corynebacterium spp.	Resistant to vancomycin, teicoplanin, telavancin, dalbavancin, oritavancin, daptomycin, linezolid, quinupristin-dalfopristin and/or tigecycline
Streptococcus pneumoniae	Resistant to carbapenems, vancomycin, teicoplanin, telavancin, dalbavancin, oritavancin, daptomycin, linezolid, tedizolid, quinupristin-dalfopristin, tigecycline and/or rifampicin. High level penicillin resistance.
Group A, B, C and G β-haemolytic streptococci	Resistant to penicillin, cephalosporins, vancomycin, teicoplanin, telavancin, dalbavancin, oritavancin, daptomycin, linezolid, tedizolid, quinupristin-dalfopristin and/or tigecycline.
Enterococcus spp.	Resistant to daptomycin, linezolid, tedizolid and/or tigecycline

Exceptional resistance phenotypes of anaerobes	
Bacteroides spp.	Resistant to metronidizole
Clostridium difficile	Resistant to metronidizole, vancomycin, fidaxomicin

(1) Current difficulties regarding testing methodologies, awaiting clarification

SBAR RE Infection Control and Patient Safety at QEUH

Dr P Redding, Dr C Peters, Dr A Despande 03/10/17

Situation

Dr Redding has written to Dr Jennifer Armstrong, Medical Director regarding her serious concerns in relation to the risks to patients arising from infection control issues at the QEUH.

Background

Dr Redding was an ICD (Infection Control Doctor) for nearly 25 years and was involved with the initial stages of the planning for the QEUH.

Assessment

Current issues were identified by discussions with clinical staff, local ICDs and Consultant Microbiology colleagues as well as weekly updates from the IPCT discussed at Consultant meetings. These concerns touch on a number of key facets for a robust and safe infection control service within an acute health care setting.

1. **Patient Placement**
   A fundamental aspect of infection control is the appropriate placement of patients in accommodation that is best suited to prevent hospital acquisition of infection. In a brand new building this should meet SHTM standards and policies for appropriate placement with exact locations for isolation should be available.

Date issue Raised	Type of accommodation	Current Situation	Patient /Staff Risk identified
June 2015, through IC SMT And numerous times in the intervening years including AICC . Letter from Infectious Diseases Consultants raising concerns. **06/05/2016**	**Source Isolation** of Infected patients to prevent transmission of infections to staff and other patients Specialist ventilation required for airborne infections	PPVL (Positive Ventilated Lobbied rooms) exist in both QEUH and RCH. These were not built to SHTM standard. It is unclear what remedial work has been carried out on any/all isolation rooms to date. ID and Microbiology Consultants are concerned that they do not provide appropriate airborne protection. There is a lack of provision of isolation in A+E/Acute	Patients with airborne infections including MDRTB, MERS, Measles, Chickenpox are being transferred to GRI/ Monklands. This was an interim measure put in place in December 2016 and was not meant to be a long term solution. Risk of inadequate airborne isolation pending microbiological diagnosis eg AAFB positive continues. Risk of exposure of large numbers of patients and

June 2015		Receiving	staff to infection eg norovirus/ MERS/Pandemic Flu.
June 2015	**Protective isolation** To prevent infections in patients vulnerable to infections Specialist ventilation required for airborne infections	PPVL rooms exist in the QEUH, Critical Care 4C PICU 2A Throughout the RHC Currently HEPA filters are not fitted in PICU isolation rooms where BMT patients are regularly accommodated Work is due to be carried out to alter 4 rooms to positive pressure in 2A – HAISCRIBE issues raised Safe placement of patients who are immune compromised is not documented or risk assessed for either QEUH or RHC. No HEPAS are in place in the Prep rooms on 2A IV s prepared in treatment room on 2A, not prep room High rates of line related infections are being experienced in the 2A immune compromised population.	Current ongoing risk of airborne infections to neutropenic patients There was a public statement by GGC regarding Air quality when the adult BMT patients moved back to Beatson 08/07/15 which said that : The Bone Marrow transplant services at the Royal Hospital for Children Glasgow are "separate and unaffected" At the time fungal growth was demonstrated in the Paediatric unit and issues with the design were identified. Air quality has remained an issue on 2A since opening. There has been an Aspergillus outbreak on the unit and particle counts continue to be raised. This risk continues .
May 2016	Single side room accommodation	Air changes per hour (ACH) for all clinical accommodation in QEUH and RCH are half the standard – ie 3 ACH instead of 6 Grills collect dust as air is entrained over cooler beams - again not recommended for healthcare setting.	Increased risk of airborne and dust borne infections, especially to immune compromised and CF patients currently housed in these rooms. Potential for organisms such as Acinetobacter, MRSA and MSSA to collect in the ducting. Risk that other

			organisations build hospitals with this ventilation system without knowledge of issues encountered in GGC. This pertains to all the building issues encountered.

2. Cleaning

Cleaning has long been recognised as a key component of an infection prevention strategy for hospitals

Date issue Raised	Issue	Current Situation	Patient Risk identified
June 2015 at ICSMT Estates October 2015	Cleaning agents were not used on floors in clinical areas . Agreement at SMT June 2015 that this would be raised with HPS and ICDS suggested Actichlor should be used	Cleaning agents are still not used . Achtichlor has not been used this Winter to date. Office block is dirty, no /minimal cleaning in place	Build up of environmental organisms throughout the hospital and risk of outbreaks of viral and bacterial infections Most medical staff are located in this block . Risk of infections to staff and ongoing to patients.
September 2017	Dishwashers Not cleaned , installed or operated according to manufacturing instructions	An outbreak linked to this alerted IPCT to issue and remedial steps taken. Water jugs and cups were washed in these dishwashers including for haematology oncology, CF and HIV patients This was not picked up by any audit system but has relevance to infection control throughout the hospital.	Unknown if there are further gaps in the cleaning schedules and environmental audits

3. Estates

Date issue Raised	Issue	Current Situation	Patient Risk identified
June 2015 at ICSMT Estates October 2015	Water Quality	All taps are fitted with TVCs Cleaning and maintenance policy not reported and need to ensure is up to date. Water in 4B not tested to be up to high risk standard.	Risk of Legionella and Pseudomonas and Mycobacterial growth if the rolling programme of cleaning is not maintained.
2015 and ongoing	Water testing	In order to manage outbreaks water testing can be a key measure to investigate possible sources and need to be requested by the ICD Delays in testing and reporting occur	Prolongation of outbreak and source not controlled eg potentially relevant to recurrent issues with Serratia, Pseudomonas Stenotrophomonas, Cupriovadis
July 2015	Plumbing in Neuro surgical block	Sewage leakage repeatedly in theatre suite since before 2015 and ongoing. Not all incidents have been reported to ICDs by ICNs or estates ICDs and ? HIS told that plumbing would be replaced. This has not occurred. Delay in New ICE theatre opening, so Neuro theatres continue in use despite the risk assessment in 2015 stating that the theatre would not be in use beyond December 2016	Obvious risk of repeated incidents due to underlying poor infrastructure in neurosurgical block which increases the risk of post surgical infections .
2014	Decontamination Provision for respiratory clinics	The decontamination facilities in both Paediatric and adult respiratory clinics has been identified as inadequate on numerous occasions. Remedial actions have not been taken.	Risk of fomite transmission of pathogens through inadequately decontaminated respiratory equipment

4. Infection Control Structure

Roles within the infection control team are unclear and appear to have changed eg the lack of formal involvement of the IPCT including an ICD in the planning and commissioning of the QEUH. ICDs are not being informed of HAISCRIBE meetings and incidents in a timely manner.

There appears to be a lack of resources to investigate potential outbreaks /increase in infection rates eg neuro surgical rates of EVD infections, line related infections in 2A.

There is a gap in experience and knowledge of ICDs with Dr Inkster's absence eg . they are unable to sign off and commission complex building projects . This is aggravated by a lack of communication of important information despite requests for that information. There is therefore a professional risk of making decisions and giving advice based on incomplete information.

Recommendations

All the above issues are openly discussed and evidenced information collected . This will ensure that all the concerns are fully understood by everyone. Risk assessments should be carried out where appropriate. Recommendations can then be based on published guidelines with policies and procedures written and updated as required.

NB this document is not comprehensive but summarises the main areas of concern.

Title: Review of Infection Control Doctor's role in Scotland

Author: Dr A. Keith Morris (Infection Control Doctor NHS Fife)

Situation

Microbiology training in the UK has undergone a change in recent years. Clinicians are now unable to train in pure medical Microbiology, but are required to undergo joint training in medical microbiology with another discipline i.e Virology, Infectious Diseases, Genito-Urinary Medicine. Although infection prevention is still part of the training in microbiology for membership of the Royal College of Pathologists, the change in training may lead to a loss in the infection control training experience.

In addition the laboratory re-organisation is under review locally with out-sourcing of some services such as environmental microbiology specimens. Plus there is likely to be regional reconfiguration of laboratory services and the use of modern platforms which require fewer high skilled biomedical scientists with graduate training in biomedical science. This has resulted in a loss of microbiological expertise in environmental microbiology.

Background

Traditionally, Infection Control Doctors (ICDs) work as part of a team of individuals (Infection Control Nurses (ICNs) and Infection Control Managers (ICMs)). While the day to day prevention role is managed by the ICNs the ICD was always available to give advice, support the infection control team and where necessary provide microbiological expertise. Health Boards could rely on clinical microbiologists leaving training with significant infection control experience and confidence in managing a wide range of situations which required microbiology input such as clinical outbreaks, decontamination incidents and environmental contamination incidents.

Assessment

The shape and structure of the infection control team is already changing with a stronger emphasis on prevention, hospital improvement teams plus and the realisation that infection control starts before the patient arrives in the hospital. This change needs to be embraced and managed so that going forward there are still clinical microbiologist who can be relied upon for advice regarding infection prevention and control.

Change in the structure of the infection control doctor's role would provide an opportunity to rebrand infection control teams in to "Infection Prevention & Control Teams" with Infection Prevention Doctors and infection Prevention Nurses. While this may appear a rather trivial matter it would help create a better impression of the role of the team which is to prevent infection and control is only required when prevention has failed.

In addition in small health boards with a limited number of microbiologist retaining knowledge and experience to manage all the requirements of the ICD role and managing outbreaks which by their nature are unpredictable is difficult whilst also managing routine clinical practice. This is in part due to an increase in work associated with the ICD role plus increase in clinical workload for microbiologists

Options

<u>Option 1</u>

The status quo with health boards advertising for medical microbiologists whose job plan will include an element of infection control. This is unlikely to be tenable going forward because as the present

cohort clinical microbiologist retire there are unlikely to be individuals coming through wishing to take up the “ICD post” This is likely to lead to a “last in gets the ICD role” making recruitment an issue for health boards.

Option 2

Separation of environmental infection control (water, decontamination, ventilation and building) from clinical infection control (patient placement, education, clinical outbreak management and infection surveillance). HFS/HPS would provide the microbiological expertise for managing environmental infection control. Option two has in part already occurred with Health Facilities Scotland (HFS) providing local Infection Control Teams with advice. However Option two would require a larger and more substantial input from HFS/HPS. HFS/HPS would work through the local infection team.

Option 3

Health Boards employ a clinical scientist/environmental microbiologist to undertake the environmental infection control role. These individuals would not have to be clinically trained and could be funded through various options i.e. infection control, clinical microbiology, estates or even HPS. The number in each Health Board would depend on the size and scope of services provided. The clinical infection control position post would be the responsibility of an infection specialist. Option 3 is similar to Option 2 but HPS would work through a local environmental microbiologist

Option 4

This would be a hybrid of option 1 & 2 where there was a local clinical microbiologist who wished to take on clinical infection control plus environmental infection control. However these individuals are going to be less available as the modern microbiology training is likely to result in an infection specialist who is pulled towards patient liaison. This is already happening with microbiologists taking part in ward rounds to manage patients with complex infections and improve antibiotic stewardship.

NHS Greater Glasgow and Clyde	**NHS Greater Glasgow & Clyde** **Infection Prevention and Control – Review of Medical Microbiology input to the Infection Prevention and Control Team**
Situation:	The provision of Infection Control Doctor (ICD) input is a fundamental component of the significant work of the Infection Prevention & Control Team (IPCT) within GGC. The agenda being addressed by the IPCT is continually and increasingly evolving and it is important to the functioning of the IPCT that the structure and function of ICD input is reviewed and refreshed.
Background	Within GGC and across NHS Scotland the role of the ICD is almost exclusively fulfilled by Consultant Medical Microbiologists. This is an important consideration as the ICD role is therefore, in reality, a subset of the numerous functions and specialities encompassing Medical Microbiology. Developments over the last decade, driven in part by national directives, have resulted in a partial separation of the Microbiology and ICD structure and remit. Whilst perhaps suitable for purpose at the time there is now a perceived need and an opportunity to draw these vital components of Medical Microbiology closer together again for the benefit of both services. Similarly, there are national directives requiring the Board level Infection Control Manager to have managerial oversight of the Board Infection Control services and staff, including ICDs. Whilst again potentially fit for purpose, this arrangement results in a divergent hierarchical management reporting for ICDs and the Lead Infection Control Doctor in particular. Provision of ICD input to the IPCT has evolved on a sessional commitment basis. Whilst this has been broadly effective to date it is not efficient in meeting the workload demands of either the Microbiology or IPC services. When both services are busy this places increased and unsustainable demands on the designated ICDs.
Assessment	The vital work undertaken by ICDs needs to be recognised as a subset of the overall Medical Microbiology service. It is important that the Medical Management within Microbiology have full oversight of the work undertaken by all Consultant Microbiologists including ICDs. The professional and managerial reporting arrangements for the Lead ICD could be reviewed to ensure the point above. Infection Control outbreaks, incidents and situations are entirely unpredictable. An ICD service based on a sessional commitment cannot therefore effectively meet the demands of the IPC service without significant impact on the overall Microbiology service. A different mode of ICD service delivery is required.

Recommendation	1. The structure and function of the Medical Microbiology input to the IPC service is reviewed to ensure it is both effective and fit for purpose.
	2. Consideration is given to the Medical Management arrangements for the Infection Prevention and Control service and the Lead ICD. One potential recommendation is that the Lead ICD reports both managerially and professionally to the Head of Microbiology with the Head of Microbiology having a management link to the Board Infection Control Manager. This would ensure ongoing oversight of all of Medical Microbiology by the Head of Service and draw the two services closer together.
	3. A review of the overall provision of ICD cover is undertaken with a view to replacing the current sessional basis delivery model with one which reflects the needs and demands of both services. An option for consideration is a regional/sectoral duty ICD rota on a weekly basis with allocation of longer term or ongoing projects to Medical Microbiologists on a specialist/interest basis.

SBAR: 2A Patient Accommodation and Risk of Invasive Fungal Disease

QEUH ICDs
30/10/17

Situation

Ward 2A at the RHC houses the Haematology- oncology Paediatric services including the Scottish Paediatric Bone Marrow Transplant Unit. Since the unit opened in 2015 ICDs have expressed concern regarding the ventilation and building spec of the unit with regard to effective airborne protection of high risk patients on a number of occasions. A recent probable case of invasive fungal infection has occurred in the context of raised particle counts and fungal growth on the unit, once again raising concern regarding the ongoing issues on the unit. Of note this patient was not housed in a HEPA filtered room, but was at high risk of fungal infection.

Background
Prevention and early recognition and treatment of IFD are crucial to prevent associated mortality, increased length of stay and delay of critical treatment for underlying malignancies.

Patients at risk of Invasive Fungal disease

Current standards and guidelines support the use of isolation facilities that protect profoundly immune compromised patients from fungal spores particularly in the setting of building works occurring on site. This includes:

- Allogenic Bone Marrow transplant patients during neutropenic period or with graft versus host disease
- Autologous BMT during neutropenic period
- Children with SCIDS
- Prolonged neutropenia for greater than 14 days following chemotherapy of immunosuppressive therapy.

Other groups at high risk, but to a lesser level are:

- Acute lymphoblastic Leukaemia patients on high dose steroid therapy
- Neutropenia for less than 14 days following chemotherapy
- Solid organ transplant patients

Building requirements for Neutropenic/BMT patients

Based on recommendations , SHTMs as well as HPS advice on 4B (adult BMT) BMT and other high risk patients should be housed in rooms that meet the following requirements:

- 10ACH
- Positively pressured at 10 pa to corridor
- All air entering room should be HEPA filtered
- Room must be sealed
- Continuous pressure monitoring system in place with alarms for failure.

Jacie Standard B2.1 recommends HEPA filtration and positive pressure is used for high risk patients and that if non-HEPA filtered rooms are used for lower risk patients that SOP's on infection control should indicate how allocation is prioritised. Furthermore audit of airborne infections in those patients is recommended.

Current Provision
The ward has 8 positive pressure ventilated lobbied rooms (PPVL) with supply that is HEPA filtered coming into the lobby.These are rooms 17,18,19,20,22,23,24,25.

All other rooms on the unit, including those on the Teenage Cancer Corridor are :

- Single rooms with ensuite
- Have 3 ACH
- Neutral pressure
- Not HEPA filtered
- Have entrainment of air on to cooler beams resulting in collection of dust on grills

The corridor is not HEPA filtered and is not positively pressure to the rest of the hospital.

Air sampling

A regime of air sampling as a quality assurance tool was in place in Yorkhill , and is in place at the Beatson. Samples are being taken in 2A on a monthly basis and the document circulated by the QA team for 2A states a particle count of <1000 and <1 CFUcm3 is acceptable for HEPA filtered rooms. There is no standard for the rest of the ward.

Particle counts have been raised and fungal growth has occurred on a number of occasions in both HEPA and non-HEPA filtered rooms.

These results have drawn attention to the ventilation of the rooms and have been instrumental in highlighting to the ICDs the underlying defects with the estate.

Incidents
Faults that have been discovered since the opening of the unit and have been managed to date include:

- PPVL Rooms originally had no HEPAs – now in place, but not in ITU
- Rooms not sealed – not seen final sign off re the leak testing on all the rooms
- Incorrect light fittings - fixed
- Ducting ripped - fixed
- Water Leaks with subsequent mouldy ceiling tiles – now replaced
- Leaks occurred 2 weeks ago – no information regarding what work was carried out and what the HAISCRIBE was to do this work.

An IMT was held in August 2016 due to cases of aspergillosis and again in April 2016.
Assessment

1. High risk patients are treated regularly on the ward, currently ALL patients on induction chemo are not housed in HEPA filtered rooms and there are not enough HEPA-filtered rooms for the numbers of BMT patients on the ward on occasion and are being housed in the non-HEPA filtered rooms.
2. The current configuration of ventilation has extensively been discussed by Dr Inkster and Estates and the Board have agreed to upgrade the PPVL rooms into positive pressure rooms that will meet the specifications for high risk patient protection

3. The work for this upgrade is pending in November - there is an increased risk of IFA during this work and measures to protect the vulnerable population have been discussed between Prof Jones and Prof Gibson including the use of prophylaxis.

4. There are currently extensive demolition projects ongoing at the QEUH site which increases the risks of IFA in the immune compromised population.

5. Currently all patients who are neutropenic or on high dose steroids are being given antifungal prophylaxis – either ambisome or posaconazole, including the solid organ cancer patients at risk of fungal infection

6. Currently there are 3 HEPA filtered rooms that are out of use to our knowledge : room numbers: 19, 24, 25? However it would be useful to confirm this.

7. Air sampling baselines are not well established on the unit – as the spec is entirely different from the Beatson, 4B and old York hill ward, there is no established agreement on the cut off values for particle counts or CFU for the non HEPA filtered rooms. This is causing confusion and misunderstandings with regard to appropriate course of action on receiving these results.

Recommendations

1. Air sampling regime and interpretation is clarified by ICSMT and cumulative results presented for each room, with clarity on the reports whether the rooms are HEPA filtered or not.
2. A reduction in turn around time for ID of organisms is achieved by laboratory
3. Intensified air sampling should occur during periods of construction work both within the unit and on the QEUH site.
4. Clear guidance is produced regarding the risk assessment around the housing of ALL, and other high risk patients in the non-HEPA filtered rooms when these rooms are not available.
5. Further consideration is given to risk mitigation measures to be put in place pending the completion of the upgrade works including use of masks on moving around site and advice regarding routes into and out of hospital. Consideration may also be given to use of mobile HEPA filtration units

NHS Greater Glasgow and Clyde	**NHS Greater Glasgow & Clyde** **Infection Prevention and Control Team**
Purpose:	Briefing Paper
From:	Infection Prevention and Control Team
To:	Dr. J Armstrong Board Medical Director
Date:	03.11.17
Subject/ situation:	Potential cross infection with carbapenem resistant organism (CRO) pseudomonas. [redacted]
Background	Carbapenems are a class of beta-lactam antibiotic with a broad spectrum of activity against Gram-positive and Gram-negative bacteria. Some organisms acquire resistance to these antibiotics which can severely limit treatment options and is considered to be a significant threat to public health. [redacted] [redacted] <u>Problem Assessment Meeting 27.11.17</u> HIIAT GREEN by Microbiologist and IPCT. Actions put in place re TBP for patients and ward audit. [redacted] <u>Problem Assessment Meeting 30.11.17</u> PAG held due to further case but no indication that this was as CRO. PAG advised a full IMT to review all cases and actions taken with clinical team this was arranged for 03/11/17. 3/11/17 [redacted]

	[redacted] [redacted] In summary Possible cross transmission of CPO to two other patients ([redacted] across two sites.
Actions	• Wards 10D and 3c closed to admissions. • Terminal clean of the areas arranged 03.11.17 • Advised TBP for all patient • All patients will be screening in the next 12 hours and samples sent to microbiology • Limit movement of staff as far as possible • Information for patients made available • Informed Jim McMenamin HPS • HAIORT completed and submitted to HPS • Informed the press office • Informed on call PHPU consultant Dr Penrice
Recommendation	The next meeting of the IMT will take place at 3.30pm on Monday 6.11.17 in QEUH venue to be confirmed. [redacted]

A number of updates to the use and wearing of respiratory protective equipment (RPE) published in Appendix 11 of the National Infection Prevention and Control Manual (NIPCM).	
Situation	A number of changes have been made to the Aide memoire for application of TBPs in Appendix 11 and Chapter 2 (TBP) of the NIPCM published on 9th February 2018. The changes are listed below. No impact assessment was carried out Nationally. It is anticipated that the cost of RPE and domestic services will increase with the introduction of this update.
Background	Changes to Appendix 11 1. Staff are recommended to wear a fluid-repellent surgical mask when undertaking routine care of patients and an FFP3 mask for aerosolgenerating procedures for the following alert organisms: *Adenovirus (respiratory tract infection)* *Bordetella pertussis* *Chlamydia pneumonia* *Coronavirus (non-SARS/Mers CoV)* *Enterovirus D68* *Haemophylus influenza type b* *Herpes zoster (Shingles) – respiratory lesions* *Neisseria meningitidis* *Mumps* *Mycoplasma pneumonia* *PVL positive Staphylococcus aureus pneumonia* *Influenza and Parainfluenza* *Parvovirus B19 (slapped cheek syndrome)* *RSV* *Rubella* *Streptococcus pneumonia (pneumonia)* *Streptococcus pyogenes (Group A Strep) (respiratory infection)* 2. Staff are recommended to wear an FFP3 mask for all care (AGP /routine) for the following alert organism: *Measles* *Mycobacterium tuberculosis* *Novel coronavirus (e.g. MERS CoV)* *Varicella virus (chicken pox)* 3. Staff are recommended to wear an FFP3 mask for Aerosol generating procedures for the following alert organisms: *MRSA (pneumonia)* *Extrapulmonary Tb* 4. Patients with the following organisms will be isolated in single ensuite rooms in high risk areas (e.g. ICU, PICU, NICU, oncology/haematology units). No RPE required. *Stenotrophomonas maltophilia* *Pneumocystis jirovecii* *Pseudomonas aeruginosa* *Candida auris* *Serratia marcescens*

	5. Staff are recommended to wear a fluid –repellent surgical mask (FRSM) with patients who are suspected or confirmed to have the following alert organism **AND** are vomiting : *Norovirus* *Gastrointestinal infections e.g. Salmonella spp.* *Hepatitis A* **<u>Changes to Chapter 2</u>** <u>2.1 Patient placement</u> 1. In OPDs, if patients are suspected of infection / colonisation they should be prioritised for assessment/treatment e.g. scheduled appointments at start or end of the clinic session. 2. In OPD infectious patients should be separated by at least 3 feet (1m) 3. If ambulance service required, they should be informed of the infectious status of the patient. <u>2.3 Safe Management of the Care Environment</u> **Hospital/Care home setting**: 1. After each AGP on an infectious patient, staff must arrange for the room to be decontaminated before it is used for the next patient. 2. If an AGP is undertaken on an infectious patent depending on the Air changes in the room, the time to wait before cleaning can commence is at least 20 minutes. <u>2.4 PPE (Respiratory Protective Equipment)</u> 1. Staff in Staff in primary care/outpatient settings or care homes should wear an FFP respirator when undertaking an AGP 2. In rooms without lobby, staff must remove FFP3 respirators outside the isolation/cohort room/area. 3. If visitors are assessed as requiring an FFP3 respirator to visit a patient, consideration must be given to how training can be provided.
Assessment	<u>The impact of these changes are as follows:</u> 1. Changes to practice across use of Respiratory Protective Equipment, namely use of FRSM for routine care and FFP3 for all care for patients infectious with organisms listed above. 2. Increased requirement for clinical staff to understand the risks associated with routine care and performing aerosol-generating procedures to enable them to undertake appropriate risk assessment for RPE. 3. Increased requirement for FFP3 fit testing by appropriately trained trainers every 2 years 4.Introduction of single use disposable respirator hoods (training, storage and cost) 6. Increased use of masks may have an adverse affect on young children and patients with mental health / cognitive impairment, therefore risk assessment required 7. In OPD arrange clinics to allow infectious / colonised patients to attend at start or end of list and to allow for cleaning to take place if AGP undertaken. 8. Identify infected/colonised patients to allow for separation by 1meter at all time during OPD visit 7. Increased cleaning requirement following each AGP on infectious patient in

	all areas (in-patient and OPD) prior to room being used for next patient 8. Requirement to have an understanding of air changes per hour (ACH) in rooms in which AGPs are undertaken to allow for adequate time lapse after AGP for cleaning of room and before FFP3 can be removed. This can be from 20 minutes to 2 hours depending on site and ACH. 9. Risk assessment for removal of FFP3 respirator 10. Training of Domestic services staff for FFP3 respirator / hood. 11. Assessment of requirement for visitors to be fit tested for FFP3
Recommendation	1. Communicate changes across all staff groups in NHS GGC 2. Develop an implementation plan which includes : • Update IPC SOPs and education materials • Engage with clinical and facilities teams and provide support to ensure understanding of recommendations. • Liaise with H&S staff around face it testing • Promote good practice through IPC bulletin, toolbox talks and clear pathways for use of RPE • Identify ways to support risk assessments to allow staff to care for patients safely

SBAR – Airborne infection , RHC, patient pathway
Dr T Inkster, Dr R Hague, J Rodgers, S Dodd –Feb 2018

<table>
<tr><td>Situation</td><td>There is concern re the suitability/safety of Positive pressure ventilated lobby (PPVL) isolation rooms in RHC for patients with airborne infections.</td></tr>
<tr><td>Background</td><td>PPVL rooms are situated throughout RHC. A review of these facilities in the adult hospital has suggested they are unsuitable for airborne infections. Work is ongoing with input from HPS and HFS with a view to upgrading to negative pressure facilities. These PPVL rooms are suitable for other infections not spread via the airborne route and for isolation of immunocompromised patients.</td></tr>
<tr><td>Assessment</td><td>Guidance for MDRTB is conflicting (see table below)
<table>
<tr><th>Guideline</th><th>Year</th><th>Recommendation</th></tr>
<tr><td>The Interdepartmental working group on Tuberculosis</td><td>1998</td><td>Minimum requirement for an infectious MDRTB patient is a negative pressure room</td></tr>
<tr><td>HBN 0401 Suppl 1 and SHPN 04-01 Suppl 1 Isolation facilities in acute settings</td><td>2005/2008</td><td>‘Airborne infection’ – no examples. Exclusion – does not describe isolation facilities required in an ID unit. Guidance will follow..</td></tr>
<tr><td>HBN 04-01 Suppl 1 Isolation facilities for infectious patients in acute settings</td><td>2013</td><td>PPVL suitable for chickenpox , measles and ‘some forms of pulmonary tuberculosis’</td></tr>
<tr><td>SHTM 03-01 Ventilation for healthcare premises Part A</td><td>2014</td><td>Infectious disease isolation room – negative pressure room -5 pascals (PA), 10 air changes//hour (ACH)</td></tr>
<tr><td>NICE Tuberculosis</td><td>2016</td><td>Negative pressure room</td></tr>
</table></td></tr>
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MERs- CoV

MERs- CoV is a new and emerging pathogen therefore not considered in HBNs or SHTMs.

Guideline	Year	Recommendation
Health Protection Scotland	2015	Patients should be admitted to a negative pressure isolation room. If not possible a single room with ensuite facilities should be used
CDC	2015	Patients should be placed in AIIR – single patient rooms at a negative pressure and minimum 6 ach/hour

Conclusion - There is no guidance which definitively states that PPVL rooms are suitable for airborne infection. Negative pressure rooms are the preferred option, a view supported by HPS/HFS.

Risk Assessment

The potential risks associated with use of PPVL room for airborne infection are;

1) Cross transmission or outbreaks of serious airborne infections in patients
2) Cross transmission or outbreaks of serious airborne infections in staff members who have not been adequately protected. This does not relate to staff in the room with appropriate IC precautions but staff in the vicinity (corridor) due to potential leakage of contaminated air

The risks associated with moving a paediatric patient elsewhere in the UK are;

1) The lack of specialist paediatric ID input to a serious infection where treatment may be complex.
2) The risk of travelling a considerable distance for a sick patient
3) Increased risk of transmission to staff involved with travel
4) Increased distress to patient and family if they end up far way from home.

Recommendations

1) Nurse paediatric patients with MERs CoV in one of the two PPVL rooms in CDU, RHC. Implement appropriate IC precautions as per policy.
2) Nurse patients with Chickenpox or Measles in any PPVL room in RHC (not 2A). Implement appropriate IC precautions.
3) MDRTB – individual risk assessment by paediatric ID Consultant. Older children may be transferred to MDGH or GRI as per adult pathway. Younger children should be admitted to any PPVL rooms in , RHC (not 2A) with appropriate IC

	precautions in place . 4) Consider upgrade of two PPVL rooms in RHC to negative pressure facilities. One should be in PICU.

SBAR Water contamination incident QEUH/RHC

Situation	Water contamination in QEUH/RHC.
Background	Following an unusual Gram negative bacteraemia in a 2A RHC patient, water was tested. The same organism (Cupriavidus) was found on testing outlets in 2A and therefore dosing with Silver hydrogen peroxide was commenced. Further water testing took place in RHC and QEUH with the aim being to find a suitable decant option for ward 2A, as chemical dosing was deemed ineffective. This testing revealed more extensive contamination affecting both hospitals. Point of use filters have been fitted but can only be considered a short-term control measure.
Assessment	Microbiology results reveal well established biofilm therefore localised measures will be ineffective and a more systemic approach incorporating a range of control measures is required Water testing reveals presence of bacteria in tanks and risers therefore there is contamination of the system further back than just the outlets which also tested positive on swabbing. A range of bacteria and fungi have been found which pose a risk to immunocompromised patients.
Recommendation	Point of use filters should remain until we can demonstrate control of the water supply by repeat testing. Control of the system should be achieved in 6 stages (as per Sanitation paper) Stage 1-2 involves dosing of pipework and tanks with Silver Hydrogen Peroxide Stage 3 involves installation of a continuous dosing system Options for long term continuous dosing include Chlorine dioxide and Copper Silver ionisation. Both are listed as acceptable approaches in SHTM 0401. Following a literature review Chlorine dioxide is deemed the agent of choice. There is concern with respect to the pH of water which might render copper- silver ineffective. In addition, some bacteria have been shown to develop silver resistance whereby Chlorine dioxide resistance is not described. Stages 4 and 5 include further biofilm control with chemical dosing plus draining, cleaning and pasteurisation of hot water system. Finally, stage 6 addresses the outlets. We recommend replacement of taps in high risk areas (as defined by the Pseudomonas risk assessment for RHC/QEUH). The replacement tap is the Marwick 21 tap (Armitage shanks) with copper lined bio-guard flow control. In low risk units current taps can remain in situ but there must be 3 monthly maintenance and new flow straighteners inserted On completion a water sampling programme will be implemented and point of use filters reviewed.

NHS Greater Glasgow and Clyde	**NHS Greater Glasgow & Clyde** **Infection Prevention and Control Team**
Purpose:	Proposed approach to the review of water systems at QEUH and RHC.
From:	Tom Walsh, Infection Control Manager
To:	Jonathan Best, Interim Chief Operating Officer.
Date:	5th July 2018
Subject / Situation:	NHSGGC is required to ensure that water systems are compliant with all relevant safety standards and to fully support both internal and external review of the commissioning and safety of the Water Systems in QEUH and RHC.
Background:	Recent laboratory tests were undertaken as part of the investigation into increased rates of infection within ward 2a at RHC. The test results indicated higher than normal levels of bacterial counts in the water supply which have been managed through an Incident Management Team (IMT), lead by the Lead Infection Control Doctor. Further testing in other clinical areas yielded similar results. Health Protection Scotland (HPS) and Health Facilities Scotland (HFS) have been fully involved throughout the IMT process and the Water Group. A broader review of the water systems, including commissioning, was instigated at the request of Scottish Government. The Board has to date been responding to a number of questions on the water system and a formal external review has been commissioned from HPS and HFS. Reports relating to the commissioning of the water systems have been identified in recent days which include a number of recommendations and actions which the Board needs to review in terms of both internal and external assurance. The board recognises the paramount importance of patient safety and the need to ensure that the water systems are compliant with all relevant safety standards. It is vital that all current and retrospective information is available to fully support the internal and external review processes.
Action	• The external review of the water system is already underway with a number of services and senior managers actively contributing to the process. • The Board will additionally commission an internal review within NHSGGC to look at the commissioning process • The Board will, as a matter of urgency, review all recommendations and ensure they have been addressed with clear evidence and take urgent action to put in place actions to address any outstanding areas.
Recommendation	To provide optimum support to the internal and external review processes a structured

	approach to communication, review and management of documentation, and local coordination of resources is proposed. This will be Lead by the Interim Chief Operating Officer supported by the Interim Director PPFM and the Board's Infection Control Manager. The Board's Infection Control Manager will act as a single point of contact for both internal and external colleagues. The coordinated approach will focus on three primary and interlinked work streams: 1. Review and management of all relevant documentation and written communications to support the SG commissioned external review and the GGC internal review. 2. Ensure that the QUEH/ RHC water reports have been reviewed and all actions are either completed or in the process of being enacted with clear evidence 3. Liaison with and support to the internal review process when commissioned. Regular meetings, (2 or 3 per week), have been arranged to monitor and review progress given the high priority and tight timescales.

NHS Greater Glasgow and Clyde	**NHS Greater Glasgow & Clyde** **Infection Prevention and Control Team**
Purpose:	Proposed approach to the review of water systems at QEUH and RHC.
From:	Tom Walsh, Infection Control Manager
To:	Jonathan Best, Interim Chief Operating Officer.
Date:	8th August 2018
Subject / Situation:	NHSGGC is required to ensure that water systems are compliant with all relevant safety standards and to fully support both internal and external review of the commissioning and safety of the Water Systems in QEUH and RHC.
Background:	Recent laboratory tests were undertaken as part of the investigation into increased rates of infection within ward 2a at RHC. The test results indicated higher than normal levels of bacterial counts in the water supply which have been managed through an Incident Management Team (IMT), lead by the Lead Infection Control Doctor. Further testing in other clinical areas yielded similar results. Health Protection Scotland (HPS) and Health Facilities Scotland (HFS) have been fully involved throughout the IMT process and the Water Group. A broader review of the water systems, including commissioning, was instigated at the request of Scottish Government and a report has been prepared by HPS with expert technical support from HFS. The Board has to date adopted a coordinated approach to responding to a significant number of questions on the water systems which are informing the HPS review. The report is due to be with the Cabinet Secretary on 17th August 2018. Reports relating to the commissioning and management of the water systems have been identified in June 2018, these included a number of pre-existing recommendations and actions which have been reviewed urgently in terms of both internal and external assurance. A recent report commissioned from the Authorised Engineer notes good progress against these recommendations. It is however anticipated that the HPS report will indentify a number of actions and recommendations for national policy and locally for NHSGGC. The board recognises the paramount importance of patient safety and the need to ensure that the water systems are consistently compliant with all relevant safety standards. It is vital that all recommendations arsing from the internal and external reviews are fully addressed and implemented with NHSGCC.
Action	• The external review of the water system is completed and the report with will be with the Cabinet Secretary on 17th August. • The Board will, as a matter of urgency, review all recommendations in the HPS report and the internal review to ensure they will be fully addressed. • The Board has additionally commissioned an internal review within NHSGGC to look at the commissioning and maintenance processes for the water systems.

	This review has commenced.
Recommendation	To provide optimum support to the internal and external review processes a structured approach to communication, review and management of documentation, and local coordination of resources is required. This has been to date Lead by the Interim Chief Operating Officer supported by the Interim Director PPFM and the Board's Infection Control Manager. It is recommended that a structured Project Management approach is taken to the review and implementation of recommendations arising from the internal and external reviews and reports. Ideally a project structure should be adopted where a senior manager is appointed or released from their current remit to ensure clear focus, with a continuation of Executive oversight. The Interim Chief Operating Officer will ensure the NHSGGC Board are updated regularly on the outcome the reports and progress against implementation of the associated recommendations.

NHS Greater Glasgow and Clyde	**NHS Greater Glasgow & Clyde** **Infection Prevention and Control Team**
Purpose:	Infection control advice regarding lack of water availability during chlorine dioxide dosing in QEUH
From:	Dr Teresa Inkster, Lead ICD, Lynn Pritchard, Lead IPCN
To:	QEUH
Date:	16/10/18
Subject/ situation:	This advice covers the following circumstances which will occur during chlorine dioxide dosing; No access to hot or cold water for 4 hours during the night No access to hot water for 24 hours
Background	Due to the ongoing water quality issues affecting QEUH and RHC, chlorine dioxide dosing will be commencing to bring the system under control and allow removal of filters which were a short term control measure only. There is a phased approach to dosing which will cause disruption to the water supply to your area. This will be for periods of both 4 hours (loss of hot and cold water) and 24 hours (loss of hot water only) at different times over the next few months. Some specialist areas e.g. theatre may have both these shut downs at the same time. You will be advised of these time periods well in advance.
Action	**Patient Hygiene** Disposable patient cleansing wipes, disposable wipes and cleansing foam will replace water for all patient hygiene needs. If you have to use water , bottled water can be used. High intensity areas such as ED and acute admissions units will be supplied with portable sinks to enable a source of warm water to be available. **Hand Hygiene** Alcohol hand gel can be used many times and will remain effective. When you hands start to become sticky you should wash your hands with soap and bottled water. If they are visibly contaminated you should use a clinical wash hand basin and wash and rinse your hands with soap and bottled water (a colleague will be required to assist you with this). NB: Handwashing can be performed with cold water effectively. Warm water provides comfort only. **Aseptic Technique** If you have to perform a procedure that requires an aseptic technique then the non sterile bottled water should be used to wash and rinse your hands, followed by application of alcohol hand rub.

	Surgical scrub Surgical scrub can be performed with cold water during the 24 hours shutdown period that it is available. Warm water is preferred to avoid dermatitis but cold water can be used safely and effectively although it is uncomfortable. During loss of both hot and cold water, surgical scrub can be performed over a scrub sink by asking a colleague to pour over bottled water for washing and rinsing. **Toilets** Toilets **cannot** be flushed during the 4 hour shutdown periods but can still be used during the 24 hour shutdown During the 4 hour shutdown staff and relatives will be advised to use toilets outwith their area (adjacent ward or department). Patients should be encouraged to use toilets prior to the 4 hour shutdown. If patients need to use the toilets commodes should be used and Vernacare gel sachets used to solidify the urine and then the bed pan should be double bagged in a clinical waste bag. There will be additional waste uplifts during this period. **Showers** Showers cannot be used during the 4 hour shutdown period. Only cold water will be available from shower during the 24 hour shutdown **Cleaning** Detergent wipes are available for cleaning equipment and the environment actichlor solution can either be made in advance or made with bottled water. **Portable sinks and toilets** Portable trough sinks which will provide a source of warm water will be stationed in ED and receiving units. Portable toilets will be accessible outside both ED departments
Recommendation	These temporary measures are applied by all staff during periods without water. Following dosing water may be slightly discoloured but is safe to use

References

Health Protection Scotland.Standard Infection Control Precautions Literature review: Hand Hygiene: Hand Washing . May 2016

NHS Greater Glasgow and Clyde	**Property, Procurement & Facilities Management Directorate - SBAR**
Purpose	*Ward 2A\2B Ventilation review*
From	*Ian Powrie, Deputy General Manager (Estates)*
To	*Tom Steele, Director of Property Planning & Facilities Management (PPFM)*
Date	*12\11\2018*
Situation	*Single bed room accommodation has a nominal Air Change Rate (ACR) of 2.5 Air Changes per Hour (ACH) with the single rooms being neutral to negative pressure relative to the ward corridor, this combined with the potential risk of air recycling from en-suite WC's to the supply air stream via air passing through bypassing the thermal wheel heat recovery unit introduce a potential for cross contamination between single room suites.*
Background	*General ward single room ventilation design was derogated from national guidance requirements 6 ACH to 2.5 ACH, in order to adopt Chilled beam technology to meet BREAM energy performance targets, on the basis that the fresh air provision of "40 litres per second per single room (8 litres per person per second) for one patient and four others" with the 'proviso' "Negative pressure to be created in the design solution. "* *In practice the single room ventilation rates are 2.5 ACH with neutral to very slightly negative pressure with relative to the ward corridor.* *This derogation seems to have been applied universally across an all single room accommodation regardless of the patient risk group with no allowance for Neutropenic patient groups.* *During investigation of this issue to develop a solution the following issues were also identified:* *a) The Supply and extract Air Handling Units (AHU's) are fitted with thermal wheel heat recovery units. Permissible under SHTM 03-01 Pt A, Para 1.144 "Thermal wheels may be used providing they are fitted with a purge sector. The small amounts of air leakage across those devices are not considered significant."* *b) The supply AHU is cross connected to the toilet extract system via the thermal wheel, by design.* *The design of this thermal wheel combined with the potential for toilet extract bypass air to enter the supply air stream introduces a risk of cross contamination into the patient environment.*
Action	*a) Assessed feasibility of modifying existing system to improve patient environmental containment. Outcome:- due to limitations of existing installed AHU, duct work & chilled beam capacities as well as the building fabric air permeability leak rate this is not a viable option.* *b) Assess the scope of works required to redesign and install suitable ventilation plantand distribution to provide a safe environment for Neutropenic patients.* *c) Review the ventilation arrangements for all other high risk ward area's to assess if this ventilation configuration is applied in these areas.*
Recommendation	*Decant patients from ward and commission a full feasibility study, re-design and prepare tender specification to meet the requirements of this patient group:* **Duration 3-6 months***.* *Implement project to reproved a resilient ward ventilation strategy including , new supply and extract plant (Including High Efficiency Particulate (HEPA) filtration), distribution ducting and associated heating & cooling circuit re-distribution to allow for a suitable comfortable and protective patient environment at +10 pa positive pressure and 10 ACH, including the removal of the chilled beam technology and separation of supply and extract systems with new dedicated general and sanitary extract systems.* *Budget costs £1 – 1.5m* *Duration 6 – 9 months* *Overall Patient decant period 12 – 15 months*

NHS Greater Glasgow and Clyde	**NHS Greater Glasgow & Clyde** **Infection Prevention and Control Team**
Purpose:	Briefing Paper
From:	Infection Prevention and Control Team
To:	Chairman NHSGGC
Date:	13/11/2018
Subject/ situation:	QEUH and RHC – Bacteria in Water System.
Background	Since February 2018 NHSGGC have been investigating an increase in environmental organisms linked to the water system which could have caused blood stream infection in Children within the oncology/haematology unit (ward 2a/b) in the Royal Hospital for Children. To date, 23 cases have been linked to the water supply the breakdown is as follows: • 1 Cupriavidus • 1 Pseudomonas • 8 Stenotrophomonas • 7 Enterobacter • 1 Klebsiella • 1 Pseudomonas/Stenotrophomonas • 1 Serratia • 1 Stenotrophomonas, Acinetobacter • 1 Stenotrophomonas, Chryseomonas • 1 multi: Pseudomonas, Stenotrophomonas, Acinetobacter An Incident Management Team was convened as per chapter 3 of the National Infection prevention and Control Manual in February 2018 and representatives from both Health Protection Scotland and Health Facilities Scotland were involved from the outset of the incident. In June 2018 it was agreed by the IMT that the ward could return to normal operational practice and the IPCT could revert to their normal triggers for this type of infection if the ward had no further cases of infections possibly linked to water in the preceding 6 weeks. In the following six weeks no further cases were identified and normal triggers were resumed. It should be noted that this type of infection is not uncommon in this group of highly vulnerable patients therefore triggers are used to identify were numbers are exceeding clinical expectations. In August 2018 a new possible case was identified and by the beginning of September there were three cases despite the implementation of extensive infection control measures, this initiated the reconvening of the IMT. The subsequent recommendation from the IMT was to decant the ward. This was to enable a detailed assessment of the source and remedial

	measures to be undertaken. A risk assessment was completed by the Senior Management Team (SMT) in the Royal Hospital for Children and a recommendation was made to the GGC Board Directors who approved this recommendation, i.e. to move patients from 2A/B to suitable accommodation in the adult building. A robust and comprehensive planning process was undertaken in terms of risk assessment and risk mitigation of all aspects of the decant. All of the above were successfully completed prior to decant, which took place uneventfully on the 26th of September. The ward is now running as normal from the two decant areas. This facilitated a more detailed investigation by a specialist external company of the drainage system in 2A/B. This survey is currently complete and actions agreed. The issues relating to this on-going incident are both complex and evolving. The safety of the children is of paramount importance and the key consideration in all actions being taken. Members of the senior management team are fully engaged with the clinical, infection control and facilities teams and national agencies/ advisors in both the management of the situation and the implementation of a robust and permanent solution. The Board has received several parliamentary questions regarding this incident and these have all been fully answered within the set time scales. NHSGGC have also sought advice from the outset of the incident from nationally recognised water experts and from Health Protection Scotland and Health Facilities Scotland. All children who had positive blood cultures have recovered from infection and have completed or continued with their treatment regimes. A report on the incident was submitted to the Healthcare Associated Infection Policy Unit, Scottish Government Health Directorates in October 2018. Recommendations from this are awaited. There have been no cases associated with water since the ward move to the adult hospital.
Actions	NHSGGC have taken advice from HPS, HFS and national/international water experts as to appropriate remedial actions. Within wards 2A/B the following actions have been implemented; - Introduction of local continual treatment of the water system in ward 2A/B with Chlorine dioxide due to commence 15\11\2108. - Replacement of all Thermostatic Mixing Taps (TMT's) , clinical wash hand basins (CWHB) including modified drain connections and trap arrangements, as well as modifying the hot water flow and return position in relation to the tap. - Replacement of all local WC cisterns with direct flushing valves. Installation of a continuous (low level) water treatment chlorine dioxide system is due to commence 28/11/18 for both QEUH and RHC Decisions regarding replacement of TMT's , CWHB and connecting water supply\drainage

	connection pipes elsewhere will be risk assessed for implementation commencing with high risk areas. Point of Use (POU) Filters will remain on outlets until we have demonstrated satisfactory Total Viable Counts (TVCs) of bacteria are being maintained.
Recommendation	Note the contents. .

NHS Greater Glasgow and Clyde	**NHS Greater Glasgow & Clyde** **Infection Prevention and Control Team**
Purpose:	Proposal for Enhanced/ Increased Infection Control Doctor (ICD) input to the Built Environment and CDU.
From:	Tom Walsh, Board Infection Control Manager
To:	Dr Jennifer Armstrong. Board Medical Director.
Date:	6th December 2018
Subject / Situation:	Recent incidents in both QUEH/RHC and the Cowlairs CDU require significant ICD input, both in terms of the current situation and the ongoing monitoring and assurance processes for the built environment from and Infection Prevention and Control perspective.
Background:	The ongoing Water Incident at RHC has required significant input from the Lead Infection Control Doctor, both as Chair of the Incident Management Team and as an expert advisor on Water and Ventilation Systems in the clinical environment. The incident has demonstrated the ongoing need for significant involvement of an ICD in the design and maintenance of all aspects of the built environment within GGC going forward. The CDU at Cowlairs recently had the relevant operating license temporarily revoked following an unannounced inspection by the external accrediting authority. Part of their findings was a perceived failure to act on increased particulate counts in the clean preparation room. Further investigation identified this as a likely result of water ingress to the ceiling and the growth and potential dispersion of mould. It is anticipated that the review of this incident will result in a recommendation for more direct involvement of an ICD in the testing and reviewing of microbiological results for both CDUs at Cowlairs and Inverclyde.
Action	These recent events have been fully support by the Lead ICD for GGC and have required considerable input over a prolonged period of time. The total available ICD sessions for all of the Board Area currently sits at 1.9 WTE and is covered on a sessional basis by 6 Consultant Microbiologists. The current enhanced support and the ongoing requirements for input to the built environment cannot be sustained within the available sessions without impact on other key areas of the Infection Prevention and Control workload.
Recommendation	To provide optimum support to Facilities Colleagues on the Built Environment and environmental QA processes within the CDUs it is requested that funding for two additional ICD sessions is provided to support the current and ongoing requirement for expert input and advice.

	The approximate cost of the two additional sessions is circa £30K per annum.

NHS Greater Glasgow and Clyde	**NHS Greater Glasgow & Clyde** **Woman & Children's**	**Service – 2A/2B decant to QEUH 6A/4B**
Purpose:	**Provide background and business continuity arrangements during current decant of BMT services at RHC ward 2a to the QEUH Ward 4b**	
From:	Melanie Hutton, CSM	
To:	Jamie Redfern, General Manager	
Date:	8th January 2019	
Situation:	Decant of BMT inpatients from Ward 2A at RHC to Ward 4B at QEUH. Decant of BMT Ward 2B day care to Ward 6A at QEUH	
Background:	During 2018 there was a well documented water incident on the QEUH campus. The first impact of this was identified in Ward 2a/ 2b RHC. A variety of contingency arrangements were put in place to maintain BMT service in this clinical environment. Following this there were further problems with drainage on site in Ward 2a / 2b. The relationships between these two incidents are well documented in the previous IMT minutes. A decision was then made for both wards to be decanted to space in the QEUH; this was expected to last for a short period of time while further remedial work to the wards was carried out. A decant plan was agreed and successfully implemented. It was subsequently agreed that the decant plan would be extended because of agreed improvements to the ventilation system in ward 2a. This extended period would last for up to 12 months.	
Assessment:	Ward 4B, QEUH was identified by GGC as the designated area for new BMT patients to be transplanted during the period of this decant. Any follow up BMT inpatient episodes and/ or day case provision on these patients were to be managed in Ward 6a QEUH alongside the wider haematology oncology services and the decant plan for them. A close clinical interface between ward 4b and ward 6a was established. It is noted that Ward 4b is a full specified BMT unit and now used by the nationally commissioned service for adults requiring this treatment.	
Recommendation:	3 BMT inpatients from ward 2a RHC relocated to Ward 4B - 25/9/18 Three single cubicles, which were to be collocated in a specific area of the ward, were identified for sole use by the paediatric service. This physical capacity has now been extended to four cubicles. BMT day care to be moved from Ward 2B RHC to Ward 6A, QEUH – 25/9/16. Day care facilities provision – 6 consultation/clinical rooms, waiting area, treatment room, parent interview room, medical/nursing office accommodation, storage area, pharmacy area. Play equipment will be available in waiting area and individual clinical	

	rooms. Ward 4B will continue to be staffed from current BMT skilled nursing and medical workforce within RHC but with close adjacencies to Ward 6a. **Staffing arrangements** in ward 4b – Nursing Day - 2/3 registered and 1 non registered Night - 2/3 registered and 1 non registered This is dependent on occupancy and acuity and will flex accordingly. Medical Staffing One Middle Grade doctor will be rosterd for ward 4B at all times. Hospital at Night Team – additonal cover will be rostered for overnight cover 9pm-8am, This cover will be provided by Middle Grade Medical staff or Advanced Nurse Practitioner **Patient Pathway's completed -** Emergency Admission via ED to 6A/4B, PICU and radiology Internal collapse from 6A/4B to PICU Internal transfer for patients from 6A/4B to Theatre, OPD, radiology etc Service pathway – laboratories, catering, pharmacy and portering Day case attendances at Ward 6A Mock resuscitation scenario and timing for team to arrive from RHC **Family Facilities** All cubicles have ensuite facilities for both parent and child usage All parents/Carers will have access to fold down bed facilities to allow them to remain resident with their child. All parents will be offered meals and snack provision from the catering service. Parent Room – this is available in third floor at RHC if required **The service will continue to transplant during decant period. The available capacity is sufficient for service to meet its nationally contracted obligations.** **Due to an extended decant period now in place all pathways and arrangements initially agreed is currently under review. There will also be regular review with adult**

	BMT service about maintaining this available capacity to the paediatric service. **During the decant period the service will not be able to go through a JACIE accreditation.**

SBAR Report for Cryptococcus IMT
Ventilation and *Cryptococcus*
Dr Christine Peters

Situation

Two cases of hospital acquired *Cryptococcus neoformans* have occurred in immune compromised patients at the QEUH. Pigeons and associated guano have been found in all plant rooms supplying ventilation to QEUH. An IMT investigation required details regarding plausibility of Cryptococcus contaminating the ventilation system.

Background

Organism
Cryptococcus neoformans is a yeast type fungus that is found globally in soil and pigeon (and other bird) guano in high densities. Pigeon guano also harbours a number of other potentially pathogenic fungi including Candida , Aspergillus and Mucor species.

For the purposes of this investigation the key characteristics of *Cryptococcus neoformans* are*:*

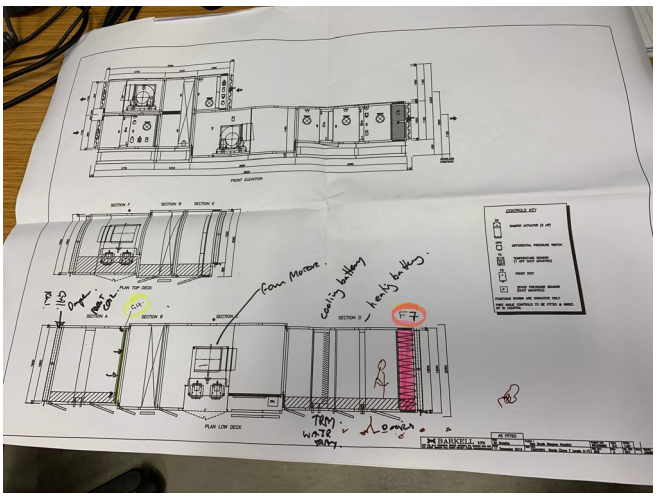
1. Infectious Particle size : various studies indicate 1-5 microns, basidiospores or desiccated yeast cells, can be airborne nuclei depending on life cycle stage and morphic form of organism as well as environmental factors such as temperature, humidity and air currents. Particles as small as 0.6 have been shown to be infectious.
2. Infectious dose: unknown, may depend on type of exposure eg yeast forms versus spores, sub species and host factors
3. Route of infection: usually inhaled into alveolar space, reports of inoculation with localised soft tissue infection
4. Incubation period: unknown , variable depending on exposure and susceptibility of host, up to months, latent infections also described
5. Disease spectrum: asymptomatic, mild pneumonitis through to fatal sepsis with pneumonia and meningitis. Severity related to underlying immune status, although severe infections also reported in immune competent exposed to high levels of guano contamination
6. Survival in environment: varies depending on water and nutrients can be months on pigeon guano which is the ideal nutritional environmental niche
7. Susceptibility to disinfectants: 0.5% chlorhexidine is fungicidal
8. Laboratory detection: grows within 24-48 hours at 37 C degrees on SAB agar. Appearance is similar to other yeast species and unless further ID test are carried out may be labelled as “yeast species” eg on air sampling plates
9. Hazard Group 2 organism
10. although most cases occur due to environmental exposure, HAI outbreaks have been described

Ventilation
The QEUH is an entirely mechanically ventilated building with plant rooms on the 12th floor covering four separate but interconnected wings which house Air Handling Units (AHU) that supply wards in the wings below to the 4th level.

Assessment

A walk around was undertaken on 18/01/19 with Dr T Inkster (lead ICD) and Colin Purdon (Estates) to inspect an AHU to answer queries from Peter Hoffman and to exam the possible routes of transmission of Crypotococcus from plant room to patient rooms. There after Dr Peters had a telephone call with Peter Hoffman (PHE) to discuss the findings.

1.Assessment of possible Route of transmission via ventilation system and ducting:
Diagram of AHU



External fresh air enters the AHU via ducting from area below helipad to plant room. These ducts have panels which can be opened for visualisation and maintenance.

Extract ducts and AHU sit on top of supply ducting and AHU. This is critical to the design as thermal wheels are used for energy efficiency of temperature control. These can theoretically provide an opportunity for dirty extract air to mix with clean supply air. The use of thermal wheels is approved in SHTM 03 however potentially pose difficulties when specialised ventilation is required for extract from infectious patients (eg VHF, MERS, measles, chicken pox and TB) and supply for immune compromised patients (BMT, transplant, HIV and others) and have not been specifically approved for such specialised ventilation systems.

Full details of AHU numbers and exact wards they supply are not available at this time.

Route of Supply air taken for external high level clean fresh air (photos below)

1. grill

2. frost coil
3. G4 filter – external pressure gauge present - changed when pressure reaches >100 (? Need to check maintenance schedules)
4. thermal wheel
5. Fan
6. cooling battery (with associated condensate trap)
7. heating battery
8. F7 filter – external pressure gauge present

There are 7 doors in the AHU to allow access for filter changes and maintenance, which involves personnel going from plant room into the inside of the AHU to carry out necessary filter changes. These cannot be opened when AHU is switched on and so while photos were taken through a window, this does not allow for full visualisation of potential gaps round filters.

9. Ducting to rooms
10. supply cooler beam at point of supply to bedroom
11. grill to bedroom
12. air entrained through cooler beam and grill

Potential for Cryptococcus and other airborne fungi to contaminate ventilation:

1. External air inlet: if there is roosting or guano contamination at the inlet this could lead to variable and wind dependant ingress of large numbers of spores. This could not be visualised but this needs to be done.

2. guano has been present in the plant room over at least a number of weeks (photos below) with reports of pigeons nesting in one area. Cryptococcus , along with other fungi can become airborne particles in dry settings when droppings are disturbed and could enter the AHU either on feet of personnel during filter changes, or via air when the access doors to the AHU are opened.

3. The F7 filter is at the terminal end of the supply AHU, so all air entering the ducting should go through this. It is impossible at this stage to determine if there are, or ever have been gaps to allow bypass of F7. Pressure records may indicate bypass, however normal pressures would not exclude this.

4. While F7 filter efficacy for 1 micron particles is 88%, HEPAs afford 100% for this range of particle size and are required for fungal airborne protection for severely immune compromised patients. There is evidence that naturally occurring infectious particles of Cryptococcus can be in the order of 1 micro and below. Numbers of particles getting through a filter will depend on the level of pre-filter contamination. As the infectious dose is not well described in this patient group the number needed to penetrate the filter to cause infection is not possible categorically determine. The infectious dose will also vary with patient susceptibility. Note those infected were severely immune compromised. While F7 filters will give considerable protection (only if installed correctly), this may not be to an adequate level for immune

compromised patients. The principle of HEPA filtration for airborne isolation of immune compromised patients is the nearly 100% elimination of fungal spores in the supplied air as per SHTM neutropenic accommodation guidance.

5. The air in the AHU will be at negative pressure upstream to the fan. Thus any breaches in the unit and/or the extract AHU including the thermal wheel could cause a continuous intake of plant room or dirty extract air. It is not possible to examine all surfaces of the AHUs to detect any such defect, but may warrant further inspection in the future.

6. The air in the AHU post fan will be under positive pressure which will safeguard against ingress from dirty areas when the fan is switched on.

2. Possible Route of transmission from building void to patient rooms

The void air could gain access to all rooms that are not under positive pressure through gaps such as the panel above sinks and electrical sockets etc. The principle of positive pressure for protective airborne isolation is primarily to prevent such ingress so that immune compromised patients only breathe supplied and filtered air.

The void air could have been contaminated with cryptococcus by:

- Communication with the contaminated plant room which has had, and continues to have gaps to the building void (clearly that is how the pigeons ingressed in the first place) and is normal in any building as water and waste pipes etc need to pass through different areas of the hospital. ie the void is not sealed off from any room in the hospital other than those specialised areas which require a determined level of seal and positive pressure (eg 4B)
- Other areas of pigeon ingress and faecal contamination which is impossible to visualise throughout the hospital
- Ingress from heavily contaminated external sources through any breaches in cladding

In terms of plausibility of infectious doses of the organism gaining access to the rooms in this manner in two different wards within a short timeframe, it seems less likely than the ventilation route but, as discussed with Peter Hoffman, cannot be ruled out.

3. Possible route of transmission from plant rooms via POD system

The POD system has a station in a plant room (need to ascertain which one) and it is plausible that due to the pressures involved in shifting the PODS through the tubes that contaminated air could be drawn into the treatment rooms where the PODS are deposited at the ward end. This requires further consideration.

Recommendations

It seems entirely plausible that cryptococcal infectious particles have been able to gain access through the ventilation system to the rooms of immune compromised patients.

There is also the additional possibility that infectious particles could gain access to patient rooms via the void as the rooms are not positively pressured, or to the ward corridors via the pod system.

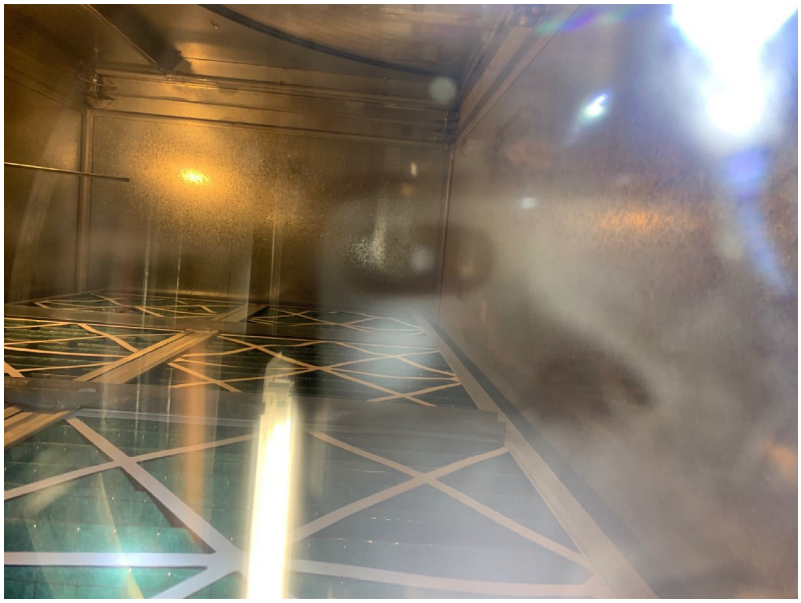
Further information is now required to further assess these possibilities not only to draw conclusions regarding the previous infections, but crucially to prevent any future infections.

1. External inlets need to be visualised and shown to be free from pigeons and droppings
2. AHUs that supply 6A and 4C and ITU should be inspected (will need 30 mins switch off):
    a. Visually for gaps in F7 filter housing
    b. air sampled inside AHU
    c. pressure records across filters compared to manufacturers minimal levels
    d. particle counts taken pre and post F7 filter
    e. filters sampled for culture on SAB agar (expect a lot of fungus, but important to identify if any Cryptococcus has challenged the filters)
3. Smoke testing of rooms of affected patients to identify level of leakage into the rooms
4. Thermal imaging report needed to rule out further pigeon roosting in the building void
5. Air sampling of the void at different points in the building to determine levels of cryptococcal contamination in comparison to wards.
6. Air sampling near POD system
7. Air sampling in laboratory block as a control – same external air , different HVAC system.

In conclusion it is important to note that in order to protect immune compromised high risk patients from exposure to airborne fungal infection including but not restricted to Cryptococcus, the well established ventilation strategies are positive pressure, HEPA filtration and adequate ACH with minimal door opening.

PHOTOS of AHU components


GRill


G4 Filter


F7 Filter

Pressure gauge

PHOTOS of Pigeon guano contamination in plant rooms

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Mycopathologia
January 1982, Volume 77, Issue 2, pp 117–122| Cite as
A one year study on the viability of *Cryptococcus neoformans* in nature

F Efficacy of antiseptics and disinfectants on clinical and environmental yeast isolates in planktonic and biofilm conditions

Infect Immun. 2009 Oct; 77(10): 4345–4355.

Spores as Infectious Propagules of *Cryptococcus neoformans*▽ †

Rajesh Velagapudi,[1] Yen-Ping Hsueh,[1] Scarlett Geunes-Boyer,[2] Jo Rae Wright,[2] and Joseph Heitman[1,3,4,*]

Emerg Infect Dis. 2015 Oct; 21(10): 1719–1724.
Cluster of *Cryptococcus neoformans* Infections in Intensive Care Unit, Arkansas, USA, 2013
Snigdha Vallabhaneni, Dirk Haselow, Spencer Lloyd, Shawn Lockhart, Heather Moulton-Meissner, Laura Lester, Gary Wheeler, Linda Gladden, Kelley Garner, Gordana Derado, Benjamin Park, and Julie R. Harris

J Res Med Sci. 2013 Jan; 18(1): 56–60.

Isolation of *Cryptococcus neoformans* and other opportunistic fungi from pigeon droppings

Maryam Soltani, Mansour Bayat, Seyed J. Hashemi,[1] Mohammadali Zia,[2] and Nader Pestechian[3]

Miozzo, I., Aquino, V., Duarte, M., Santos, R., & Goldani, L. (2010). Cryptococcus Neoformans as a Rare Cause of Hospital Infection. *Infection Control & Hospital Epidemiology*, *31*(3), 315-317. doi:10.1086/651064

From: de Caestecker, Linda
Sent: 04 March 2019 16:17
To: Armstrong, Jennifer; Mathers, Alan
Cc: Best, Jonathan; Stewart, David; Devine, Sandra; Hill, Kevin
Subject: RE: Water Issues at RHC : 3 year retrospective case series URGENT B, please print

Jennifer and Alan
I discussed this with Iain Kennedy who is already undertaking an analysis of the data, working with Theresa and he and I are very happy to help with the assessment.
Kind regards
Linda

Dr Linda de Caestecker
Director of Public Health
NHS Greater Glasgow and Clyde

From: Armstrong, Jennifer
Sent: 04 March 2019 14:39
To: Mathers, Alan
Cc: Best, Jonathan; Stewart, David; de Caestecker, Linda; Devine, Sandra; Hill, Kevin
Subject: RE: Water Issues at RHC : 3 year retrospective case series URGENT B, please print

Alan
Many thanks for your email regarding this issue. I discussed this at the director's meeting today . Jonathan and I discussed your email thereafter. The directors were in agreement that we should;

1. Ask you/Kevin Hill to commission an initial assessment of the issues set out below
2. This should be done in conjunction with IC/Microbiology and Public health to determine and set out the various aspects of the issue
3. Linda De C very happy to discuss with you a lead doctor from the public health team who can provide specialist advice /support
4. There needs to be an initial report which will be considered by Jonathan and David Stewart

Can you call Linda so we can get this review underway
Kind regards
Jennifer

From: Mathers, Alan
Sent: 01 March 2019 20:26
To: Armstrong, Jennifer
Subject: Water Issues at RHC : 3 year retrospective case series URGENT B, please print

Dear Jennifer

Situation

I have to report a potentially serious concern I have following a meeting today.
It appears that there may have been a Microbiology Line management issue that meant that concerns raised about unusual organisms were not adequately addressed.

Background

I met with Brenda Gibson and Teresa Inkster this afternoon at their request.

The main subject was to identify what to do next following a look back of Positive Blood Cultures with unusual organisms with the RHC 2A Cohort since the hospital opened.

Two issues emerged and were obviously informed by:

- The "HPS QEUH / RHC: water contamination incident report" from last week
- The Clinical and Managerial Team Actions to manage the difficulties of the past year
- The knowledge that one parent has contacted HPS and through them had a "difficult" and lengthy conversation with Teresa [redacted]

Issue 1: There is a series of cases demonstrating a theme of water borne gram –ve organisms of unusual type.
Issue 2: Earlier identification *may* have been possible (*speculation only at this point*)

Assessment

Brenda has identified a group of children and detailed the organisms found on Blood Cultures. This group had a range of outcomes.
Teresa has identified that there is a theme of gram negative water borne bacteria of unusual type. [redacted]
Brenda's team queried on an individual case basis that (I paraphrase) : " we haven't hear of that organism before". Note this was within a specific case context. They treated the infection and carried on managing the individual patients.

This lead me to ask Teresa about whether Microbiology had appreciated the unusual nature of the organisms or if there was a pattern, etc.
In questioning Teresa about the matter I gained the clear impression that concerns had been expressed within Microbiology that organisms were being seen that were unusual.
I asked about what the surveillance systems were and what happened next when something was triggered and gained the *impression* that the Line Management processes may have been weak.
I am first to admit that my knowledge of the Laboratory processes is weak and I know little about the personnel beyond those that I have met directly for clinical or managerial reasons.
However , that means that I asked a series of Root Cause Analysis questions, which lead to my concerns. I believe that in light of the current context and the level of scrutiny we are under that it would be best if this matter was explored and understood now rather than at a later date.

Response

Issue one : the case series.

I have asked Brenda to arrange a Review of each one of these cases using a standardised review process that identifies the underlying pathology / treatment pathway, the reason for the Blood culture, the response to same, any re-infection (recurrent or new organism), the outcome of the case. The Time-lines for the infection events can then be studied within a patient and across the cohort.
My view is that the Clinical Team need to be able to demonstrate that their response to the positive results was appropriate. If parents contact the unit then they need to know that any treatment was appropriate, timely and effective (in terms of the infection, irrespective as to what happened long term through the underlying disease).

Issue two: escalation processes in Microbiology Laboratory

I know that you meet with Teresa regularly and you will have a much better understanding than I about the processes and management structures in the Microbiology / Infection Control Services. My concern is that there may have been an opportunity missed to identify the water issue earlier than it was and it is at least worthwhile exploring this. I understand that there would have to have been a series of cases before there was any chance of a "pattern" being identified.
I would therefore suggest that you explored the matter with Teresa. I have told her that I will contact you.

Final comment: I have separated out the matter of Teresa's telephone conversation with the [redacted]. It appears that her focus has turned on water issues and infection rather than anaphylaxis. I have reminded Teresa, Brenda, Jamie, Kevin and Jen that we need to keep matters separate and not confuse through conflation of processes. The TOR for the Reviews are such that we need those matters concluded to answer the questions posed already.

Brenda's new case series is not about whether RHC is appropriate place for offering treatment to MPS cases and it won't offer us assurance about our ability to respond to the deteriorating patient.

It may however inform the investigation into Estates and H&S processes.

Happy to discuss further.

Kind regards

Alan

Dr Alan M Mathers
Chief of Medicine Women and Children
Consultant Obstetrician and Gynaecologist (Clinical at Princess Royal Maternity, Glasgow Royal Infirmary)
Greater Glasgow and Clyde Health Board

[redacted]

From:	Peters, Christine
Sent:	03 June 2019 18:42
To:	Dodd, Susie; Inkster, Teresa; Johnson, Angela; Inkster, Teresa (NHSmail); Khalsa, Kamaljit (NHSmail)
Cc:	Conner, Darryl James; Gibson, Brenda
Subject:	RE: Leakage from chilled beams - Ward 6A
Attachments:	IMG_2745.jpg; IMG_2739.jpg; IMG_2737.jpg; IMG_2735.jpg; IMG_2734.jpg; IMG_2733.jpg; IMG_2732.jpg; IMG_2729.jpg

Hi All,
Just back from assessing the water and pigeon issues.

Re pigeon it looks like pigeons are nesting in a bit of building ornamentation over the walkway between RHC and Mat building. Darryl has already called pest control. At present it does not look like this has access to any ventilation or indeed any internal component of the building. No further action taken.

Re Water drip:
Situation

IPCT alerted to dripping of water through chilled beam supply ventilation grills on 6A

Background

2A houses the decant Haemonc patients from Schallion including BMT patients . These rooms have en-suite facilities , in-room portable HEPAs and a cooler beam supply of 2.5 ACH with a nominal positive/neutral pressure to corridor.

There has been a history of leaks of water from the beam area since the hospital opened in different wards , with a particular incident occurring on 6A 2 weeks ago.

There is currently a 3 monthly cleaning schedule in place for vacuuming the components of the chilled beam. Last time this occurred in February on 6A.

Nurses were alerted by a parent of a child who had noticed a cold foot – the sock was soaked in water and water was noted to be heavily dripping from the supply grill.

Assessment

Cause of leak

A rapid HAISCRIBE was put in place signed by Darryl (Estates) , Emma (ward charge nurse) and Dr Peters (Microbiology Consultant) to assess the status of the chilled beams. Classed as a Grade iii/iV piece of work. This was done in room 5 , which had recently had raised fungal counts.

Inspection of the cooler beam found:

1. Very dusty metal heat exchange grill
2. Dry copper piping of the hot and cold supply to beam (ie no evidence of condensation)
3. Dripping from fitting at the hot water connection into the metal casing. There was evidence of previous drips and pooling of water with black markings on the upward facing casing.
4. The attachments were considered to require replacement
5. Swabs were taken of the dripping water and the dusty grills.

The sequence of events appears to be boiler failing (due to reduction in incoming water pressure ?)leading to reduced heat in hot water system to beams, leading to reduction in temperature of pipes, leading to contraction of metal, leading to loss of seal integrity at the point of join to beam pipes , leading to leak into casing and gravity driven dropping into the grill to floor. There was evidence of old leaks which fits with history of previous dripping events.
Photos of the cooler beams are attached to show the dripping water, the dust collection and the leak in the ceiling space.

RISKS

The risk presented by water collecting and dripping over dusty material is the precipitation of fungal sporulation into a room which houses severe immune compromised patients prone to fungal infections.

Recommendations

1. Rooms should remain closed until the following work can be completed for each room (following the HAISCRIBE precautions as already agreed)

- Fixing of the root problem – boiler has already been fixed by estates, and fittings should be replaced to a higher standard of connection to reduce likelihood of recurrence
- Reducing contamination by cleaning the casing in the ceiling void with achticlor wipe
- Reducing contamination by cleaning the beam and grill using vacuum
- Deep clean of room

2. Frequency of cleaning of beams should be increased to monthly and monitored
3. Antifungal Prophylaxis should continue as per policy already in place on the unit for high risk patients (one patient identified to commence prophylaxis by clinical team)
4. If for any reason a high risk patient is not able to take prophylaxis they should be housed on 4B or in a PPVL room with HEPA filtration in RHC as the best available option within the two hospitals
5. Current accommodation is already decant facility and is not to a standard of a BMT unit in that ACH (2.5), pressure differentials (neutral basically) and lack of sealed roof tiles and light fittings, are sub optimal . These risks are being mitigated with prophylaxis and portable HEPA units. Increased fungal counts on the unit have already occurred and any source of water ingress and pooling should be rigorously sought and managed rapidly.
6. An SOP should be developed for the event of water dripping into rooms of immune compromised patients.

Please do not hesitate to contact me for clarification on any of the issues

Kind regards,

Christine

Dr Christine Peters
Consultant Microbiologist
Queen Elizabeth University Hospital,
GGC
[redacted]

SBAR – ward 4C QEUH

Dr T Inkster –July 2019

Situation	Ward 4C QEUH had been previously identified as an area of concern with respect to ventilation . Discussed at ventilation group and SBAR requested
Background	Ward 4C comprises 10 beds for haemato-oncology (non BMT) and 10 beds for renal transplant patients. Haematology patients in ward 4C were originally planned to be housed in ward 4B. The specification for 4B and this patient group was designed by Dr Hood (microbiologist) and comprised Hepa filtered rooms, air changes of 6/hr and positive pressures of + 6PA. BMT patients were a late addition to the QEUH site and were moved into this area with the remaining haem-onc patients being moved to 4C which was designed as a general ward area
Assessment	Ward 4C currently has patient rooms with no HEPA filtration , at < 3 air changes per hour and rooms at a slightly positive pressure. Chilled beams are present in patient rooms. Thermal wheel technology is present. The same patient group in the Beatson oncology centre is housed in ward B7. Ward B7 has some single rooms at positive pressure and is HEPA filtered throughout There is no capacity currently on QEUH site to isolate a BMTpatient with an infectious diseases. This requires a positive pressure patient room with a negative pressure anteroom . Two such rooms were available on the Beatson top floor.
Recommendations	1) The feasibility study for ward 2A is applied to ward 4C. Key features should be; • Upgrade ward 4C to HEPA filtration and minimum 6ach/hr and positive pressure of + 6PA • Creation of double door entry to mitigate the risk from corridor air • Creation of an isolation room for an immunosuppressed patient with airborne infection either within 4B or 4C. Requires construction of an anteroom.

SBAR on ICE NEUROSURGICAL THEATRES

Dr Christine Peters

Clinical Lead QEUH Microbiology

19/07/2019

Situation

A newly fitted suite of four neuro- surgical theatres has been built within the ICE building at the QEUH site. There have been a series of issues which have delayed the opening of these theatres over a period of 18 months and on 17/07/19 a meeting was held for infection control to consider the acceptance of the validation of the theatres as being compliant or otherwise with SHTM standards.

Background

GGC requested HFS to comment on the suitability of the theatres after many months of remedial works and attempts to achieve compliance with the SHTM standards. HFS carried out a walk around of the Neuro theatres and issued a report on 27th June 2019.

Dr Christine Peters and Dr John Hood were invited to attend a meeting with Steve Russell, Colin Purdon and Darryl Connor to discuss recent validation and HFS documentation. There were no ICDs available to attend the meeting and Dr Peters attended in her role as Microbiologist giving cover for Infection Control.

Documents considered were the HFS report, Validation data from 12th June, emails from IPCT regarding a recent leak into the roof of one theatre, and emails between Capital planning team and HFS as well as designers and authorising engineer.

Assessment

1. These theatres are proposed to be used for Neuro surgery – this represents the highest level of requirement for a correct ventilation strategy which includes as a basic premise compliance with the standard parameters represented in the SHTM 03-01. Infections can be caused by extremely low levels of organisms as brains are immune deplete parts of the body, with the key defence being the blood brain barrier which is breached during neuro-surgical interventions. The consequences of neurological post operative infections are potentially catastrophic in terms of mortality and morbidity and long term disability and quality of life. In short these are not the type of theatres to compromise on standards.

2. The HFS document issued in June 27th 2019 following a walk around by HFS plainly recommends that the systems should be reset in compliance with the SHTM 03-01 guidance and be " re-commissioned from scratch" .

3. They further note that "it is clear that there are issues with the design, installation and commissioning of the theatre systems , otherwise they would be balanced and functional by now". It is not clear, but this may be a result of the non-standard layout of the theatres which were restricted in scope due to the floor space being a restricted size and shape as well as the number of derogations mentioned in the validation.

4. HFS have raised their concerns based on validation results on the 12th of June and they raise concerns regarding the net effect of the numbers of derogations . The derogations identified at the meeting were:

    - the placement of filters in the wrong side of the air stream which is in direct contravention of the SHTMs – this risks filter bypass and ingress of organisms into the operative field. Locks to the grill have been proposed as a means to address this, however this would be a very non-standard arrangement, carrying a risk of lock failure and bypass
    - the location of transfer grilles which are not in keeping with SHTM – this risks incorrect air mixing and thus dilution effect may be compromised , this had previously been an accepted derogation
    - lack of active ventilation in the scrub room which also has doors and concerns that air mixing will not occur, an important part of theatre ventilation strategy with regard to infection control, again previously accepted, however this may impact on the overall inability to achieve correct balances.
    - the excessive levels of pressure – this can cause turbulence and unexpected airflow directions in a complex theatre suite which has many doors and shared dirty utility facilities
    - out of spec ACH,
    - the AHUs are rated as "average" and HFS note this is not acceptable in a brand new suite

5. Concerns re the noise level is relevant to infection control only in so far as levels of distraction/annoyance it causes to surgeons however it must be noted that it is a sign that the suite is not functioning correctly as compliant noise levels in standard design theatres should be achievable.

6. Further to the HFS recommendations there has been a leak into the ceiling of one of the theatres identified in late June. The water damage has not been fixed yet and raises two further issues:

    - Toilets are located immediately above the suite. This is not a good idea and is a lesson which was learned from the old suites. Toilets block and overflow. Any level of water ingress into the ceiling has the potential to go un-noticed for some time and set up an ongoing source of fungal contamination in the suites. The images from that leak demonstrate a longstanding water damage and clear evidence of mould growth. Fungal neurological infections are

extremely serious and hard to treat. There is a need for vigilance within all theatres, but especially neuro-surgical theatres for sources of fungus.

- The ceiling and all damp materials will need to be fully removed as has already been recommended by the IPCT. This will by definition mean that the seal of the room will be breached and therefore the whole validation process would need to be repeated post completion of work in that theatre. An HAISCRIBE has I believe been discussed with the IPCT. There is a risk of mould ingress to adjacent areas.

7. There is a discussion regarding the potential utility of installing Constant Air Volume boxes (CAV's) into the airflows of the theatres, this has had some success at Monklands Hospital. The report does make reference to the fact that this may not provide a solution.

Recommendations

1. These theatres are NOT accepted as meeting SHTM standards in their current condition. Therefore they are NOT considered fit for purpose at present.

2. A full options appraisal is undertaken regarding the various recommendations contained in the HFS report regarding what may be achieved within the confines of the current design by starting the commissioning process from scratch, or the feasibility of a redesign. This should include the type of surgery to be performed in these theatres.

3. In order to *attempt* successful validation the first stage would be to remove the damp material and redo the ceiling and remove toilets above the theatres. The completed HAISCRIBE should be followed for this. Following this HFS advice should be followed regarding the alterations required and full re-commissioning attempted following use of the CAV in one theatre as a test of concept as suggested by HFS.

4. Revalidation should occur after re-commissioning followed by air sampling if successful validation parameters are met.

SBAR PICU Ventilation Validation

21/07/2019

Dr Christine Peters

Situation

The PICU at the RHC underwent a ventilation validation attempt on 6th July 2019. This raised a number of non conformances with SHTM 03-01 and the unit was rated "Poor" by Correct Air Solutions. This requires urgent Management action as per HBN 26 and SHTM 03-01. A meeting was held on Tuesday 16th June , chaired by Tom Steele Director for Facilities and Estates, to discuss if any actions were necessary as a result of the failed validation. Dr Peters was asked to summarise from a Microbiology/IC perspective (no ICDS available) the IC issues based on the information available.

Background

The PICU at RHC is comprised of four 4 bedded rooms , one recently validated negative pressure room (converted from a PPVL room) and 3 PPVL rooms and 2 single rooms. There are two prep rooms, two dirty utility rooms and scrub sinks in the corridor areas. The Isolation rooms have been assessed separately by Dr Inkster and are not considered further here.

There is no documentation available regarding the design intent, nor the original validation with a list of accepted derogations from SHTM. Therefore it is unclear whether the current design parameters were agreed and signed off, making current verification to a validation impossible.

Relevant standards

SHTM03-01

> 1.*37 In assessing the need for more specialised ventilation and the standards desired for patient care, managers will need to be guided by their medical colleagues and by information published by Health Facilities Scotland.*
>
> *1.39 Handover to client requires Basic design information, commissioning results and Validation report*
>
> *Table A : critical care areas require ACH of 10, and Pressure of +10*

HBN 04-02

> *6.9 The precise number of isolation rooms will depend on the case mix of the critical care unit. For example, units that routinely admit neutropenic haematology patients may require up to 50% of their beds to be provided as isolation rooms with lobbies. No unit should, however, have less than 20% of their beds as isolation rooms.*

Documents available for assessment

- Correctair Solutions Lmt validation documents for four bedded bays and single rooms on 6th july2019. Note previous validation date unknown.

- Comissioning of AHU by Brookfield on 04/09/2014 AHU 46 (supply) and AHU 14 (supply and extract)
- Records of Estates Annual Inspection of AHU and Plant room AHU 46 on 08/07/13, AHU 14 on 25/04/19
- Data from ICNet re organisms isolated from patients on the unit since 2016 supplied by ICM Sandra Devine

Assessment

Design

As there is no record of rationale for current design, any plans for alterations to the ventilation strategy requires details regarding the clinical patient groups being admitted to the unit, and any procedures carried out on the unit and requirements for both source and protective isolation.

Original AHU commissioning:

Note copies circulated signed by Brookfield Multiplex representative on 04/09/2014 not signed off by client, issues identified include pressure gauges not working and no stand by plant provided.

- Significance of absence of functional gauge is that there is no evidence that some filters were properly installed at time of commissioning or that this was fixed with potential for filter bypass to have occurred
- Significance of no standby is that the AHUs have to be turned off for filter changes and maintenance, significantly affecting this critical ventilation system and all pressure differentials for the duration of the down time.

Annual Inspections

Note no summary of whether poor/average/good, no note of acceptable range pressure differential across filters supply and extract, or if measures taken before or after filter change . AHU was shut down and restarted, this will have had an impact on the ventilation on the ward including pressure cascades.

Annual Validation and Inspection by Correct Air

Rated POOR

1. Note this document excludes areas such as prep room and dirty utility which need ACH and pressures confirmed
2. Separate validation documentation to isolation rooms assessed by Dr Inkster previously
3. Transfer Grilles in ceiling in place which allow air to circulate freely between the ceiling void (dirty area) and room (should be clean). This was thought to be due to the requirement for medical gas dilution however this has clearly been ruled out as a requirement by information circulated by Estates. There appears to be no design justification for these grilles and they are not compatible with a clean ventilation strategy within the unit. Of note one 4 bedded room has no grille and is not at positive pressure.
4. Concern was expressed regarding altering pressure cascades in one four bedded room and how this could potentially impact on other areas within the ward.

5. Multiple extract grilles labelled NA meaning that correct calculation of actual air extract is not possible. Of note a number of extracts in which measurements were achieved fall below 75% standard , and one in Room CCW-098 was recorded as 0 Air Volume l/s when the design is 125l/s . This has significance as the air flow within the rooms should be clean to dirty. If one extract above a bed space is failing (not clear if a damper issue) then air will not follow the planned clean to dirty pathway and has potential to disrupt the airflow and mixing within the unit.
6. Supply Grille readings generally within 75% of design, with only one failing at 72%.
7. Overall ACH calculations are within 75% of 10 ACH , with the two single rooms achieving 14.4 , and this indicates that these rooms were potentially designed for higher ACH nearer 15 which needs to be unpicked regarding why these rooms were designed for such a high ACH. If these were planned as airborne isolation facilities the consideration of pressure differential and HEPA filtration would be important or perhaps they are used as treatment type rooms?
8. Pressure differentials: all bed bays and single rooms fail as they have been designed to have no pressure cascade and are sitting at between -1 and +1 PA, ie no meaningful pressure differential. This may have been intentional if a large number of infectious patients were anticipated to be admitted to the unit, however it is not ideal for non infected vulnerable critical care patients such as burns and cardiothoracic or renal transplant patients .

DATA

The data supplied does not capture fungal infections as these are often diagnosed by molecular and serological methodologies as well as radiological. Denominator data is missing. This will need some consideration regarding how to interpret trends and how to obtain data from comparator units.

Historical data for the PICU unit in Yorkhill has been historically gathered within the microbiology department and this is being actively identified and extracted .

Summary Assessment

Positive pressure may be a disadvantageous ventilation strategy for this PICU's clinical needs and careful consideration of the ventilation as a whole needs to be undertaken prior to any changes with regard to the pressure differentials is made. Notwithstanding there are other issues that have been picked up by the validation process that need to be addressed.

Recommendations

1. Issues identified at the original commissioning in 04/09/2014 should be investigated to ensure they had been rectified e.g. AHU 14 had no standby plant and faulty gauge , AHU 46 supply single fan and motor noted i.e. no standby , and the recorded pressure differentials across filters should have note of acceptable range.
2. Thermal wheel technology removal needs to be considered in the future due to risk of cross contamination dirty into clean airflow
3. The exact detail of the ventilation ducting requires to be mapped to ensure that there is no extract vitiated air being re-circulated into supply air at any point within the system as has been recorded elsewhere in the building

4. Ceiling transfer grilles need to be replaced with ceiling tiles under agreed scribe conditions . The current air flow may then cause the rooms to become positively pressured and may affect the ceiling tiles. Consideration should be given to replacement of ceiling tiles with a solid ceiling.
5. Validation needs to be carried out for the ancillary rooms – dirty utility and prep rooms
6. Clinical input should be requested as per what would normally occur at design stage to ensure a documented understanding of the patient groups and flows through the unit, any procedures carried out on the unit and requirements for different ventilation strategies (Point 1.39 SHTM 03-01)
7. Data on patient movements through the unit should be gathered by the service with records of specific numbers of infected patients and immune suppressed patients admitted.
8. Data should be gathered regarding number of outbreak/HAI incidents on the unit since opening and this should be compared both with the old Yorkhill data (with the expectation/hope that current arrangements should show an improvement) and with other units such as Alder Hey and Great Ormond Street. This will allow an objective, albeit imprecise assessment of the impact of derogations in the design on infection rates. It must be noted that there are many confounding factors to be taken into account such as water and drain issues so data needs to be interpreted with caution. Data should be de-duplicated. I t would be useful to have as a potential denominator the number of acute occupied bed days in the unit per month/quarter since opening and similar data in the old unit if this is available as well as numbers of patients.
9. An agreed design requirement of the unit is agreed with the group with regard to how many beds, if any, need to be in a positively pressured environment based on the above data.
10. Following this agreement a feasibility study may need to be undertaken to assess how this can be best achieved
11. An SOP should be developed for when validation and AHU switch off occurs for maintenance purposes to ensure full risk assessment of consequences of ventilation shut down

Situation

Ward 2A in Paediatric haemato-oncology was moved to Ward 6A QEUH in September 2018. This was initially planned to be a short term decant assessed via an options appraisal to enable water control measures to be implemented on 2A.

During that time HPS commissioned a review of the ventilation strategy for ward 2A.
An external report concluded that the ventilation strategy for 2A was abnormal, placing patients at risk of infection, therefore the decant had to be extended to enable extensive ventilation remedial actions.

Given that there were no further cases that met the Water incident case definition between September and April, a repeat options appraisal was not undertaken when it became apparent that the decant was to last much longer than at first anticipated.

A PAG was held on 3rd June 2019 to discuss 4 cases of environmental Gram negative bacteraemias. An IMT followed on 19th June due to a further environmental bacteraemia, this time a Mycobacterial species which was subsequently found to be related to the water supply utilising whole genome sequencing . This was the second *M chelonae* in one year. The hypothesis for M chelonae acquisition was exposure to unfiltered water outside 6A , possibly operating theatres. The IMT process is still ongoing and to date there have been 11 confirmed and one possible case of Gram negative environmental bacteraemias since 13th April.

Background
Surveillance of all bacteraemias was put in place when the ward was decanted to 6A.

From September to April bacteraemia rates were very low and any Gram negatives were coliforms, i.e. expected species of bacteria and usually endogenous gut flora.

From April 2019 , bacteraemias secondary to environmental organisms have occurred, some of these meet the case definition from the previous incidents from 2A e.g.*Stenotrophomonas maltophilia*, *Enterobacter cloacae* . Others are from rare organisms not part of that incident but of a soil/water type of bacterial species. Examples include *Chryseomonas sp*, *Elizabethkingia miricola, Pantoea septica.*

Assessment

Current environmental risks on ward 6A

1. Air changes – essential for dilution and removal of pathogens generated within the room environment eg from toilet plume, respiratory generated infectious aerosols, and water generated aerosols from taps and drains containing pathogens as well as flora shed from skin such as *Staphylococcus aureus*.
   Current Air Changes per Hour is less than 3. SHTM guidance is 10 for neutropenic rooms ie less than a third of fresh air turnover required to meet standards

2.chilled beam technology is in place in each bedroom at the point of supply

Chilled beam technology should NOT be used in the neutropenic setting.

Infection risks associated with chilled beams :

1. Build up of dust which typically harbours skin organisms , fungi and Acinetobacter. This is due to recirculation of air, with no clean to dirty pathway and with essentially the beam functioning as a filter that is not changeable which collects up dust and fibres from the room air . These are requiring 6 weekly cleaning schedule , however they are not designed to be thoroughly cleaned in situ and will require removal under HAISCRIBE conditions to achieve.
2. Water source from

a) Condensation
b) Leaks from the hot and cold circulating water (known contaminated cold water)
c) Dripping water from both can become contaminated with the dust organisms

The SHTM guidance states that condensation should not be allowed to occur when these systems are in place. However condensation events have been recorded on numerous occasions throughout the hospital including on 2A and 6A. This allows multiplication and growth of bacteria and fungi , particularly when dripping through collected dirt on the unit.

Leaking connections have also occurred which allows water borne organisms from a complex water system to ingress into the room. This poses a risk of Legionella as well as Pseudomonas and other water borne organisms. Water has been seen to pool in the frame of the unit thus causing a significant potential for fungal overgrowth.

This chilled beam water system has not been subject to the water quality management system through the water governance structures of the organisation. *Pseudomonas aeruginosa* and *P. oleovorans* and unidentified environmental organisms have been grown from the water supply , and from the surface swabs *Stenotrophomonas sp, Pantoea sp, Acinetobacter sp*, *Exophiala, Pseudomonas olevorans* , and fungal species.

3. Pressure cascade : recommended pressure of 10 pascals positive pressure to corridor in SHTM, currently there is a nominal 2 pascal positive pressure which is insufficient to ensure robust air movement out of the room , allowing external contaminants to ingress into the rooms from the building void and corridor. Furthermore air sampling studies have shown ingress form risers of heavily unfiltered contaminated air.

4. HEPA filtration: SHTM recommends HEPA filtration of all air supplied to the neutropenic rooms. Currently on 6A there is no HEPA filtration on the supply air. Portable HEPAs are in place in an effort to reduce airborne contamination, but this is not ensuring that HEPA filtered air only is breathed by patients. Contaminated air continues to enter the room and we are reliant on portable HEPA to clean the air

5. Air sampling in the bathrooms has detected pathogenic fungi such as Aspergillus and Mucoraceous mould . Previous issues with mould in the bathrooms was identified and rectified due to weak joins between the shower floor and the wall, however the risk remains as the weak join remains as per original spec – it is only a matter of time before the join is coming apart again . A long term solution to remove the join altogether has not been supplied to date. There is potential for HEPA filters to be placed in the bathroom ceilings, however again, this is a cleaning method for air rather than a HEPA supply.
6. Toilets – toilet plume is a risk as no toilet seat in place. These are currently being rolled out
7. Exposure to unfiltered water ; while all bathroom and bedroom outlets have had point of use filters applied , it has not been possible to place these in the DSR where water is sourced for domestic cleaning .
8. Ceiling : solid ceilings are required to both assist with positive pressure achievement and protection from ingress of water from services in ceiling , however ceilings are tiled and therefore inappropriate for this setting.
9. Play areas; there is no play area and communal toys are situated in the corridor, thus presenting a risk of cross transmission
10. Door entry – no double door or pressure cascade therefore external hospital air ingresses to the unit readily
11. Kitchen hand wash sink is a non compliant size and no POU filters .
12. Prep room – stainless steel sink, not useable due to tap misalignment and therefore clinical hand hygiene sink is being used for prep room functions

Recommendations

1. The decant from 2A was for a short term only and given ongoing environmental risks and recent environmental bacteraemias , a reassessment of the options appraisal is urgently acquired.
2. 6A should be considered to have significant unacceptable levels of infection risk for the immune compromised patients due to the built environment.

		Mitigations
Situation	Ward 2A in Paediatric haemato-oncology was moved to Ward 6A QEUH in September 2018. This was initially planned to be a short term decant assessed via an options appraisal to enable water control measures to be implemented on 2A.	
	During that time HPS commissioned a review of the ventilation strategy for ward 2A.	The review was commissioned by NHS GG&C and carried out by Innovated Design Solutions.
	An external report concluded that the ventilation strategy for 2A was abnormal, placing patients at risk of infection, therefore the decant had to be extended to enable extensive ventilation remedial actions.	The word "abnormal" refers to the dirty extract element of the ventilation system extracting air from the toilets and ensuites. It does not apply to the system as a whole.
	Given that there were no further cases that met the water incident case definition between September and April, a repeat options appraisal was not undertaken when it became apparent that the decant was to last much longer than at first anticipated.	There is no mention here of the short term decant that ocucurred during the further incident. This occurred between 22nd Jan 2019 and 8th Feb 2019.
	A PAG was held on 3rd June 2019 to discuss 4 cases of Gram negative bacteraemias. An IMT followed on 19th June due to a further environmental bacteraemia, this time a Mycobacterium species which was subsequently found to be related to the water supply utilising whole genome sequencing. The hypothesis for M chelonae acquisition was exposure to unfiltered water outside 6A, possibly operating theatres. The IMT process is still ongoing and to date there have been 11 confirmed and one possible case of Gram negative bacteraemias since 13th April.	Initial hypothesis was from the water system somehow within the ward. PALL filters were checked, samples were taken and filters were proven to be efffective. Estates response was to fit PALL filters throughout the patient pathway as per ICT guidance. The hypothesis proposed for the increase in gram negatives was that condensate from the chilled beams was contributing to the infection rates.
	Surveillance of all bacteraemias was put in place when the ward was decanted to 6A.	Correct and continuous with triggers in place.

Background	From September to April bacteraemia rates were very low and any Gram negatives were coliforms, i.e. expected species of bacteria and usually endogenous gut flora. From April 2019, bacteraemias secondary to environmental organisms have occurred, some of these meet the case definition from the previous incidents from 2A e.g.*Stenotrophomonas maltophilia* , *Enterobacter cloacae* . Others are from rare organisms not part of that incident but of a soil/water type of bacterial species. Examples include *Chryseomonas sp* , *Elizabethkingia miricola, Pantoea septica.*	
Assessment	Current environmental risks on ward 6A 1. Air changes – essential for dilution and removal of pathogens generated within the room environment e.g. from toilet plume, respiratory generated infectious aerosols, and water generated aerosols from taps and drains containing pathogens as well as flora shed from skin such as *Staphylococcus aureus* . Current Air Changes per Hour is less than 3. SHTM guidance is 10 for neutropenic rooms i.e. less than a third of fresh air turnover required to meet standards 2.Chilled beam technology is in place in each bedroom at the point of supply	SHTM guidance for general ward areas is 6 ac/ph. The highest risk patients are all cared for in ward 4B BMT unit which delivers 6 ac/ph (derogated) in the side rooms and also benefits from H14 HEPA filtration.

Chilled beam technology should NOT be used in the neutropenic setting.	There are no UK guidance documents which state this. SHTM 03-01 gives specific guidance on the use of the chilled beams within Hospital and goes on to encourage the benefits they may bring (Section 2.38, SHTM 03-01 Part A, 2014). With regards to the internal air condition control, SHTM 03-01 states that humidity controls are not required within general wards in hospital areas (Section 1.24) but also suggests an air handling unit cooling coil control strategy which should be used when close control of humidity is required. Guidance and legislation regarding the selection of active chilled beam HVAC system suitability for clinical environments will vary from country to country. Based on the Scottish Guidance (SHTM 03-01, 2014), it appears to be the case that Active Chilled beams are acceptable as the re-circulation is only present within the one space, and is not being transported across to different areas within the hospital as found in central plant re-circulation.
Infection risks associated with chilled beams :	
1. Build up of dust which typically harbours skin organisms, fungi and *Acinetobacter sp* . This is due to recirculation of air, with no clean to dirty pathway and with essentially the beam functioning as a filter that is not changeable which collects up dust and fibres from the room air. These are requiring 6 weekly cleaning schedule, however they are not designed to be thoroughly cleaned in situ and will require removal under HAISCRIBE conditions to achieve.	The whole chilled beam cannot be removed for cleaning. The only part to be removed is the vent grille incorporating directional fins. The heating/cooling matrix assembly where dust build up is observed cannot being removed as it is a fixed asset. The SHTM recommendation for chilled beam cleaning is 6 monthly. Higher frequency cleaning is being followed due to ICT guidance.
2. Water source from	

a) Condensation	Condensation control programme is now in place to maintain the chilled water temperature above the environmental dewpoint.
b) Leaks from the hot and cold circulating water (known contaminated cold water)	Leaks have not occurred from the chilled water circuit, only the Low Temperature Hot Water (LTHW) heating circit (reference to "cold water" should be altered to differentiate between domestic water supply as these are completely separate)
c) Dripping water from both can become contaminated with the dust organisms	
The SHTM guidance states that condensation should not be allowed to occur when these systems are in place. However condensation events have been recorded on numerous occasions throughout the hospital including on 2A and 6A. This allows multiplication and growth of bacteria and fungi, particularly when dripping through collected dirt on the unit.	SHTM states that control measures should be in place to avoid the formation of condensation via control strategies.
Leaking connections have also occurred which allows water borne organisms from a complex water system to ingress into the room. This poses a risk of Legionella as well as Pseudomonas and other water borne organisms. Water has been seen to pool in the frame of the unit thus causing a significant potential for fungal overgrowth.	Pooling could only have resulted from condensation or from leaking LTHW circuits. LTHW has been sampled previously and shown to be clear of any cfu counts. The LTHW circuit generally runs at approx 75degC therefore should eliminate bacteria within a short period of time.

		This chilled beam water system has not been subject to the water quality management system through the water governance structures of the organisation. *Pseudomonas aeruginosa* and *P.oleovorans* and unidentified environmental organisms have been grown from the water supply, and from the surface swabs *Stenotrophomonas sp, Pantoea sp, Acinetobacter sp* , *Exophiala, Pseudomonas olevorans* , and fungal species.	There is no requirement to monitor and maintain the chilled water system through the same govenrnance procedures as domestic water systems. Chilled water is a closed, sealed system maintained under pressure. Leakage would be immediately evident.
		3. Pressure cascade: recommended pressure of 10 pascals positive pressure to corridor in SHTM, currently there is a nominal 2 pascal positive pressure which is insufficient to ensure robust air movement out of the room, allowing external contaminants to ingress into the rooms from the building void and corridor. Furthermore air sampling studies have shown ingress from risers of heavily unfiltered contaminated air.	The area in and around Ward 6A was designed to be a general ward area and as such is not expected to be free of air infiltration from voids or risers.
		4. HEPA filtration: SHTM recommends HEPA filtration of all air supplied to the neutropenic rooms. Currently on 6A there is no HEPA filtration on the supply air. Portable HEPAs are in place in an effort to reduce airborne contamination, but this is not ensuring that HEPA filtered air only is breathed by patients. Contaminated air continues to enter the room and we are reliant on portable HEPA to clean the air	Ward 6A was designed as a general ward environment. Mobile HEPA units were installed at the instruction of the IMT as an additional control measure.

		5. Air sampling in the bathrooms has detected pathogenic fungi such as Aspergillus and Mucoraceous mould. Previous issues with mould in the bathrooms was identified and rectified due to weak joins between the shower floor and the wall, however the risk remains as the weak join remains as per original spec – it is only a matter of time before the join is coming apart again. A long term solution to remove the join altogether has not been supplied to date. There is potential for HEPA filters to be placed in the bathroom ceilings, however again, this is a cleaning method for air rather than a HEPA supply.	The new design being proposed for Ward 2A will take account of these issues. Flooring detail will be more robust and the environment will be entirely HEPA filtered.
		6. Toilets – toilet plume is a risk as no toilet seat in place. These are currently being rolled out	Current infection control guidance in general wards does not support the use of toilet seat covers for cleanliness purposes.
		7. Exposure to unfiltered water ; while all bathroom and bedroom outlets have had point of use filters applied , it has not been possible to place these in the DSR where water is sourced for domestic cleaning .	The model of taps fitted throughout the ward is varied. Some of the taps did not immediately support the installation of PALL filters and had to be modified. These are now complete.
		8. Ceiling: solid ceilings are required to both assist with positive pressure achievement and protection from ingress of water from services in ceiling; however ceilings are tiled and therefore inappropriate for this setting.	Suspended ceilings are acceptable in general ward settings.

	9. Play areas; there is no play area and communal toys are situated in the corridor, thus presenting a risk of cross transmission	
	10. Door entry – no double door or pressure cascade therefore external hospital air ingresses to the unit readily	The area in and around Ward 6A was designed to be a general ward area and as such is not expected to be free of air infiltration from external sources, voids or risers.
	11. Kitchen hand wash sink is a non compliant size and no POU filters.	POU filter has now been installed.
	12. Prep room – stainless steel sink, not useable due to tap misalignment and therefore clinical hand hygiene sink is being used for prep room functions	This tap has been changed. Ward staff have adopted this onto their flushing regime.
Recommendations	1. The decant from 2A was for a short term only and given ongoing environmental risks and recent environmental bacteraemias, a reassessment of the options appraisal is urgently acquired. 2. 6A should be considered to have significant unacceptable levels of infection risk for the immune compromised patients due to the built environment.	

	3. External peer review from colleagues in Great Ormond Street	

From: Peters, Christine
Sent: 27 September 2019 18:41
To: Redfern, Jamie ; Hill, Kevin ; Conner, Darryl James ; Chaudhury, Shahzya ; Rodgers, Jennifer
Cc: Joannidis, Pamela ; Inkster, Teresa (NHSmail) ; Gibson, Brenda
Subject: Incident leakage 6A

Situation

ICD Dr Peters on call alerted at 5.08 pm regarding a leaking tap in 6A kitchen and an immediate HAISCRIBE was requested

Background

6A is a ward that has 15 beds open for Haematoncology paediatric patients. This ward has been undergoing a number of estates interventions to improve the environment and is subject to an ongoing IMT regarding infections

A water leak had been detected by the fridge under the work top in the kitchen on ward 6A. The kitchen is not accessed by patients or parents, and houses a fridge which contains special feeds . Food and drink for relatives and patients is prepared in this room.

Assessment

Dr Peters, Dr Inkster, Dr Chaudhury, SN on ward, Jen Rodgers, Jamie Redfern, Darryl and Kerr (Estates) convened to assess the situation and agree control measures

The understanding was that the hot tap had been leaking for some time –noted today and alerted to estates early afternoon. Hot water had been isolated so dripping was no longer apparent

On inspection:

There was clear evidence of a long standing leak behind the kitchen cabinets, (photos attached) with old bits of paper in situ , wet to the touch and covered with corrosive material.

There was also a clear dead leg with a filter attached ? had been connected to a previous water cooler or other device. Dead legs pose a significant risk in a water system due to stagnation , and there was evidence of wet material immediately below the filter.

There is a clear risk of this being a source of mould and may have contributed to positive air samples on the ward in the past.

Two swabs of black material taken to lab for culture.

Recommendations

- Remove fridge, clean with achtichlor wipes, to be placed in empty room with signage to prevent entry
- Throw out any soft material/ uncovered items in kitchen
- Seal off room , put under negative pressure by closing off supply
- HAISCRIBE to be undertaken on Tuesday to get both dead leg and all wet materials removed
- Jen Rodgers to agree communication with relatives

Please do not hesitate to contact me if any further queries

Kr

Christine
Dr Christine Peters
Consultant Microbiologist
Queen Elizabeth University Hospital,
GGC
[redacted]

SBAR 6A incident , data and epidemiology, 07/10/19

Dr Teresa Inkster, Consultant Microbiologist, QEUH

Dr Chrstine Peters, Consultant Microbiologist, QEUH

Situation

An IMT which is managing blood stream infections in paediatric haemato-oncology patients (ward 6A) has been presented with opposing views and differing interpretations of data regarding rates and numbers of infections. A request has been made to microbiology for laboratory data and interpretation.

Background

Immunosuppressed patients are at risk of infection for a number of reasons which include; chemotherapy, neutropenia, immune dysfunction secondary to disease, steroids, invasive devices, broad spectrum antibiotics and GVHD.

Sources of infection in this group can be endogenous (own flora e.g. gut) or exogenous (external environment). Each requires a different infection control strategy. The most common bacteraemias in this patient group are E. coli, Klebsiella sp, Coagulase negative Staphylococcus and MSSA. Exogenous infections such as those due to environmental Gram negatives are considered preventable as they do not tend to originate from the patients normal flora. There has been a shift in predominant organism type in this patient group. Comparison with other centres demonstrates that we differ due to the environmental nature of the bacteria seen.

Water Incident

A water contamination incident was declared in February 2018 following the identification of a rare unusual organism in a patient's blood culture, Cupriavidus pauculus. Over the course of the incident 23 cases in ward 2A patients were reported linked to contaminated water or drains. There was extensive biofilm present as evidenced by 38 species of bacteria identified in the water in addition to fungi and atypical mycobacteria. This was followed by a drain contamination incident with a number of Gram negative bacteria isolated from them.

Case definitions
Any environmental Gram negative in the haemato -oncology paediatric population, HAI or HCAI. Data below is used for case ascertainment, not as a means to define attack rate/ incidence. Note Enterobacter whilst classically a 'coliform' is classed as environmental due to extensive drain contamination locally and as defined by CDC environmental guidelines.

Note that whilst these environmental organisms may be found in the gut they originate from an environmental source and are not considered normal gut flora.

Paediatric haem-onc patients attend the day unit which is situated on ward 6A often frequently for lines flushes or treatment therefore the definition was extended beyond the traditional 48 hour HAI rule to also include HCAI. One could argue that the haem –onc population being frequent attendees should be considered similar to haemodialysis patients which are classed under HAI but that is a subject for further debate.

Laboratory identification

There have been no major changes in laboratory identification with automated methods having been implemented in 2012. Prior to this efforts were always made to identify Gram negative organisms to species level in high risk patient groups using more traditional methods and where these failed isolates were sent to reference laboratories.

Taxonomy

There have been no major changes to taxonomy that would impact on the classification of these environmental bacteria,

Assessment

Outbreak definitions

For an environmental source where biofilm may be implicated classic outbreak definitions such as 2 cases of the same organism over a 2 week period may not be met. This is due to the diversity of biofilm and range of bacteria found within them. Therefore an environmental outbreak may be comprised of a diverse range of bacteria and not just a single pathogen.

Data

CLABSI data

This is generated as part of a QI initiative and has strict definitions, includes only central lines inserted in RHC (excludes PICC lines) and excludes cases where blood culture positive at another hospital. Seven day de-duplication. Denominator data is line days. While outbreaks can affect overall rates, it is possible to have a reduction in rates while an outbreak is ongoing as during the water incident. The nature of the organisms and routes of transmission will affect the impact of the interventions - e.g. skin flora versus environmental organisms.

SPC charts

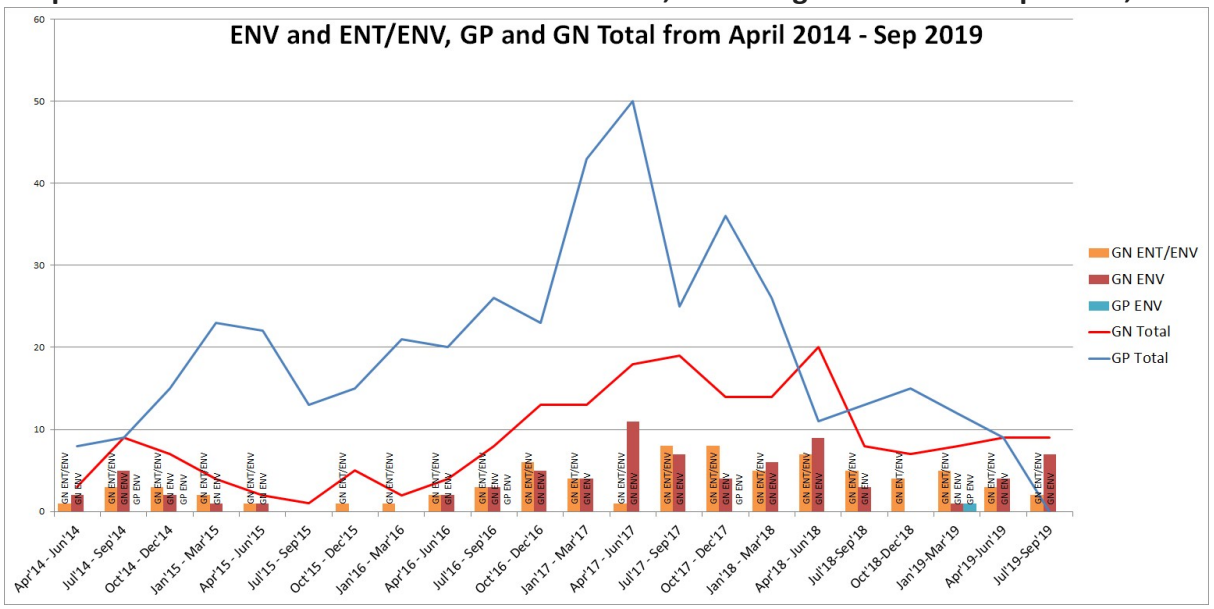
SPC charts are not the appropriate tool for this incident. These charts were first developed in industry and do not lend themselves well to biological data particularly data that is unstable. They are best applied to endemic organisms such as C diff and MRSA. Furthermore they are dependent on a prior 25 data points of stable data. The underlying statistical assumptions are not met. The SPC chart in the SBAR presented to IMT is invalid as it contains an outbreak, the significant water contamination incident. Therefore the data is skewed. If we were to remove the incident and apply stable baseline rates the current incident would likely be a breach of a UCL. SPC charts count numbers but not the nature of bacteria. In control SPC charts can contain unrecognised outbreaks.

Laboratory Generated Data

Methodology:

The laboratory LIMS system is used for monthly gathers of all positive blood cultures in haemonc patients, using Haemonc Consultants as the identifier, as part of established Clinical Scientist led surveillance for department positivity rates and to assist with CLABSI data. It includes additional cases picked up clinically e.g. if positive at another hospital as epidemiologically linked if line inserted in RCH or admissions/ outpatient appointments. The numbers are per organism duplicated within 14 days. All cases are discussed at daily MDTS with the clinical teams and records regarding line or other presumed source kept in Telepath.

Graph 1: total Numbers of Positive Blood cultures, Gram negative and Gram positive, RHC

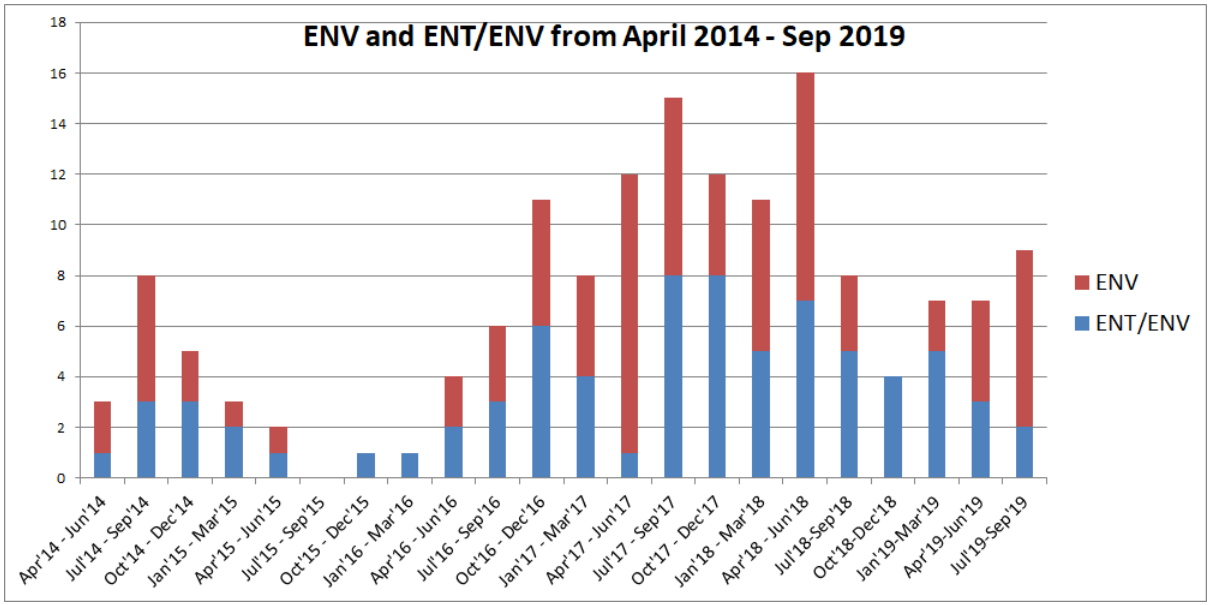


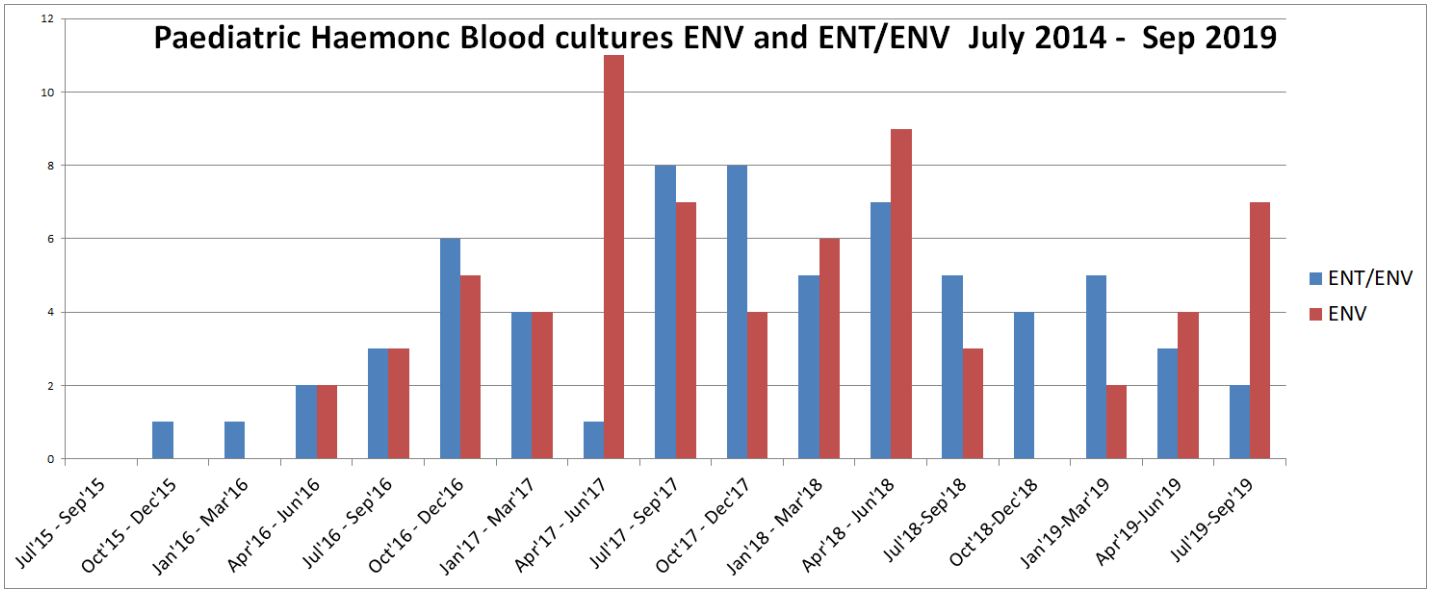
[Blue line = Gram positive isolates, Red line = total Gram negative isolates.]
{Gram Neg ENT/ENV group include Serratia, Enterobacter, Klebsiella, Citrobacter and Pantoea which have all been grown from environmental samples , but can also be gut flora. Note Enterobacter typing in water incident matched environmental sample.

Gram neg ENV Environmental include Cupriavidis ,Pseudomonas, Elizabethkingia, Stenotrophomonas, Acinetobacter, Aeromonas, Delftia, Sphingomonas, Roseomonas, Rhizobacterium, Burkholderia, Brevundimonas, Chryseomonas, Herbispirillium, Achromobacter}

Note: unusual for Gram negatives to out number Gram positives, this has occurred on two occasions: during water incident and current increase in cases on 6a

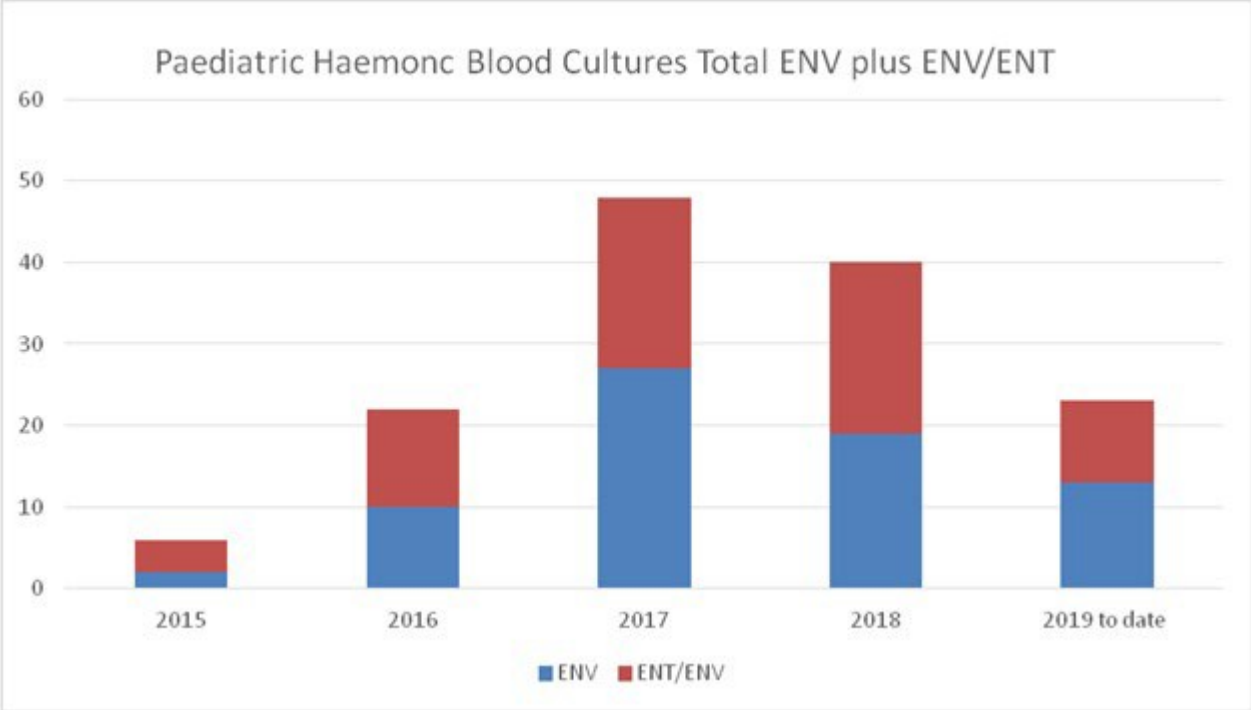
Graph 2: Environmental organisms and Environmental/Enteric



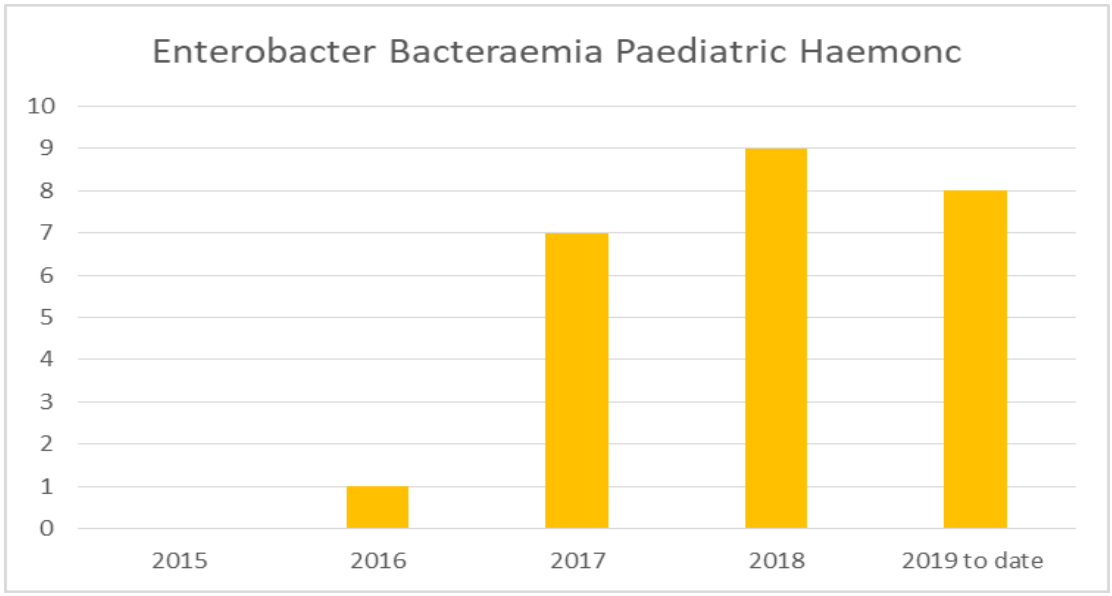


ENV : includes all ENV Gram negatives as above as well as environmental Gram positives(Gordonia, , fungi (Rhodotorula) and Mycobacterium)

Note: These graphs demonstrate a clear increase in proportion of Gram negatives which are environmental organisms over last quarter . Applying outbreak definition, methodology and the epidemic curve concept this pattern is consistent with a **continuous source**. These organisms are typically found in biofilm and implicated in the literature as causing outbreaks linked to water and other environmental sources. We do not have access to bed occupancy data but note reduced admissions to the ward during the last quarter due to the incident so these numbers are at a time of low bed occupancy and represent a lower risk patient group as high risk patients are being diverted. Implementation of control measures during this recent incident from beginning of August 2019 includes antibiotic prophylaxis with Ciproxin. Despite this measure cases continue to occur.



2018 was the year the water incident was investigated between Feb- Sept. Note the higher numbers of Gram negative isolates in 2017 which warrants investigation, these numbers are more than double those of 2016. From 2017 the proportions change and environmental Gram negatives out number enterics which are the organisms we would expect to see. Note the current numbers in 2019 to date which is post water incident and following implementation of control measures. These numbers are higher than 2016 and again environmental Gram negatives predominate. Enterobacter levels are approaching the numbers for 2018.



Enterobacter levels are high and this is the most common gut organism in our paediatric haem on population. Usually E coli and Klebsiella are more frequent in this patient group so this warrants investigation. The drainage system is contaminated with Enterobacter and this may represent an ongoing uncontrolled source.

Recommendations

Local

The IMT discuss this data set as part of their overall investigations and analysis of the infections in the patient cohort.

It is clear that the predominant bacteria are environmental in nature and typical of biofilms and this requires investigation.

National

Progress further the work on revision of Chapter three of the National manual and the Pseudomonas guidance to include other environmental Gram negatives associated with biofilm and potential water sources, including triggers for actions from IPCTs

Consider the definition of haem onc patients who attend for frequent line flushes or therapy, should these be considered HAI as per haemodialysis patient in SAB surveillance due to frequent attendance associated with interventions.

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Report on the root-cause analysis of 13 incidents of gram negative blood culture taken from 12 paediatric haematology / oncology patients in the RHC, NHS GGC	
Situation	Between the 13th April 2019 and 3rd September 2019, 12 patients receiving ongoing care from the Haematology / oncology service based at the Royal Hospital for Children, Glasgow, were reported to have laboratory confirmed gram negative bacteria in blood cultures taken from the patient's central line. The chair of the Incident Management Team requested a root-cause analysis be undertaken of each case to determine where possible, the source, and route of transmission and portal of entry for the range of gram negative bacteria listed below.
Background	Many of the published reports of gram negative bacteria, where water was considered to be the source, more than 1 patient was affected and identical isolates were found in environmental sources including sink, taps, mechanical ventilator equipment, suction regulators, soothers (dummies). The environmental isolates and patient isolates in these studies shared identical PFGE patterns. In this incident, 12 patients have had 13 positive blood cultures with gram negative bacteria. The initial review of each patient was undertaken by the ICD, Lead Nurse and Senior Nurse for the local Infection Control Team. Data gathered for this review was further analysed. The root-cause analysis was undertaken by the Lead Nurse Surveillance, Nurse Consultant and Associate Nurse Director IPC. This analysis still requires the input from microbiology and expert clinician. 8 different gram negative bacteria were reported in blood cultures. They are: *Stenotrophomona maltophilia* *Pantoea septica* *Enterobacter cloacae* *Pseudomonas putida* *Chryseomonas* *Elizabethkingia miricola* *Aeromonas* *Serratia marcescens* 2 patients each had 2 gram negative bacteria present 3 patients were in different health boards when the blood cultures weretaken 1 patient was very likely translocation of *E. cloacae* from the gut. 8 isolates sent for typing are all unique strains.

	1 patient had a mix of gram positive and negative bacteria (septic shower?)
Assessment	**Root-cause analysis** The purpose of this root-cause analysis (RCA) was : • To identify any critical points and contributory factors • To determine whether any further preventative action(s) and improvement action(s) can be undertaken to reduce or control the incidence • To find effective solutions to identified problems in order that they do not recur **Methodology** Information was gathered from patient case notes, TrakCare, Clinical Portal, ICNet and Koala. A root cause analysis was undertaken using current published information linked to gram negative bacteraemia risk factors, information known about each organism isolated and a case note review. The risk factors included: Malignancy, prolonged hospitalization, age, lung disease, neutropenia, mechanical ventilation, recent surgery, contaminated equipment, central line, trauma and broad spectrum antibiotics. Data on infection markers such as CRP and temperature were also collected. **RCA results** All 12 patients have a malignancy and were undergoing intensive and invasive chemotherapy. [redacted] [redacted] [redacted]. All patients with Hickman lines or PICC had Smartsite and Curos caps applied to the end of the line. (The Curos cap was replaced with BD Pure Hib on the 19th August. It was reported that the curos cap was not a tight fit and was 'spinning'). **Definition of a GN bacteraemia.**

	Both mono and polymicrobial blood cultures have been included in this incident to date. Only the gram negative bacteria have been sent for typing. This definition, without a single common bacterium and without an environmental source, makes analysis of the incident difficult. For example: [redacted]
Recommendation / conclusion	This review has not identified a single environmental source. Gram negative (and positive) blood culture could be linked to flushing / accessing the central line in the 3 days prior to a culture being taken. This access could be Ward 6a, Ward 6a day care, RHC OPD, NHS Lothian and NHS Tayside. The data must be reviewed by an expert clinician and microbiologist before any conclusion can be made. A definition of gram negative bacteraemia case should be agreed Review each case to determine if it is a case in this incident Each new case will have an RCA in real time and considered at the IMT

NHS Greater Glasgow and Clyde	**NHS Greater Glasgow & Clyde**
Purpose:	Briefing Paper/Situation Update: Ward 6a (Haematology/Oncology) April 13 2019 - 10 October 2019
Date:	10 October 2019 (version 4)
Subject/ situation:	Since the middle of April 2019 there has been a possible increase in gram negative bacteraemia hypothesised to be caused by an environmental source (14 cases from the 13 of April 2019 until 10 October 2019). The organisms identified in this increase were also organisms found in water and drains during 2018 investigations; reported in the HPS 2A/2B situational report. Environmental organism defined as': [*Achromobacter*], *Acinetobacter, Aeromonas, Brevundimonas , Burkholderia ,* [*Cedecea*] *, Chryseobacterium,*[*Commamonas*], *Cupriavidus , Delftia, Elizabehtkingia, ,*[*Morganella*], *Pantoea,* [*Paracoccus*], *Pseudomonas,*[*Pseudoxanthomonas*],[*Ralstonia*], *Rhizobium, Serratia,* [*Shewanella*], *Sphingomonas, Stenotrophomonas* 'Non-environmental': *Citrobacter, Enterobacter, Klebsiella*
Background	On 20 June 2019, NHSGGC reported to HPS an increased incidence of Gram Negative Bacteraemia (GNB) linked to Ward 6A: Five cases over an 8-week period (April 13 2019 until June 12 2019) and two cases in 12 months of Mycobacterium chelonae, the second of which was a cutaneous infection. Laboratory typing linked the second case of mycobacteria to water in the hospital. The first case was also typed; no link to the hospital water supply was confirmed (NB novel typing technology). However this case was not sent for typing at the time of case identification along with water samples obtained at this time (12 months earlier). This case was not considered at the time of acquisition as M.Chelonae had not been reported from the water samples tested. **DEFINITIONS** **Hospital Acquired Infection** Positive blood culture obtained from a patient who has been hospitalised for >48 hours. The patient was discharged from hospital in the 48 hours prior to the positive blood culture being taken.

	If the patient was a neonate/baby who has never left hospital since being born. OR A patient who receives regular haemodialysis as an outpatient. OR Contaminant if blood aspirated from hospital. **Healthcare Associated BSI Definition – Health Protection Scotland** Positive blood culture obtained from a patient within 48 hours of admission to hospital and fulfils one or more of the following criteria: Was hospitalised overnight in the 30 days prior to the positive blood culture being taken OR Resides in a nursing home OR IV, or intraarticular medication in the 30 days prior to the positive blood culture being taken, but excluding illicit drug use OR Regular user of a registered medical device OR Underwent a medical procedure which broke mucous or skin barrier in the 30 days prior to the positive blood cultures being taken OR Underwent care for a medical condition by a healthcare worker in the community which involved contact with non-intact skin, mucous membranes or the use of an invasive device 30 days prior to the positive blood culture being taken **Case Definition** *(based on a precautionary principle)*: Any patient linked to Ward 6a with a laboratory confirmed bloodstream infection from an environmental organism(s) associated with the QEUH or RHC. *2018 - Previous case definition-GNB: any patient with an HAI due to an organism previously linked to water or drains.* M.chelonae: any patient who had contact with QEUH or RHC testing positive for M chelonae (in any sample not exclusively BC) from 2017. There were no further cases of M.chelonae.

Two key Hypothesis were proposed during this incident:

Hypothesis 1

Patients exposed to unfiltered water outside of Ward 6a but within the hospital environment, for example in theatre, in school (RHC) or when visiting either of the main atriums with families.

As of September 2018 PoU filters were fitted to all tap outlets in Ward 6a and this was extended to include the Domestic Services Room (DSR) and Kitchen during this incident.

Hypothesis 2

Condensate/Fluid from the Chilled Beams was dropping directly onto the patients or their environment and this provided a source of bacteria which caused infection in the patients.

During the period June 28-30th 2019, the external atmospheric conditions around the QEUH increased significantly generating humidity in excess of 90%, and dew point temperatures in excess of 19 degrees C. During this time period, and because the chilled beam circuit set point was fixed at 15 degrees C, condensation would have been a predictable outcome. A related parameter in this incident is that of the dew point. If the air dew point is of a higher temperature than the contact surfaces it meets (i.e. in this case pipe work at 15 degrees C), the air will condense and moisture will form causing condensate to build up externally and 'drip' off the surface of the pipework which has invariably happened in this case.

The route of transmission being proposed is that water drips from the condensate from the pipework supplying the chilled beams was falling directly into the patient care environment leading to direct contact with the patient, or indirectly from the patient's immediate care environment.

Summary

From 13th April 2019 to date, 14 GNB have met the case definition i.e. any patient in Ward 6a with a bloodstream infection from an environmental organism associated with the QEUH or RHC and were included in the time line. It should be noted that since the 2 August no new patients have been admitted to the ward. The ward has however been open to outpatients. Four cases have been included since 2nd August 2019.

A review of data has established:

	• Current numbers of bacteraemia are consistent with historical figures; the split between environmental and gram negative BSI and has also been broadly consistent over time • Incidence of Central Line Associated Blood Stream infections is at the lowest level ever recorded (appendix 2) and is consistent with those recorded by Great Ormond Street Hospital (appendix 3). • All organisms considered to be unusual have been isolated previously in this patient group in the Royal Hospital for Sick Children, Yorkhill. • Since 2016, patient acuity has increased as has bed occupancy (appendix 5). • There has been no identified link between clinical isolates and results from environmental sampling ie. Chilled beams, air, water in Ward 6A except for the case of M. chelonae which was isolated from pre filtered water. A SBAR report from HPS concluded that following the move in September 2018 the rates of positive blood cultures for both gram negative and environmental bacteria in Glasgow Unit were no different when compared to the rates of the combined Lothian & Aberdeen Units. This provides additional independent evidence (appendix 4)
Actions/Assurance	These actions have been split into those linked to proposed hypothesis and those which should provide assurance going forward. **<u>Hypothesis 1</u>** Patients were exposed to unfiltered water outside of the ward environment. **Actions** • Additional point of use filters (POU) were installed in all areas (except clinic 2 and nuclear medicine – taps being sourced which would enable a POU filter to be added) where this cohort of patients may attend. • Point of use filters were installed in the DSR and the kitchen areas within ward 6A. • Toilet seat covers were fitted to patient en-suites in ward 6A. **<u>Hypothesis 2</u>** Leaking chilled beams were contaminating the patients' environment and leading to colonisation of patients and resulting in infection. **Actions** • Biocide dosing introduced to the chilled beam water system. • Push fittings replaced with mechanical fittings for all chilled beams in Ward 6A.

	• Increase cleaning of chilled beam outer grilles from 3 monthly to 6 weekly. • A new algorithm regarding the functionality of chilled beams was implemented. This should eliminate the problem experienced during fluctuations in outside temperatures. **Additional actions taken** • HEPA filtration units to be installed in all en-suites in Ward 6A. • Water pipes to/from the Arjo bath were capped. • New shower hoses procured to ensure that shower heads could not reach the drain if left out of the holder. • Review of line care by practice development was carried out in all areas. • Commencement of antibiotic and antifungal prophylaxis **Further actions agreed** • A root cause analysis review to be completed for all clinical cases identified in this incident • Appraisal of options for this cohort of patients will be completed. • A closed NHSGGC face book page developed for parents and carers. • An environmental pathogen SOP will be developed with reset triggers as before; in addition to this, a multidisciplinary review will be conducted for all new positive BC with any gram negative or environmental organism going forward. This will be submitted to IMT for agreement. • An air/environmental sampling regimen will be developed with agreed parameters that would trigger additional action. NB there is no agreed standards for air quality in non-ventilated areas so this will be a local SOP. The previously issued HPS SBAR for adult BMT services will be reviewed and will inform this SOP. This will be submitted to IMT for agreement. **Ongoing Assurance:** • SOP describing triggers and the RCA process will be developed and this should provide real time information for clinical staff. • Results from any environmental sampling if agreed will be returned to W & C SMT for action. • Water sampling will continue as per the Water Technical Group recommendations; and ICD can trigger additional water sampling in order to investigate a cluster or trigger. • Enhanced supervision of practice will continue at intervals agreed by Chief Nurse and IPC.
Recommendations	The IMT is asked to note the above, and support the recommendation of the IMT from Friday 13th September 2019 that the ward is re-opened to new admissions.

	The Senior Management Team Women and Children will be kept informed of all results, triggers and reports. It is anticipated that they will liaise with clinical staff as appropriate SCRIBE documents and an installation plan for the additional HEPA filters will be forwarded to HPS for information.

NHS Greater Glasgow and Clyde	**NHS Greater Glasgow & Clyde** **Infection Prevention and Control Team**
Purpose:	Briefing Paper
From:	Infection Prevention & Control Team
To:	IPC Committees
Date:	November 2019
Subject/ situation:	Proposed changes to Infection Prevention and Control Audit Tool (IPCAT) – Safe IPC Practice in Acute Care
Background	IPCAT - Safe IPC Practice in Acute Care was rolled out across NHSGGC Acute inpatient wards during 2015/2016 and comprises four sections; standard infection control precautions (SICPs), transmission based precautions (TBPs), safe patient environment (SPE) and quality assurance (QA). The aim of IPCAT is to provide the Board with a profile of staff knowledge and practice with assurance in areas such as SICPs implementation and the implementation of care plans to reduce the risk of infection by invasive devices. Following completion of IPCAT, results and an action plan generated can be accessed via a dashboard. Actions highlighted as a critical non-compliance must be addressed within 24 hours of IPCAT with a period of one month allowed for all other actions to be completed. Overall IPCAT score determines when an area is due for re-audit. IPCAT is completed in each Acute inpatient ward as a minimum yearly, using agreed standardised definitions. The HIS unannounced inspection undertaken at Queen Elizabeth University Hospital January 2019 focussed on three HAI standards including Standard 6: Infection Prevention and Control Policies, Procedures and Guidance. The inspection report highlighted a risk of overall IPCAT scores giving false assurance and not being reflective of individual elements of the audit where a score is low. Inspectors were not assured IPCAT provided sufficient assurance to senior management.
Actions taken May 2019 to date	A review of the existing IPCAT – Safe IPC Practice in Acute Care was undertaken May 2019 and resulted in reduction from 163 audit questions across four sections to 65 questions over two sections; SICPs and QA. A new **Safe IPC Practice in Acute Care 2019** was tested in eight areas Acute inpatient areas and while score information cannot be compared like-for-like, IPCNs participating in user acceptance testing were asked to look for large differences in scoring when using the existing audit tool. Although overall IPCAT score decreased (🡻 1-8%) in all but one of the test audits, it was felt score was reflective of what was found on the day. The existing **NHSGGC IPC Audit Schedule and Process- IPCAT Strategy** has also been reviewed as part of this piece of work and a new draft strategy aligns to guidance set out within the National Monitoring Framework (NMF); the intent of the NMF being to establish a framework which adds value to the audit process and supports a quality improvement approach.

The revised strategy document details additions to the action plan process following IPCAT as well as recommendations for a programme of local audit to monitor for sustained improvement.

Action Plan Following IPCAT
Following IPCAT an action plan is automatically generated with a timeframe for completion. Actions previously split into critical non-compliance (CNC) or action with one month to complete are now separated into three distinct categories:-

- S**hort term actions** (or CNC) will require immediate attention or action within 24 hours. CNC are highlighted during any immediate post-audit feedback for ease of identification.
- **Medium term actions** must be completed within one month of IPCAT.
- **Long term actions**, for example, installation of a fully compliant clinical wash hand basin within a room used for isolation of a patient with a known/suspected alert organism, will require to be placed on the risk register for the individual Service until the action is complete.

Action plans are available on the day of IPCAT completion and the 'responsible person' should ensure completed actions are recorded to provide a brief summary of rectifications/action taken.

There should now also be a process of investigatory management by the 'responsible person' to identify cause and support improvement; details of this should be included in the action plan. The findings of any investigatory management during action plan completion should highlight local changes/interventions required to achieve reliability. An example of this may be:-

- Monitoring Criteria - The appropriate bed space checklists and weekly assurance checklists are in place and up to date.
- IPCAT Finding – IPCN unable to locate evidence of weekly assurance checklists.
- Investigation – SCN who completes weekly assurance has been on leave and this activity was not allocated to a nominated person.
- Action – Weekly assurance completed and this activity will be allocated to a nominated person to complete in SCN absence.

Monitoring for Sustained Improvement Following IPCAT
One month following completion of IPCAT the IPCN and SCN/Departmental Manager will re-audit together any red or amber sections of the audit. Audit results and an action plan will be available on the IPCAT dashboard immediately following any re-audit.

Following re-audit with IPCN, SCN/Departmental Manager must then discuss with their Lead Nurse/Head of Department and agree an ongoing programme of re-audit locally to monitor for sustained improvement. The frequency of monitoring as well as the outcome measure linked to improvement should be agreed between SCN/Departmental Manager and Lead Nurse/Head of Department.

SCN/Departmental Manager have access to a SICPs monitoring tool and can access a quality assurance monitoring tool via IPC homepage should this section of IPCAT score red or amber. Re-audit by SCN/Departmental Manager should follow the process of developing an action plan which should be approved by the Lead Nurse/Head of

	Department. Completed action plans generated as a result of re-audit should be retained for a period of one year.  Acute IPCAT 2019 - version FINAL - no pa  IPCAT 2019 CNC - version FINAL.docx
Recommendation	We acknowledge the findings of the HIS inspection (QEUH, January 2019) and the publication of the National Monitoring Framework. The IPCT seek approval to roll out **Safe IPC Practice in Acute Care 2019** during January 2020 and incorporate this with changes to the process following IPCAT as described in the revised **NHSGGC IPC Audit Schedule and Process- IPCAT Strategy**. The IPCT will replicate this piece of work and undertake review of the existing **Safe IPC Practice in Mental Health Care**.

Reference

HPS - National Monitoring Framework to Support Safe and Clean Care Audit Programme . (v1.0) Sept 2018
https://hpspubsrepo.blob.core.windows.net/hps-website/nss/2678/documents/1_national-monitoring-framework.pdf

NHS GGC
Acute Division

Women and Children (W&C) Directorate / Hospital Paediatrics and Neonatology (HPN)
SBAR on Paediatric Haematology Oncology Service (PHOS)

Situation

The PHOS is currently displaced from Ward 2a/2b in the Royal Hospital for Children (RHC).

Since September 2018 it has been temporarily relocated to Wards 4b and 6a in the Queen Elizabeth University Hospital (QEUH).

The reason for this arrangement is because Ward 2a is undergoing significant capital works on the Ward(s) ventilation system.

This ventilation work is expected to be completed March 20 when PHOS will then transfer back.

During the stay in Ward 6a an Infection Control incident was reported and an Incident Management Team (IMT) was commissioned to deal with it.

This IMT was set up in June 2018 and concluded in November 2019.

A recommendation from the IMT in August 2019 was for PHOS to put temporary restrictions in place for access to the ward.

These temporary restrictions covered newly diagnosed inpatient admissions and planned infusional chemotherapy for existing patients.

This has led to patients being transferred to similar services in Edinburgh and Aberdeen.

[redacted].

To avoid pressure on other Scottish units the PHOS have used Ward 4b beds flexibly for such patients, in particular those requiring short inpatient stay for planned infusional chemotherapy.

Ward 4b hosts the national Stem Cell Transplant Service for adults and has not been affected by the infections linked to Ward 6a.

Originally in the initial transfer PHOS had an agreed 4 4 beds in Ward 4b and these were planned for the paediatric equivalent transplant service.

This allowed said service to continue during transfer period as Ward 6a was not a suitable clinical environment for these patients. As the IMT progressed PHOS have managed to procure up to 6 beds in Ward 4b which has allowed for the aforementioned flexibility; and subsequently avoided unnecessary transfer of patients out of Glasgow.

Background

PHOS is the largest of three such services in Scotland.

In a previous option appraisal when temporary transfer of service was being considered it was confirmed that the totality of services must remain in the QEUH campus.

There were various reasons for this but the two main ones were

1) There was no alternative paediatric provider in Scotland or England who could absorb the level of service which would have been considered for transfer

2) The QEUH allowed continued access to RHC Theatres, Radiology, Paediatric Intensive Care and other tertiary medical and surgical specialty teams provided on site.

On decision to transfer from RHC wards in September 2018, originally prompted on a water related infection control incident, it was suggested this would only be for a few weeks.

However, while out of Ward 2a/2b it was agreed that the transfer timeline would be extended to allow for aforementioned upgrade of the ward ventilation systems.

Assessment

The IMT is aware that it has continued to meet for a significantly long period of time.

This is irregular for a standard IMT.

Currently there remains no direct working hypothesis linking the series of infections which prompted the Incident to Ward 6a environment.

During the IMT there have been a number of proposed hypothesis including concerns around chilled beams.

Linked to this there has been a series of Estate works carried out which are all now completed,

There is no connection between the IMTs which prompted the initial transfer from Ward 2a/2b to the current incident under review.

The NHS GGC Water Technical Group has routinely reported to the IMT that the supply of water to Ward 6a is pristine and not the source of any recent infections.

There continues to be enhanced infection control surveillance / inspections on Ward 6a and outputs from this have been exemplar.

The HPN management team continue to build relationships between clinical team, themselves, infection control and Estates / Facilities.

Health Protection Scotland (HPS) have recently submitted a report to the IMT which highlights:

1) There is no variation between RHC and other unit providers Edinburgh / Aberdeen for Gram negative infection rates during the period of this IMT

2) RHC Gram positive infection rates are lower in RHC compared to other unit providers in Aberdeen / Edinburgh during period of this IMT

3) There are different types of Gram negative / positive infections across the three providers.

4) They are supportive of NHS GGC through the IMT to review current access restriction to Ward 6a with view that they are lifted with immediate effect.

HPN management team have been working with the PHOS clinical team including a meeting held Monday 11/11/19 (minute attached as appendix 1) to consider bullet point 4.

This has included a local re-opening bundle (attached as appendix 2).

Across both appendices 1& 2 attention would be drawn to the following:

1) Consultant team are in agreement that access restrictions should be lifted

2) Real time Root Cause Analysis (RCA) should be implemented

3) There should be an HPS approved IMT trigger process linked to future Program Assessment Group (PAG)/ IMTs associated with Ward 6a including immediate access to external support as required

4) Strong relationships should be rebuilt with parents and families of the PHOS; this should be extended to a robust communication plan

5) A clinical management group will be established and operationally review infections and other matters associated with provision of service between now and March 2019

Since August 2019 when restricted access to Ward 6a was implemented there has been significant pressure placed on Aberdeen and Edinburgh units.

There have been periods when these units have not had capacity to take GGC patients. This has meant extra pressure on availability of additional Ward 4b beds (> 4) which has had subsequent impact on existing adult services as previously described.

Recommendations

This document recommends the following

1) Access restrictions on Ward 6a are lifted with immediate effect

2) All actions in Appendix 2) are implemented
3) Emphasis is placed on a robust communication plan with parents and families of the PHOS
4) This SBAR has been approved by the Clinical Team and the IMT

Footnotes

1. Restricted access to Ward 6a has had no impact on the normal PHOS day care service.

2. PHOS outpatient services have continued as normal

3. PHOS paediatric transplant service has continued as normal

4. The IMT received a recent report from NHS GGC microbiology department (Dr A Leonard) on geno-sequencing review of all enterobacter infections linked to PHOS. Outputs from this suggested that none of these infections were hospital environment related.

5. There has been a significant reduction in infection rates across current HPOS patients using Ward 6a since end of September 2019

Jamie Redfern

Final Version 14-11-19


Appendix 1 Nov.docx


Appendix 2.docx

NHS GGC

Acute Services

Women and Children / Hospital Paediatrics and Neonatology

Bundle for re-opening of Ward 6a to high risk haematology oncology patients

Element	Description	Lead Officer Key	Date for Completion	Additional Comments	Requirement to be in place for opening week beginning 11/11/2019
1	Updated HPS report and gram negative infection control data with exclusion of Gram negative Enterobacter cases	PJ / AL / HPS	Nov 11th2019	As per IMT action this will be reviewed by the Clinical Review Group with view to resume to normal service	Will be achieved
2	Estates work as part of IMT working hypothesis	TS	Sept 2019 Nov 11th Ongoing	1. All previous IMT estates actions complete. 2. Supplementary action of Installation of hep-filter machines installed in the shower rooms ward 6a 3. For ongoing issues Directorate has a robust process in place for immediate actions following any reported concerns. Excellent links in place between infection control, facilities and service. Description of works completed available as required.	Will be achieved on time
3	Provision of microbiological review and real time root cause analysis for every gram negative reported infection	JRo / PJ/ AL	Ongoing – start Nov 8th	This will be a combined approach by infection control, microbiology and the clinical team. The RCA will work to the pro forma agreed by IMT including HPS. The development of the methodology for Whole Genome Sequencing covering environmental pathogen.	Will be achieved on time

				This point extends to the continued close monitoring of the SPC and CLABSI data	
4	Ongoing infection control enhanced supervision program	PJ	Ongoing	1. Weekly inspections and routine IPCAT audits. 2. Process in place for immediate actions following any reported concerns. 3. SCN for Ward and Day Care Unit (DCU) will undertake IPC weekly assurance checklists and discuss findings with staff at huddles. 4. SCN for Ward and DCU will undertake monthly SICPs and Hand Hygiene audits and upload to CAIR dashboard	In place
5	Lead Nurse will provide formal visibility in Ward 6a	JRo	Ongoing – in place	This will provide additional nursing leadership and support daily to the clinical team. Coordinator will provide similar cover for weekends. Linked to this will be a routine weekly senior manager walk about to speak to staff and parents / patients alike	Will be achieved on time
6	Recruitment of temporary Band 7 nurse to support Senior Charge Nurse with priorities set around infection control	JR/ JRo	Nov 13th	At advert. Dates for interview 13th November 2019 with immediate start date thereafter	Will be achieved on time
7	Continue program of wellbeing and support to the clinical team	JRo / JR	Ongoing – started October 2019	This program provides psychology drop in sessions, train the trainer program for mindfulness, staff yoga program etc	In place
8	Rollout of enhanced communication strategy to staff and parents	JRo/ JR/ SB	Nov 8th / ongoing	This strategy focuses on the reassurances staff and parents require around the safety of Ward 6a but also plans for the service return to Ward 2a/2b March 20	Will be achieved on time
9	Develop program of family awareness sessions	JRo	Start Nov w/o 11th	Focus on infection control, hand hygiene with other social / psychology topics to follow	Will be achieved on time

10	Provision of additional portering support to Ward 6a with target on pharmacy supplies	WH/ JR	Nov 2019	Agreed between Directorate	Will be achieved on time
11	Switch from hospital supplied bottled water to tap water for patients and families	JRo	Nov 2019	Implement as agreed by IMT.	Will be achieved on time
12	Continued review program of Ward 6a water and air samples	WH / PJ	Ongoing – started Nov 2019	Water technical group reports for review plus air sampling report from microbiology via Clinical Review Group	Will be achieved on time
13	Recruitment of additional housekeeper for ward 6a	JR/ Jro / WH	Pending	No formal sign off across Directorates for this to proceed.	Pending ongoing discussion/ not limiting factor
14	Formal rolling program for HPV clean on patient discharge	JR/ JRo / WH	Will not be progressed	Discussed at IMT and evidence does not support progression	N/A

Key

JR –	Jamie Redfern	General Manager
JRo -	Jennifer Rodgers	Chief Nurse
PJ -	Pamela Joannidis	Acting Chief Nurse Infection Control
WH-	William (Billy) Hunter	General Manager Facilities
TS-	Tom Steele	Director of Facilities
SB-	Sandra Bustillo	Acting Director of Communications

NHS Greater Glasgow and Clyde
Acute Division
Women and Children's Directorate / Hospital Paediatrics and Neonatology

Meeting with the Paediatric Haematology Oncology Consultant Team to discuss re-opening of Ward 6A
Date of Meeting: 11/11/2019
Time of Meeting: 11.00
Venue of Meeting: RHC Level 3 Meeting Room

In Attendance

Jamie Redfern (JR)	General Manager
Jen Rodgers (JRo)	Chief Nurse
Dermot Murphy (DM)	Paediatric Oncologist
Liz Chalmers (LC)	Paediatric Haematologist (at 12 midday)
Shahzya Chaudhury (SC)	Paediatric Haematologist
AnnaMarie Ewins (AME)	Paediatric Haematologist
Jaraim Sastry (JS)	Paediatric Oncologist
Fernando Pinto (FP)	Paediatric Haematologist
Diana McIntosh (DMc)	Paediatric Oncologist

Apologies

Brenda Gibson (BG)	Paediatric Haematologist
Chris Halsey (CH)	Paediatric Haematologist
Nick Heaney (NH)	Paediatric Haematologist
Milind Ronghe (MR)	Paediatric Oncologist

Introduction

JR opened up the meeting by thanking all for attending. He confirmed this was a formal meeting and a recorded minute would be shared. JR also updated that the outcome of the meeting would be summarised to the Incident Management Team (IMT) who were meeting later that day. The primary purpose of the meeting was to discuss with the consultant team what needed to be completed to allow the lifting of restricted measures on Ward 6A. All were clear of the purpose for the meeting.

Current Position

JR noted the recent difficulties for the clinical team in working under current restrictions. He also noted the difficulties this was presenting to other paediatric Haematology Oncology sites in Scotland (Aberdeen and Edinburgh).

The key question (s) he suggested were:

1) Was the status quo the optimal safety position to take for staff and patients given all the new information that was being shared through the IMT.
2) Was this position sustainable until the return to Ward 2A/2B in March 2020

All noted a positive approach to lifting restrictions but that it had to be carried out in a safe and timely manner.

All agreed that the answer to Q2 was no.

Did we have an infection control problem?

DM wanted reassurance that the IMT agreed that there had been an infection control problem in the ward. He remained unsure whether all felt there had been one.

JR/JRo suggested there had to be a problem given there was an IMT which had been meeting for a number of months. They also reaffirmed this by the recent activities at highest level of the Board and in Scottish Government. Finally, it could not be forgotten that patients had been redirected to other hospitals. JR suggested there was other situational awareness which would also suggest yes to this problem.

The need for raising this question was JR felt linked to the uncertainty of the IMT around finding a working hypothesis and putting in a series of actions to deal with a particular problem.

JR agreed to formally note this in his summary of this meeting to the IMT later that day.

A bundle of initiatives to support re-opening

JR/JRo went back to their original question and the new situational awareness that needed to be considered when answering it.

They confirmed all Estates works linked to previous IMT hypothesis and further improvements had now been completed or would be completed this week.

They noted the robust interface between the clinical team, management and estates which was in place both for identification of any estate problem in the ward and solutions to deal with it both quickly and safely.

JR/JRo noted all recent water and environment reports had suggested no problems and/or links to Ward 6A with previously reported infections.

The recent sequencing report of Enterobacteral infections presented by Dr Leonard was referred to and that he could find no common link between the various infections/samples he had used in his analysis.

JRo confirmed that from now there would be daily visibility of Lead Nurse on the Ward working with both Senior Charge Nurses (SCN) and other nursing/clinical colleagues.

She noted that an additional Band 7 nurse was being appointed to the Ward with this nurse in post by end of November 19 at the latest. This role she highlighted would be to focus on infection control matters thus allowing both SCNs to concentrate their time on standard day to day service matters.

It was noted that the Directorate were supporting extra porter resource to the Ward and while the focus on this would be to the processing of pharmacy supplies, it could be used for other key priorities. SC suggested transfer of samples.

JR confirmed that the Directorate would look to extend this relationship with Facilities by appointing an additional housekeeper.

JR suggested just like with Estates, there were now in place excellent relationships with Infection Control (IC).

This was reflected in the excellent results which were coming out of Enhanced Surveillance and the various external audits being completed. No ward was under this level of scrutiny but at the same time showing such consistently high performance reporting.

Relationships with infection control were continuing with the development of the Root Cause Analysis (RCA) tool being used. The Clinical Team were encouraged that each new infection was being reported in a systematic way through RCA with their involvement alongside IC colleagues. SC confirmed she had recently been involved in this with a new case and it had been a very helpful process to follow.

JRo noted that the most recent case thought to be a gram negative infection was formally reclassified to a gram positive.

All were happy that this was an ongoing process that would be followed. DM asked who the IC doctor contact for service was? JR again confirmed he would raise this at the IMT later today and get an answer to the question.

DM asked what the trigger points would be if a new problem were to emerge after re-opening the Ward. JRo/JR answered that Health Protection Scotland and NHS GGC IC were working up a final document on this which was an instruction under the current IMT. This working document would be shared with the clinical team when received.

All agreed the importance of having this document in place as soon as possible.

JRo updated on initiatives to build staff resilience. AME suggested that the Psychology sessions offered to staff had not been well used. Both JR and Jro agreed to review this.

AME felt recent press reporting on this and what had been offered to staff had not been accurate/ helpful. JRo agreed on this and noted that press reporting of this nature was challenging with the board having little control over newspaper publications.

All agreed it was important that the various initiatives like yoga sessions be continued and where possible enhanced. Timing of events needed to be considered so maximum use could be made of them.

JRo confirmed she was going to look at the introduction of family sessions that have been implemented in Neonates and mirror it in Haematology Oncology.

Everyone noted the importance of building confidence with all the families currently using the service across all layers of it. They must at all times feel the ward/ hospital was safe for their child to be treated.

This work with parents and families would extend to infection control sessions but again this would be implemented in a meaningful and sensitive way.

JR noted the IMT were already working on a communication strategy for staff and families and again it was imperative this was implemented successfully. It was also noted that this must be sustainable through to March 2020 and the return to Ward 2A/2B. JR noted there were emerging positive stories which could feature on this. Timescales and content on this would be discussed at the later IMT. All felt confident that this was being prioritised and identified as an area for ongoing improvement.

Moving forward – clinical management group

JR affirmed his intention to pull together a Clinical Management Group (CMG).
Membership he expected to be made up of two or three consultants from the paediatric haematology oncology team. It would include JR/JRo and nursing and medical representation from infection control. It would also include both SCNs from the Ward.

He agreed to document draft terms of reference and suggested that it meet weekly in the first instance.

On the basis that the IMT would stop meeting, he felt this group was necessary to maintain vigilance and report on any matters of potential concern once the ward had been re-opened.

Key areas to cover would be environmental sampling results and outputs from real time RCA.

Overseeing ongoing communication with staff and families would also be pivotal to the working of this group.

Finally, he confirmed the CMG should report to the department haematology oncology clinical governance framework already in place. He would also use it as a means to brief senior management within W&CD and above.

The first meeting of this group would be scheduled for week beginning 18/11. JR would put a process in place to canvas membership with immediate effect.

Neutropenic patients at local DGH

DM highlighted the positive steps made across West of Scotland Boards and their local paediatric units with the development of shared care working for neutropenic patients who could be managed locally.
He was keen and all agreed that this positive way forward for treating patients locally should not be lost when restricted measures were lifted.

JR suggested that formalising an action around this could be the work of the newly formed CMG.

Health Protection Scotland (HPS) Report

All clinical colleagues asked on the status of the HPS report. JRo noted a revised version was expected today ahead of the IMT.
DM noted the importance of going forward with this that while it was comparing infection rates between the three main paediatric haematology oncology units in Scotland, there was also a need for them to confirm they were happy for NHS GGC to lift its restricted measures. JR/JRo suggested this would be a topic of discussion at today's IMT.

DM, JS and SC confirmed they would be attending the IMT.

Conclusions

JR asked clinical colleagues to reconsider the two questions he had posed earlier.
Following all discussions today that he personally felt had been very positive and built on what had been a very positive previous week's IMT, the service should now formally start planning for removal of special measures.

His own view was that a continuation to March 2020 of the status quo given the current situational awareness was not optimal or in the patients/staff's best interest.

He was aware that obtaining the confidence of all key stakeholders would be essential and that the delivery of a successful communication strategy would be pivotal.

All agreed with his summation and were happy that he briefed the IMT of this outcome.

This in the context that not all actions had been completed and not all of the consultant team were present.

JR thanked all for attending.

Jamie Redfern GM/ HPN v1.3

SBAR: Review of 2017 Mortalities in which Stenotrophomonas was isolated.

Prepared by Dr Alan Mathers for W&C Clinical Governance Forum Autumn meeting

Situation

A retrospective review of three mortalities in 2017 has been conducted. All of the patients were managed in the Haemato-Oncology service and all had positive Stenotrophomonas blood cultures.

Background

There has been a detailed and on-going investigation into infection control and related issues within the RHC and QEUH sites. This Review continues with active Infection Management Processes with the collaboration with colleagues from Health Protection Scotland.

As part of the Infection Management Team (IMT) process it was agreed that a ”retrospective” review of cases involving positive blood cultures of Stenotrophomonas cases from 2017 was indicated. This included three mortalities. This augmented the local Morbidity and Mortality Review processes of cases in RHC.

The review was performed with a view to establishing whether there were common themes between the deaths and the infection. An assessment regarding the need for an SCI was determined following consideration of the case series review and local M&M processes.

It was determined that on the information available *in 2017* an SCI process was not indicated.

Following reflection on the retrospective review it was determined that the decision not to perform an SCI was upheld. A major consideration related to the clinical course and the intervening investigations and changes in the clinical paradigm that occurred as part of the IMT processes.

This review was performed by Dr Shahzya Chaudhury, who was not an RHC Consultant at that time (2017) and therefore was deemed to be independent.

[redacted]

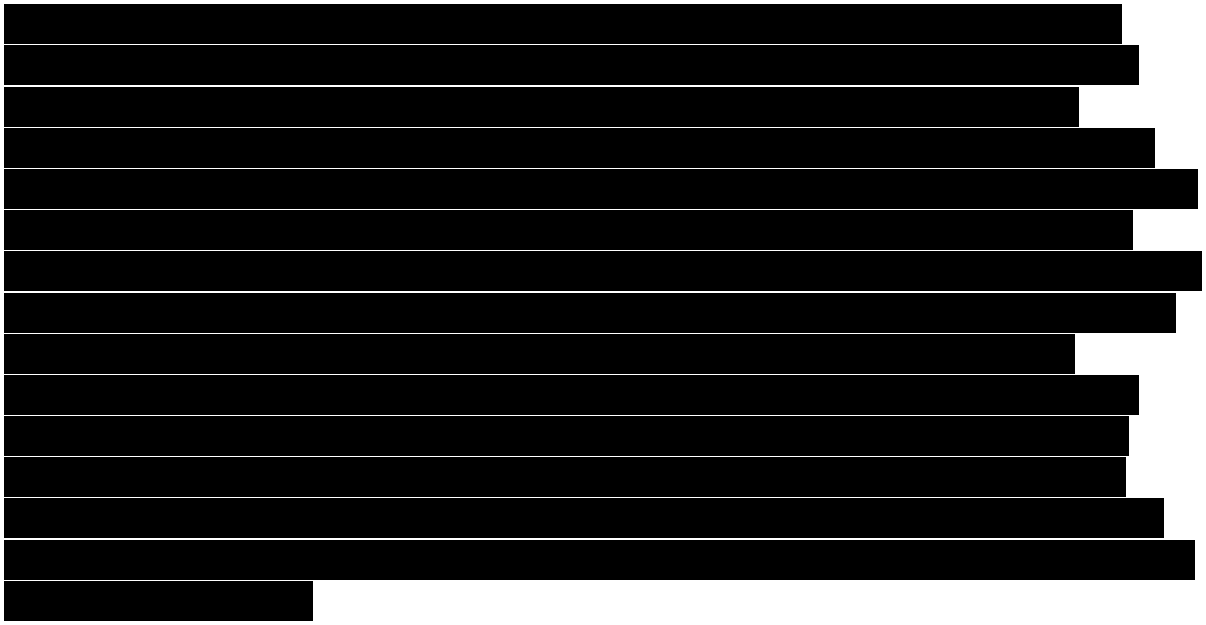
This SBAR does not identify the cases by case note identifiers or date beyond the Year of interest.

This document is restricted in view of the sensitivities above.

<u>Summary of cases:</u>

[redacted]

[redacted]



A sample of the bacteria was sent to the reference Lab at Collingdale, which did not suggest any linked infections. Stenotrophomonas had sporadically been found in patients with central lines (including on the Yorkhill RHSC site).

At the point [redacted] death there were no active concerns raised about the clinical environment.

The PICU or Cardiology M&M processes concluded that an SCI was not indicated given the evidence presented at their mortality process and it was agreed by these *separate* processes *that* everything that could have been done to save this patient was done and [redacted] management had been appropriate.

The above decision making process was presented to the W&C Chief of Medicine who reviewed the relevant submissions, accepted the outcomes and determined to advise the W&C CG Committee by SBAR.

Response

The W and C Clinical Governance committee are asked to review this SBAR and determine if the Conclusion to not perform an SCI is appropriate.

The SBAR outcome decision will then be submitted to the Acute CG Committee.

Alan Mathers

Chief of Medicine Women and Children

November 2019

From: Craig.White[redacted]
Sent: 13 January 2020 07:19
To: Mcguire, Margaret; Vanhegan, Elaine; Rodgers, Jennifer; Calum.Henderson[redacted] Philip[redacted] Oneill, Angela (DoN); Bustillo, Sandra
Cc: [redacted] Fiona.McQueen[redacted]
Subject: [ExternaltoGGC]Oversight Board - Communication and Engagement Sub-Group - SBAR

Colleagues,

I have prepared this SBAR outlining the position in respect of existing channels of communication, reflecting the range of mechanisms in place, the suggestions about focus groups, wider reference groups and the options to ensure that the work on a Master list provides the opportunity to support decision-making about the most appropriate actions when a need to consult, engage and work collaboratively with families is flagged. I expect this to assist discussions planned for tomorrow and the need for clarity and decisions at pace about the shared commitment to deliver person-centred communications for each family. I would of course be pleased to receive improvement suggestions to content and/or recommendations and anticipate that this will form the basis for a contribution to a report to the next Communication and Engagement Sub-Group.

Best wishes

Craig

Situation

The need to clarify the available mechanisms in place to communicate with families with contact with the NHSGGC paediatric haemato-oncology service has been identified.

Background

Professor White was appointed by the Cabinet Secretary for Health and Sport to link with 13 representatives of families who met with her and the CNO in September/October in respect of various issues and questions they had in respect of their child's contact with the paediatric haemato-oncology service at NHS Greater Glasgow and Clyde.

The Chair and Chief Executive of NHS Greater Glasgow and Clyde met with 9 families/family members at a meeting on 02 November 2019. Following this a letter was sent to those who attending in which it was suggested that Professor White would work with senior management to develop a focus group.

A survey was issued to all families in contact with the paediatric haemato-oncology service (approximately 400 families), with 19 families indicating that they wished to receive updates on the ongoing work with respect to communication and engagement.

There is a closed Facebook Group for the service which around 70 families are members of.

Since Professor White's appointment, the meeting families had with the Chair and Chief Executive NHSGGC was escalated to Stage 4 on the Performance Framework and a Sub-Group of the Oversight Board, with parent representatives, was established to specifically consider issues in respect of communication, information provision and engagement.

Proposals had been made to invite some families to sessions with members/NHSGGC staff in attendance at the Communication and Engagement Sub-Group, though the need for greater clarity about whom to invite and providing sufficient notice ahead of any proposed event(s) has been highlighted.

Assessment

There are a group of around 10-15 families who have been in regular communication in respect of issues, questions and concerns relating to the paediatric haemato-oncology service at NHS Greater Glasgow and Clyde.

These families have had responses to questions previously unanswered and those with outstanding questions/areas of concern have recently benefitted from more proactive and responsive engagement in respect of general and child-specific concerns relating to their individual experiences.

The importance of ongoing engagement and communication with families has been emphasised by Ministers and officials in terms of ongoing and planned work associated with the escalation of NHS Greater Glasgow and Clyde, including the need to involve patients and families in the process of case review.

The Cabinet Secretary for Health and Sport has indicated her agreement with a recommendation from Professor White and the CNO that the focus on engagement with families must now be on the basis of person-centred and specific consideration of communication preferences and the nature of current lines of communication and links with NHS Greater Glasgow and Clyde.

Recommendations

The parent representatives on the Communication and Engagement Sub-Group should be invited to confirm the arrangements they have developed to link with a wider group of parents in support of their attendance at meetings, providing details of the mechanisms in place and the approximate number of families reached through this.

The list of parents who attended meetings with the Cabinet Secretary, attended the 02 November 2019 with representatives of the Board, parents who have been in contact subsequently about general and/or child specific concerns and the parents who have indicated a wish to receive further information about the work on communication and engagement should be collated.

The families who have been in contact with the parent representatives, the members of the Closed Facebook Group and those who have been in touch with Professor White and the Board's complaints manager should be invited to provide details of what would be most helpful to them in terms previous suggestions variously referred to as focus group or reference group. It is possible that the arrangements in place through parent representatives could form the basis of the wider reference group, as could the members of the Facebook Group – though this may need to be complemented by channels of communication through those who have been in touch through other means who are not members of that Group. This communication should be issued week commencing 13 January 2020 and specific actions in response to this should be agreed and in place by 27 January 2020.

The work to complete and validate a core Master List of all families with current and recent contact with the paediatric haemato-oncology service should be completed by 20 January 2020 and should be clear on the arrangements in place for individual families to reflect the mechanisms outlined herein and also those in place through existing arrangements within NHS Greater Glasgow and Clyde. The daily QEUH PMO updates could provide a useful means to capture progress on this work, particularly if the scope of content is extended to capture all contact (ie service and corporate) with parents and families.

Professor Craig White | **Divisional Clinical Lead**
Healthcare Quality and Improvement Directorate | Planning & Quality Division | DG Health and Social Care |
[redacted]

NHS Greater Glasgow & Clyde	**Paper No. 21/06**
Meeting:	**Clinical and Care Governance Committee**
Date of Meeting:	**08/06/2021**
Purpose of Paper:	**For Approval**
Classification:	**Board Official**
Sponsoring Director:	**Dr Jennifer Armstrong, Medical Director**

Paper Title

SBAR Action Plan

Recommendation

The Clinical and Care Governance Committee are asked to note the final update to the Action Plan (SBAR), in particular:

- the completion of 26/27 actions contained in the plan
- The technical limitations in regards to installation of an isolation room within the Emergency Department at Queen Elizabeth University Hospital (Action area 3)

Purpose of Paper

The Action Plan was initially presented to the Clinical and Care Governance committee on 05/12/2017 *(Paper 17/24*) following concerns raised over infection control issues at QEUH and RHC. The plan covers a wide range of themes including:

- Positive Pressured Ventilated Lobbied (PPVL) Isolation Rooms.
- Royal Hospital for Children (RHC) – Protective Isolation – Haematology Oncology Unit.
- RHC – HEPA filters in Paediatric Intensive Care Unit (PICU).
- Queen Elizabeth University Hospital (QEUH) – Ward 4B – Upgrade to the Haematology Ward.
- Single Room Specification and Location of Areas that can be used for Protective Isolation.
- Cleaning of QEUH, RHC and Office Block
- Cleaning of Dishwashers in QEUH and RHC linked to a potential outbreak of exophiala
- Water Quality and Water Testing
- Plumbing in the Neurosurgical Block
- Decontamination of Respiratory Equipment

The plan has been continuously updated by staff working across Infection, Prevention and Control and Estate and Facilities Teams and has been discussed across various groups and committees within the Board. The Clinical and Care Governance Committee also received a further update to the action plan on 05/03/19 with the Lead Infection Control doctor present at this meeting.

Key Issues to be considered

The Oversight Board Report (March 2021) has specifically documented the SBAR and the quick action taken by the Board to identify, discuss and raise these concerns. (Page 52, Paragraph 127)

The Oversight Board have also commented that the latest update to the SBAR was presented in 2019 with many of the actions showing “in progress”. The Oversight Board has therefore recommended:

- a further update of the plan (provided);
- review by the Clinical and Care Governance Committee and
- closure of the plan.

Any Patient Safety /Patient Experience Issues

None

Any Financial Implications from this Paper

There has been considerable capital programme of investment for refurbishment of Wards 2A/2B which is included in the Action Plan.

Any Staffing Implications from this Paper

None

Any Equality Implications from this Paper

None

Any Health Inequalities Implications from this Paper

None

Has a Risk Assessment been carried out for this issue? If yes, please detail the outcome.

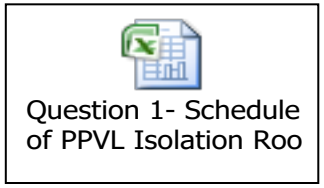
N/A

Highlight the Corporate Plan priorities to which your paper relates

Better Care

Author: Sandra Devine
Title: Acting Infection Control Manager
[redacted]

SBAR Action Plan submitted to Care and Clinical Governance Committee with final updated position as of May 2021

Item	Issue	Current Position as of 5th December 2017	Future Actions	Final Position as of May 2021
1	PPVL rooms not compliant with SHTM standards Critical Care	Facilities colleagues confirmed that there are 10 air changes per hourand a positive pressure of 10 pascals in the PPVL rooms which is consistent with SHBN 04-01.	Included in item 2	PPVL Schedule attached 34 rooms on schedule across RHC/QUEH.  Question 1- Schedule of PPVL Isolation Roo 7 rooms have been converted to Negative pressure rooms to differentiate between two types. See Table 1. **Table 1** RHC – Ward 2C – Room 6 RHC – CDU – Room 18 RHC – PICU – Room 5 QEUH – Medical HDU – Room 43 QEUH – Medical HDU – Room 44 QEUH – ITU 1 – Room 24 QEUH – Surgical ITU Unit 1 – Room 4 Ward 2A has had 4 rooms converted to Positive pressure at a cost of £206,000. Now undergoing complete refurbishment . Lead ICD confirmed with Chief Nurse (CN) that three rooms within RHC would be suitable for IDHC if needed.
2	PPVL rooms do not provide appropriate protection for patients with infectious diseases of high consequence (IDHC) e.g. MERS, SARS This issue also exists in the Royal Hospital for Children	IDHC should be nursed in negative pressure rooms. These are not available in QEUH. In order to address this issue in the short term a patient pathway has been agreed by the Infectious Disease (ID) Clinicians whereby patients will be routed either to GRI or Lanarkshire ID unit. Chief Nurse (CN) for Paediatrics discussing with clinical teams a pathway for children.		

3	Lack of isolation rooms in the emergency department.	ED was designed with input from clinical staff and observation of patients was a priority. There are single rooms in ED but not negatively pressured isolation rooms.	Property Procurement Facilities Management (PPFM) has commissioned a feasibility study to ascertain if negatively pressured rooms are technically feasible	Options were considered to convert existing PPVL to negative pressure facilities suitable for infectious patients. However there are currently no specific plans to develop isolation rooms within Emergency Department.
Item	**Issue**	**Current Position as of 5th December 2017**	**Future Actions**	**Final Position as of May 2021**
4	Rooms not built to the standard expected as a tertiary referral centre.	The transfer of the Infectious Diseases Unit was a late addition to the project and was not fully commissioned as an ID unit at the outset.	Actions as described in item 2.	Actions as described in item 2.
5	Microbiologists not aware of plans to upgrade areas.	Lead Infection Control Doctor (ICD) was aware of this proposal.	Work continues with input from the Lead ICD.	**Health Board Process** HAI Scribe 1 - PPVL and PPIR.docx The process is that any refurbishments are signed off by ICD/ IPCT in conjunction with the estates department. These are signed off at various stages through design to completion and handover. Final sign off is undertaken with reference to relevant SHTM's design criteria and commissioning/ validation data provided by an external contractor. A project manager or lead (usually Estates) will use Part B to identify, manage and record built environment infection control risks of a project within health care premises. The assessment will take into account the nature of the work to be undertaken and the adjacency to patient areas. The SHFN 30 HAI Scribe document will be put in place before work commences. This comprises sets and check lists. Both the Infection Prevention and Control Team and the lead clinical staff will be asked to review and approve the assessment before work commences. The size of the project will determine the amount of involvement by the IPCT, which may include regular review during the project and inspection at the end. The ICD would provide advice on any environmental sampling to be undertaken prior to areas handover to users.

Item	Issue	Current Position as of 5th December 2017	Future Actions	Final Position as of May 2021
6	HEPA filters in PICU for the protection of patients in the Bone Marrow Transplant Unit (BMTU) that might need critical care during treatment. The BMTU is ward also referred to as ward 2A.	HEPA filters were installed within PICU/Ward 2a week commencing 6 November 2017, within room numbers 12 and 17 – previously installed within room 18. HEPA filter still to be fitted in room 5 (access to be agreed with clinical colleagues). HEPA filters were also fitted into RHC Ward 3c week commencing 13 November 2017 within rooms 9 & 10.		PICU Room 5: Installation of HEPA filter is no longer required as the room has been converted to negative pressure accommodation for infectious patients. (as described in item 1 & 2) Planned work: £8 million spend for the upgrade of ward 2A (Haemato–oncology\TCT) ventilation system & internal building elements to provide HEPA filtered environmental conditions suitable for use by Immuno-compromised patients with Enhanced (Positive Pressure) Single Bedrooms with En-Suite facilities, providing 10ac/hr positive pressure within each Bedroom space, and ensuring the Bedrooms are at +10Pa pressure gradient relative to the adjacent Corridors. All in accordance with design principles embodied within SHTM 03-01 guidance documentation.
7	HEPA filters in prep room	HEPA filters have not been routinely fitted (as standard) within prep rooms, however HEPA filters are fitted within QEUH Ward 4B. Instruction required to determine whether HEPA filter should be fitted into RHC Ward 2A prep room.		The plan will take into account full HEPA filtration of all aspects of Ward 2A (including Prep room)
8	IVs prepared in treatment room.	IVs are prepared in the preparation room but not chemotherapy which is prepared in a specialist unit.	CN paediatrics confirmed that this was the standard practice.	IVs are prepared in the preparation room; however chemotherapy is prepared in a specialist unit.
9	Outbreak of Aspergillus associated with poor air quality	There were two cases of aspergillus associated with the ward in March 2017. This was fully investigated and was possibly associated with a leak into the ceiling space which was not immediately apparent. On review of cases in the new BMTU and the unit previously located in Yorkhill there is no significant increase in the number of cases of this infection.		ICD has confirmed with HPS that there is no guidance on air sampling non specially ventilated areas.

		This was fully reported as per Chapter 3 of the National Infection Prevention and Control Manual to Health Protection Scotland.		
Item	**Issue**	**Current Position as of 5th December 2017**	**Future Actions**	**Final Position as of May 2021**
10	Concern that the statement issued advised that BMT services in RHC were unaffected by issues identified in the adult BMTU.	Clarification from the NHSGGC Comms Team "To the recollection of colleagues involved, the Communications team were not briefed at the time of the release about the adult BMT move of any testing underway at the Royal Hospital for Children.	Clarification issued to the meeting attendees. No further action required. This perhaps appears to be misinterpretation of the media communication.	**Clarification from the NHSGGC Communications Team**  070715 BMT News Release.doc The final line of the press release of 8th July 2015 "Bone Marrow Transplant Service Temporary Relocation" was written to make clear to media that the move of the adult service did not include the paediatric service at the Royal Hospital for Children and that the latter was not moving. "
11	HEPA filters not in place in PICU	Action complete as previously agreed and noted within point 6.		Point 6 covers the action

Item	Issue	Current Position as of 5th December 2017	Future Actions	Final Position as of May 2021
12	Increase in the number of line infections in Ward 2A	Two years' retrospective data were analysed in May 2017 and it was noted that there was an increase in line related infection. The initial baseline infection rate per 1000 total line days was 3.25 and this had risen to 6.33. A group led by CN Paediatrics first met in **May 2017** to review this information and put actions in place to reduce this incidence. The last 4 months (July to October) have shown improvement in infection rates. CN Paediatrics presented a paper to the Board Infection Control Committee on the 27 November 2017 outlining several work streams and the most recent infection rates in this area.		All line infections with gram negative organisms are subject to a RCA review. This process is completed with clinical staff and IPCT staff. Report is sent monthly to the Director of W & C for onward distribution to clinical staff within the unit. SPC which are based on methodology provided by ARHAI Scotland is used to assess trends in this area. 2021-05-06 Paed Haem-onc SPCs.pdf clabsi chart.doc
13	Increase in the number of line infections	IPCT participating in above work. Line related surveillance was subsequently picked up by the Directorate.	Ongoing assessment of surveillance activity and resource within the IPCT to enable IPCT to respond to local clinical needs.	

Item	Issue	Current Position as of 5th December 2017	Future Actions	Final Position as of May 2021
14	Concerns that the ongoing work would not accurately pick up any concerns.	• As above work streams in place re line infections. • IPCT audit process is in place and ongoing; this includes audit of the environment, audits of line and urinary catheter care. Audits of standard Infection Control Precautions (SIPS). • IPCT twice weekly visits. • GGC compliant with the National IPCT Manual – this lists all types of infections that should be reviewed and what should be reported if an outbreak or incident occurs. • Weekly report to Board and Acute Directors weekly on an IPC issues throughout GGC.	IPCT and CN Paediatrics will continue to have a clear focus on this area.	HPS have published a nationally agreed list of alert micro-organisms which should be notified to IPCTs which may require further investigation. Hospital level analysis has been carried out by HPS using the national HAI surveillance data. Hospital attributed cases of *Clostridioides difficile* infection (CDI), *Escherichia coli* bacteraemia (ECB) and *Staphylococcus aureus* bacteraemia (SAB) for 2016, 2017 and 2018 (Q1 to Q3) were compared to peer hospitals with similar patient population using funnel plot analysis. The Queen Elizabeth University Hospital (QEUH) and the Royal Hospital for Children (RHC) were not highlighted as an exception (rate above the 95% confidence limit) in any of the plots for 2016, 2017 and 2018 (Q1 to Q3). • The peer hospitals for QEUH were Aberdeen Royal Infirmary (ARI), Forth Valley Hospital (FVH), Glasgow Royal Infirmary (GRI), Ninewells Hospital (NWH), Royal Alexandra Hospital (RAH), Royal Infirmary of Edinburgh (RIE), University Hospital Crosshouse (UHC) and Western General Hospital (WGH) • The peer hospital for RHC were Royal Aberdeen Children's Hospital and Royal Hospital for Sick Children (Edinburgh) • ECB and SAB cases were hospital attributed assigned through enhanced surveillance ECOSS webtool. For CDI cases were categorised through linkage with Scottish Morbidity records (SMR01) for a patient with CDI onset on day 3 or later following a hospital admission on day one. • The denominator was hospital level 'total occupied bed days (TOBDs)' using ISD1 data. • Funnel plot analysis was based on an over-dispersed Poisson regression model. • See Q13 in response to Line Infections

Item	Issue	Current Position as of 5th December 2017	Future Actions	Final Position as of May 2021
15	Microbiologists do not have the information to advise clinical staff on where to place immunocompromised patients.	Director of Regional Services stated that this had never been raised as an issue by clinicians within his service that care for patients who are immunocompromised. Most patients who are immunocompromised are cared for within this directorate. It was agreed by the group that placement of immunocompromised patients was a decision that should be taken by the clinical team looking after the individual patients.	The attached document in the next section will continue to be reviewed and updated.	patient-placement-sop-v1-amended-18-
16	Infection rates are not being monitored.	GGC compliant with the National IPCT Manual – this lists all types of infections that should be reviewed and what should be reported if an outbreak or incident occurs. • Every patient with a notifiable infection is reviewed and monitored. • NHSGGC is fully compliant with all elements of the national Mandatory Surveillance of Infection Programme (mainly specific surgical site and blood stream infections. • Weekly report on exceptions is sent to the Board Directors. • Monthly reports are sent to Senior Management teams. • All outbreak and incidents are reviewed by the Board, Partnership and Acute Infection Control Committees. • The most recent National Point Prevalence Survey in 2016 indicated that both the QEUH and RHC were under the national average in terms of the incidence of Hospital Acquired Infections.	In April 2021 the IPCT approached ARHAI to develop early warning systems for high risk units and we hope to pilot this technology in the coming months	**Surveillance Undertaken by the GGC Infection Prevention and Control Team (IPCT)** In 6a and PICU a novel surveillance technique advised by ARHAI was implemented (see item 12). All other mandatory systems are in place.

Item	Issue	Current Position as of 5th December 2017	Future Actions	Final Position as of May 2021
17	There are three air changes and chilled beam technology instead of the 6 air changes recommended.	There are three air changes in the single rooms within both QEUH and RHC.		No further action.
18	Use of cleaning agents.	NHSGGC has for several years changed the cleaning regimens each winter to include a chlorine based detergent as a strategy to reduce norovirus outbreaks. This switch commences on the 1st of November and continues until the 30 April each year or longer if the season is prolonged. This is not recommended in the National Infection Control Manual because of lack of scientific evidence but is put in place in GGC based on local site knowledge.	This policy and practice will continue unless new evidence emerges	Every winter Health Protection Scotland alert boards when the norovirus season commences. Each year in response to this, the IPCT ask facilities to change all cleaning products to one that includes chlorine. Chlorine based detergents are recommended to be used during outbreaks of norovirus (HPS National Guidance). NHSGGC use them as recommended during outbreaks but also to potentially prevent outbreaks when patients with norovirus are admitted to wards and departments. This policy continues to be implemented and reviewed and was extended to include all areas during 2020 & 2021 in response to the COVID 19 pandemic. We note any emerging evidence and update practice as required.
19	Roles and responsibilities with regards to cleaning of the dishwashers in the ward pantries was not clear.	IPCT held an Incident Management team Meeting (IMT) on 22nd of September. Dishwashers were removed from use until they could be serviced and re-sampled.	Catering staff agreed to assume the responsibility for cleaning of the dishwashers going forward.	NHSGG&C is fully compliant with the National Monitoring of Domestic Services. Point of use water filters have been installed in Dishwashers in use in the QEUH and no issues have been identified since these have been in place. As an extra precaution dishwashers have been removed from the adult Cystic Fibrosis wards and are not used and the clinical areas in the Royal Hospital for Children.
20	Issue with dishwasher not picked up during routine monitoring.	GGC fully compliant with the National Monitoring of Domestic Services	Roles and responsibilities had been clarified and a process in now in place.	

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21	Cleaning of Temperature Control Values (TCVs)	TCVs are maintained in all high risk areas and plans are in place to carry this out in all areas despite this not being mandatory. Protocols are in place to manage this process.	Continued to be reviewed by the board water safety group and the water technical group.	Board recognises paramount importance of patient safety and the need to ensure the water systems and controls are consistently compliant with all relevant safety standards. Board water safety is in place and water systems and processes are monitored as per national guidance
22	Water testing is not as per national guidance	Board water safety is in place and water systems and processes are monitored as per national guidance.	None	NHS GGC is compliant with SHTM 04-01 Part B – Operational Management (Page 72) testing for Legionella guidelines and with the HSE Legionnaires disease "Microbiological Monitoring". HSG 274 The local water safety groups review testing results to discuss anything any exception reports. This includes all counts of Legionella serogroup 1. Pseudomonas testing has been implemented in high risk areas where flow straighteners are present in taps. Authorising Engineer for the Board has reviewed this on our sites as part of the Authorising Engineers role and responsibilities and has provided a statement to Estates and Facilities.

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24	Plumbing not replaced in Neuro Surgical Block	The Director of Regional Services advised that there is ongoing work in the neuro building that would because of its complexity, take several years to complete, in the meantime the new operating theatres were due to open in January 2018.	Planned replacement of the INS announced in May 2021	Planned replacement of the INS announced in May 2021 X4 New Theatres were commissioned in June 19.
25	Perceived Increase in surgical site infections	Regional Services has funded 1.5 WTE surveillance nurses to carry out prospective surgical site surveillance in this area. For context, there are 3 surveillance nurses that provide this service for the rest of GGC therefore the investment in the INS to monitor SSI is significant. Although it is difficult to obtain benchmark rates for SSI in this area, continuous surveillance will pick out trends and therefore any increase. This is monitored via a group unique to Regional Services – the RS Surgical Site Infection Group. The group in turn reports into the Regional Service Clinical Governance Group	Continue to monitor trends in surgical site infection in this area.	• Surveillance commenced in July 2016 for cranial and spinal surgery in INS and in November 2016 for major free flap surgery in OMFS. • A substantive 1.0 WTE surveillance nurse has been in post since September 2018. • Surveillance comprises in-patient and 30 day readmission to GGC hospitals. • SSI rates are reported in monthly surveillance reports. Statistical Process Control(SPC) charts are used to monitor trends. • The RS Surgical Site Infection Group continues to meet every quarter to discuss reports and review progress. • Surveillance was undertaken for External ventricular devices in neurosurgery and quality improvement work was undertaken. This resulted in the development of an EVD insertion care bundle and an EVD output record

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26	Decontamination facilities	Most decontamination of equipment is conducted in the central Decontamination Unit or Endoscopy facilities. Respiratory equipment is easily damaged and advice from manufacturers is often difficult to implement. There should be dedicated facilities with established work flow patterns (dirty to clean). At this point in time the Decontamination group (which is a sub group of the Board Infection Control Committee) has give advice on many items of equipment and had obtained room designs which could be used if space was identified in QEUH and RHC. This has been submitted to management colleagues for consideration. In addition a list of specialist equipment that we require national advice on has been submitted to Health Protection Scotland.		At this point in time the Decontamination group (which is a sub group of the Board Infection Control Committee) has given advice on many items of equipment and had obtained room designs which could be used if space was identified in QEUH and RHC. An area for respiratory decontamination has been allocated on the QEUH and RHC site.

Item	Issue	Current Position as of 5th December 2017	Future Actions	Final Position as of May 2021
27	Roles of IPCT have changed	The current IPCT all have Job Descriptions which have been in place for ten years. There is a clear documented governance structure that has been reviewed by Price Waterhouse Cooper and approved by the Infection prevention Committees within NHSGGC. There is a clear management structure which complies with the recommendations contained within the Vale of Leven Report and the Healthcare Environment Inspectorate Standards	Review of structure being undertaken by NHS Board in response to the recommendations contained in the SG Oversight Board Report.	Lead ICD to be appointed in June 2021 when current post holder takes up a promoted post. All ICD's have Job Plans and organisation development events have taken place and continue to take place on a regular basis. SBAR re further resources are currently being identified by NHSGG&C to strengthen the Infection Control team including provision of senior project management support to ensure that all of the strands of work at the QUEH including water, IC, ventilation etc is effectively coordinated and the requirement to NHS Assure going forward are met. Designated business manager to support the work of the IPCT has been appointed and will take up post in June 2021.

Bundle of documents for Oral hearings commencing from 12 June 2023 in relation to the Queen Elizabeth University Hospital and the Royal Hospital for Children, Glasgow

Bundle 4 – NHS Greater Glasgow and Clyde: Situation, Background, Assessment, Recommendation (SBAR) Documentation

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