SCOTTISH HOSPITALS INQUIRY

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

Bundle 21 - Volume 4
Responses to Expert Report of
Dr Sara Mumford and Linda Dempster

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Keoghs

Scottish Hospitals Inquiry

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Our Ref: RIL.T10513091
Your Ref:
Date: 15 July 2024
Please Ask For: Ruth Lawrence / Rachel Blair
Email: [redacted] /
Direct Dial: [redacted]

Dear Sirs

Our Client: **Currie & Brown UK Limited**
Re: **Queen Elizabeth University Hospital, Glasgow**

We write with reference to the expert report of Dr Sara Mumford and Ms Linda Dempster ("**the Report**") which reviewed the link between patient infections and the water and ventilation systems at the Queen Elizabeth University Hospital ("**QEUH**"); and in accordance with the directions in the email from the Inquiry Solicitor dated 10 June 2024.

This is the response to the Report on behalf of our client Currie & Brown UK Ltd ("**Currie & Brown**").

References to paragraph numbers below are to the numbered paragraphs of the Report.

Responses to the Report

Paragraph 9.66: "*The Independent Review, Bennett and Poplett all found that the project team regarded the recommendations in SHTM 03-01 as non-mandatory and, in an effort to achieve 'BREEAM Excellent' status, the air changes per hour were reduced, with derogation agreed by NHS GGC Board, from the recommended 6 (or 10 for neutropenic isolation rooms) to 2.5 on the basis that the chilled beams were controlling the ambient temperature and the high energy consumption was saved.*" [Emphasis added]

1. Item ER 2/1 of the final M&E Clarification Log recorded an agreed derogation from the recommendation for 6 air changes per hour ("**ACH**") to 2.5 ACH for single bedrooms (but not for areas of specialist ventilation). There was no such agreed derogation from the recommendation for 10 ACH in the neutropenic isolation rooms.

Paragraph 9.67: "*This failed to consider the other reasons for the higher number of air changes, including dilution and control of airborne pathogens and preventing HAI.*"

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2. It is understood that NHS GGC requested advice from the Health Protection Agency ("**HPA**") about the proposed derogation from the recommendation for 6 ACH during the design phase. By his internal email dated 21 October 2010, John Hood (Consultant Microbiologist at NHS GGC) expressed concern about the proposed derogation from 6 ACH to 2.5 ACH, stating that "*Air changes are about dilution and removal… A normal ward would be expected to have at least 6 airchanges per hour*". As indicated in his email, Mr Hood consulted Peter Hoffman of the HPA about this proposal and, by email dated 25 October 2010, Mr Hood reported internally to Alan Seabourne (NHS GGC's Project Director) and others[1] that Mr Hoffman had advised him that "*the suggested 6 ACH is really for temperature control and not for any infection control issues (i.e. not dilution and removal as I mentioned below)*"[2].

Paragraph 9.71: "*In addition, the ventilation system was fitted with thermal wheel heat recovery units which were sited in the supply and extract air handling units. Consequently, the supply air handling unit is connected to the toilet extract system via the thermal wheel with the potential for toilet extract air to bypass and enter the supply airstream resulting in a cross-contamination risk.*"

3. SHTM 2025, Ventilation in Healthcare Premises (June 2001 edition), which was current at the time of the design phase, permitted the use of thermal wheels, see paragraph 4.105, Part 2: "*For most systems in healthcare premises, either a "run-around" system of heat exchangers, a thermal wheel or a plate type unit may be appropriate*".

4. Thermal wheels were also permitted by SHTM 03-01, Ventilation for Healthcare Premises (February 2013 edition), see paragraph 4.144, Part A: "*For systems in healthcare premises, a plate heat exchanger or 'run-around coil' system is suitable. Thermal wheels may be used providing they are fitted with a purge sector.*"

5. Currie & Brown is unable to comment on the positioning of the thermal wheel heat recovery units, or how they were incorporated into the design, as this is outside its knowledge.

Paragraph 9.78: "*The use of chilled beam units is cautioned by SHTM 03-01 in specialist ventilation areas and should only be considered with the written approval of the Ventilation Safety Group. The complex maintenance of the chilled beam units makes them impractical for patient rooms.*"

6. The note of caution about the use of chilled beam units in specialist ventilation areas was not introduced until SHTM 03-01 was updated in February 2022, long after the construction of QEUH was completed. (Indeed, the version of SHTM 03-01 referenced in footnote 158 is the February 2022 edition.) The February 2014 edition of SHTM 03-01, which was published during the construction phase, permitted the use of chilled beam units: see paragraph 2.38, Part A, which stated as follows: "*The use of chilled beams for the provision of heating, cooling and ventilation is increasingly common in healthcare premises. The use of Active Chilled Beams*

[1] Including Fiona McCluskey (Senior Nurse Advisor and part of the QEUH Project Team), Jackie Stewart (Infection Prevention Control advisor), Craig Williams (Consultant Microbiologist), and Sandra McNamee and Tom Walsh (roles unknown).

[2] The emails referred to were provided to the Inquiry by Currie & Brown on 21 June 2021. Please see page 6 of document 22 under tab '5 Request 1' – Ref Doc DJR_1a Email 20.03.2018 enclosure – Ward Ventilation Strategy – Wallace Whittle (TUV) Report and email chain.

providing tempered filtered air to a heating / cooling device within the room can provide effective local control of environmental conditions."

If any further information or clarification is required by the Inquiry, Currie & Brown would be happy to provide this.

Yours faithfully

Keoghs LLP

1 Introduction

1.1 The following is a response by Multiplex Construction Europe Limited ("Multiplex") to the expert report prepared by Dr Sara Mumford and Linda Dempster dated 24 May2024 ("Expert Report").

1.2 Multiplex is grateful for the opportunity to assist the Inquiry in relation to the Expert Report.

1.3 As noted in its response to the expert report of Dr Walker, Multiplex does not consider that a period of 5 weeks to respond has provided Multiplex with sufficient time to properly consider and formulate a response to all of the matters raised in the Expert Report, particularly when this period falls across summer holiday season.

1.4 The above being said, in the limited time made available, and with a view to assisting the Inquiry, Multiplex has prepared the commentary below.

1.5 Having regard to Section 2(1) of the Inquiries Act 2005, Multiplex's position set out in this response is provided solely to assist the Inquiry's understanding and is without prejudice to and under reservation of any further submissions Multiplex may make or evidence it may lead in any forum.

2 Commentary

2.1 Multiplex refer the Inquiry to the following Multiplex responses, already issued or which will be issued to the other expert reports produced by the Inquiry:

2.1.1 Expert Report of Dr James Walker – Response 11 June 2024

2.1.2 Expert Report of Sid Mookerjee – Response 20 June 2024

2.1.3 Expert Report of Andrew Poplett (Water) – To be issued

2.1.4 Expert Report of Andrew Poplett (Ventilation) – To be issued

2.1.5 Expert Report of Allan Bennett – To be issued

2.2 Consideration of the above responses are necessary when reviewing the response to the present report as the Authors rely on the work of Dr Walker, Sid Mookerjee, Andrew Poplett and Allan Bennett in relation to the water system, ventilation systems and comparator hospital analysis. Multiplex considers it has commented on those issues where possible in response those reports.

2.3 There are, however, a few discrete points which Multiplex considers it is appropriate to address at this stage.

<u>Miscellaneous</u>

2.4 Multiplex notes that some guidance referenced post-dates the guidance appliable to the construction contract. For example:

2.4.1 Section 9.5.8 refers to SHTM 03-01 2014. As Multiplex has previously explained, the version applicable to the construction contract is SHTM 03-01 Part A dated March 2009. Any updates to standards after March 2009 are not matters for which Multiplex bears any responsibility.

2.4.2 Section 9.78 identifies the caution on the use of chilled beams within the interim version of SHTM03-01 dated Feb 2022. The version applicable to the construction contract (SHTM 03-01 Part A dated March 2009) advises "*The use of chilled beams for the provision of heating, cooling and ventilation is increasingly common in healthcare premises.*" The caution is a new addition to the updated guidance as noted by A Bennett in his report sections 7.23, 7.52, 7.53, 8.4 & 8.46 and is not something that could ever have been in the contemplation of the parties when the hospital was designed and constructed.

2.5 Multiplex also notes that a number of issues with regards to the training and hygiene practices of staff, as well as the hygiene practices of patients and visitors are identified by the report. These are matters on which Multiplex considers Greater Glasgow Health Board would be best positioned to comment. However, whilst it acknowledges that it is not an expert on these matters, Multiplex does not consider that it is an unreasonable conclusion that issues with hygiene could be connected to increased rates of infection at the hospital.

2.6 Multiplex is happy to discuss this response with the Inquiry team if it would be of assistance.

SCOTTISH HOSPITALS INQUIRY

QUESTIONS AND COMMENTS

ON THE

EXPERT REPORT PREPARED BY DR SARA MUMFORD & LINDA DEMPSTER DATED 24 MAY 2024

SUBMITTED ON BEHALF OF DR CHRISTINE PETERS

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1. INTRODUCTION

1.1 The following comments and questions on the expert report titled "Review of the Link Between Patient Infections and Identified Unsafe Features of the Water and Ventilation Systems at QEUH/RHC" prepared by Dr Sara Mumford and Linda Dempster dated 24 May 2024 ("Infection Link Report") are submitted on behalf of Dr Christine Peters in accordance with the procedure set out in Appendix B of Direction 5 – in respect of the Hearing Commencing 19 August 2023. References herein to section and paragraph numbers and to defined terms are to such numbers and terms used in the Infection Link Report unless otherwise stated.

1.2 The comments and questions below do not raise new matters. Instead, their purpose is to correct errors, to provide further clarification or to allow the authors to elaborate more fully on points raised in the Infection Link Report.

2. SECTION 3: REPORTING OF HEALTHCARE ASSOCIATED INFECTIONS

2.1 **Para. 3.14, bullet point 5 (Internal HAI reporting):** In terms of internal reporting, the authors of the Infection Link Report state, *"At NHS GGC, the acute IPCC reports to the Board IPCC. The acute IPCC receives reports on HAI and other IPC related issues."* It should be noted that this statement omits the Senior Management Team (SMT) level of governance which reports to the Acute Infection Control Committee (AICC).

2.2 **Para. 3.15, bullet point 2 (External HAI reporting):** Are the authors aware of the limitations in ECOSS data validation and also the permissions required by HPS/ARHAI

to analyse data for trends? It would be helpful if the authors could provide a full explanation of the role and limits of the rights that ARHAI have to monitor trends compared to the NHS boards who "own" the data.

2.3 **Para. 3.17 (Process of Reporting – Post Infection Review)**: Is it the authors view that the Microbiologists involved in treating the case should be involved in the root cause analysis (RCA) process and that all the learning from a case should be communicated to the wider Microbiology team (including the non ICD members of the team)?

2.4 **Para. 3.20 (Process of Reporting):** The authors state, *"Regular reports of HAI are often used to share information with clinical teams. These reports may take the form of integrated dashboards, excel spreadsheets or narrative reports and are distributed to a wide audience. In our experience this is best practice and applies equally to Scotland and other parts of the UK.*" Would the authors agree that for regular reports of HAI to be prepared in accordance with best practice they should include national alert organisms plus locally relevant organisms as reported by the IPCT and Microbiology colleagues? For the regular reports of HAI being prepared for QEUH/RHC over the past 9 years, do the authors know what locally relevant organisms were being looked for? If they do, please can they advise.

2.5 **Para. 3.23 (Process of Reporting – Board reporting):** Has there been any attempt by the authors to analyse the information shared with the Board in comparison with what was going on in QEUH since 2015 to date? The reason this comparison is necessary is because Board meetings are held in public. However, not all issues affecting the QEUH/RHC at any point are presented at those public meetings. Instead, some issues are reported at other non-public meetings. Therefore, in Dr Peters' opinion, the issues presented at those non-public meetings should be analysed and compared with the issues being discussed in public to assess the extent of candour regarding HAIs.

2.6 **Para. 3.25 (Potential issues and areas of failure – Communication):** Do the authors consider that the risk of a Microbiologist not flagging up a case of interest outweighs the risk of an IPCT being informed twice about the same case?

2.7 **Para. 3.38 (Potential areas for improvement)**: Would the authors consider the storing of isolates, despite immediate obvious links for potential future typing, to be a reasonable practice?

3. CHAPTER 4: EXECUTIVE SUMMARY

3.1 **Para. 4.15:** The authors state, *"The existence of a link between infections and the water system appeared to have been accepted when the patients from wards 2A and 2B were moved to ward 6A and 4B(BMT) in QEUH so that 2A and 2B could be refurbished. This major refurbishment work was extended to include the ventilation system and patients returned to wards 2A and 2B in March 2022."*

3.2 Please can the authors clarify who accepted the existence of a link? This clarification is required because, at the time, the ICDs who were of this opinion were fighting an uphill battle to get this accepted by the wider NHS management, including IPCT, Estates and fellow Microbiologists.

4. CHAPTER 5: METHODOLOGY

4.1 **Para. 5.5:** Do the authors accept that the probability of finding a typing match is significantly reduced by factors such as: slowness to test water (e.g., 2017 *Stenotrophomonas* cases); interventions before testing (e.g., cleaning drains in Ward 6A and cleaning showerheads in Ward 2A); lack of a systematic analysis of environmental typing and patient typing; only one isolate being typed when a range of types can be present in an individual; and a lack of appreciation of how biofilm organisms behave? Further, do the authors accept that the likelihood of finding an exact match is low in organisms of great genetic variability and the limitations of the sampling and typing strategies employed over a long period of time?

4.2 **Para. 5.13:** Dr Peters has concerns about the adequacy of the data which was provided to the authors by NHSGGC. Can the authors advise what attempts have been made to independently validate the data? Is it the case that ARHAI are unable to validate due to data restrictions and how does this fit with a concept of independent scrutiny of GGC? It may be of assistance for the authors to know that Kathleen Harvey Wood, a Health Care Clinical Scientist, curated a database of typing results for a number of years which may provide a useful cross-check of the data provided by NHSGGC.

4.3 **Para. 5.16:** Can the authors advise if there is a reason why the Microbiologists involved in identifying the problems at the QEUH/RHC were not included in the invite to attend the onsite visit?

5. CHAPTER 7: WHAT IS A RELEVANT INFECTION?

5.1 **Para. 7.11**: The authors advise that they *"did not have access to the Electronic Communication of Surveillance in Scotland (ECOSS) system or the Central Line Associated Blood Stream Infection (CLABSI) surveillance system used in previous analyses".* Is there a reason why this access was not obtained?

6. CHAPTER 8: THE SCOPE OF THE REPORT AND THE BODY OF EVIDENCE CONSIDERED

6.1 **Para. 8.3:** The authors state that, *"[a]lthough many of the patients admitted to the Schiehallion Unit were day case admissions, their unique susceptibility and frequency of attendance means that any infection they acquire has been taken as healthcare associated in this report and their infections and data have been included in the analysis."* The authors' position on day case admissions stands in marked contrast to that of GGC. The authors are requested to comment on the following hypothesis that was repeatedly provided to Dr Peters by GGC to explain the microbiology, clinical presentations and epidemiology in such day case admissions:

- Braehead, a local shopping centre, was more likely a source of the infection than the hospital (even though no procedures are carried out there).
- The infections at issue were all translocation from the gut.

7. CHAPTER 9: ANALYSIS

7.1 **Para. 9.8:** The authors state, *"In our view this inability to see an overview of infections, typing and environmental data due to poor record keeping would prevent the clarity needed to identify the environmental risks."* In relation to the criticism of the record keeping, are the authors aware of the typing results and databases that were curated by Kathleen Harvey Wood? To Dr Peters' knowledge, the Case Note Review (CNR) was not made aware of these results and databases. As a result, the CNR recommended that a database of all typing results should be established and maintained. While such a database was put in place following the CNR, there were a number of significant problems with it. Have the authors been advised if this database is still maintained and

used? If it is, can the authors comment on whether it is now fit for purpose? If it is not, how are NHSGGC currently addressing the problem identified by the CNR?

7.2 **Para 9.15 (Patient environment):** Dr Peters' concerns were wider than the failure to follow the SOP for the Terminal Clean of Isolation Rooms (see reference to the SOP at fn 78) but extended to the cleaning methodology implemented throughout the hospital. Are the authors aware that the standard protocol for cleaning throughout the hospital (not high-risk areas) was to use a microfibre mop without any cleaning agent? What are the authors views on this?

7.3 **Para. 9.16 (Patient environment):** The authors note that "[t]here is no mention in these protocols of adjunct environmental decontamination using HPV and UV-C light". As a point of correction, it should be noted that Dr Peters implemented HPV in the cystic fibrosis wards; a measure which is still in place. Dr Peters can provide emails on this to demonstrate the efforts which were made to ensure cleaning for a very high risk group. Dr Peters experienced significant opposition by the IPC SMT to this endeavour and it was only through the efforts of the Clinical team that this was established as a regular intervention for a terminal clean.

7.4 **Para. 9.24 (Direct aerosol transmission):** As a point of clarification, do the authors mean Nontuberculous Mycobacterial species rather than Tuberculosis in the context of water sources which is person to person?

7.5 **Para. 9.34, bullet point 5 (Infection incidents associated with the Schiehallion Unit, 2017):** Have the authors been able to ascertain whether any action taken by Estates would have made the water sampling less likely to be positive, *i.e.,* changing showerheads (as mentioned in the testimony of the mother of Milly Main) or treatments of the water? Further do the authors have information regarding the specific water outlets tested and how they related to the infected patients' journey and exposure to outlets?

7.6 Do the authors consider the water testing strategy to have been adequate to rule out water as a source in the particular instance of Milly Main?

7.7 **Para. 9.37 (Infection incidents associated with the Schiehallion Unit, 2019):** The authors mention aspergillus and fungal cases – has any data been provided by NHSGGC regarding patients given treatment dosing of Antifungals over the time period as well

as bio marker results, and all fungal positive cultures? This data would be useful to have a full assessment of the likely rates of invasive fungal infections.

7.8 What is the authors' assessment of the change in view of the IMT given the evidence they have? Was the ward a safe environment?

7.9 **Para. 9.42 *et seq* (Water System):** The Infection Link Report does not refer to the Stage 1 Whistleblow which took place in September 2017. The risk posed by this omission is a mistaken impression that no one at QEUH had any concerns about the risks to patient safety and care from the built environment. In fact, Dr Deshpande was pushing for water testing in the summer of 2017. Please can the authors include this important step and provide any additional comment. Information about the Stage 1 Whistleblow can be provided on request if that would assist.

7.10 **Para. 9.101 (Evidence source 2: patterns of infection)**: Would the authors agree that the implementation of mobile HEPAs, in the light of new research, is not able to exclude aerosol use and the positioning and eACH (a metric used to measure air cleaning devices) was possibly sub-optimal? Therefore, would the authors also agree that the aerosol route was not entirely mitigated, particularly with the supply not being HEPA filtered?

7.11 **Para. 9.150 (Other reporting):** In this paragraph, the authors state, *"In the August 2018 HPS/HFS report the authors state that 'testing of the organisms in this incident has not provided an exact link to the patient cases and the water system. Testing in an incident like this can be difficult and should only be used to include cases rather than exclude'."* Of note is that, in their response to the PPP, NHSGGC quote the first half of the statement, regarding no "exact link", but ignore the part about not being possible to exclude. Do the authors of the Infection Link Report consider this to be a misrepresentation of the conclusions of that report?

8. CONCLUSION

8.1 In relation to the above and the Infection Link Report more generally, Dr Peters would be happy to provide further input, information and/or clarification as required.

Helen Watts KC and Leigh Lawrie, Advocate

On behalf of Dr Christine Peters

15 July 2024

In The Scottish Hospitals Inquiry

Response by IBI Group (UK) Limited to the Expert Report by Dr Sara Mumford and Linda Dempster entitled "Review of the link between patient infections and identified unsafe features of the water and ventilation systems at QEUH/RHC"

1. IBI welcomes the opportunity to respond to this report.

2. In terms of which particular aspects of the built environment may be linked to patient infections, until the remaining three reports have been fully considered, IBI is unable to form a final position on the aspects of these reports upon which Dr Mumford and Ms Dempster rely in forming their conclusions.

3. IBI will revisit this report as soon as that process has been concluded on 25 July 2024.

Dated this 15th day of July 2024

Murdo MacLeod KC

Barney Ross, Advocate

Womble Bond Dickinson (UK) LLP

SCOTTISH HOSPITALS INQUIRY

REVIEW BY NHSGGC

OF

REPORT FROM

DR SARA MUMFORD AND MRS LINDA DEMPSTER

DATED 24 MAY 2024

[1] A joint report from Dr Sara Mumford and Mrs Linda Dempster, dated 24 May 2024, has been disclosed to core participants. With reference to Scottish Hospitals Inquiry Direction 5, Appendix B at para 2.1, specific questions to be asked of the authors of the report, and specific comments on the substance of the report, are set out below. The questions and comments raise new matters or issues insofar as they relate to matters either not covered or not fully addressed in the report.

Key Themes of questions and comments on report

[2] Questions and comments on behalf of NHSGGC on the joint report from Dr Mumford and Mrs Dempster relate to 9 main themes, principally:

(i) the independence of the witnesses and their reliance on the flawed analyses set out in the reports of Dr Walker and Mr Mookerjee;
(ii) misunderstanding of the Scottish context;
(iii) approach to "contamination";
(iv) water surveillance;
(v) definition of "environmental pathogens";
(vi) use of Schiehallion patient cohort as proxy for wider patient population;
(vii) use of Statistical Process Control charts;
(viii) use of IMT theories and risk mitigation as evidence of environmental link; and
(ix) implied failures in NHSGGC Infection Prevention and Control/ laboratory management.

Independence of the witnesses/ reliance on flawed analyses in other reports

[3] At para 2.6, the witnesses assert, quite properly, that they "acknowledge and accept the necessity of expressing an independent opinion which is the product of our own consideration and research and that we have complied with the duty to do so." The report which follows, however, is heavily reliant on the analysis and opinions put forward by others, notably Dr Walker and Mr Mookerjee. The methodology and conclusions of the reports by Dr Walker and Mr Mookerjee have been challenged by NHSGGC. Given the significant reliance by Dr Mumford and Mrs Dempster on the reports from Dr Walker and Mr Mookerjee, the same fundamental issues arise with the report from Dr Mumford and Mrs Dempster.

[4] For opinion evidence to have any validity, it requires to be given on the basis of an established factual matrix. The factual matrix relied upon by Dr Mumford and Mrs Dempster would appear to be the opinions offered by other witnesses. The whole premise of the report is centred around the opinions of Dr Walker and Mr Mookerjee being categorised as fact. The opinions offered by Dr Mumford and Mrs Dempster are little more than an agreement that the methodology and conclusions of Dr Walker and Mr Mookerjee are accurate in every respect, with no independent or critical analysis put forward as to their reasoning.

[5] Whilst authors uncritically accept the conclusions of the reports from Dr Walker and Mr Mookerjee, the conclusions of the reports from other experts and organisations are almost entirely dismissed, including those from: ARHAI (formally HPS); Queen Elizabeth University Hospitals Independent Review by Dr Montgomery and Dr Fraser; Dr John Hood; Prof Alistair Leanord; Prof Tom Evans; and Dr Ian Kennedy.

[6] NHSGGC has raised a significant number of issues with the methodology and conclusions of the reports of Dr Walker, including his unclear and unrealistic approach to risk assessment; his selection of isolated data points to support his opinion whilst ignoring data, context and published evidence which refutes it; and his assessment of the QEUH/ RHC water system as "contaminated," without explanation as to what particular threshold he applies to determine "contamination" in relation to any particular micro-organism.

[7] Further, NHSGGC has raised significant concerns in relation to the report from Mr Mookerjee, not least the fundamental error in the approach to the admission denominators which were used for the purpose of his comparison exercise, which invalidates his calculations of blood stream infection rates and comparator analysis.

[8] At para 6.10, the reports states that, amongst the material considered by the authors in their report, was "statistical analysis of the patterns of infection seen at QEUH/RHC" which was used "to identify unusual occurrences and correlate them with known incident/ outbreak interventions." Assuming this to be a reference to Mr Mookerjee's report, his report does not contain any such statistical analysis. The only statistical analysis put forward by Mr Mookerjee is an interpretation of a Pearson correlation between annual blood stream infection rate and annual "water positivity" rate. This analysis has been challenged by NHSGGC.

[9] The report of Dr Mumford and Mrs Dempster contains numerous statements which have been lifted almost verbatim from the reports of Dr Walker and Mr Mookerjee, including errors in the reports from Dr Walker and Mr Mookerjee which have been transplanted into their own report. These statements are variously relied upon by Dr Mumford and Mrs Dempster in support of what they offer as conclusions.

[10] Given that the position of Dr Mumford and Mrs Dempster is wholly predicated on the assumption that Dr Walker and Mr Mookerjee's reports are entirely accurate, the content of their report loses validity in the event of criticisms of the Walker and Mookerjee reports being accepted. Dr Mumford and Mrs Dempster are invited to consider the questions and comments on the Dr Walker and Mr Mookerjee reports which have been submitted by NHSGGC.

Misunderstanding of Scottish context

[11] The authors have made fundamental mistakes in their descriptions of local systems and the national systems in Scotland for infection prevention and control, the structure of IPC staff and systems of surveillance and monitoring. This may reflect their own lack of experience and expertise in the Scottish system and in a large complex health board such as NHS GGC.

"Contamination" of QEUH/ RHC water system

[12] The witnesses refer to the water system at QEUH/ RHC as being shown to be "contaminated." The witnesses do not define what they mean by "contaminated" and do not offer any explanation or threshold as to what would constitute "contamination" of a water system by any particular micro-organism. This reference would appear to be a repetition of the position as put forward by Dr Walker.

[13] At para 9.50, the report references the water testing reports prepared by Dr Dominique Chaput in support of the assertion that the water system at QEUH/ RHC was "contaminated." Dr Chaput's reports do not make any such conclusion, either implicitly or explicitly. Dr Chaput's reports do not, at any point, state that the water systems were "contaminated."

[14] At para 9.22, the report states that "the concentration of organisms in the water and waste water system can be assumed to play a role in the likelihood of patients developing infections caused by environmental organisms in some measure." The authors are invited to explain the basis for this assumption. The authors do no state what concentration would present a risk.

[15] At para 9.32, the report states "All modes of transmission could have potentially played a role in the high numbers of infections seen related to the Schiehallion patients. Where the water is contaminated to a high degree and the number of air changes in a room are low… the opportunity for micro-organisms to contaminate flat surfaces and equipment is greater and aerosols and droplets remain airborne for longer." It is not clear if the authors' position is that the water was "contaminated to a high degree" in the Schiehallion wards. If so, it is not clear what is meant by a high degree of contamination or what the evidence is for such a proposition.

[16] Para 9.51 implies that the QEUH/RHC water system is colonised by Legionella pneumophilia serogroup 1 from the outlets to the "deep infrastructure" and that this represents an additional risk of infection to patients. The data and the report shared with the Inquiry and the authors of the report clearly show that there is no Legionella problem at the QEUH/RHC. This paragraph is largely lifted from Dr Walker's report. If the authors maintain, as they assert, that "Legionella can be used as a proxy marker of widespread microbial contamination," then the near absence of Legionella in the new buildings at the QEUH/RHC would suggest that widespread microbial contamination is not an issue.

Water surveillance

[17] At para 4.8, the report refers to a steady increase in blood stream infections from 2016 and states "We have seen no evidence that there was any over-arching surveillance of environmental organisms despite the frequency with which they were occurring." It is not clear whether the authors mean clinical surveillance in terms of making the organisms alert organisms. At all times, NHSGGC complied with the surveillance requirements as set out in

the National Infection Prevention and Control Manual, and in fact exceeded requirements as detailed in para 19 below.

[18] At para 9.33, the authors make reference to water sampling carried out from wards 2A/2B in 2016 and state that "in our experience, this is below the expected level of sampling and testing of a high-risk area such as the Schiehallion unit." The authors make no reference to what they suggest is the usual or "expected" level of sampling and testing. The authors are invited to expand upon their experience of water testing in other large hospitals and what level of sampling and testing was being carried out elsewhere in 2016.

[19] Tens of thousands of water tests were carried out within QEUH/ RHC from this point. From the opening of the hospital in 2015, clinical cases of Pseudomonas in high risk units were referred to ICPT, in terms of the National Infection Prevention and Control Manual. From 2016, all Serratia marcescens in high risk units were added into this process this was in addition to what was included in the manual and was not mandatory. In July 2017, Acinetobacter and Stenotrophomonas were also included as alert organisms when the National Manual was updated. There was no national guidance or impact assessment developed to support this change in national policy. NHSGGC implemented these changes immediately. The assertion by the authors ignores the work of the IMT in investigating cases of infection. The implication that there was no surveillance is incorrect. NHSGGC has conducted, and continues to conduct, more surveillance of its water system than any other NHS board.

Definition of "environmental pathogens"

[20] At para 7.3, the authors state that "environmental pathogens" can be defined as "micro-organisms that normally spend a substantial part of their lifecycle outside human hosts in the environment, but when introduced to humans cause disease with measurable frequency", citing a key report from the American Academy of Microbiology. However, like Dr Walker and Mr Mookerjee, the authors then include bacterial and fungal taxa in their report that do not meet this definition and whose inclusion under the term "environmental pathogens" is not supported by the cited reference.

[21] The authors have included enteric bacteria (i.e. associated with the human gut) and the yeasts Candida and Rhodotorula (i.e. human commensals). These taxa do not "spend a substantial part of their lifecycle outside human hosts" and would not be considered

"waterborne" by any reasonable definition. Furthermore, the extensive water testing data shared with the expert panel clearly shows that these organisms are vanishingly rare in water samples.

[22] The authors have also included gram negative bacteria and fungal taxa (e.g. moulds) that are widespread in water distribution systems but for which there are few or no case reports of human disease, and that are exceptionally rare in or absent from NHSGGC infection data shared with the expert panel. These taxa do not "cause disease with measurable frequency". The authors are invited to explain the approach taken to their selection of environmental pathogens.

Use of Schiehallion patient cohort as proxy for wider hospital population

[23] At para 4.5, the authors state that their report "reviews the infection events overall and in following the Schiehallion Unit cohort of patients, uses this group as a proxy for the wider hospital population. This approach removes variation in the patient risk factors due to their underlying illnesses and therefore looks at non-patient variables in seeking to understand the causes of the infections seen." The use of the most vulnerable group as a proxy for all patients does not remove risk factors due to their underlying illnesses. The opposite is true. There are patient factors that are quite specific to that cohort that do not apply to the hospital population as a whole. For this reason, it is not appropriate to use the Schiehallion patient cohort as a proxy for the wider hospital population.

Use of Statistical Process Control charts

[24] The report criticises the use of SPC charts and discusses how they should be used instead. SPC charts were the standard used by ARHAI and were the method adopted by HPS and NHSGGC. NHSGGC do not use SPC charts as the authors have described at paras 9.106-9.112, but rather as the authors say these charts should be used.

Use of IMT theories and risk mitigation as evidence of environmental link

[25] Other possible causes, including issues with practice, were discussed at IMTs, and furthermore, considering a possible environmental link is not, in itself, evidence of such a link.

Similarly, the implementation of risk mitigation measures is used as evidence that an environmental link was known and accepted, when in reality, good practice is to implement mitigation measures proactively while investigations are being carried out. They are not, in themselves, evidence of an environmental link.

Implied failures in NHSGGC Infection Prevention and Control/ laboratory management

[26] At paras 3.25- 3.35, the report sets out "Potential issues and areas of failure." This section is ambiguous. It is unclear whether these are included as general issues that could apply to any health board or whether the authors suggest that these are failures in NHSGGC. The authors are invited set out whether they are aware of any areas where NHSGGC did not comply with national guidance or experienced these failures.

[27] In particular, the authors' statement at para 3.30 that "the lack of an open culture that supports the reporting of cases/ incidents in an honest manner leads to a failure in recognising the learning and ensuring that those lessons are learnt and shared within the organisation, ultimately resulting in the same errors occurring" bears to question the honesty and integrity of NHSGGC staff. This is an egregious statement and one which calls for an explanation.

[28] Further, the report directs undue criticism at NHSGCC laboratory and data management staff, asserting, at para 9.133, that "there has been no standardised methodology recorded for either taking samples, labelling or culturing organisms from the water and drainage samples." NHSGGC laboratories are UKAS-accredited and operate according to strict SOPs with all patient and environmental data being obtained and managed with accuracy and integrity.

[29] NHSGGC Microbiology Standard Laboratory Procedure - "LP509 – Investigation of Blood Cultures" is included in the ISO 15189 UKAS Accreditation Scope of Practice and is consistent with the UK Standards for Microbiology Investigations (SMIs). The laboratory procedure identifies all blood culture isolates where possible and this has always been the case. NHSGGC Microbiology Standard laboratory Procedure "MP512 - Control of Clinical Material" details the storage and retention of isolates. "LP538 – Non Legionella Water Testing" describes the retention of water isolates.

Peter Gray KC

and

Emma Toner, Advocate

15 July 2024

Scottish Hospitals Inquiry

NHS National Services Scotland response to the report by Dr Sara Mumford and Linda Dempster ('Review of the Link Between Patient Infections and Identified Unsafe Features of the Water and Ventilation Systems at QEUH/RHC')

1. In this response, NHS National Services Scotland ("NSS") responds to the report submitted by Dr Mumford and Ms Dempster on 24 May 2024.

General comments

2. NSS has already provided responses to the reports of Sid Mookerjee and Dr J.T. Walker. The report of Dr Mumford and Ms Dempster relies heavily on those earlier reports, particularly that of Mr Mookerjee. For the sake of brevity, NSS will not restate the earlier responses in full. But they should be read together with this response. If Mr Mookerjee is able to provide the various clarifications requested, they may give rise to further comments on the report of Dr Mumford and Ms Dempster.

3. It is not always clear where Dr Mumford and Ms Dempster have done their own primary analysis rather than relying on analysis by the authors of other reports. See, for example, the comments on paras. 5.13 and 6.10 below. This can make it difficult to comment on the basis for Dr Mumford and Ms Dempster's conclusions.

Specific comments

4. At para. 3.13, there is a reference to "post infection review". Formal Post Infection Reviews are exclusive to NHS England and they are not carried out in Scotland. However, NHS Scotland has its own systems for reporting infections, including DATIX, Severe Adverse Event Reports, and use of the Healthcare Infection Incident and Outbreak Reporting Template ("HIIORT").

5. Para. 3.15 states that "In Scotland there are national mandatory reporting requirements for MRSA, MSSA, CDI, E. coli. . ." For the avoidance of doubt, NSS notes that the national reporting requirements do not apply to <u>all</u> MRSA, MSSA, and E.coli – they just apply to MRSA, MSSA, and E.coli bacteraemia.

6. Para. 5.12 states that the Schiehallion Unit "is in effect used as a proxy for the hospitals as a whole to identify overall risk." It would be useful if Dr Mumford and Ms Dempster could explain why this approach has been taken. On the face of it, the Schiehallion Unit is not representative of either the whole patient population or the whole healthcare environment.

7. Para. 5.13 notes that a data extract was obtained "but the authors and Sid Mookerjee have not been able to independently validate the data set." It is not clear if there was separate analysis conducted by Dr Mumford and Ms Dempster.

8. 6.10 refers to "unusual occurrances". It would be helpful to understand exactly what is meant by an unusual occurance, and whether the unusual occurrances are taken from the Mookerjee report.

9. With regard to para. 7.15, NSS notes that ARHAI are currently conducting a systematic literature review into "Infection prevention and control (IPC) for safe healthcare water systems". Once complete, this will inform any updates to the non-exhaustive list of environmental organisms in Appendix 13 of the National Infection Prevention and Control Manual. NSS also notes that each of the additional organisms set out in para. 7.15 was included in HPS's October 2019 "Review of NHSGG&C paediatric haemato-onclology data".

10. Para. 9.2 states there has been a NIPCM in Scotland "since 13 January 2013." In fact, the NIPCM was first published on 13 January 2012.

11. Para. 9.4 states that the NIPCM "defines healthcare infection incidents as follows" with four bullets. For clarity, Chapter 3 of the NIPCM defines healthcare infections, outbreaks and data exceedance in order to support territorial NHS Boards in their detection and recognition of infection related incidents. There are 6 definitions, not 4.

12. Para. 9.36 discusses two cases of infection that "were HAI". NSS notes that an IMT sub-group was set up (of which it was initially a member) to investigate several hypotheses. These hypotheses included but were not limited to HAI.

13. Para. 9.48 references the 2018 "HPS HFS report on the water contamination incident". This was an HPS report, rather than a joint HPS and HFS report.

14. Para. 9.50 references the 'Report on the findings of NHS Greater Glasgow and Clyde: Queen Elizabeth University Hopsital/Royal Hospital for Children water contamination incident and recommendations for NHS Scotland'. NSS refers to its response to the report of Dr J.T. Walker. In particular, this was a draft report that was never finalised. The word "DRAFT" appears in large letters diagnonally across the report's front. This comment also applies to other references to the report (e.g. at para. 150).

15. Paras. 9.106 and 9.108 discuss SPC charts. NSS agrees that SPC charts have limitations, particularly when the number of cases is small. The report featuring the SPC charts was a management information document requested to support a live incident. It was drafted under time-pressure, comparative data from NHS England was unavailable, and the report was never intended to be a definitive epidemiological study.

16. Para. 9.112 states that the SPC charts "fail to show the increased risk and do not assess the situation accurately." The report featuring the SPC charts was not written for the purpose of showing increased risk. The IMT had already established an increase in the number of cases. The purpose of the report, as commissioned by the Scottish Government, was to review several sources of information that were being presented to the Scottish Government.

17. Para. 11.24 states that "the move to ward 6A was an additional risk for this cohort of patients." The move has to be seen in context. There was an urgent need to vacate wards 2A/2B in order to allow estates work to be carried out. Patients could not viably have remained in place while this happened.

18. The 'Queen Elizabeth University Hospital/ NHS Greater Glasgow and Clyde Oversight Board: final report' included the following recommendation:

> "Where there are a number of successive infection incidents in the same or a related location, NHS GGC should work with ARHAI Scotland to pilot a process that goes beyond the current IMT focus on individual incidents on behalf of NHS Scotland."

In response to this, NSS ARHAI has developed an Electronic Outbreak Reporting Tool (ORT). This tool allows NHS Boards to visualise all their reported incidents and

outbreaks within an E-VIZ platform. The tool allows Health Boards to interrogate their data by clinical area, making the intelligence accessible. NSS acknowledges that the ORT has been designed and supported from limited resources within ARHAI. There are a number of improvements that could be made. For example, if there was a web-based reporting tool it would make reporting less time intensive for Health Boards. However, this would require significant investment. [Outbreak Reporting Tool Protocol (scot.nhs.uk)]

National Services Scotland

15 July 2024

NHS National Services Scotland

Protocol for the Reporting of Healthcare Infection Incidents, Outbreaks and Data Exceedance in NHSScotland through the Outbreak Reporting Tool (ORT)

Version 1.4

December 2023

ARHAI Scotland
Antimicrobial Resistance and Healthcare Associated Infection

A49387878

General enquiries and contact details

If you have any enquiries or comments on this protocol or in conducting surveillance, please direct your queries in the first instance to:

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Contents

Aims and objectives

Antimicrobial Resistance and Healthcare Associated Infection (ARHAI) Scotland is responsible for the coordinating of national surveillance and reporting of healthcare associated infections and the monitoring of antimicrobial resistance and antimicrobial prescribing.

One of the core functions of ARHAI Scotland is to work with stakeholders to facilitate an effective response to incidents and outbreaks within healthcare settings, especially those which are likely to severely test the NHS and other public services.

Circumstances can arise when the health of the population may be at risk because groups of individuals are exposed, or at risk of being exposed, to the following:

- infectious disease
- high levels of a hazardous substance
- adverse environmental conditions

These situations are public health incidents and along with NHS boards, ARHAI Scotland must provide supportive actions to protect public health.

The Outbreak Reporting Tool (ORT) aims to accurately record health and care incidents and outbreaks facilitating the collation of epidemiological data and lessons learned which contribute to the development of national guidance and help inform local incident and outbreak management.

Reporting requirements for incidents and outbreaks

Definitions of a healthcare incident, outbreak or data exceedance are included in Chapter 3 of the National Infection Prevention and Control Manual (NIPCM).

It is the responsibility of NHS boards to ensure incidents, outbreaks and data exceedances are reported to ARHAI Scotland in line with the protocol, the Healthcare Infection Incident Assessment Tool (HIIAT) and the NICPM.

Following the identification of an incident/outbreak according to the NIPCM, a HIIAT assessment (Red, Amber or Green) should be performed and the incident/outbreak should be reported to ARHAI Scotland through the Outbreak Reporting Tool (ORT), using the corresponding form for that incident/outbreak type.

Incidents/outbreaks from key respiratory viruses which do not require ARHAI support can be reported through the Respiratory Short Form. All other incidents/outbreaks, as identified in line with the NIPCM, should be reported through the HIIORT form.

HIIORT Form

HIIORT Incidents and Outbreaks

The Healthcare Infection Incident and Outbreak Reporting Template (HIIORT) form is for any HIIAT Red, Amber or Green assessed incident/outbreak.

Note: Respiratory incidents/outbreaks from key respiratory pathogens (COVID-19, influenza and respiratory syncytial virus (RSV)), where Infection Prevention and Control (IPC) measures align with the checklist and NIPCM and where ARHAI support is not requested can be reported through the Respiratory Short Form (see below).

Non-Hospital Incidents and Outbreaks

Any incidents/outbreaks which occur in a non-hospital setting i.e. care home, dental practice, GP/health centre, can be reported using the “Non-Hospital” form type on the HIIORT form.

Respiratory Short Form

Reporting of COVID-19, Influenza and RSV through the Short Form

Any incident/outbreak from key respiratory viruses (COVID-19, influenza and respiratory syncytial virus (RSV) only), where IPC measures align with checklist and NIPCM and ARHAI support is **not** requested can be reported through the respiratory short form using a minimum dataset. Incidents/outbreaks should still be HIIAT assessed (Red, Amber or Green).

Frequency of updates to ARHAI Scotland

For incidents/outbreaks that are HIIAT assessed as Red, Amber or Green:

HIIAT Red – review and complete a daily update.

HIIAT Amber– review and complete a twice weekly update.

HIIAT Green – review and complete a weekly update.

These frequencies should continue until the incident/outbreak is closed or unless a change in frequency has been agreed between ARHAI Scotland and the board.

Note: Incidents/outbreaks should not be closed whilst the HIIAT remains at Amber or Red. The HIIAT must have been de-escalated to Green before incidents/outbreaks can be considered for closure.

You must notify ARHAI Scotland in addition to these frequencies if there has been an update in HIIAT assessment or the situation changes significantly. Further information can be found in appendix 14 of the NIPCM.

Reporting by ARHAI Scotland to the Scottish Government Policy Unit

ARHAI Scotland may contact the NHS board for further information on their assessment. Incidents/outbreaks may be sent for onwards communication to the Scottish Government Healthcare Associated Infection Policy Unit (SG HAIPU) in line with Chapter 3 of the NIPCM.

Methods

ORT Process for information capture

This section includes instructions for NHS boards on how to store, handle and complete the Outbreak Reporting Tool (ORT) using the Microsoft (MS) Excel file.

- Each NHS board is responsible for capturing the data as required for local incidents and outbreaks identified according to the National Infection Prevention and Control Manual (NIPCM).
- NHS boards are responsible for locally coordinating the completion of the MS Excel ORT for submission of extracts to ARHAI Scotland.
- **Do not add any patient identifiable information (PII) or staff personal details to any of the data items.**
- Essential fields must be completed, but if the information is not available at the time opening, will not prevent the user from saving the form. Essential and mandatory fields must be completed to save the form.
- Tools are provided at NHS board level or on request and can be issued for a single hospital or group of hospitals within an NHS board. Please contact ARHAI Scotland if any changes to hospital groupings or lists are required.
- There should be **one** master version of each unique tool supplied to NHS board users, where they are named "[Board Name/Location] Outbreak Reporting Tool v1.4". Please archive or delete any old/previous versions of the ORT to avoid confusion.
- The tool must be saved in a secure location but be accessible to all users who may be required to input data.
- Only one user can access the ORT to complete/edit any data at any one time.
- All updates have a date and timestamp and saved internally as a new row within the data extract.
- The saved location for the master ORT will be the same location where exported files will be extracted/saved out to. Please ensure folders have adequate space to store generated exports.
- Exported MS Excel files must be emailed to ARHAI Scotland for processing – the "Export" button within the ORT only saves the extract from the ORT into the folder Extracted data files should be emailed to the ARHAI Scotland ICT mailbox (nss.ARHAIinfectioncontrol@nhs.scot),

- Data extracts produced by the ORT follow the naming format “outbreak-dd-mmm-yyyy hh-mm-v1.4-[Board Name/Location]”.
- All users must ensure that MS Excel Macros are enabled when using the tool. This must be done on an individual basis for all users who require use of the tool:
    - Macros can be **permanently** enabled through personal Excel settings (File > Options > Trust Centre > Trust Centre Settings > Macro Settings > Enable all Macros)
    - Or, users can click to enable macros **each time the file is opened** through the button which should appear below the main toolbar ribbon, but permanent enabling of macros is recommended to avoid possible issues.

How to complete the ORT for new or existing incidents/outbreaks

Figure 1 provides a decision aid for NHS boards to select the appropriate ORT form for new and existing incidents/outbreaks.

- The ORT home page (**“Home”** tab) includes four main action buttons.
    - “**Create New HIIORT Incident/Outbreak**” – opens a blank form for submitting a newly identified HIIORT incident.
    - “**Search for Existing HIIORT Incident/Outbreak**” – use the ID number for an existing HIIORT incident/outbreak to open the completed incident/outbreak form for submitting an update.
    - “**Create and Edit Respiratory Incidents/Outbreaks**” – opens the respiratory short form to complete new incidents/outbreaks or update existing incidents/outbreaks.
    - “**Export Data File for ARHAI**” – exports a data extract for submitting any updates to ARHAI Scotland.

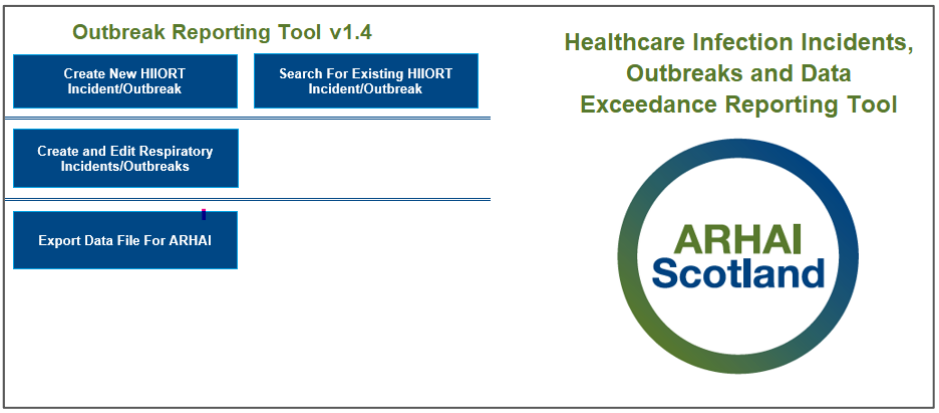
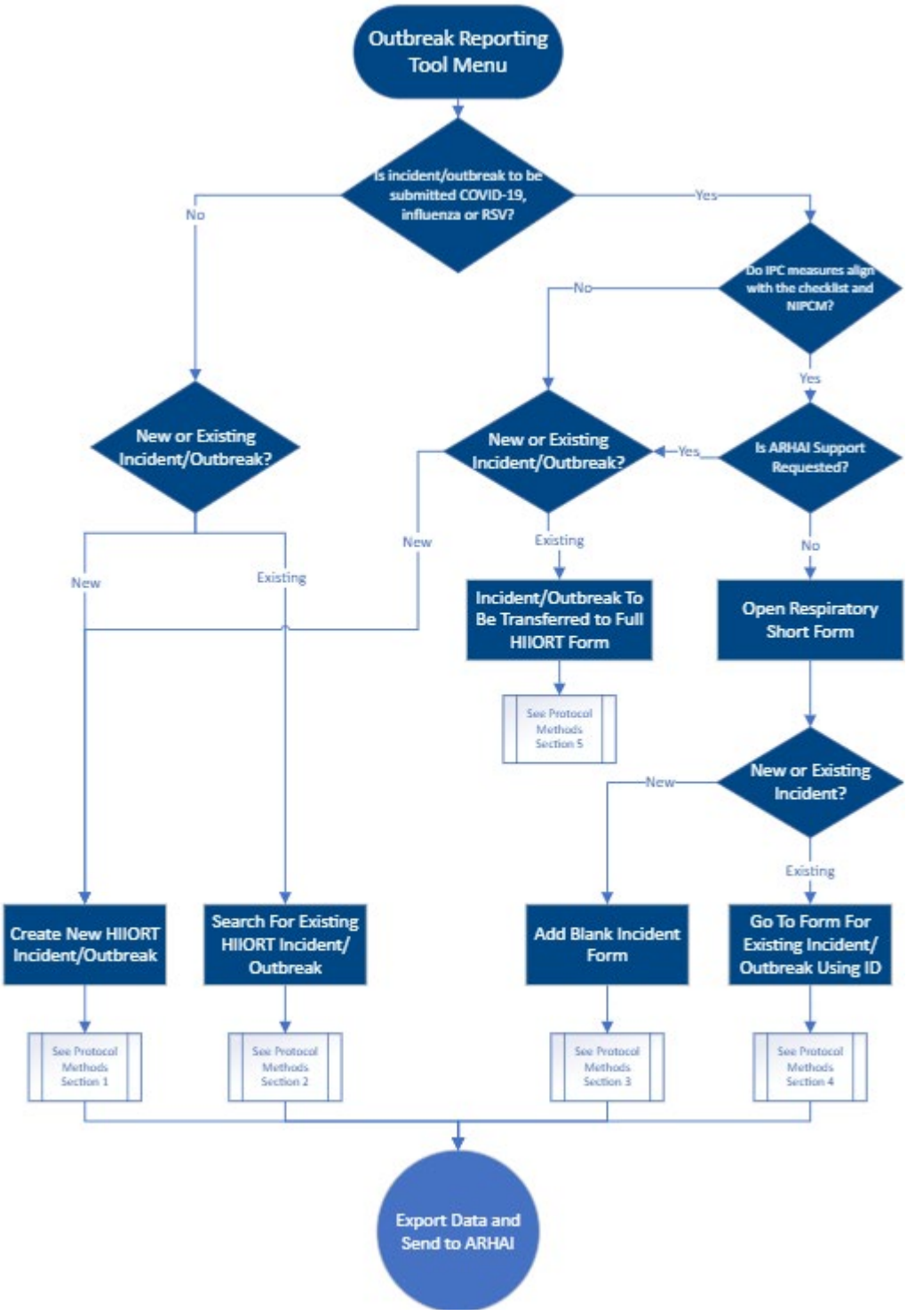


Figure 1: Flowchart of reporting requirements for incidents and outbreaks identified in NHSScotland through the Outbreak Reporting Tool (ORT).



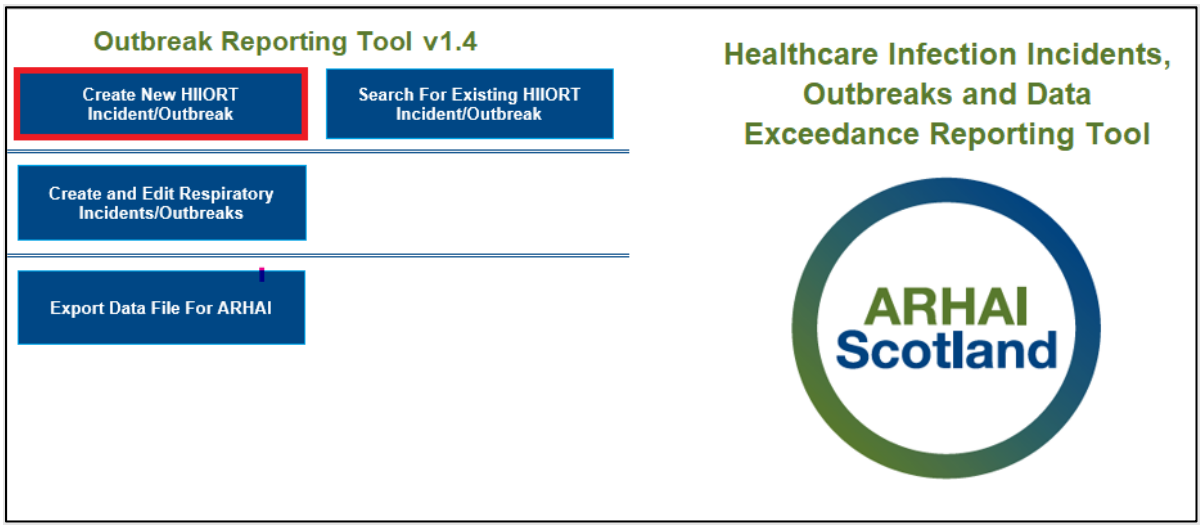
Section 1. Adding new HIIORT incidents/outbreaks

When to add a new HIIORT incident/outbreak

Use the HIIORT incident/outbreak form for all new incidents/outbreaks identified as per Chapter 3 of the NIPCM.

Completing the ORT

- Click the **"Create New HIIORT Incident/Outbreak**" button to take you to a new form.



- Complete the form, starting with the Form Type (i.e. 'HIIORT form', 'Non-Hospital form' – see Reporting Requirements for Incidents and Outbreaks). This will cause some fields to 'grey-out' / appear as appropriate to the incident/outbreak. Details of form questions are outlined in the "Data Items" section below.
- When the form is completed, click the "**Create New Record**" button at the bottom of the form. Then confirm if the data is accurate.

- **You may receive an error message if mandatory fields have not been completed –** please review the data fields as directed in the error message to ensure data are complete and correct. See data items for more information.
- You will receive a message when the record has been successfully saved. Data are now saved within your local version of the ORT.

- To submit further updates, navigate to the **"Home"** tab to the ORT.

- If no more updates are required, then an extract of the data must be emailed to ARHAI Scotland.

Section 2. Amending open HIIORT incidents/outbreaks

Incidents/outbreaks should be updated in line with the HIIAT frequency specified in Appendix 14 of the NIPCM.

Reasons to amend an open HIIORT incident/outbreak

- Confirm a change of contact details for the person completing the update.
- Confirm total number of cases, or add new cases/remove excluded cases to amend the **total** number of cases/deaths, alongside any discussion of these cases within the case summary text box.
- Add new details from Problem Assessment Groups (PAGs) / Incident Management Teams (IMTs) (e.g. update of the investigations being carried out).
- Inform changes as per the Healthcare Infection Incident Assessment Tool (HIIAT).
- Inform changes to the investigations.
- Refine the case definitions or working hypotheses.
- Add lessons learned, media statements or other relevant information.
- Inform the reopening of a ward or closing the incident/outbreak.

For full details of how to complete and amend fields, and which fields are fixed following first submission, please see data items.

When making updates to free text boxes, data entered in the most recent submission is autofilled for review. When submitting a new update, **users should delete out of date content from the box and only include current and new information related to that update**. This will avoid free text boxes from getting too large, and to ensure each update is relative to that date's submission.

Please ensure content is specific to the field in line with the data items section, and not directly copied and pasted from i.e. IMT minutes.

All free text submissions and updates are visible over time on the ARHAI Scotland E-Viz platform.

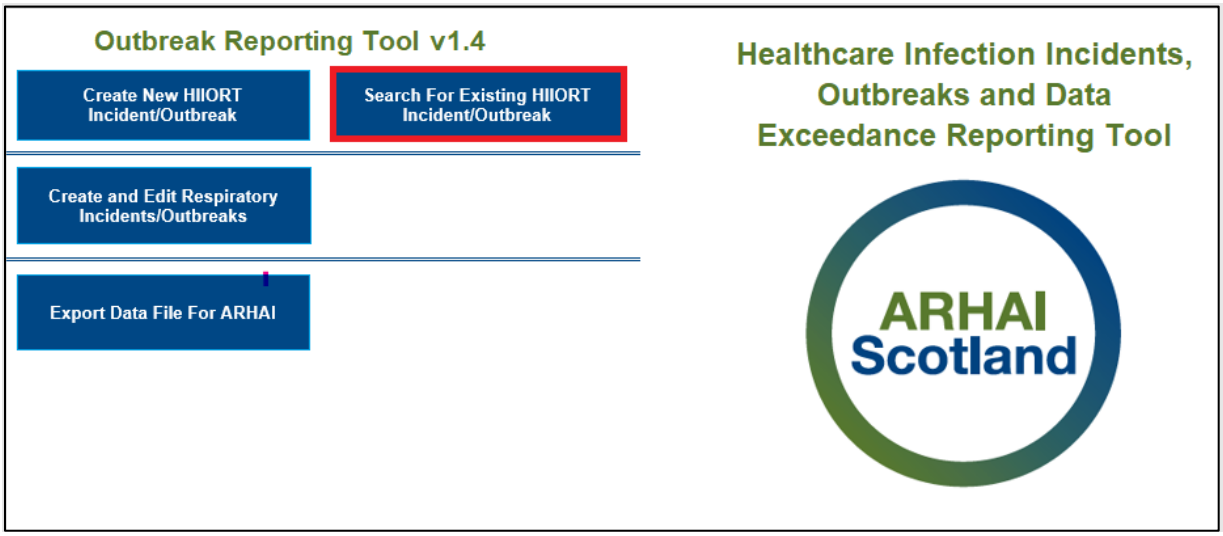
Completing the ORT

- Review the open incidents/outbreaks in the "**HIIORT - Open Incidents**" tab.

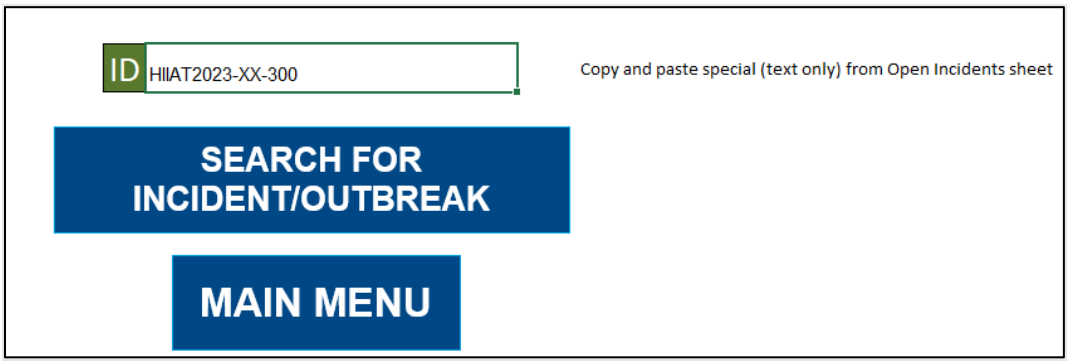
- Copy the incident ID number that is to be amended.

A	B
ID number	Form type
HIIAT2023-XX-300	HIIORT form
HIIAT2023-XX-301	HIIORT form
HIIAT2023-XX-305	HIIORT form
HIIAT2023-XX-309	HIIORT form
HIIAT2023-XX-313	HIIORT form
HIIAT2023-XX-317	HIIORT form
HIIAT2023-XX-321	HIIORT form
HIIAT2023-XX-325	HIIORT form
HIIAT2023-XX-329	HIIORT form

- Navigate to the **"Home"** tab and click on "**Search for Existing HIIORT Incident/Outbreak**". This will open the Search Form tab.



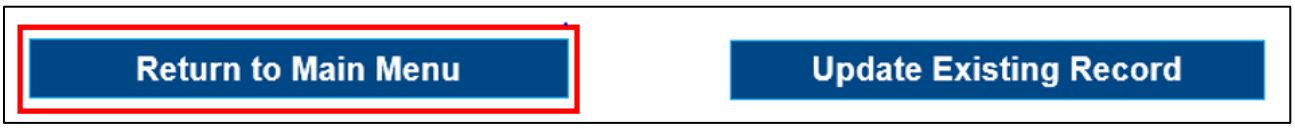
- On the search form, paste the ID number into the search box and click the "**search for incident/outbreak**" button to take you to the search form results.



- The most recent update for the incident/outbreak will load and a pop up will appear.

- Update fields where required (see full descriptions in data items). **Please note that for free text fields including Case Definitions, Case Summary, Investigations and Working Hypothesis, any out-of-date information should be deleted prior to adding information relevant to the current update**. All previously submitted information is retained within the tool against the date it was originally submitted and can be viewed on the ARHAI Scotland E-Viz platform.

- If for any reason, the user has entered data incorrectly and the form has not yet been saved, the user can select "**Return to Main Menu"** at the bottom of the form – this will allow the user to exit the form **without saving** any changes.



- Once the update to the form has been completed, click "**Update Existing Record**" to save data entered. A pop-up should appear if any mandatory fields are blank, and to confirm if the data is complete and has been added successfully.

Important: If multiple updates to a single incident/outbreak are entered on the same calendar day, and submitted to ARHAI Scotland as a single extract, only the latest one on that day will be visible to ARHAI Scotland for review and reporting.

Section 3. Adding new incidents/outbreaks to Respiratory Short Form

When to add a new incident/outbreak to the Respiratory Short Form

The Respiratory Short Form is for COVID-19, influenza and RSV respiratory incidents/outbreaks only, where IPC measures align with the checklist and NIPCM, and where ARHAI support is **not** requested.

Completing the ORT

- On the "**Home**" tab select the "**Create and Edit Respiratory Incidents/Outbreaks**" (Short Form) button to be taken to the "**Respiratory Form**" tab.
- Click the "**Add Blank Incident/Outbreak Form**" button to show the blank data items for a new incident/outbreak. The following data items will be automatically filled:

- **"Date of Update"** is automatically filled to the calendar date when the form was created.
- **"Incident/Outbreak Status"** will be automatically set to "Open",
- "**Should Update Be Saved?"** will be automatically set to "Y" for yes.

- The ID number will auto-generate once the "Hospital" data item and "Organism" data item have both been completed.
- Complete each data item. The Data Items section of this protocol, alongside Appendix 1 and Appendix 2, provide further details.
- Only "Ward / Bay" and "Ward / Bay Specialty if Other" accept free text. Most data items contain a list of options (via dropdown boxes) and others only accept a particular data type (i.e. whole numbers or dates in DD/MM/YYYY format).
- Multiple incidents/outbreaks can be added at the same time by repeating the above process as required. Each new incident/outbreak added will appear under the previous one as an alternating colour (green/blue) to visually differentiate.
- If there is an incident/outbreak on the list where no updates are available at present, and you do not wish to submit an update, then change the **"Should Update Be Saved"** data field to "N" to exclude from saving any changes to that incident/outbreak whilst submitting other updates to ARHAI Scotland.
- When the form is complete, there are two options to save forms:

1. Click the **"Save All Incidents/Outbreaks"** button to save all and update the timestamps. This will update in the **"Data and Time of Last Update**" data item. **These timestamps will update even if data was not amended.**

OR

2. Click the "**Save Selected Incidents/Outbreaks**" button to **save those where "Should Update Be Saved?"** is selected as **"Y"**, then confirm if the data is accurate.

- Open incidents/outbreaks will become visible in the **"Respiratory – Open Incidents"** tab.

Section 4. Amending open incidents/outbreaks within the Respiratory Short Form

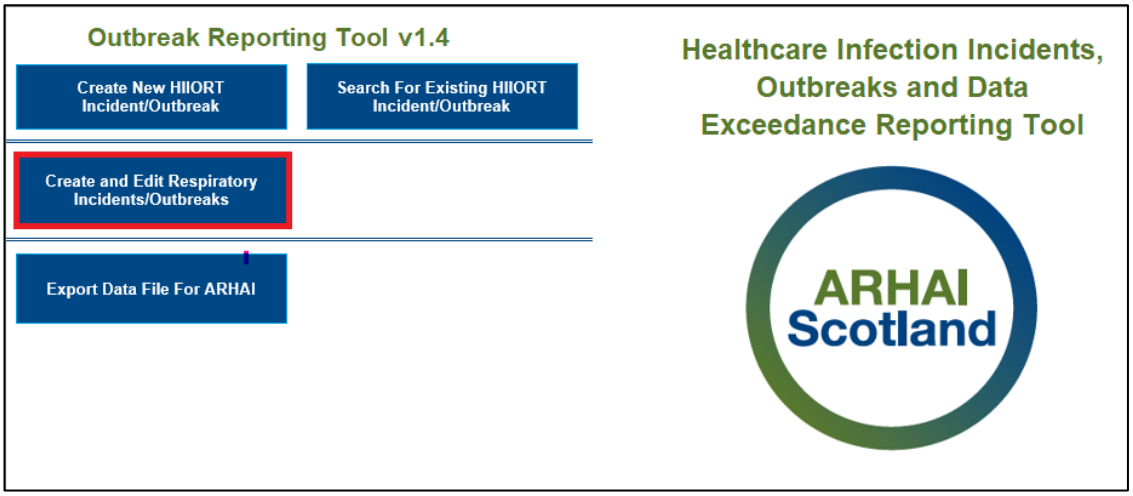
Incidents/outbreaks should be updated in line with the HIIAT frequency specified above and as per Appendix 14 of the NIPCM.

Reasons to amend an open HIIORT incident/outbreak

- Confirm total number of cases or add new cases/remove excluded cases to amend the **total** number of cases / deaths.
- Inform changes as per Healthcare Infection Incident Assessment Tool (HIIAT).
- Inform the reopening of a ward or closing the incident/outbreak.

For full details of how to complete and amend fields, and which fields are fixed following first submission, please see data items.

Completing the ORT

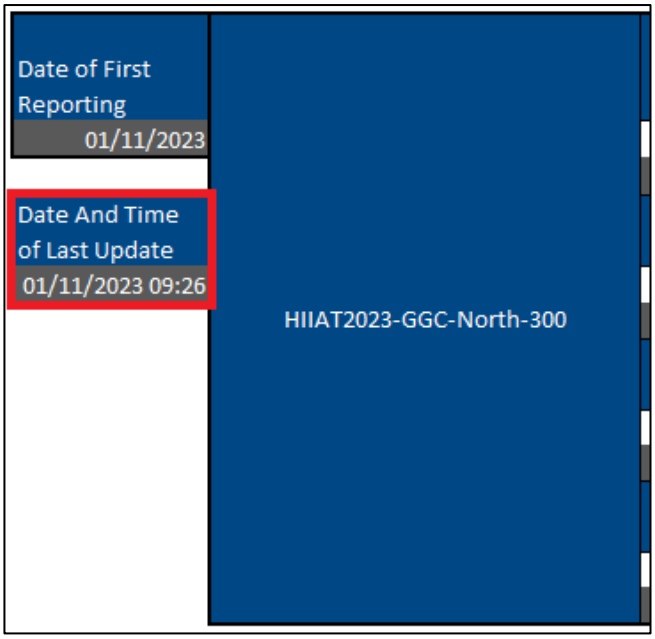


- On the "**Home**" tab click on the "**Create and Edit Respiratory Incidents/Outbreaks**" button, this will open the **"Respiratory Form"** tab, and show all open incidents/outbreaks.
- Update the editable fields as required (e.g. date of ward opening/closure, number of new cases/deaths, the current HIIAT assessment).
- If adding new case numbers, the "total" cases will update accordingly.
- If there is an incident/outbreak on the list where no updates are available at present, and you do not wish to submit an update, then change the **"Should Update Be**

Saved" data field to "N" to exclude from saving any changes to that incident/outbreak whilst submitting other updates to ARHAI Scotland.

- When the form is complete, there are two options to save forms:

1. Click the **"Save All Incidents/Outbreaks"** button to save all and update the timestamps for all open incidents. This will update in the **"Data and Time of Last Update**" data item for all rows. **Timestamps will update even if data are not amended.**



OR

2. Click the "**Save Selected Incidents/Outbreaks**" button to **save those where "Should Update Be Saved?"** is selected as **"Y"**, then confirm if the data is accurate.

Section 5. Transferring incidents/outbreaks from the Respiratory Short form to the HIIORT form

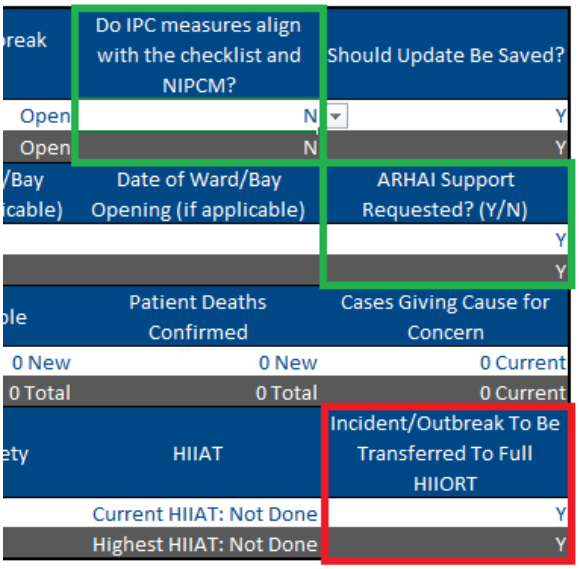
Reasons to transfer an incident/outbreak from the Respiratory Short Form to the HIIORT form

Incidents/outbreaks completed on the Respiratory Short Form should be transferred to the full HIIORT form if, during the course of the incident/outbreak, IPC measures no longer align with the checklist or NIPCM or if ARHAI support is requested. NHS boards can also transfer

an incident/outbreak from the Respiratory Short Form to the full form for any other reason if deemed appropriate.

Completing the ORT

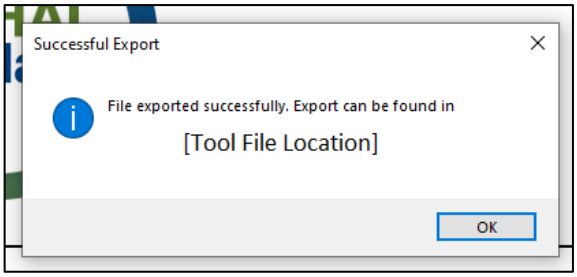
- To transfer an existing incident/outbreak on the Respiratory Short Form to be captured on the full HIIORT form, the field **"Incident/Outbreak To Be Transferred To Full HIIORT"** should be set to **"Y"** for the incident/outbreak to be saved.



- When an existing incident/outbreak is moved from the short form to the HIIORT form, that incident/outbreak should now appear on the "HIIORT – Open Incidents" tab.
- To make further updates to this incident/outbreak, follow the process as per methods section 2 - Amending open HIIORT incidents/outbreaks.

How to extract and send updates to ARHAI Scotland using the ORT

- On the **"Home"** tab, click the **"Export Data"** button, this will create a snapshot MS Excel file (named "outbreak-DD-MMM-YYYY HH-MM-v1.4-BoardCode.xlsx") in the ORT folder containing all submitted data.



- Once the file has been exported you will receive the following message and the Excel file will be saved in the same location as your Master ORT file.
- Send this exported Excel snapshot file to the ARHAI Scotland ICT mailbox (nss.ARHAIinfectioncontrol@nhs.scot), when a new update to the ORT is recorded, and to ensure the HIIAT frequency of reporting requirements are met. This will prevent information being lost and submitted data will be fed through to appropriate review/reporting processes.

Data items – HIIORT form

Log Details

Contact Details

Infection Incident / Outbreak Details

Initial Assessment

Organisational Arrangements

HIIAT Assessment

Case Numbers

Incident / Outbreak Closure Details

Log Details

HIIORT data item 1. Log Number

Response required: Derived field.
Format: Autogenerated ID.
Definition: Outbreak type, year of incident, NHS board/location, and sequential number are used to assign a unique log number to the incident.
Rationale: Unique identifier for each incident.
Comments:

HIIORT data item 2. Form type

Response required: Essential. Fixed following first submission.
Format: Drop-down list. HIIORT form // Non-hospital form.
Definition: See definitions above.
Rationale: Facilitates the correct form for the incident/outbreak reporting.
Comments: Must be completed first since other available fields and validation rules will depend on this selection. Retrospective amendments can be discussed with ARHAI Scotland if necessary.

Contact Details

HIIORT data item 3. NHS board

Response required: Essential. Fixed according to NHS board tool used.
Format: Predefined field for each NHS board.
Definition:
Rationale:
Comments:

HIIORT data item 4. Person reporting

Response required: Essential.
Format: Free text.
Definition: Forename and surname of the person entering information into the outbreak tool.
Rationale: Enables identification of the most appropriate team member to communicate with regarding specific incidents/outbreaks where necessary.
Comments:

HIIORT data item 5. Designation

Response required: Optional.
Format: Free text.
Definition: Designation (e.g. ICM, IPCN, ICD) of the person entering the information into the outbreak tool.
Rationale:
Comments:

HIIORT data item 6. Email

Response required: Essential.
Format: Free text.
Definition: Email address of the person entering the information into the outbreak tool.
Rationale:
Comments:

HIIORT data item 7. Telephone number

Response required: Essential.
Format: Free text.
Definition: Contact number for the person entering the information into the outbreak tool.
Rationale:
Comments:

Infection Incident / Outbreak Details

HIIORT data item 8. Hospital

Response required: Essential and mandatory to save form. Fixed following first submission.
Format: Drop-down list. Predefined as per NHS board/location.
Definition: A list of hospitals within the NHS Board.
Rationale: Enable place specific identification of incident/outbreak.
Comments: If any changes are required to the list of hospitals included in the dropdown, please contact ARHAI Scotland. Retrospective amendments can be discussed with ARHAI Scotland if necessary.

HIIORT data item 9. Specialty

Response required: Essential and mandatory to save form. Fixed following first submission.
Format: Drop-down. See appendix 1.
Definition:
Rationale: Enable place specific identification of incident/outbreak.
Comments:

HIIORT data item 10. Specialty if other

Response required: Essential if 'other' selected for Specialty. Mandatory to save form. Fixed following first submission.
Format: Free text.
Definition:
Rationale: Enable place specific identification of incident/outbreak.
Comments:

HIIORT data item 11. Ward/Department/Facility

Response required: Essential and mandatory to save form. Fixed following first submission.
Format: Free text.
Definition:
Rationale: Enable place specific identification of incident/outbreak.
Comments:

HIIORT data item 12. Non-hospital category

Response required: Essential.
Format: Drop-down list. Care home // dental practice // GP/health centre // Other (please specify).
Definition:
Rationale: Enable place specific identification of incident/outbreak and any potential vulnerabilities of the population.
Comments: This data item is for Outbreak Type of “Non-hospital” only.

HIIORT data item 13. Non-hospital category (if other)

Response required: Essential if ‘other’ selected for Non-hospital category.
Format: Free text.
Definition:
Rationale: Enable place specific identification of incident/outbreak.
Comments: This data item is for Outbreak Type of “Non-hospital” only.

HIIORT data item 14. Care organisation

Response required: Essential if “care home” is selected for “Non-hospital category”.
Format: Free text.
Definition:
Rationale: Enable place specific identification of incident/outbreak.
Comments: This data item is for Outbreak Type of “Non-hospital” only.

HIIORT data item 15. Name of non-hospital facility/location

Response required: Essential.
Format: Free text.
Definition:
Rationale: Enable place specific identification of incident/outbreak.
Comments: This data item is for Outbreak Type of “Non-hospital” only.

HIIORT data item 16. Specialty of non-hospital facility

Response required: Essential.
Format: Free text.
Definition:
Rationale: Enable place specific identification of incident/outbreak.
Comments: This data item is for Outbreak Type of “Non-hospital” only.

Initial Assessment / Update

HIIORT data item 17. Date of update

Response required: Auto-derived field from the date of the submission.
Format: DD / MM/ YYYY
Definition: Populated using the current data of the form/update being created.
Rationale: To ensure that latest incident/outbreak assessment is being used.
Comments: Date will autofill to the date of update. If any retrospective updates require an earlier date than this, please contact ARHAI Scotland.

HIIORT data item 18. Initial assessment

Response required: Essential.
Format: Drop-down box. Incident // Outbreak // Data Exceedance.
Definition: Please see Chapter 3 of the NIPCM.
Rationale: To ensure that appropriate reporting procedures are complete.
Comments:

HIIORT data item 19. Incident/outbreak status open/closed

Response required: Essential and mandatory to save form.
Format: Drop-down box. Open // Closed.
Definition: If the incident/outbreak is currently open and is being managed/monitored, or closed, where HIIAT should be returned to Green and investigations complete.
Rationale: Defines whether an incident/outbreak is ongoing.
Comments: This reflects the current status of the incident/outbreak. This field must be toggled “Closed” to end the incident/outbreak, and thereafter it will be removed from the “Open Incidents” tab. **N.B**. an incident/outbreak can be opened and closed on the same submission if no further updates are expected.

HIIORT data item 20. Primary mode of transmission.

Response required: Essential and mandatory to save form.
Format: Drop-down box. Airborne // Contact // Droplet // Decontamination Incident // Environmental Incident.
Definition:
Rationale: Defining the transmission route of the incident/outbreak enables derivation of epidemiological links.
Comments:

HIIORT data item 21. Date first symptomatic

Response required: Optional.
Format DD / MM / YYYY
Definition: Date of first symptomatic case.
Rationale: To capture full period of symptomatic cases.
Comments:

HIIORT data item 22. Date first positive test

Response required: Optional.
Format DD / MM / YYYY
Definition:
Rationale: To capture accurately the period of confirmed cases.
Comments:

HIIORT data item 23. Has any screening been undertaken as part of the incident/outbreak management

Response required: Optional.
Format: Drop-down box. Y // N.
Definition:
Rationale: To ascertain possibility of further cases being discovered.
Comments: Specify if patient and/or staff screening or environmental screening/sampling in "Investigations" free text box.

HIIORT data item 24. Infectious agent known or suspected (Y/N)

Response required: Optional.
Format: Drop-down box. Y // N.
Definition:
Rationale: To determine if correct form used and understand stage of investigation.
Comments:

HIIORT data item 25. Organism genus

Response required: Essential.
Format: Drop-down list.
Definition: The organism associated with the incident/outbreak.
Rationale: To ascertain organism genus and facilitate surveillance.

Comments: If there is no association to an organism then can use “NA”. The most commonly reported organisms are listed at the top of the drop-down list and then all organisms are included alphabetically thereafter.

HIIORT data item 26. Organism species

Response required: Optional.
Format: Drop-down list. List based on organism genus selected.
Definition: The organism associated with the incident/outbreak.
Rationale: To ascertain organism species and facilitate surveillance.
Comments:

HIIORT data item 27. Organism if mixed

Response required: Essential if “mixed” if selected as organism genus.
Format: Free text.
Definition: The organism(s) associated with the incident/outbreak. Please complete organism genus and species if known for all organisms listed.
Rationale: To ascertain organism(s) and facilitate surveillance.
Comments: Other relevant information such as AMR alert organism details (e.g. VRE, CPO) can also be included. Please note that mixed respiratory (COVID-19, influenza and RSV) incidents/outbreaks reported through the HIIORT form should be completed as separate HIIORT forms (one for each organism included within an incident/outbreak). Therefore, this field should not be used to report mixed respiratory incidents/outbreaks. For some instances patients may be included as cases under more than one respiratory incident/outbreak.

HIIORT data item 28. Infection category

Response required: Essential.
Format: Drop-down list. Blood stream infection (BSI) // Bloodborne virus (BBV) // Gastrointestinal (GI) // Respiratory // Skin and soft tissue infection (SSTI) // Surgical site infection (SSI) // Urinary tract infection (UTI) // Colonisation, Mixed infected and colonised // Mixed infected // Other // N/A.
Definition:
Rationale: To ascertain infection category and facilitate surveillance.
Comments: If mixed infected or mixed infected/colonised, please include details of infection categories for each case within the case summary field.

HIIORT data item 29. Date ward closed (if applicable)

Response required: Optional.
Format: DD / MM / YYYY
Definition:
Rationale: Gives indication and timeframe of ward closure during incident/outbreak.
Comments:

HIIORT data item 30. Typing or WGS Requested

Response required: Optional.
Format: Drop-down list. Y // N
Definition:
Rationale: To provide a record of incidents/outbreaks where whole genome sequencing has been requested to allow further analysis if required.
Comments:

HIIORT data item 31. Is service restricted?

Response required: Essential.
Format: Drop-down list. Y // N.
Definition:
Rationale: To ascertain impact on service.
Comments:

HIIORT data item 32. Do IPC measures align with the checklist and NIPCM?

Response required: Essential.
Format: Drop-down list. Y // N.
Definition: Note if the measures align with the checklist and NIPCM.
Rationale: To ascertain whether IPC measures align with the checklist and NIPCM.
Comments: If “N” is selected, please complete the free text box “If IPC measures do not align with the checklist and NIPCM, please provide details”.

HIIORT data item 33. AMR alert organism

Response required: Essential.
Format: Drop-down list. Y // N.
Definition: List of AMR alert organisms can be found in Appendix 13 of the NIPCM.
Rationale: To ascertain need for further investigation or escalation.
Comments: Please include notes of relevant AMR alert organisms within the case summary / investigations fields as appropriate.

HIIORT data item 34. If IPC measures do not align with the checklist and NIPCM please provide details?

Response required: Essential if "Do IPC measures align with the checklist and NIPCM" marked as "N".
Format: Free Text.
Definition: Where IPC measures do not align with the checklist and NIPCM, details should be included within the free text box. Reporting by exception details may include;

- Failures with isolation or cohort areas
- Non-compliance with PPE
- Issues with Hand hygiene which have been identified during audit
- Concerns regarding equipment or environmental cleanliness
- Any other obvious deviances from the National Infection Prevention and Control Manual (NIPCM) and associated appendices

Rationale: To provide context and rationale for non-compliance.
Comments: With each update ensure that only text/data relevant to the most recent/current situation are held within this field. This information could include Implemented measures to address the previously reported exceptions. All previously submitted text is stored in previous submissions and viewable on E-viz.

HIIORT data item 35. Case definition

Response required: Essential and mandatory to save form.
Format: Free text.
Definition: Criteria for person, place, time, and clinical features. These should be specific to the incident/outbreak under investigation and have corresponding case numbers completed for each definition supplied (confirmed/probable/possible).
Rationale: Clear case definition(s) is(are) critical for effective investigation of an outbreak including case ascertainment.
Comments: A case definition(s) should be agreed and regularly reviewed/revised as required. With each update ensure that only text/data relevant to the most recent/current situation are held within this field. All previously submitted text is stored in previous submissions and viewable on E-viz.

HIIORT data item 36. Case summary (Staff/Patient cases/No PII)

Response required: Essential.
Format: Free text with standardised wording (see definition).
Definition: Provide a succinct clear statement of the affected cases for the incident/outbreak defined with the timeframe and include any details of the local trigger alert (where known/investigated). From your report you will want to know for each isolate those

that are infections and/or colonisations. Please use the following standardised wording when completing data item –

> Patient cases:
>
> xx number patient cases with (organism/s) reported within xxx defined period (xxxx). Onset of symptoms (date xx/xx/xx) or if asymptomatic, positive sample (date xx/xx/xx) of index case and number of contacts identified (if applicable)
>
> Case 1 (confirmed/probable/possible as per case definition), isolate type (wound, ET aspirate etc.), confirmed positive (specify type if mixed organisms) on date (xx/xx/xx); colonisation (define)/infection (define).
>
> Case 2 (confirmed/probable/possible as per case definition), isolate type (blood culture), confirmed positive (specify type if mixed organism) on date (xx/xx/xx); colonisation (define)/infection (define).
>
> Of those, xxx cases remain an inpatient in xxx and xx patients giving cause for concern /deaths as a direct consequence of this incident/outbreak; (xxx if on Part 1 or 2 of Death Certificate, etc. cases).
>
> Staff cases: (if applicable):
>
> Onset of symptoms (date xx/xx/xx) of index case /asymptomatic, confirmed positive date xx/xx/xx if identified through screening) and number of contacts identified (if applicable). Xxx staff excluded from duty and date last worked (if known).

Rationale: Clear case summary is critical for effective investigation of an outbreak.
Comments: Use case definition to complete. With each update ensure that only text/data relevant to the most recent/current situation are held within this field. All previously submitted text is stored in previous submissions and viewable on E-viz.

HIIORT data item 37. Investigations

Response required: Essential and mandatory to save form.
Format: Free text.
Definition: Investigatory review should be carried out relevant to the incident/outbreak/data exceedance. Provide a bullet list of all your investigations relevant to the incident/outbreak and may include:

- Any contact tracing required.
- Any drug resistance identified.
- Antimicrobial review carried out (date).

- Any incident review planned or completed.
- Isolates sent to Reference Laboratory for Typing (date).
- Whole Genome Sequencing requested (date).
- Outbreak Trigger Tool utilised.
- Clinical practice reviews, observations or audits planned or completed.

- Water specific incidents/outbreaks:
  - Source investigation.
  - Water sampling where appropriate as part of incident review (date, outlets tested).
- Ventilation specific incidents/outbreaks:
  - Planned or completed inspection of system.
  - Last validation carried out, and issues identified.
  - Microbiological air sampling planned or completed.

Rationale: Investigatory review is required to inform control measures and identify any quality improvement actions required to prevent ongoing transmission or risk.
Comments: With each update ensure that only the most up to date information are added to this field. All previously submitted text is stored in previous submissions and viewable on E-viz.

HIIORT data item 38. Working hypothesis

Response required: Essential and mandatory to save form.
Format: Free text.
Definition: A working hypothesis is required to consider the cause of the incident/outbreak and should be a statement of the potential rationale for why the incident/outbreak occurred and is important for lessons learned. A working hypothesis may evolve as new information/results becomes available. The investigations undertaken should assess each of the working hypotheses.
Rationale: A logical explanation following review of epidemiological data and investigations which will inform a proposed route of exposure to the infective agent or the environmental hazard involved.
Comments: With each update ensure that only text/data relevant to the most recent/current situation are held within this field. All previously submitted text is stored in previous submissions and viewable on E-viz. The hypothesis should be reviewed as the understanding of the situation evolves/changes.

Organisational Arrangements

HIIORT data item 39. ARHAI support requested

Response required: Essential.
Format: Drop-down list. Y // N.
Definition:
Rationale: Ascertain if support requested from ARHAI.
Comments: If support is required, ensure an email request is sent to nss.ARHAIinfectioncontrol@nhs.scot in addition to selecting Y in this field.

HIIORT data item 40. Date last PAG/IMT held

Response required: Optional.
Format: DD / MM / YYYY
Definition:
Rationale: Gives indication of whether a PAG/IMT has been held for the incident/outbreak.
Comments:

HIIORT data item 41. Date next PAG/IMT held

Response required: Optional.
Format: DD / MM / YYYY
Definition:
Rationale: Gives indication of when next PAG/IMT will be held for the incident/outbreak.
Comments:

HIIORT data item 42. Escalation within board

Response required: Optional.
Format: Drop-down. See appendix 1.
Definition:
Rationale: Defines who in the NHS board the incident/outbreak has been escalated to.
Comments:

HIIORT data item 43. Escalation within board (if other)

Response required: Optional unless “other (please specify)” has been selected from “Escalation within Board”
Format: Free text.
Definition:
Rationale: Defines who the incident/outbreak in the NHS board has been escalated to.

Comments:

HIIORT data item 44. Specific advice / meetings / information provided to patients or relatives.

Response required: Optional.
Format: Drop-down list. Y // N.
Definition:
Rationale: Indicates additional information provided to patients, relatives and carers.
Comments:

HIIORT data item 45. Media statement prepared.

Response required: Optional.
Format: Drop-down list. Y (released) // Y (holding) // N.
Definition:
Rationale: Gives the status of media communications and must be provided to ARHAI Scotland via the ORT update for all HIIAT Red and HIIAT Amber incidents/outbreaks.
Comments:

HIIORT data item 46. Communication, Duty of Candour and Media Statement.

Response required: Optional.
Format: Free text.
Definition: Include media statements, information shared with patients and family where appropriate and Duty of Candour. Please label statements appropriately. Providing information on Duty of Candour will provide the board with a record that the necessary requirements have been completed/considered. The status of media communications must be provided to ARHAI Scotland via the ORT update for all HIIAT Red and Amber incidents/outbreaks.

> Example Duty of Candour statement:
> Relative/next of kin of patient case(s) have been informed by the clinician that acquisition of xxx has occurred as a consequence of incident/outbreak and documented in the patient clinical notes.

Rationale: Gives the status of media communications and must be provided to ARHAI Scotland via the ORT update for all HIIAT Red and Amber incidents/outbreaks.
Comments:

HIIAT Assessment

HIIORT data item 47. Severity of illness.

Response required: Essential and mandatory to save form.
Format: Drop-down list. Minor // Moderate // Major.
Definition: Please see the definitions in appendix 14 of the NIPCM.
Rationale: Required to formulate HIIAT assessment.
Comments:

HIIORT data item 48. Impact on services

Response required: Essential and mandatory to save form.
Format: Drop-down list. Minor // Moderate // Major.
Definition: Please see the definitions in appendix 14 of the NIPCM.
Rationale: Required to formulate HIIAT assessment.
Comments:

HIIORT data item 49. Risk of transmission

Response required: Essential and mandatory to save form.
Format: Drop-down list. Minor // Moderate // Major.
Definition: Please see the definitions in appendix 14 of the NIPCM.
Rationale: Required to formulate HIIAT assessment.
Comments:

HIIORT data item 50. Public anxiety

Response required: Essential and mandatory to save form.
Format: Drop-down list. Minor // Moderate // Major.
Definition: Please see the definitions in appendix 14 of the NIPCM.
Rationale: Required to formulate HIIAT assessment.
Comments:

HIIORT data item 51. HIIAT

Response required: Auto-derived field based on current answers to Severity of illness, Impact on services, Risk of transmission, and Public anxiety
Format: Red / Amber / Green.
Definition: Please see the definitions in appendix 14 of the NIPCM.
Rationale: Formulates an assessment of the ongoing incident/outbreak.

Comments: This field is automatically calculated from the above fields, if HIIAT needs updated please amend Severity of illness, Impact on services, Risk of transmission or Public anxiety accordingly.

HIIORT data item 52. Highest HIIAT recorded

Response required: Auto-derived field based on current/previous answers to Severity of illness, Impact on services, Risk of transmission, and Public anxiety**.**
Format: Red / Amber / Green.
Definition: Please see the definitions in appendix 14 of the NIPCM. The highest HIIAT reported so far during the incident/outbreak is derived.
Rationale: Returns the highest HIIAT for the incident/outbreak.
Comments: This field is automatically calculated from the above fields.

HIIORT data item 53. Date HIIAT green

Response required: Auto-derived field based on current/previous answers to Severity of illness, Impact on services, Risk of transmission, Public anxiety**.**
Format: DD / MM / YYYY.
Definition: Please see the definitions in appendix 14 of the NIPCM. Returns the date that the HIIAT was last amended from Red/Amber to Green.
Rationale: Returns the date that the incident/outbreak was marked as HIIAT green.
Comments:

Case Numbers

HIIORT data item 54. Number of new patients confirmed.

Response required: Essential and mandatory to save form.
Format: Numerical.
Definition: Number of **new** confirmed patient cases for incident/outbreak since last update, to capture the incidence of cases over time. If using this field, please complete a corresponding case definition for patients confirmed in the "Case Definition" field.
Rationale: Provides data on incident/outbreak cases.
Comments: Minus numbers can be entered to adjust totals. Please note 0 if no new cases are applicable. Any changes to case numbers should also be reflected in the case summary.

HIIORT data item 55. Number of new patients probable.

Response required: Essential.
Format: Numerical.
Definition: Number of **new** probable patient cases for incident/outbreak since last update, to capture the incidence of cases over time. Please complete a corresponding case definition for patients probable in the "Case Definition" field.
Rationale: Provides data on incident/outbreak cases.
Comments: Minus numbers can be entered to adjust totals. Please note 0 if no new cases are applicable. Any changes to case numbers should also be reflected in the case summary.

HIIORT data item 56. Number of new patients possible.

Response required: Essential.
Format: Numerical.
Definition: Number of **new** possible patient cases for incident/outbreak since last update, to capture the incidence of cases over time. If using this field, please complete a corresponding case definition for patients possible the "Case Definition" field.
Rationale: Provides data on incident/outbreak cases
Comments: Minus numbers can be entered to adjust totals. Please note 0 if no new cases are applicable. Any changes to case numbers should also be reflected in the case summary.

HIIORT data item 57. Number of new staff confirmed.

Response required: Essential and mandatory to save form.
Format: Numerical.
Definition: Number of **new** confirmed staff cases for incident/outbreak since last update, to capture the incidence of cases over time. If using this field, please complete a corresponding case definition for staff confirmed in the "Case Definition" field.

Rationale: Provides data on incident/outbreak cases
Comments: Minus numbers can be entered to adjust totals. Please note 0 if no new cases are applicable. Any changes to case numbers should also be reflected in the case summary.

HIIORT data item 58. Number of new staff probable.

Response required: Essential.
Format: Numerical.
Definition: Number of **new** confirmed staff cases for incident/outbreak since last update, to capture the incidence of cases over time. If using this field, please complete a corresponding case definition for staff probable in the "Case Definition" field.
Rationale: Provides data on incident/outbreak cases.
Comments: Minus numbers can be entered to adjust totals. Please note 0 if no new cases are applicable. Any changes to case numbers should also be reflected in the case summary.

HIIORT data item 59. Number of new confirmed patient deaths.

Response required: Essential.
Format: Numerical.
Definition: Number of **new** confirmed deaths as a direct consequence of the incident/outbreak since last update, to capture new deaths over time.
Rationale: Provides data on incident/outbreak cases and provides information on case severity associated with the incident/outbreak.
Comments: Minus numbers can be entered to adjust totals. Please note 0 if no new deaths are applicable. Any changes to cases/deaths should also be reflected in the case summary.

HIIORT data item 60. Cases giving cause for concern.

Response required: Essential.
Format: Numerical.
Definition: The current number of cases giving cause for concern as a direct consequence of the incident/outbreak at the time of update.
Rationale: Provides information on case severity associated with the incident/outbreak. Allows counting of cases giving cause for concern
Comments: This field is a prevalence figure and can be amended to reflect the number of patients with cause for concern at that point in time.

HIIORT data item 61. Current number of contacts

Response required: Optional.
Format: Numerical.
Definition: Current number of patient contacts associated with the incident/outbreak.
Rationale: Allows counting of patient contacts including contacts who were outpatients or patients who have been discharged.
Comments: This field is a prevalence figure and can be amended to reflect the number of contacts at that point in time.

HIIORT data item 62. Was the infectious agent cited as a cause of death on a death certificate?

Response required: Essential if confirmed death recorded.
Format: Free text.
Definition: Patient deaths confirmed to have been caused as a direct consequence of the incident/outbreak, was infectious agent cited on part 1 or part 2 of the death certificate.
Rationale: To identify if the infectious agent was quoted as the primary or secondary cause of death.
Comments:

Cumulative Totals (Auto Generated)

HIIORT data item 63. Total patients confirmed

Response required: Derived field/non-editable.
Format: Pre-populated total number.
Definition: Total number of probable patient cases for incident/outbreak.
Rationale: Provides data on incident/outbreak cases.
Comments: Check to ensure accuracy – can be adjusted using minus numbers in corresponding adjustable data fields.

HIIORT data item 64. Total patients probable

Response required: Derived field/non-editable.
Format: Pre-populated total number.
Definition: Total number of probable patient cases for incident/outbreak.
Rationale: Provides data on incident/outbreak cases.
Comments: Check to ensure accuracy – can be adjusted using minus numbers in corresponding adjustable data fields.

HIIORT data item 65. Total patients possible

Response required: Derived field/non-editable.
Format: Pre-populated total number.
Definition: Total number of possible patient cases for incident/outbreak.
Rationale: Provides data on incident/outbreak cases.
Comments: Check to ensure accuracy – can be adjusted using minus numbers in corresponding adjustable data fields.

HIIORT data item 66. Total staff confirmed

Response required: Derived field/non-editable.
Format: Pre-populated total number.
Definition: Total number of probable patient cases for incident/outbreak.
Rationale: Provides data on incident/outbreak cases.
Comments: Check to ensure accuracy – can be adjusted using minus numbers in corresponding adjustable data fields.

HIIORT data item 67. Total staff probable

Response required: Derived field/non-editable.
Format: Pre-populated total number.
Definition: Total number of probable patient cases for incident/outbreak.
Rationale: Provides data on incident/outbreak cases.
Comments: Check to ensure accuracy – can be adjusted using minus numbers in corresponding adjustable data fields.

HIIORT data item 68. Total patients deaths confirmed

Response required: Derived field/non-editable.
Format: Pre-populated total number.
Definition: Total number of confirmed deaths that are a direct consequence of the incident/outbreak.
Rationale: Provides data on incident/outbreak cases and provides information on case severity associated with the incident/outbreak.
Comments: Check to ensure accuracy – can be adjusted using minus numbers in corresponding adjustable data fields.

Incident/Outbreak Closure Details

HIIORT data item 69. Date incident/outbreak closed (if applicable)

Response required: Essential/auto filled once "Incident/outbreak status open/closed" has been marked as "Closed".
Format: DD / MM / YYYY
Definition: Defines the date the NHS board closes the incident/outbreak.
Rationale:
Comments: Autofilled to current date when "Incident/outbreak status open/closed" is marked as "Closed", but can be edited thereafter if required.

HIIORT data item 70. Date ward opened (if applicable)

Response required: Essential if "Date ward closed" has been completed during the incident/outbreak..
Format: DD / MM / YYYY
Definition: Defines the date the affected ward has been re-opened following the closure of an incident/outbreak.
Rationale: Gives indication and timeframe of ward re-opening during incident/outbreak.
Comments:

HIIORT data item 71. Lessons learned (What went well, what did not go well etc)

Response required: Essential once "Incident/outbreak status open/closed" has been marked as "Closed".
Format: Free text.
Definition: Upon closure of the incident/outbreak, it is important to consider what went well and what could be improved.

Examples of lessons learned may include:

- IPC patient management challenges
- Good/ Poor application of IPC Control Measures
    - Early recognition of incident/outbreak
    - Compliance with SICPs and TBPs
    - Assessment of risk
    - Completion of assessment tools
    - Early/delayed closure of ward
    - Decontamination failures
- Issues as a consequence of Built Environment
- Work force planning

Rationale: To implement quality improvement measures where risk has been identified. To allow national collation and dissemination of themes or novel management. To inform future guidance development.
Comments: This can be positive or areas for improvement. May also be added retrospectively after the completion of incident/outbreak debrief.

Data items – Respiratory Short Form

Core/Derived Fields

Short form data item 1. Log number

Response required: Autofilled derived field.
Format: Autogenerated ID.
Definition: Generated ID composed of “HIIAT”, the current year, the board code and a unique autogenerated number.
Rationale: Uniquely identifies an incident/outbreak.
Comments: Field is created when first reporting and cannot be amended.

Short form data item 2. Date of First Reporting

Response required: Essential. Autofilled to current date if submitting new incident/outbreak or date of first reporting if submitting amendment to existing incident/outbreak.
Format: DD / MM / YYYY
Definition: Timestamps the submission with day’s date when you click “Add Blank Incident Form”.
Rationale: A record of when the incident/outbreak was first created.
Comments: Field cannot be amended later and does not change when updating an incident/outbreak.

Short form data item 3. Date and Time of Last Update

Response required: Essential. Autofilled to date of most recent update.
Format: DD / MM / YYYY
Definition: Field will update when an incident/outbreak was last saved, regardless of any changes made. Date can be updated when data is confirmed using the “Save All Incidents” button, or when a specific incident/outbreak is set to “Y” under “Should Incident Update be Saved” and the “Save Selected Incidents” is pressed.
Rationale: Provides the date of last update to ensure data are current and reporting frequency is in line with NIPCM.
Comments: Field cannot be amended later and changes with each update.

Respiratory Incident/Outbreak Details

Short form data item 4. Hospital

Response required: Essential and mandatory to save form.
Format: Drop-down. Predefined as per NHS board/location.
Definition: A list of hospitals specific to the NHS Board.
Rationale: Enable place specific identification of incident/outbreak.
Comments: If any changes are required to the list of hospitals included in the dropdown, please contact ARHAI Scotland.

Short form data item 5. Organism

Response required: Essential and mandatory to save form.
Format: Drop-down list. COVID-19 // Flu A // Flu B // Flu (Not Specified) // Flu (Mixed) // RSV
Definition: The organism associated with the incident/outbreak.
Rationale: To ascertain organism and facilitate surveillance.
Comments: Only one organism can be selected per incident/outbreak. If there are multiple respiratory organisms within the same incident/outbreak, please report each organism as a new incident/outbreak. Please note for some instances patients may be included as cases under more than one incident/outbreak.

Short form data item 6. Date of Update

Response required: Essential. Autofilled to current date.
Format: DD / MM / YYYY.
Definition: The date of the update for the current incident. This is autofilled with the date of form completion but can be edited to allow for retrospective updates.
Rationale: To ensure that the latest update is used in analysis.
Comments: Only edit if necessary.

Short form data item 7. Incident/outbreak Status

Response required: Essential.
Format: Drop-down list. Open // Closed.
Definition: Defines if the incident/outbreak is currently active.
Rationale: Allows for a real time picture of the incident/outbreak.
Comments: This reflects the current status of the incident/outbreak. Must be toggled “Closed” to end the incident/outbreak, and thereafter will be removed from the “Respiratory – Open Incidents” tab. N.B. an incident/outbreak can be opened and closed during the same submission if no further updates are expected.

Short form data item 8. Do IPC measures align with the checklist and NIPCM?

Response required: Essential and mandatory to save form.
Format: Drop-down list. Y // N.
Definition: Note if IPC measures align with the checklist and NIPCM – if so please submit "Y".
Rationale: To ascertain whether IPC measures align with the checklist and NIPCM and identify if incident/outbreak should be reported on the HIIORT form.
Comments: Incidents/outbreaks submitted via the Respiratory Short Form should always have this set to "Y". If IPC measures do not align with the checklist and NIPCM, a full HIIORT form should be completed instead. Previously opened incident/outbreaks can be transferred to the HIIORT form using the "Incident to be transferred to full HIIORT" field if required.

Short form data item 9. Should Update Be Saved?

Response required: Essential.
Format: Drop-down list. Y // N. Autofilled as "Y".
Definition: Notes if an update for that incident/outbreak should be saved if the "Save Selected Incidents" button is used.
Rationale: As there will be multiple incidents/outbreaks open on the form at once, this enables the user to choose only a few to submit an update for, to prevent incidents/outbreaks being flagged as updated erroneously.
Comments: This field will always default to "Y" to remove the risk of data loss, however the user should change to "N" if an update for a given incident/outbreak is not required. The "Save All Incidents" button will bypass this field and save all incidents/outbreaks regardless.

Short form data item 10. Ward/Bay (Free Text)

Response required: Essential and mandatory to save form.
Format: Free text.
Definition: The ward or bay(s) on which the incident/outbreak or outbreak took place.
Rationale: Enable place specific identification of incident/outbreak.
Comments:

Short form data item 11. Ward/Bay Specialty

Response required: Essential and mandatory to save form.
Format: Drop-down. See appendix 1.
Definition: The specialty of the ward or bay(s) on which the incident/outbreak took place.
Rationale: Enable place specific identification of incident/outbreak.
Comments: If the specialty isn't in the list, then "Other" should be selected and the free text "Ward/Bay Specialty if Other" field must be completed.

Short form data item 12. Ward/Bay Specialty if Other

Response required: Essential when “Ward/Bay Specialty” is “Other”. ORT form cannot be saved if left blank.
Format: Free text.
Definition: The specialty of the ward or bay(s) if it was not present on the dropdown list.
Rationale: Enable place specific identification of incident/outbreak.
Comments:

Short form data item 13. Date of Ward/Bay Closure (if applicable)

Response required: Optional.
Format: DD / MM / YYYY
Definition: The date of first closure of the ward or bay(s) related to this incident/outbreak, if they were closed. Note this is not the date of the closure of the incident/outbreak.
Rationale: Indication of ward/bay closure. Gives a proxy of the timeframe of the incident/outbreak across multiple updates.
Comments:

Short form data item 14. Date of Ward/Bay Opening (if applicable)

Response required: Optional.
Format: DD / MM / YYYY.
Definition: The date the ward or bay(s) are reopened after being closed.
Rationale: Indication of ward/bay opening again following incident/outbreak. Gives a proxy of the timeframe of the incident/outbreak across multiple updates.
Comments: This should only be completed if “Date of Ward/Bay Closure” has been provided.

Short form data item 15. ARHAI Support Requested (Y/N)

Response required: Essential
Format: Drop-down list. Y // N.
Definition: If ARHAI support is requested for the management of this incident/outbreak, this field should be set to “Y”.
Rationale: Allows for easy requesting of support for the board from ARHAI.
Comments: Incidents/outbreaks on the Respiratory Short Form should always have “ARHAI Support Requested” set to “N”. If support is requested on a new incident/outbreak, a full HIIORT form should be completed instead. If support is requested on an existing incident/outbreak, then the incident/outbreak should be transferred to HIIORT form using the “Incident to be transferred to full HIIORT” field.

Case Numbers

Short form data item 16. Patients Confirmed (New / Total)

Response required: Essential and mandatory to save form.
Format: Numerical.
Definition: Number of **new** confirmed patient cases for incident/outbreak since last update, to capture the incidence of cases over time, and to contribute to the **total** number for the incident/outbreak.
Rationale: Provides data on incident/outbreak cases.
Comments: Minus numbers can be entered in the “new” box to adjust totals. Please note 0 if no new cases are applicable.

Short form data item 17. Patients Probable (New / Total)

Response required: Essential and mandatory to save form.
Format: Numerical.
Definition: Number of **new** probable patient cases for incident/outbreak since last update, to capture the incidence of cases over time, and to contribute to the **total** number for the incident/outbreak.
Rationale: Provides data on incident/outbreak cases.
Comments: Minus numbers can be entered in the “new” box to adjust totals. Please note 0 if no new cases are applicable.

Short form data item 18. Staff Confirmed (New / Total)

Response required: Essential and mandatory to save form.
Format: Numerical.
Definition: Number of new confirmed staff cases for incident/outbreak since last update, to capture the incidence of cases over time, and to contribute to the **total** number for the incident/outbreak.
Rationale: Provides data on incident/outbreak cases.
Comments: Minus numbers can be entered in the “new” box to adjust totals. Please note 0 if no new cases are applicable.

Short form data item 19. Staff Probable (New / Total)

Response required: Essential and mandatory to save form.
Format: Numerical.
Definition: Number of new confirmed staff cases for incident/outbreak since last update, to capture the incidence of cases over time, and to contribute to the **total** number for the incident/outbreak.

Rationale: Provides data on incident/outbreak cases.
Comments: Minus numbers can be entered in the “new” box to adjust totals. Please note 0 if no new cases are applicable.

Short form data item 20. Patient Deaths Confirmed (New / Total)

Response required: Essential and mandatory to save form.
Format: Numerical.
Definition: Number of new confirmed deaths as a direct consequence of incident/outbreak since last update, to capture new deaths over time, and to contribute to the **total** number for the incident/outbreak.
Rationale: Provides data on incident/outbreak cases and provides information on case severity associated with the incident/outbreak.
Comments: Minus numbers can be entered in the “new” box to adjust totals. Please note 0 if no new deaths are applicable for current update.

Short form data item 21. Cases Giving Cause for Concern (Current)

Response required: Essential.
Format: Numerical.
Definition: The current number of cases giving cause for concern as a direct consequence of incident/outbreak at the time of update.
Rationale: Provides information on case severity associated with the incident/outbreak. Allows counting of cases giving cause for concern
Comments: This field is a prevalence figure and can be amended to reflect the number of patients with cause for concern at that point in time.

HIIAT Assessment

Short form data item 22. Severity of Illness

Response required: Essential and mandatory to save form.
Format: Drop-down list. Minor // Moderate // Major.
Definition: Please see the definitions in appendix 14 of the NIPCM.
Rationale: Required to formulate HIIAT assessment.
Comments:

Short form data item 23. Impact on Services

Response required: Essential and mandatory to save form.
Format: Drop-down list. Minor // Moderate // Major.
Definition: Please see the definitions in appendix 14 of the NIPCM.
Rationale: Required to formulate HIIAT assessment.
Comments:

Short form data item 24. Risk of Transmission

Response required: Essential and mandatory to save form.
Format: Drop-down list. Minor // Moderate // Major.
Definition: Please see the definitions in appendix 14 of the NIPCM.
Rationale: Required to formulate HIIAT assessment.
Comments:

Short form data item 25. Public Anxiety

Response required: Essential and mandatory to save form.
Format: Drop-down list. Minor // Moderate // Major.
Definition: Please see the definitions in appendix 14 of the NIPCM.
Rationale: Required to formulate HIIAT assessment.
Comments:

Short form data item 26. HIIAT (Current / Highest)

Response required: Auto-derived field based on current answers to Severity of illness, Impact on services, Risk of transmission, Public anxiety.
Format: Red // Amber // Green.
Definition: Please see the definitions in appendix 14 of the NIPCM.
Rationale: Formulates an assessment of the ongoing incident/outbreak.

Comments: This field is automatically calculated from the above fields. The top field is the current HIIAT score; if current HIIAT needs updated please amend Severity of illness, Impact on services, Risk of transmission or Public anxiety accordingly. The bottom returns the highest HIIAT for the incident/outbreak.

Short form data item 27. Incident/outbreak to be transferred to full HIIORT

Response required: Essential.
Format: Drop-down list. Y // N.
Definition: If the incident/outbreak is to be transferred to a full HIIORT form, which should only occur for **existing** short form incidents/outbreaks that have either not aligned with the checklist and NIPCM or have requested ARHAI support.
Rationale: Allows for an incident/outbreak to be escalated to provide more information based on the criteria within the definition.
Comments: This should always be "N" unless **either** of the criteria for not aligning with the checklist/NIPCM or ARHAI support is met. NHS boards can also transfer an incident/outbreak from the Respiratory Short Form to the full form for any other reason if deemed appropriate. Once transferred via this method, the incident/outbreak will now be visible via the "HIIORT – Open Incidents" tab and can be updated using the full HIIORT form update method.

Appendix 1 – Reference lists

HIIORT Reference Lists

Escalation within board

- Clinical service manager
- Executive Lead for HAI
- Head of Service for clinical area
- Head of Service for Infection Prevention & Control (IPC)
- ICD
- ICM
- IPC ICD Lead
- IPC Lead Nurse
- Medical Director
- Senior ICN
- Senior management
- Other (please specify)

Systematic classification of clinical specialties

Table 1: Specialties included within the ORT and details of sub-specialties within specialty classification.

Specialty	Sub-specialties within specialty classification
Accident & emergency	
Cardiology	
Cardio-thoracic surgery	
Care of the elderly	
Ear, nose and throat	
General surgery	Including: upper and lower bowel surgery, acute surgery and Surgical High Dependency Unit
Haematology	
Infectious disease	
Intensive care	Adult, Paediatric, Neonatal (SCBU and NICU)
Maxillofacial surgery	

Specialty	Sub-specialties within specialty classification
Medicine	Including: General medicine, Acute medicine, Respiratory medicine, Dermatology, Palliative care, Medical high dependency unit
Mental health	
Neonatology	
Neurosurgery	Including: spinal surgery
Obstetrics & gynaecology	
Oncology	
Ophthalmology	
Orthopaedic surgery	
Paediatrics	
Plastic surgery	Including: burns units
Rehabilitation medicine	
Renal medicine	
Transplant surgery	
Urology	
Vascular surgery	

Appendix 2 – Frequently asked questions (FAQs)

Can an MS Excel tool be used by more than one user at a time?

No. Only one person can complete data at a time.

How can I permanently enable Macros in Excel?

Enabling Macros in MS Excel is essential to facilitate the completion of the ORT.

The pathway for permanently enabling macros for Excel can be found under the Methods section.

Macros can be **permanently** enabled through personal Excel settings (File > Options > Trust Centre > Trust Centre Settings > Macro Settings > Enable all Macros)

Or, users can click to enable macros **each time the file is opened** through the button which should appear below the main toolbar ribbon, but permanent enabling of macros is recommended to avoid possible issues.

If you miss a mandatory field, will the tool alert you to this?

Yes. There are some fields which must be completed to facilitate saving data within the ORT, these are listed within the data items as “mandatory to save form”. Once “save record” / ”update record” has been clicked the record will be checked and a pop-up will appear if any mandatory fields have been missed. There are also “essential” fields whereby it may be left blank in the first instance, but these should be completed as and when data are available. All fields including mandatory fields should be reviewed with each new update.

I need to complete a HIIORT incident/outbreak for a location not on the Hospital list – how do I do this?

If there is a new Hospital location within your NHS board then please get in touch with ARHAI Scotland to add this location to the drop-down list on your local tool. If you are reporting for a non-hospital location (e.g. a care home, dental practice or other community health centre/GP) then please use the “Non-hospital” form to complete data for submission to ARHAI Scotland.

How do I add a record for more than one ward within the same hospital?

If an incident/outbreak involves more than one ward, please complete free text ward information (e.g. ward 1 and ward 2).

How do I find respiratory syncytial virus (RSV) in the HIIORT form?

When completing a full HIIORT form the “Organism Genus” should be set to “Pneumovirus” and “Organism Species” can be selected as “respiratory syncytial virus” (RSV). Note that RSV incidents/outbreaks can be reported through the Respiratory Short Form unless IPC measures are not aligned with the checklist and NIPCM or support from ARHAI is requested.

How do I submit a mixed organism incident/outbreak?

On the HIIORT form, you can select “mixed” under the “Organism Genus” field and complete the mixed organisms as free text in the “organisms if mixed” field.

For respiratory incidents/outbreaks of COVID-19, influenza and RSV, these should be reported as separate incidents/outbreaks on both the Respiratory Short Form and on the HIIORT form. This is to facilitate surveillance of COVID-19, influenza and RSV.

Can I have an incident/outbreak without an identifiable organism?

Yes – within the HIIORT form only. Complete the organism fields as ‘NA’ or ‘Unknown’.

Can I have an incident/outbreak with no cases?

Yes - within the HIIORT form only. Complete the new cases fields as zero but please specify why no cases are applicable within “Case Summary” and add other information as appropriate in the investigation/working hypothesis fields.

How do I amend an incident/outbreak if a result is confirmed as a false positive?

To make this change please enter a minus number in the “Number of new patients confirmed” or “Number of new staff confirmed” data item when amending the incident/outbreak. This will amend the totals.

If patients in an incident/outbreak are discharged should these be removed from the patient case totals?

No. These cases should still be included in the patient case totals as case fields are collected as cumulative incidence.

If contacts of the incident/outbreak are readmitted and are confirmed positive, should they be included in the case numbers for the incident/outbreak?

Yes. As long as the incident/outbreak remains currently open then these cases should be included in the case numbers for the incident/outbreak.

What if I submit multiple updates on the same day?

ARHAI Scotland will always use the most recent update each calendar day for review and reporting. If you make multiple updates on the same day, please ensure that all relevant content/free text is included within the last update of the day, instead of cleared/replaced as per the guidance for investigations/case summary etc.

Can I save multiple updates to the Respiratory Short Form at the same time?

Yes, multiple incident updates can be saved using the “Save All Incidents”. Please note that this will update the latest incident update date for all incidents in the form.

Alternatively, select “Save Selected Incidents” to save all incidents where the form includes the data item field “Should Incident Update be Saved?” toggled to “Y”. Only incidents marked “Y” will be saved and receive the new update date.

Can we change the date of first reporting/date of update?

The “day of update” field is autofilled to the current date (saved as date of first reporting for new incidents/outbreaks). This can be changed to a previous date to submit data retrospectively e.g. a new incident/outbreak or an update from a weekend. Please ensure retrospective updates are added in consecutive order so that cumulative totals for the incident/outbreak are correct for each update.

How do I make a data correction?

Users should firstly assess if real time updates can be made to a currently open incident/outbreak which would capture any desired changes e.g. case numbers or the incident/outbreak case summary, investigations, etc.

There may be situations where data needs to be amended/fixed retrospectively, where the tool should be returned to ARHAI Scotland (NSS.ARHAIdatateam@nhs.scot). Please contact ARHAI Scotland and attach the current version of the tool, alongside any details or corresponding ID numbers if:

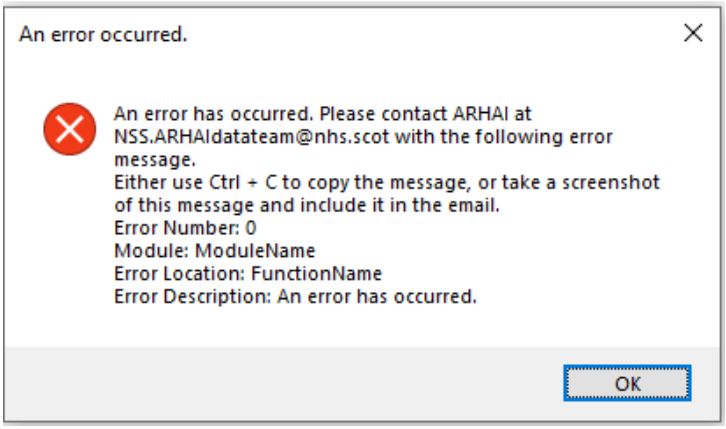
- New cases/updates need to be added to an incident/outbreak after it has been closed.
- Data has been entered to the wrong incident/outbreak.
- Data entered was incorrect (such as an incorrect death added which affected the HIIAT status).
- An amendment is needed to a field which cannot be edited after the first submission, i.e. Hospital or Specialty of the incident/outbreak.
- There is a duplicate of the same incident/outbreak on the tool.

Whilst appropriate changes/fixes are being performed by ARHAI Scotland, **do not continue to enter data into a local copy of the tool as these edits will not be retained in the corrected version.** ARHAI Scotland will send new version of the tool back which will include the date in the file name. The previous version of the tool can be deleted or archived and replaced with the new version.

I have a pop-up box that there is an error with the tool. How do I fix this?

If it appears there has been an error in the tool, please save the Excel file, close and reopen and try again. If the problem persists, please contact ARHAI Scotland D&I team (NSS.ARHAIdatateam@nhs.scot) to discuss and return your tool to be fixed. If possible, please include a screenshot of any error message or details of which incident/outbreak you were working on when problems may have arisen.

Generic error message example:



What do I need to do if I receive an updated version of the tool?

If you receive an updated tool, ensure that your new version is saved appropriately, and that new data is only entered into the new version of the tool.

Please also review the changes made and ensure that the version number of your tool matches that of the protocol. If not, return tool to the ARHAI Scotland (NSS.ARHAIdatateam@nhs.scot). ARHAI Scotland will add your existing data to the new version of tool and send the updated version back to you to replace your current local version. **While this process is taking place do not continue to enter data into the old tool as this will not be included in the corrected version.**

Appendix 3 – Revisions relevant to this publication

Table 2: Revisions to the ORT and accompanying protocol since launch in October 2020.

ORT version	Protocol version	Date of release	Description of changes	Rationale for changes
v1.0	v1.0	October 2020	Initial launch of the ORT, to collect COVID-19 clusters in addition to HIIORT incidents/outbreaks.	Collection of COVID-19 clusters as part of pandemic response.
v1.1	v1.0	October 2020	Bug fixes/updates to form interface and internal validation.	Improved functionality.
v1.2	v1.0	October 2020	Bug fixes/updates to form interface and internal validation.	Improved functionality.
v1.3	v1.3	February 2021	Bug fixes/updates to form interface and internal validation.	Improved functionality.
v1.4	v1.4	December 2023	Launch of the Respiratory Short Form. Control measures checklist transferred from ORT to NIPCM. Reporting of control measures through ORT by exception only. Protocol published on the NIPCM.	Align reporting of COVID-19 to the NIPCM and reduce the burden of data collection.

Appendix 4 – Reporting of HIIORT incidents/outbreaks and Respiratory Short Form data on the ARHAI Scotland E-Viz platform

All data that NHS boards enter on the Outbreak Reporting Tool (ORT) is automatically compiled on a daily basis and displayed on the ARHAI Scotland "E-Viz" platform. All ORT exports sent in by **9am** and **3pm** will be included within dashboard updates at **10:30am** and **4:30pm** respectively every weekday.

The ARHAI E-Viz dashboards contain aggregated summary data at NHS Scotland level, and detailed data at NHS board level (where NHS board users will be able to see their own data only). Users will also be able to view auto-generated Situation / Background / Assessment / Recommendation (SBAR) style reports for individual incidents/outbreaks within their own NHS board. Data are presented exactly as per submitted to the ORT. If any changes are required, then a new update/submission should be made through the ORT process as above.

Log-in and access

1. Use your NSS Username and Password to log in (same as existing details used to access Discovery).

    - Check you have an account already here
    - Reminder of Username here
    - Password reset here

2. If you don't have Log-in details, please go to: https://useraccess.nhsnss.scot.nhs.uk/ where you can register for an NSS account.
3. After receiving your NSS account username & details, you should contact ARHAI Scotland data and intelligence (D&I) Team (NSS.ARHAIdatateam@nhs.scot) to set up specific permissions to the ORT content on E-Viz.
4. The platform can then be accessed via the following link: ARHAI Scotland – Landing Page: ARHAI E-Viz Landing Page – NSS eViz

Please contact the ARHAI Scotland D&I Team with any questions or issues relating to the ARHAI Scotland E-Viz Platform (NSS.ARHAIdatateam@nhs.scot).

SCOTTISH HOSPITALS INQUIRY

QUESTIONS AND COMMENTS

ON THE

EXPERT REPORT PREPARED BY DR SARA MUMFORD & LINDA DEMPSTER DATED 24 MAY 2024

SUBMITTED ON BEHALF OF DR TERESA INKSTER

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1. INTRODUCTION

1.1 The following comments and questions on the expert report titled "Review of the Link Between Patient Infections and Identified Unsafe Features of the Water and Ventilation Systems at QEUH/RHC" prepared by Dr Sara Mumford and Linda Dempster dated 24 May 2024 ("Infection Link Report") are submitted on behalf of Dr Teresa Inkster in accordance with the procedure set out in Appendix B of Direction 5 – in respect of the Hearing Commencing 19 August 2023. References herein to section and paragraph numbers and to defined terms are to such numbers and terms used in the Infection Link Report unless otherwise stated.

1.2 None of the comments or questions raise new matters. Instead, the following comments and questions are submitted to correct factual accuracies, to provide clarification and to raise learning points where Dr Inkster believes further comment by the experts would prove useful to the work of the Inquiry.

2. SECTION 3: REPORTING OF HEALTHCARE ASSOCIATED INFECTIONS

2.1 **Paragraph 3.13 (Clinical reporting)**

> *"Any HAI caused by a mandatory reportable organism should usually also trigger a post infection review (PIR) to determine how the HAI was acquired by the patient."*

2.2. As a point of clarification, it should be noted that the PIR is not a tool used in Scotland. See also paragraph 3.17.

3. SECTION 4: EXECUTIVE SUMMARY

3.1 Paragraph 4.7

> *"The first unusual infection was recorded in February 2016, a case of Cupriavidus pauculus blood stream infection. We have seen no evidence of this very rare infection being investigated until five months later when the water supply to a sink in the aseptic pharmacy was tested and found to grow the same organism."*

3.2 Dr Inkster cannot comment on whether the IPCT were alerted to the *Cupriavidus pauculus* infection at the time (**10 February 2016**) as she was not the ICD for that team. As it was not an alert organism listed in appendix 13 of the NIPCM at the time, it is unlikely that the IPCT was aware. However, the statement in the Infection Link Report that it took five months to investigate is not accurate.

3.3 The GRI water lab contacted Dr Inkster about repeatedly elevated TVCs in the aseptic unit in the same month as the patient case. Dr Inkster's understanding is that the aseptic pharmacy was struggling to get assistance and the water lab was asking if she could help. Therefore, Dr Inkster contacted Joanne Gallagher, pharmacist, on **23 February 2016**. Flushing was increased and taps were descaled and cleaned by Estates. Dr Inkster asked about sink usage and later a little used sink in the unit was removed. The patient case was then identified retrospectively.

3.4 Paragraph 4.8

> *"We have seen no evidence that there was any overarching surveillance of environmental organisms despite the frequency with which they were occurring."*

3.5 Surveillance was put in place after the NICU Serratia outbreak of 2015. It was in place for the following environmental organisms from ~ May 2016; Stenotrophomonas, Pseudomonas, Acinetobacter and Serratia. This informed the NIPCM guidance and these organisms were added to appendix 13. Cupriavidus was added to the GGC alert list after the aseptic pharmacy incident in 2016. As lead ICD, Dr Inkster also developed triggers for action. Whilst Dr Inkster was off sick in 2017, there was discussion about

these triggers and a view expressed that they were too sensitive. Dr Inkster disagreed with this assessment. Dr Inkster's view is that the triggers were being breached during this period in 2017 because there were environmental issues.

3.6 Dr Inkster raises the following questions for the experts:

(i) It would helpful if the experts could define what is meant by "overarching surveillance"?

(ii) Is the view that the surveillance established in May 2016 was insufficient based on both what was known at the time and the guidance in appendix 13 of the NIPCM at the time?

(iii) Can the experts comment on whether they share the view that the triggers were too sensitive? (single case of bacteraemia, 2 infections other than BSI in 2 weeks, 3 colonisations in 2 weeks, general increase in environmental Gram negatives for the above-mentioned organisms)

3.7 **Paragraph 4.14**

"Following the implementation of Chlorine dioxide dosing, two cases of Mycobacterium chelonae infection were identified. M. chelonae is recognised as resistant to chlorine dioxide. One of these cases was matched to an isolate from the water supply. This is the second case of infection with a confirmed link to the water system."

3.8 Paragraph 4.14 is not factually accurate. The first case of *M chelonae* that the IMT was aware of in 2018 was **prior** to Chlorine dioxide installation. There was also an additional case identified by the case note review in 2016 which did not appear to have been reported to the IPCT but again was identified **prior** to Chlorine dioxide.

4. CHAPTER 9: ANALYSIS

4.1 **Paragraph 9.7**

"The CNR report was critical of the recording of environmental data which was found to be inconsistent and lacked organisation."

4.2 Up until Dr Inkster left the organisation in September 2023, she saw no evidence of any organisation of environmental data or typing results. In fact, members of the IPCT were very dismissive of any typing results that she sent to them including those where a link and potential environmental source was suggested. Although an environmental database was established, the governance was unclear and it was not known who the database belonged to. Reference lab results for environmental organisms remained paper based. Would the experts agree that an electronic system would make record keeping and analysis easier and less prone to transcription error?

4.3 **Paragraph 9.18 (Patient environment)**

> *"A decision was taken in 2019 not to implement routine HPV discharge postclean decontamination on ward 6A due to a belief that it would be ineffective."*

4.4 Dr Inkster notes with interest the minutes of the meeting held on 11 November 2019 where HPV is discussed. Previous IMTs had used HPV successfully, despite not knowing the source, e.g. Serratia in NICU. HPV was also being routinely used for discharge cleans in the Cystic Fibrosis cohort and it was utilised in ward 2A during the water incident. There also seems to be concern expressed at this IMT about the public perception of HPV being undertaken by individuals in protective suits. Would the experts agree that public perception should not be relevant and can be addressed by adequate communication? Put another way, would the experts agree that organisational reputation is not the priority?

4.5 **Paragraph 9.33 (Infection incidents associated with the Schiehallion Unit - 2016)**

> *"In our experience, this is below the expected level of sampling and testing of a high-risk area such as the Schiehallion unit and consequently cannot be used to exclude contamination in the water system at this time."*

4.6 Dr Inkster agrees that the volume of water testing in 2016 was low. However, it is worth nothing the differences in the Pseudomonas guidance between Scotland and the rest of the UK. Scotland went down a route of not advocating routine testing in high-risk areas.

It was decided in 2016, however, that in GGC such testing would be rolled-out in high-risk units due to the presence of flow straighteners. The challenge for IPCTs in implementing testing where guidance states there is no requirement should not be underestimated, particularly when the previous lead ICD for NHSGGC sat on the guideline development group.0020

4.7 **Section 9.34 (Infection incidents associated with the Schiehallion Unit – 2017)**

> *"In May 2017, two years of retrospective data were analysed, showing an increase in line infections from 3.25 per 1000 line days to 6.33 per 1000 line days. This resulted in the establishment of a Quality Improvement central line associated blood stream infection (CLABSI) working group."*

4.8 The Short Life Working Group was established **before** May 2017 and an action plan for improvement was developed in April 2017 (see previously submitted line infections pdf).

4.9 It is important to note that an increase in blood culture positivity had been under investigation since **August 2016** (see line infections pdf). At the time, the main concern was the increase in Gram positives.

4.10 Furthermore, there was an agreement in early June 2017 that a weekly multidisciplinary team meeting would be held in relation to ward 2A due to concerns and that there would be feedback to senior directors (see email from Jamie Redfern dated 12 June 2017 in line infections pdf). It is Dr Inkster's understanding that the weekly MDT meetings appear not to have taken place as planned. Are the experts aware of this agreement? Are the experts aware why the meetings have not taken place as planned?

4.11 **Paragraph 9.35 (Infection incidents associated with the Schiehallion Unit - 2018)**

> *"On 18 September 2018 the decision was made by the Technical Water Group to decant the Schiehallion Unit to 6A QEUH and 4B QEUH for the BMT patients."*

4.12 The above paragraph is not factually accurate. The decision to decant was made by the Chief Executive following a recommendation from the IMT and not the Water

Technical Group. Dr Inkster notes with interest a minute from a 'water review meeting' dated 18 September 2018. The governance and function of this group is unclear. To Dr Inkster's knowledge it did not report to the IMT or the WTG. The minute of the 'water review meeting' dated 18 September 2018 records that the Chief Executive was present. The minute also records that it was agreed to decant the patient group to another area including how to progress this. It may be that paragraph 9.35 of the Infection Link Report should refer to the 'water review meeting' and not to the WTG.

4.13 **Paragraph 9.37 (Infection incidents associated with the Schiehallion Unit - 2019)**

> *"This incident had the potential to have prevented the subsequent cases starting in June, if the water samples were positive, and illustrates the importance of complete documentation and closure of incidents,"*

4.14 It was not unusual to continue to see positive water samples at this stage as the chlorine dioxide dosing was still being implemented. The focus of the PAG was the water at source, i.e., the outlets used by patients and also to investigate patient timelines. At a subsequent PAG on 3 June 2019 sampling was extended to other areas and a water cooler was removed from ward 6A.

4.15 In relation to the foregoing, can the experts provide an opinion on what additional measures beyond POUF and dosing should have been considered at the PAG on 27 May 2019 in relation to the positive tank results?

4.16 **Paragraph 9.101 (Evidence source 2: patterns of infection)**

> *"The implementation of mobile HEPA filters appears to have had little impact on the rates of infection suggesting that the mechanism of infection may be more related to direct or indirect contact than to an aerosolization route."*

4.17 As a point of clarification, it should be noted that there was no expectation that portable HEPAs would impact on the rates of Gram-negative infection as these were implemented for prevention of Cryptococcus and Aspergillus.

5. SECTION 10: CRYPTOCOCCUS AND ASPERGILLUS

5.1 Paragraph 10.8 (Cryptococcus neoformans)

> *"The cleaning of the plant rooms prior to any microbiological sampling was not helpful in the investigation and removed a potential opportunity to isolate C. neoformans from the environment."*

5.2 The above statement is not factually accurate. Sampling of the environment did take place **before** the plant room was cleaned up – both surface swabs and air sampling.

5.3 The first round of air sampling (which was performed before any plant room clean up) took place with agar plates incubated over the festive period for the standard 5-7 days (which is recommended for fungal air sampling). However, Cryptococcal colonies tend to appear much quicker than 5 days and there is a possibility when the plates were read that any Cryptococcus present was overgrown with other environmental fungi. Would the experts agree that an important learning point for others undertaking air sampling for Cryptococcus, is that plates should be checked at 48 hours and if possible, a selective agar should be used to inhibit other fungi?

5.4 Similarly, samples of pigeon guano were taken. These were taken using the traditional method of a superficial swab. Later advice from vets was that a full pot of pigeon guano would have been preferred. However, by the time this advice was received, the plant room had been cleaned up. Nevertheless, a pot of guano was obtained from another area on the campus. Again, would the experts agree that this is an important learning point for anyone sampling pigeon guano?

5.5 Furthermore, in Dr Inkster's view, prior to the cleanup, the pigeon guano in the plant room posed a serious risk to patients, staff, and visitors. Therefore, the priority was to make the area safe and not to delay in the interests of performing further air or guano sampling. This decision was made based on an epidemiological link between cases and a likely and visible environmental source.

5.6 **Paragraph 10.9 (Cryptococcus neoformans)**

> *"The report identified that despite extensive sampling of the air in and around the hospital, no Cryptococcus neoformans was isolated, although other species of cryptococcus were found."*

5.7 As is stated, it is difficult to cultivate *Cryptococcus neoformans*. However, it is worth noting that, although extensive air sampling was undertaken, the majority of this was undertaken **after** the plant room clean up and **after** other measures to reduce pigeons on site had been implemented. Also, there was additional risk mitigation in place including HEPA filters.

6. SECTION 11: CONCLUSION

6.1 **Paragraph 11.24**

> *"In our opinion, the move to ward 6A was an additional risk for this cohort of patients."*

6.2 The decant to ward 6A was initially planned for a short duration, up until Christmas of 2018. It would be useful to know what the experts would have advised in this situation and their further comments on this point are requested.

6.3 Dr Inkster observes that there is significant clinical risk associated with shutting down a national specialist service which risks disease progression and mortality in this high-risk patient group. Dr Inkster further observes that the incident involving the move to ward 6A highlights a lack of contingency planning for specialist units in the event of an incident where patients require decanting for work to take place. The situation which arose at the QEUH is not unique. Through her work in ARHAI, Dr Inkster has been involved with two other health boards in the last two years facing similar challenges. One has had to decant haematology patients and the other is about to in order to undertake essential work. Both decants are to areas that are of a lesser specification with risk mitigation in place. Would the experts agree that greater consideration needs to be given to contingency planning for such events and this is an important learning point?

7. CONCLUSION

7.1 In relation to the above and the Infection Link Report more generally, Dr Inkster would be happy to provide further input, information and/or clarification as required.

Helen Watts KC and Leigh Lawrie, Advocate

On behalf of Dr Teresa Inkster

10 July 2024

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18 July 2024

Dear Sirs

OUR CLIENT: MOLLY & JOHN CUDDIHY
SCOTTISH HOPSITALS INQUIRY

We refer to the expert reports prepared by Sara Mumford and Linda Dempster. The last date for Core Participants to lodge responses to those reports was 15 July 2024. We have not lodged a response on behalf of our clients – the Cuddihy and McKay families – however, we do want to refer to our meeting of 18 June 2024 and to document the flawed timeline relied upon on the reports. We would also be grateful if you would confirm that all the authors of the expert reports will be asked to produce addendum commentary informed by accurate data. At our meeting, Professor Cuddihy highlighted errors within the documents published in the Scottish Government website and highlighted the fact that the documents containing errors are largely originating from NHSGG&C.

At the meeting, Professor Cuddihy also explained that Mike Stevens prepared a second report in relation to mycobacterium chelonae, but that the Inquiry legal team has not seen that. In addition, material from the Oversight Board appears on the Scottish Government's website, but does not take into account the errors in Mike Steven's first report. Furthermore, Dr Mumford's report makes no reference to the 2018 episodes of mycobacterium chelonae in June and October. We believe this is because one of the documents that is being considered is the Oversight Board's inaccurate timeline.

Having regard to the foregoing, and rather than raising these points in a response to the reports, we are simply seeking your reassurance that these issues will be addressed in the form of supplementary reports.

We look forward to hearing from you.

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Yours faithfully

[redacted]

Jonathan Cornwell
Partner/Directors
On behalf of Lindsays LLP
Email: [redacted]
DDI: [redacted]

SCOTTISH HOSPITALS INQUIRY

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

Bundle 21 - Volume 4

Responses to Expert Report of Dr Sara Mumford and Linda Dempster

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