



Infection Prevention and Control Annual Report 2022/23

1 Foreword

This 2022/23 financial year has been another important year for our infection services, with the spotlight no longer shining solely on COVID-19. Our hospitals are adapting well to life with COVID-19, with infection services refocusing on their key priority areas in order to reduce risk and deliver patient care safely.

We are proud to have retained one of the lowest rates of hospital-onset COVID-19 infection, and attribute this to the hard work of the Infection Prevention and Control (IPC) team and the frontline clinical and non-clinical teams who make our hospitals as safe as possible whilst enabling us to deliver exceptional care.

Our teams have also played an important national role as one of five High Consequence Infectious Diseases (HCID), in our case specialising in airborne diseases, and as the centre leading the HCID network. This has continued to involve us in national policy development for infectious diseases, including Mpox (previously Monkeypox) during the early part of the year.

Following a strategic review of our services, a new operating model was launched during the year, allowing our IPC service to work efficiently and collaboratively across the different sites, with clear links to the Trust's clinical groups. The newly established Surveillance and Innovation Unit (SIU) has already become an invaluable source for infection data, digital skills, reporting, and applied research within the team. The vascular access team received funding for expansion, which allows for growth in the service to match demand and additional capacity to deliver education, audit, and improvement programmes. We have also strengthened our capacity around environmental IPC, with the development of a new specialist post to work across our sites.

COVID-19 pathways have evolved over the course of the year, allowing for greater focus on other key priorities, such as reducing Gram-negative bloodstream infections, which is a national priority. A multidisciplinary project team was formed with the aim of identifying opportunities to reduce these infections.

Our antimicrobial stewardship programme is also vital to tackle the continued emergence of antimicrobial resistant organisms. Prescribing practices have changed during COVID-19, and a key priority is to reinforce best-practice around antibiotic prescribing. Preparations for our new electronic patient health record remain a key priority, with the IPC team leading the development and pre-launch optimisation of the IPC module within the system.

We would like to take the opportunity to thank the IPC team and staff at all levels of our organisation for their continued efforts to reduce the risk from infectious diseases in our patients, for optimising the use of antimicrobial agents, and especially for their response to ongoing, and emerging infectious threats.

Avey Bhatia, Chief Nurse

Dr Jon Otter and Dr Nick Price, Joint Directors of Infection Prevention and Control

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2 Glossary

A&E	Accident & Emergency
AMS	Antimicrobial Stewardship
BAF	Board Assurance Framework
BSIs	Bloodstream infections
CABG	Coronary artery bypass graft
CATS	Cardio Adjustable Thoracic Support
CCQIP	Critical Care Quality Improvement Programme
CITI	Centre for Innovation Transformation and Improvement
CQUIN	Commissioning for Quality and Innovation
DoI	Directorate of Infection
HCAI	Healthcare Associated Infection
HCAI DCS	Healthcare associated infections data capture system
HCID-A	High Consequence Infectious Disease – Airborne
HDU	High Dependency Unit
HEPA	High Efficiency Particulate Air
ICB	Integrated Care Board
IPC	Infection Prevention and Control
ICU	Intensive care unit
iGAS	invasive Group A Streptococcus
IPC	Infection Prevention and Control
LTV	Long Term Ventilation
MDR	Multidrug Resistant
MRSA	Methicillin-resistant <i>Staphylococcus aureus</i>
MSSA	Methicillin-susceptible <i>Staphylococcus aureus</i>
NIPCM	National Infection Prevention & Control Manual
PPE	Personal protective equipment
RMcH	Ronald MacDonald House
RSV	Respiratory Syncytial Virus
SEL	South East London
SI	Serious Incident
SIAP	Serious Incident Assurance Panel
SIU	Surveillance and Innovation Unit
SSI	Surgical site infection
UKHSA	UK Health Security Agency
UTI	Urinary tract infections
VAD	Vascular Access Device
VRE	Vancomycin-resistant enterococci

3 Executive Summary

- Guy's and St Thomas' NHS Foundation Trust ended 2022/23 below the threshold for healthcare-associated *Escherichia coli* and *Pseudomonas aeruginosa* bloodstream infections but above the threshold for *Klebsiella* sp. bloodstream infections and *Clostridioides difficile* infection.
- A post-infection review is undertaken for each healthcare-associated *C. difficile* infection; no lapses in care due to cross-transmission or antibiotic choices were identified during 2022/23.
- There have been four healthcare-associated MRSA bloodstream infections during 2022/23. Learning identified during these reviews, especially related to vascular access devices, has been shared with clinical leaders in the organisation and frontline clinical teams.
- Compared with the Shelford Group of peer Trusts, we have the lowest rate of *C. difficile* and *E. coli* bloodstream infection, but the highest rate of *P. aeruginosa* bloodstream infection. We continue to work towards reducing the risk of *P. aeruginosa* bloodstream infections and other Gram-negative bloodstream infections in our hospitals.
- The challenges related to COVID-19 have continued throughout the year, with several changes in local guidance in line with national guidance changes implemented. This has allowed us to open up our hospitals in response to the reducing harm profile of COVID-19 linked to the Omicron variant and the success of the vaccination programme.
- Outbreaks of COVID-19 have continued to occur across our hospital and community sites. However, we have consistently retained the lowest rate of hospital-onset COVID-19 infection compared with London hospitals in the Shelford Group and the other acute healthcare providers in south-east London.
- We also experienced influenza outbreaks across our sites over the winter, which added additional pressure to our hospitals.
- We implemented a new operating model for the team, which involved the launch of a new Surveillance and Innovation Unit and additional capacity to manage environmental IPC risks.
- Surveillance for surgical site infection continues in most surgical categories. Rates of infection above the national average have been identified in some categories, with interventions being planned to address this.
- The rate of intensive care unit-associated central venous catheter-associated bloodstream infections across the Trust remain below national benchmark rates.
- Antimicrobial prescribing indicators and consumption continue to be monitored closely, with overall compliance with prescribing indicators remaining strong but elevated consumption of some key agents.
- Internal investment has been secured to grow our nurse-led vascular access service to meet increasing demand.
- Two separate cases of healthcare-associated *Legionella pneumophila* infection linked to contaminated water has prompted an external review of our water hygiene measures. A series of actions have been taken to mitigate this.
- We continue to provide a High Consequence Infectious Diseases – Airborne (HCID-A) Centre for adults and children, which was activated regularly for the management of Mpox.
- Outbreaks of several organisms have been identified and managed across the Trust, including, Norovirus, a range of respiratory viruses, and *Serratia marcescens* cross-transmission.
- We continue to prepare for the launch of Epic, our new electronic patient record, during 2023/24.
- Applied research and innovation remains central to our team, with examples including the implementation of a dual COVID-19/influenza lateral flow test in the Emergency Department, and the evaluation of artificial intelligence to improve wound image assessment during our surgical site infection identification processes.

4 About Guy's and St Thomas' NHS Foundation Trust

- From our [5 main hospitals](#), and in the [community](#), we provide a full range of lifelong, general and specialist care, as well as [clinical research](#), innovation, [education and training](#).
- We are a diverse and welcoming organisation and are incredibly proud of our 22,700 staff and the dedication they show to our patients and each other.
- We aim to be outstanding in everything we do and to provide high quality and compassionate care and experience to all of our patients and families.
- As a leading centre of clinical research with a long history of innovation and medical firsts, we are able to provide the latest and most advanced treatments. We're [ranked top in England](#) for the number of trials open to patients and in the top 10 for the number of patients recruited to help us in our research.
- Together with our partners in [King's Health Partners](#), we form 1 of the UK's 8 Academic Health Science Centres.
- Our world-famous teaching hospitals train the doctors, nurses and healthcare professionals of the future. [GKT School of Medical Education](#) is our medical school, run jointly with [King's College London](#) and [King's College Hospital](#).
- We are guided by [our values](#) in everything we do and, as one of the largest employers in London, we reflect the diversity, opportunity and ambition of our communities and the people we serve.

5 COVID-19 and Influenza

- COVID-19 continues to involve a whole-organisation response and the Directorate of Infection has played a central role in the Trust response.
- In April/May 2022, we began to reduce COVID-19 prevention measures in order to optimise patient flow through our hospitals by reducing the requirements for patient testing and physical distancing. These changes involved an over-all reduction in the requirements for wearing personal protective equipment (PPE) during patient care; in line with changes in national guidance.
- In September 2022, we launched the next steps in our management of the COVID-19 pandemic, with a move away from asymptomatic testing for most patients. This change was in line with national guidance, and reflects the change in clinical profile of COVID-19, which is now a milder disease.
- The Trust retains the lowest hospital-onset COVID-19 infection rate compared with peer hospital Trusts in London.
- We have undertaken a review of the Omicron outbreaks that occurred in the Trust between December 2021 and June 2022 to identify key contributory factors and key learning points.
- We experienced an increase in both COVID-19 and influenza over Q3 and in the early part of Q4. This resulted in a number of outbreaks of both COVID-19 and influenza, which have been identified and managed.
- A new dual COVID-19 and influenza lateral flow testing device was launched in the emergency department to improve patient admission pathways.
- Further changes to COVID-19 guidance are planned for early 2023/24, with further reductions in patient and staff SARS-CoV-2 testing.
- A systematic review of ventilation of clinical areas is in progress, led by Essentia (estates and facilities).

6 Healthcare-Associated Infection (HAI) Surveillance

The Surveillance and Innovation Unit (SIU) was established under the Directorate of Infection at the start of the 2022/23 financial year to provide improved insight into the epidemiology of infections to inform IPC actions. Since its inception, there has been increased accessibility of mandatory reportable organism surveillance data within and outside the IPC team.

6.1 Summary of mandatory organism surveillance

- The NHS published a document, *Minimising Clostridioides difficile and Gram-negative Bloodstream Infections*, as part of the 2022/23 NHS Standard Contract in April 2022. This document sets out annual thresholds for healthcare-associated *C. difficile* infections and Gram-negative bloodstream infections (BSIs) attributable to *Escherichia coli*, *Klebsiella* sp., and *Pseudomonas aeruginosa*.
- We ended 2022/23 below the threshold for *E. coli* and *P. aeruginosa* BSIs but exceeded the threshold for *C. difficile* by 27.1% (61 cases in total), and *Klebsiella* sp., by 1% (101 cases in total); total cases are summarised below and in Figure 2.

6.1.1 *Clostridioides difficile* infection

- In 2022/23, there were 61 healthcare-associated *Clostridioides difficile* (*C. difficile* toxin-positive (reportable) cases, against the NHS threshold of 48.
- There has been a 5% increase in cases since 2021/22, and a 35% increase in cases over the last five financial years. This is in line with national trends, which show the highest rate of healthcare-associated *C. difficile* infection since 2012/13. When compared with the Shelford Group, as of January 2023, we had the lowest rates of *C. difficile* per 100,000 bed days, and have maintained this position throughout the financial year (Figure 3).
- A post-infection review is undertaken for each *C. difficile* infection; no lapses in care due to cross-transmission or antibiotic choices were identified during 2022/23.

6.1.2 MRSA bloodstream infections

- In 2022/23, there were four healthcare-associated MRSA BSIs; there is a zero tolerance for MRSA BSIs nationally. There were no cases during Q4.
- There has been a 60% decrease in cases since 2019/20 (4 vs 10 cases). Royal Brompton has not reported any cases in the last five years, while Harefield has not reported any cases since 2021/22.
- When compared with the Shelford Group, as of January 2023, we had the fourth highest rate of MRSA BSIs per 100,000 bed days.

6.1.3 MSSA bloodstream infections

- In 2022/23, there were 55 healthcare-associated MSSA BSIs; no national threshold is provided. Q4 saw the lowest number of cases (7), with only one case in March, while Q1 saw the highest (18), with nine of these cases occurring in April.
- There has been a 28% decrease in cases since 2021/22, but a 32% increase in cases over the last five financial years. When compared with the Shelford Group, as of January 2023, we had the fifth lowest rate of MSSA bacteraemia per 100,000 bed days. Investigations of these cases have identified recurring themes related to peripheral line care practices and record keeping. Key messages to promote best practice have been shared with clinical leaders in the organisation and frontline clinical teams.

6.1.4 Gram-negative bloodstream infections

- Each Gram-negative BSI is clinically reviewed to identify sources, risk factors and determine which cases were potentially avoidable. Further to this, a new “Reducing Gram-negative bacteraemias” group was formed during 2022/23, consisting of a multidisciplinary team, to explore projects to further reduce these infections.

6.1.4.1 *Escherichia coli* bloodstream infections

- In 2022/23, there were 114 healthcare-associated *E. coli* BSIs, against the NHS threshold of 125.
- There has been a 4% decrease in cases since 2021/22, and an 8% increase in cases over the last five financial years (113 vs 105). When compared with the Shelford Group, as of January 2023, the Trust had the lowest rate of *E. coli* bacteraemia per 100,000 bed days.

6.1.4.2 *Klebsiella sp.* bloodstream infections

- In 2022/23, there were 101 healthcare-associated *Klebsiella sp.* BSIs, against the NHS threshold of 100. There has been an 8% increase in cases since 2021/22, and a 30% increase in cases over the last five financial years (99 vs 76). When compared with the Shelford Group, as of January 2023, we had the fifth highest rate of *Klebsiella sp.* bacteraemia per 100,000 bed days.

6.1.4.3 *Pseudomonas aeruginosa* bloodstream infections

- In 2022/23, there were 59 healthcare-associated *Pseudomonas aeruginosa* BSIs, against the NHS threshold of 68. There has been a 13% increase in cases since 2021/22, and a 26% increase in cases over the last five financial years (59 vs 47). When compared with the Shelford Group, as of January 2023, we have the highest rate of *P. aeruginosa* bacteraemia per 100,000 bed days; this issue remains a key focus area for improvement.

6.2 ICU-associated central venous catheter-associated bloodstream infections

UKHSA Infection in Critical Care Quality Improvement Programme (ICCQIP) surveillance programme provides data on the rate of BSI and central-venous catheter-associated BSIs in participating adult ICUs. For 2022/23, all ICUs across the Trust fell below the national rate derived from participating units (Figure 1).

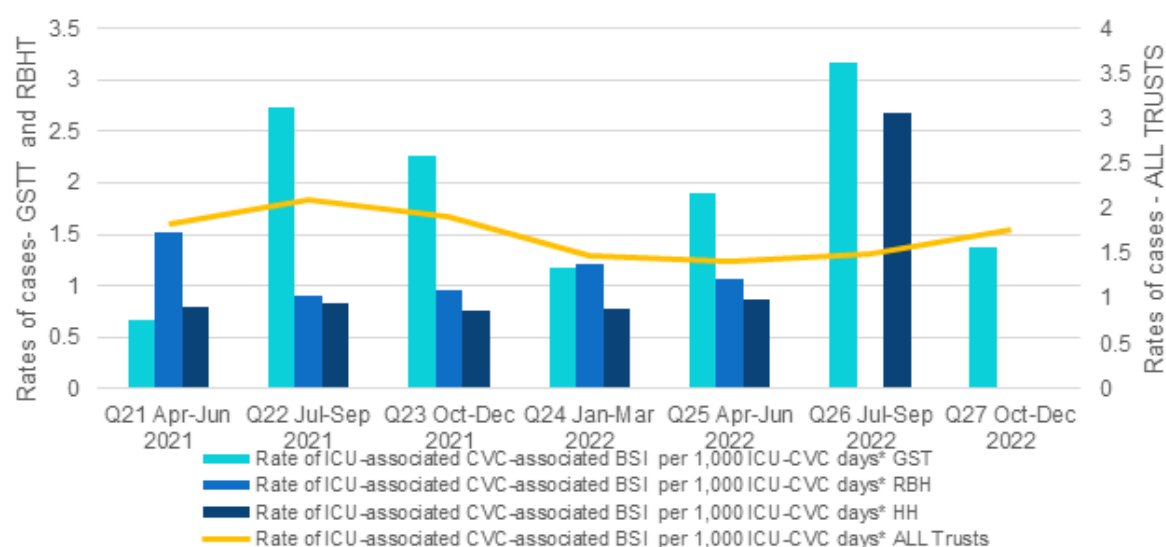


Figure 1: ICU-associated central venous catheter-associated BSI data from ICCQIP (October 2020 – December 2022, the latest available data)

6.3 Respiratory virus infections

Ahead of the winter months, the SIU developed a “Winter Pressures” dashboard, in order to track the number of respiratory viral infection cases Trust-wide.

Mirroring national trends, COVID-19 local prevalence rose and fell throughout the period (Figure 4). Respiratory Syncytial Virus (RSV) started to rise in Q3, reaching its peak during the middle of the quarter; the majority of cases were seen in Evelina, with 51% of cases being seen in those aged four and under. Influenza A saw a step rise and fall of cases, peaking with a daily count of 33 cases at the end of Q3.

6.4 Digital and epidemiological development in the Surveillance and Innovation Unit

- In line with the digital transformation goals of the wider NHS, the SIU has adopted using SharePoint sites, available to all members of the Directorate of Infection to host dashboards for data access, reports for collaborative editing, training and educational materials for continued development and applied research projects.
- Interactive dashboards have been created for Clinical Group stakeholders to provide an overview of IPC data and reports accurate to the previous reporting month. This includes dashboards presenting mandatory reported organisms at a Trust and Clinical Group level, dating back to 2017.
- A HCAI DCS case register has been established to improve the process efficiency and oversight of data that we report nationally – these data feed into reports and dashboards.
- Other registers are available for non-reportable organisms (non-toxin positive *C. difficile*, MRSA acquisitions, and respiratory cases in children, *Mycobacterium tuberculosis* complex, rotavirus and norovirus).
- The SIU is a centre of expertise to use applied epidemiology to support and extend clinical teams within the Directorate of Infection. Examples include: rapid analysis of invasive Group-A *Streptococcus* local prevalence, analysis of SARS-CoV-2 testing trends in various settings and analysing line infection data.
- EPIC, our new electronic patient record system, with the IPC module, Bugsy, will be at the forefront of the SIU when launched in 2023/24.
- The SIU has worked closely with the Epic teams to tailor the Bugsy unit for best IPC utilisation.
- The SIU led the ICNet/Epic data transformation project, ensuring the extraction of microbiologically relevant cases to Bugsy, ensuring patient reports are historically robust.
- The implementation of Epic unifies a variety of data sources and so when implemented, the SIU plans to utilise advanced data analytical tools to gain further epidemiological insight surrounding nosocomial infectious diseases.

Figure 2: Trust-wide mandatory healthcare-associated HCAI surveillance case numbers over the last five financial years

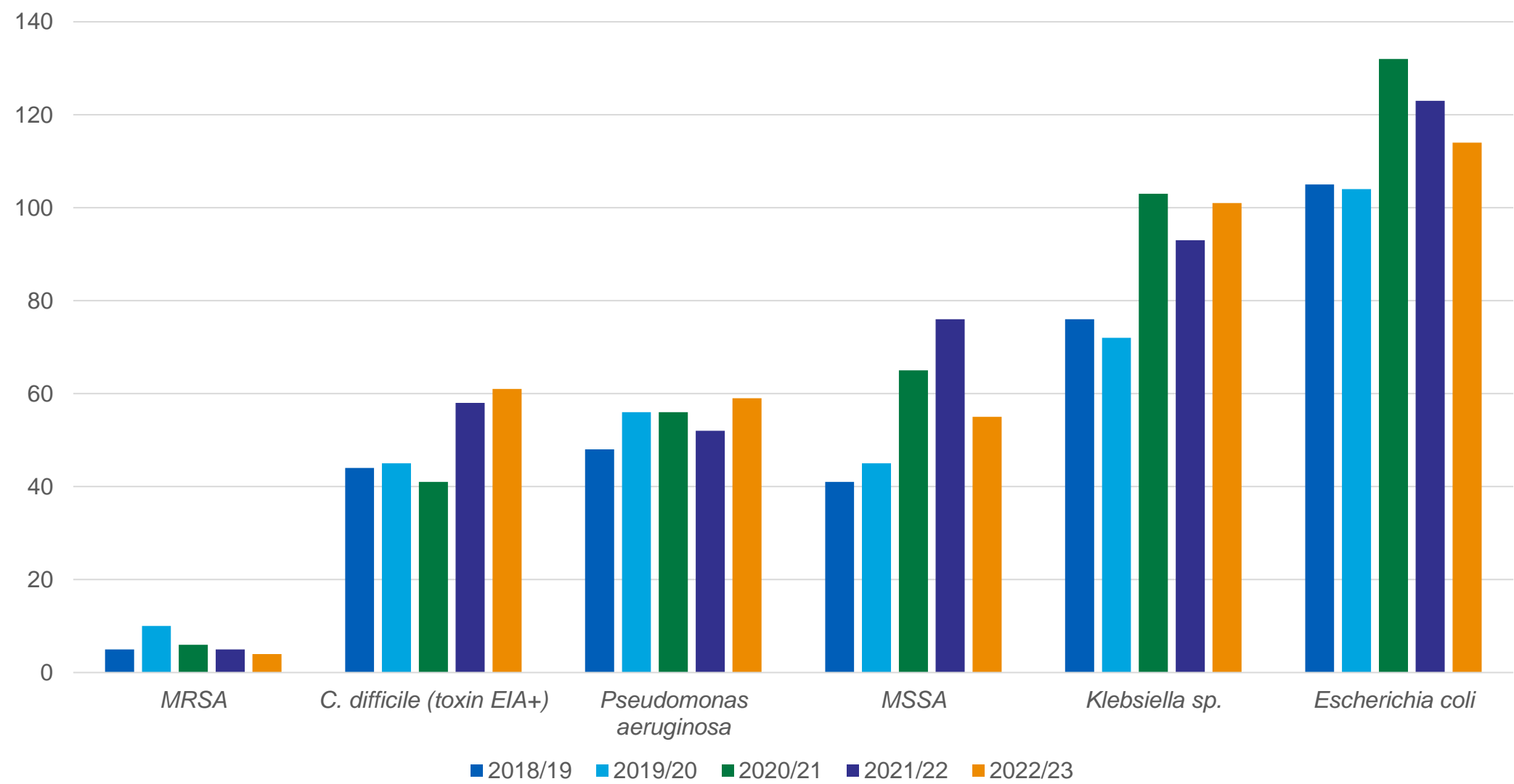


Figure 3: Healthcare-associated HCAI surveillance rates in the Shelford Group (April 2022–January 2023) ■ Trust attributable rate per 100,000 bed-days —●— Average

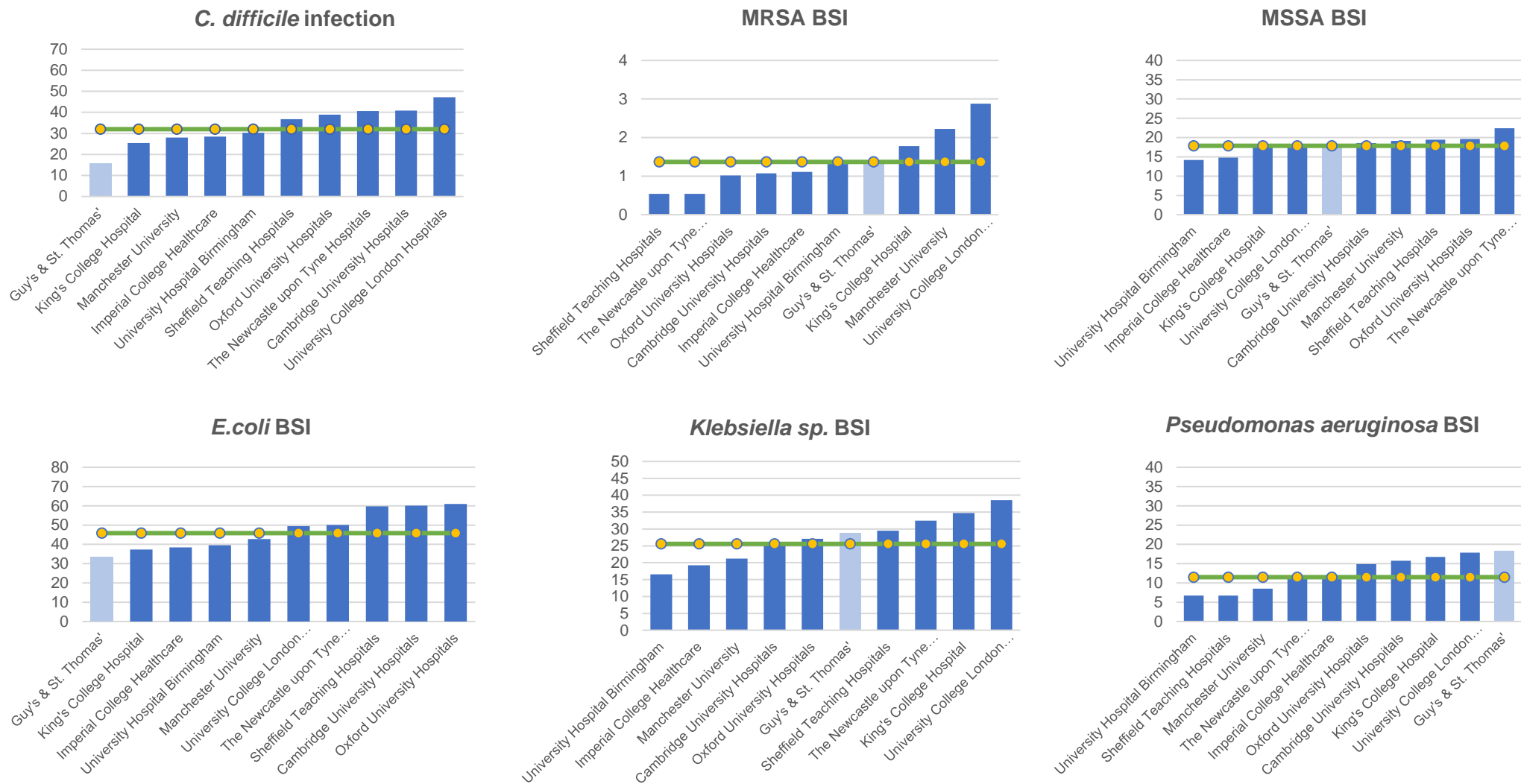
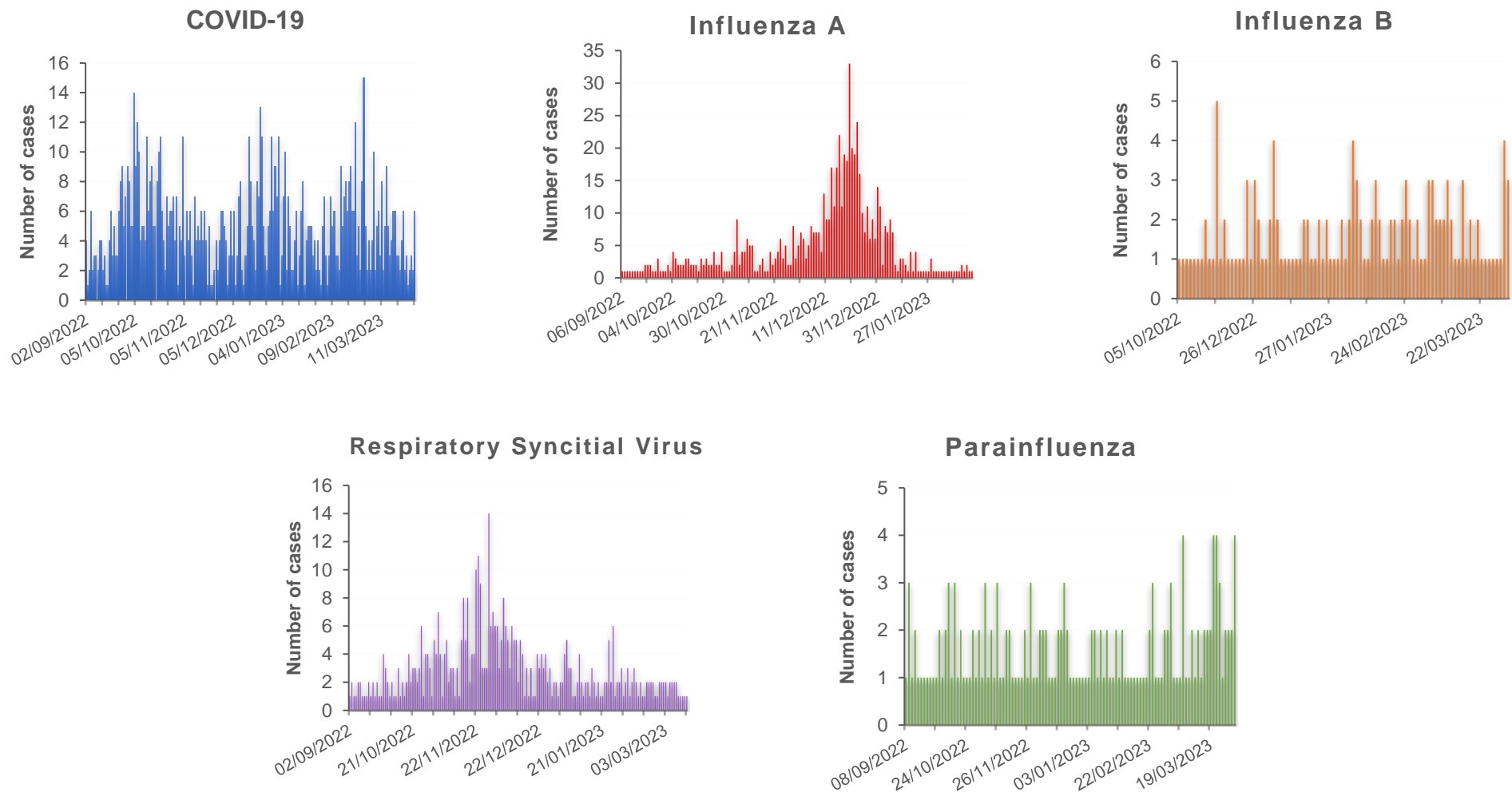


Figure 4: Respiratory virus trends (September 2022–March 2023)



6.5 Surgical Site Infection Surveillance

6.5.1 Surgical site infection rates, impact, and prevention

- SSI rates at Royal Brompton and Harefield remain in the lowest 10th percentile in these categories in England for these periods (Figure 5 and 6).
- Adult cardiac SSI management required a total of 683 bed days, 31 theatre slots, and 16 wound clinic appointments for the 12-month period.
- All deep or organ/space SSI, and any SSI (including superficial) requiring return to theatre, prolonged hospital stay or readmission, trigger investigation. Eight patients at Harefield Hospital and seven patients at Royal Brompton Hospital had SSIs that met one or more of these criteria. Learning and actions are recorded on Datix and shared at monthly meetings.
- An automated system is in place to track compliance with NICE SSI prevention assurance for SSI prevention measures for adult cardiac surgery. Compliance at Harefield was 95.8% and 91.8% at Royal Brompton in 2022.
- Orthopaedic SSI rates both at St Thomas' (fractured neck or femur) and Guy's (hip replacement) are in the highest 10th percentile in England for this period. A programme of work is in place to investigate the reasons for this and develop interventions for improvement.
- Adult Orthopaedic SSI management required an estimated total of 204 bed days for SSI management. There is ongoing work with the multidisciplinary team in adult orthopaedics, including ward and theatre reviews, to reduce the rates of SSI.
- SSI rates for Adult Cardiac, Adult Vascular and C-section were below the national UKHSA benchmark. CABG and Adult Gastrointestinal were above the national benchmark, with work in progress within these specialities to reduce these rates.

6.5.2 Surgical site infection team innovation

- **New Care Pathways:** The SSI team has developed a successful remote surgical wound monitoring system called Isla Care (Isla), managed via the GSTT Centre for Innovation, Transformation and Improvement (CITI). Over 7,000 unique patients have used this Trust innovation at Evelina, Royal Brompton and Harefield hospitals, and St Thomas'. Other national centres are using the Trust innovation. The SSI team are delighted to have been successful in a Guy's & St Thomas' Charity grant of £75K to continue using Isla for the next two years across the organisation.
- **New Process (Supporting Patient Care at Home):** a planned project for April 2023 is verifying and piloting remote wound swabbing. This innovation could help patients to self-manage their wounds at home, reduce ambulatory care appointments, help reduce inappropriate prescribing, and reduce pharmaceutical and prescription costs while simultaneously improving clinical outcomes by facilitating appropriate prescribing.
- **New Product:** The SSI team were pleased to launch the Cardio-Adjustable Thoracic Support (CATS) vest, patent pending: (UK Priority Application 2208319.0 Guy's and St Thomas' NHS Foundation Trust, Barts Health NHS Trust, Oxford University Hospitals NHS Foundation Trust). The CATS vest is now available on the NHS Supply Chain.
- Applied research projects and outputs are summarised in Section 15.

Figure 5: Five-year trend of SSI cases and incidence in surgical specialties at Guy's, St Thomas', and Evelina sites

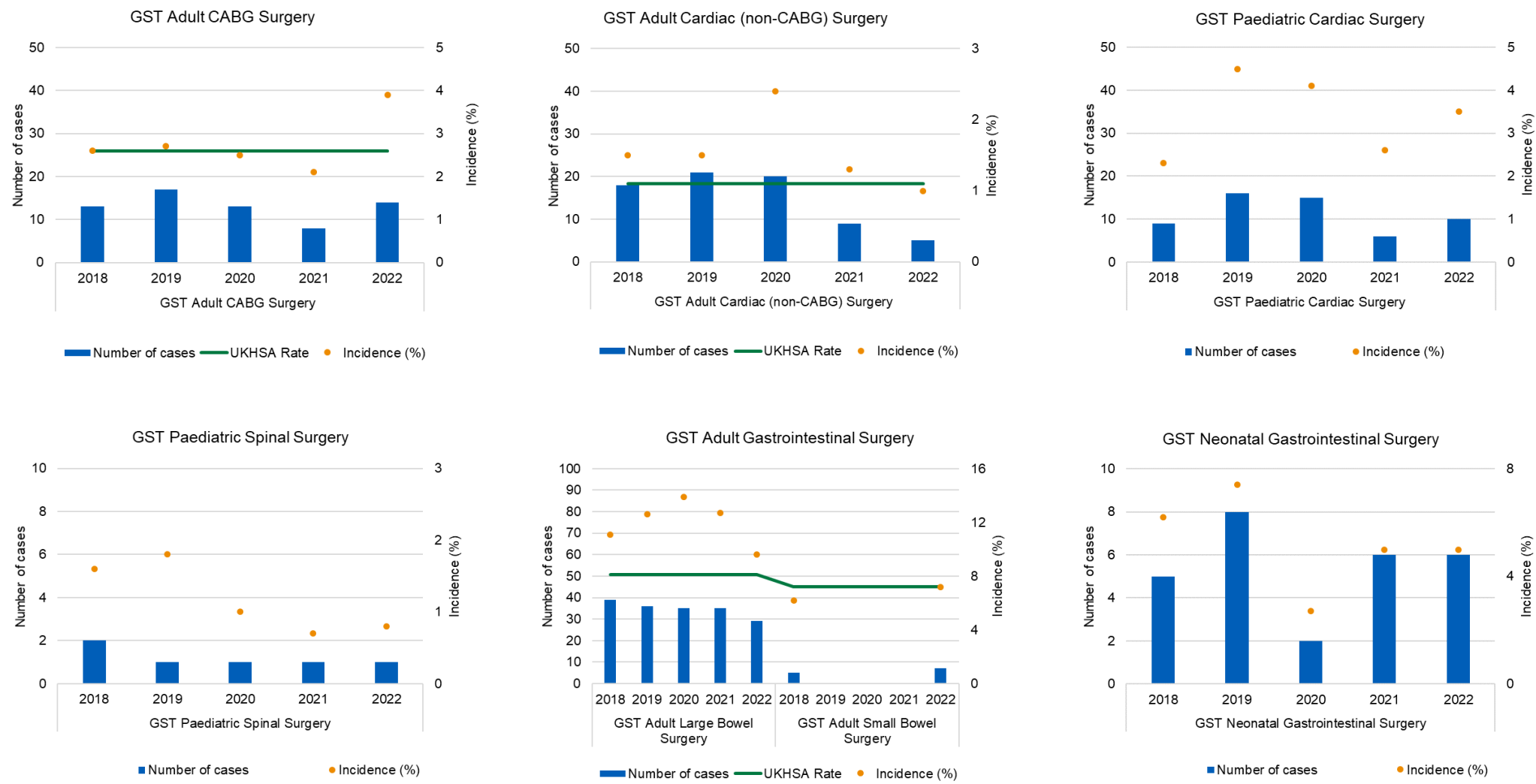


Figure 5: Five-year trend of SSI cases and incidence in surgical specialties at Guy's, St Thomas', and Evelina sites continued

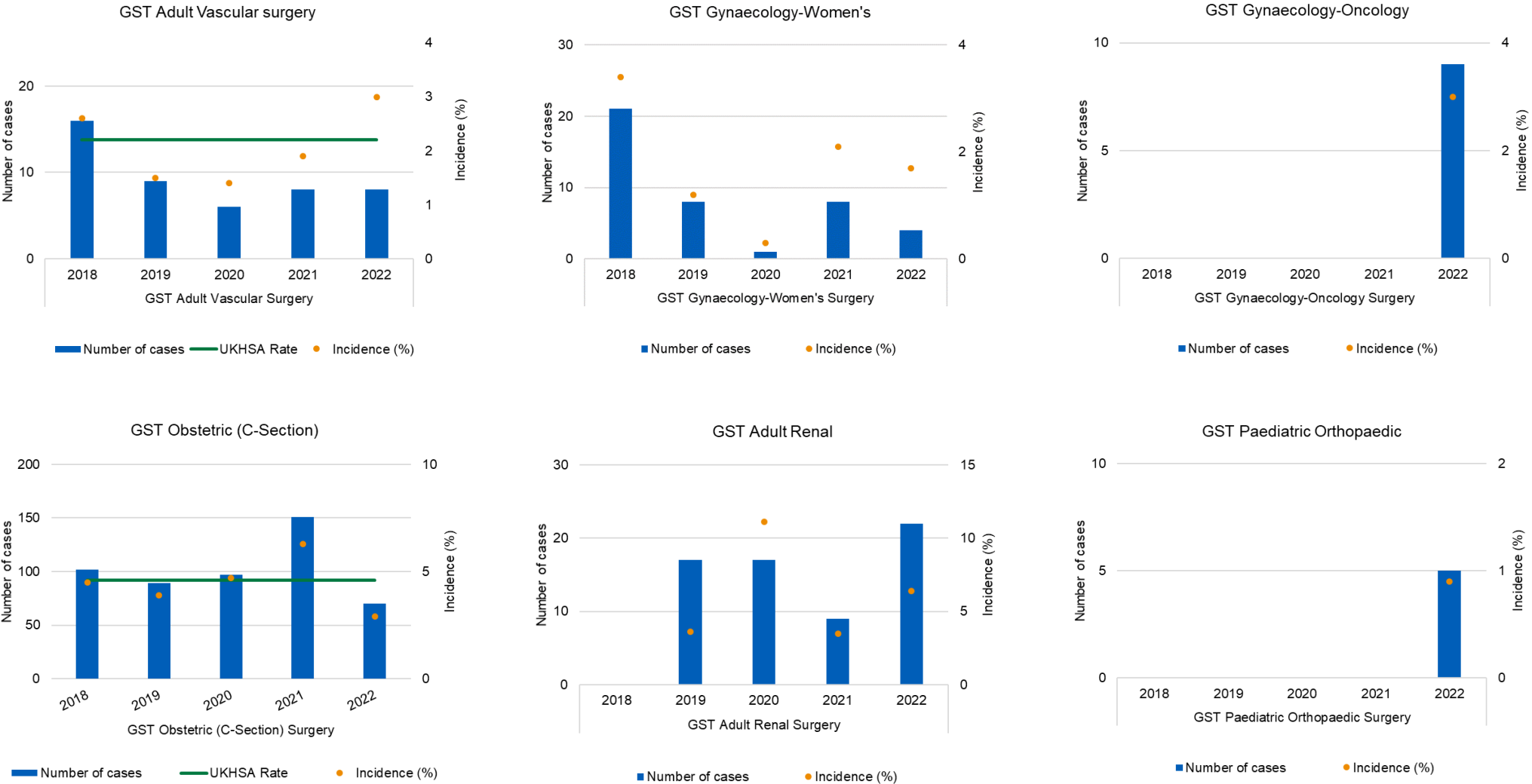


Figure 5: Five-year trend of SSI cases and incidence in surgical specialties at Guy's, St Thomas', and Evelina sites continued

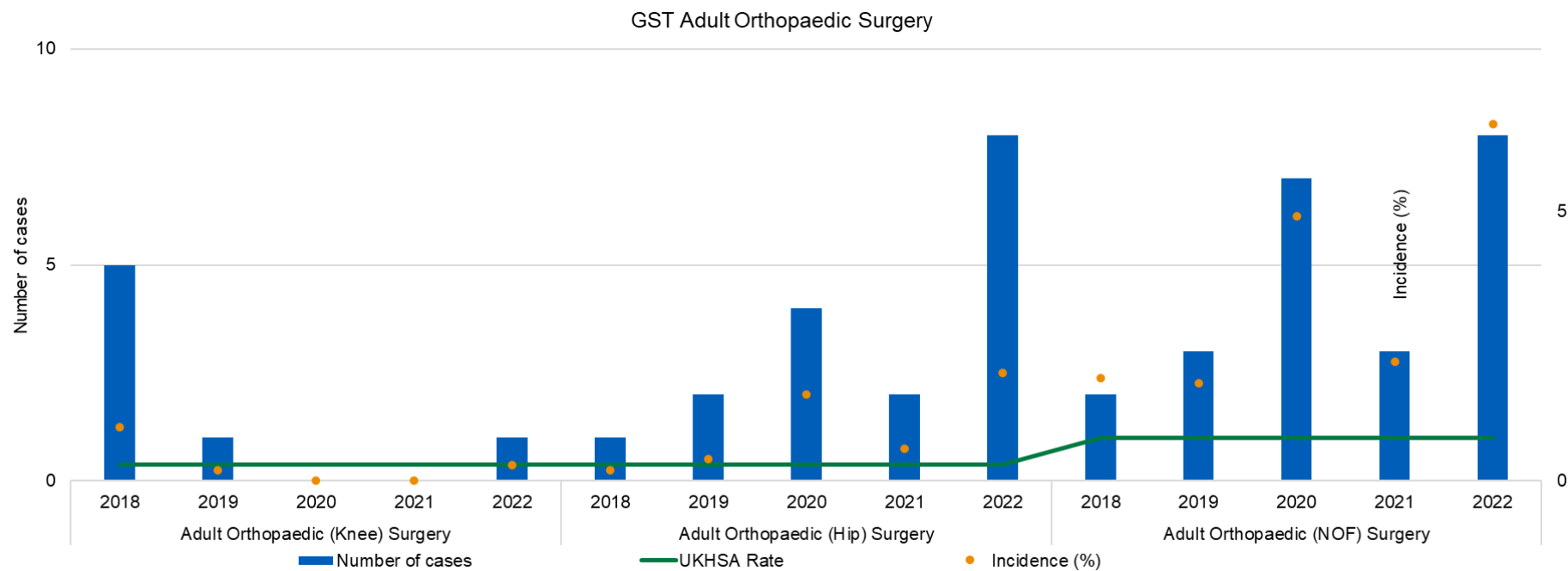
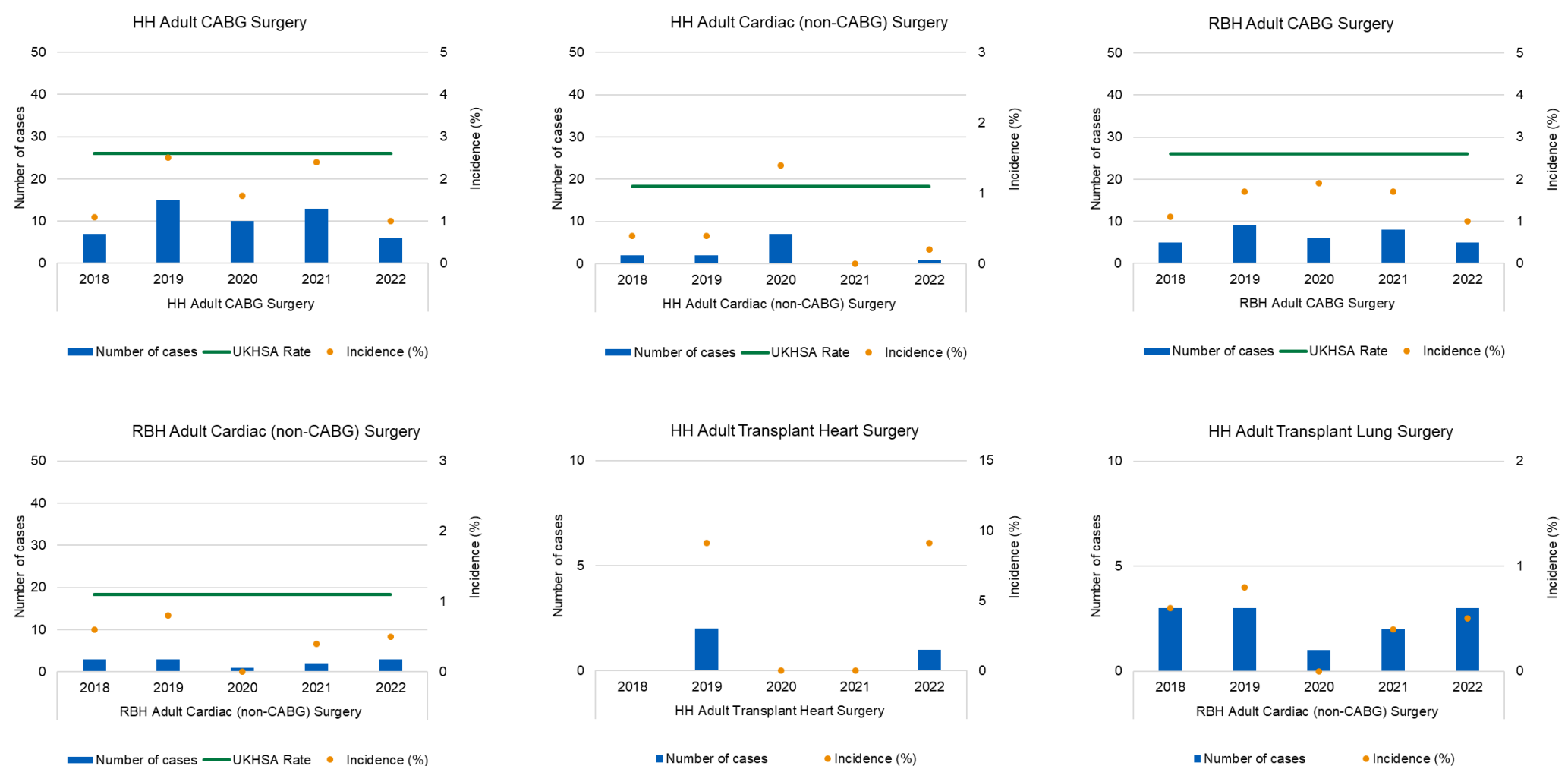


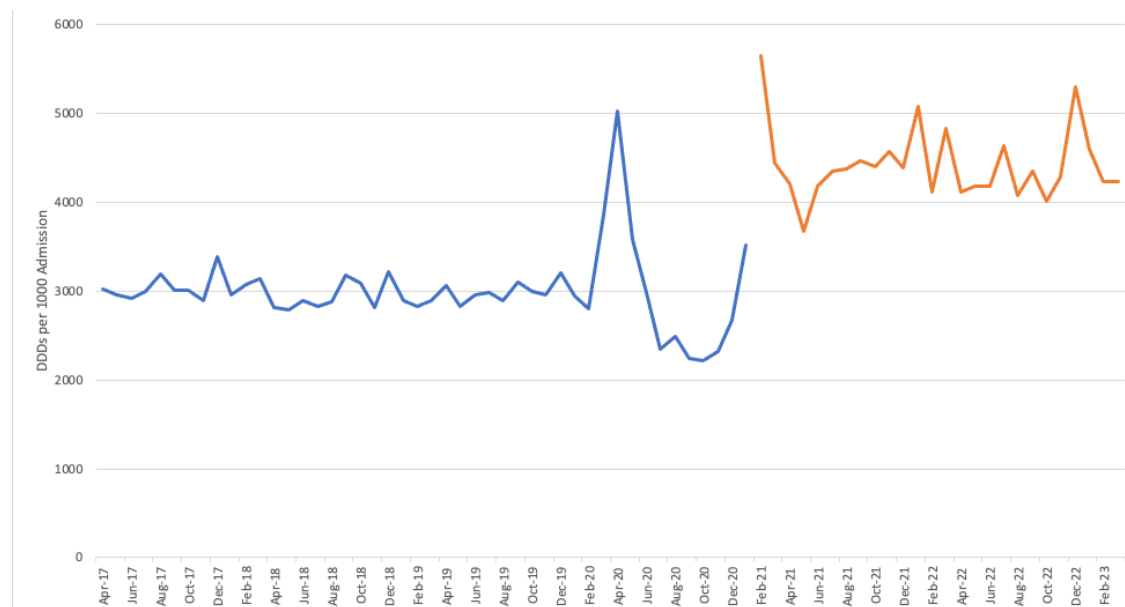
Figure 6: Five-year trend of SSI cases and incidence in surgical specialties at Royal Brompton and Harefield hospitals



7 Antimicrobial Stewardship Programme

- Nationally reported antimicrobial consumption data (UKHSA fingertips) 2022/23 continued to show that Guy's and St Thomas' as a combined Trust including Royal Brompton and Harefield hospitals has fallen from previous best-in-class performance within Shelford.
- Standard Contract targets for 2022/23 (reductions in Watch and Reserve classes of antibacterials) has continued to be particularly challenging for the Trust (Figure 7). The merger has made an impact on our overall antibiotic consumption and, crucially, our consumption of Watch and Reserve classes. We continue to work towards understanding and improving this position.
- Reporting has continued for the UTI Commissioning for Quality and Innovation (CQUIN) for 2022/23.
- New Standard Contract targets for 2023/24 have been set (10% cumulative reduction of Watch and Reserve classes of antibacterials against the 2017 baseline). This will be particularly challenging; however, work is underway to reduce consumption across the Trust.
- A new 2023/24 CQUIN promoting an IV to oral switch has been launched; the infection services will be contributing to the improvements sought via this CQUIN.
- Infection pharmacy services continue to support the ongoing COVID-19, influenza, and Mpox vaccination campaigns.
- National COVID-19 treatment shortages have continued to be managed throughout the year.
- A strategic review of pharmacy staff delivering the antimicrobial stewardship programme is in progress.
- The antimicrobial stewardship team at the Trust continue to support activities across the South East London Integrated Care Board (SEL ICB).
- The transition from an in-house app to the commercial app MicroGuide with GSTT guideline information continues.
- The team faces ongoing challenges posed by external reporting metrics alongside significant operational pressures, including increased requirements for expertise and leadership across the SEL ICB.
- The team will be integral in the delivery of reductions in Gram-negative BSIs and *C. difficile* risk.
- Specific priority areas for 2023/24 include:
 - o Transition of commissioning responsibility of all COVID-19 treatment to SEL ICB;
 - o Work to support Epic AMS-specific validation in readiness for go-live;
 - o Work to implement Epic across the Trust and begin the development of appropriate data sources and performance metrics to support AMS reporting to help direct and drive improvement within each Clinical Group;
 - o Finalise/align Infection Pharmacy staffing structure with the wider Trust Clinical Group structure;
 - o Confirm the new antimicrobial stewardship strategy, both locally and across the SEL ICB;
 - o Continue to sustain general antimicrobial stewardship performance.

Figure 7: Trends in consumption of "Watch & Reserve" antibiotics. Blue = trend pre-merger; Orange = trend post-merger.



8 Vascular Access Team

- Funding was agreed in November 2022 for the expansion of the Vascular Access service. Intensive recruitment since January 2023 has resulted in 80% of vacant and new roles filled. Recruitment for the final two roles is in process.
- Temporary changes in the service that were implemented to ensure that core clinical demands could be met are being lifted and all activity is rapidly increasing.
- The Vascular Access team paused the rolling audit programme during the staffing challenges between October–March 2023. The audits of IV-line practice resumed in March 2023. Sub-optimal line care documentation will be improved through the planning and implementation of EPIC, and will be addressed in the new Gram-negative BSIs improvement group.
- The Vascular Access team continues to have a key role in the investigation of catheter-related blood stream infections.

9 Decontamination, Water, Ventilation, and Environmental Hygiene

- **Decontamination** Activity has continued to increase and has returned towards pre-COVID levels.
- **Dental:**
 - Activity has continued to increase over the last year, increasing to beyond pre-COVID-19 levels.
 - An increase in *Legionella* sp. contamination of water samples from dental chairs has been reported. This is being investigated and is potentially linked to various underlying technical issues corresponding to a change in water sampling contractor. However, remedial actions have been implemented, which should see a gradual reduction of the incidences.
- **Quarterly internal audits:** Results are generally good with a small number of non-critical issues (e.g. with log-books being incomplete, these have been rectified following re-audit). This will remain a low-level risk for the areas that use them, however the introduction of Epic potentially allows the log books to be discontinued with information recorded directly to the patients' health record.
- **Ventilation:** A Trust-wide review of ventilation has begun, with an initial 'desktop' review of clinical areas in the Trust followed by a detailed engineering assessment of ventilation in all parts of the Trust. This is to identify areas where ventilation is considered less than adequate, and where additional measures may be required.
- **Environmental audits:** A programme of auditing for standards of environmental hygiene is in place across the Trust. Systems are in place to address areas that fall below accepted standards. Environmental hygiene audit results are discussed at the monthly Infection Control Committee to identify areas that may require additional support in meeting the standards.
- **Legionella incidents:**
 - A patient was diagnosed with hospital-onset Legionnaire's disease at St Thomas' Hospital in June 2022, which was linked to water samples from a hand wash basin close to the patient's bed. The patient was treated and recovered. This was investigated as a serious incident and a number of recommendations have responded to, overseen by the engineering team.
 - A second case of probable hospital-onset Legionnaire's disease occurred at Guy's Hospital in January 2023. The patient was admitted to another hospital with severe infections but sadly died in March 2023. The case has been referred to the Coroner and investigated as a Serious Incident. The investigation is currently ongoing. A full engineering review has been undertaken, and remedial actions implemented.
 - These incidents have prompted an external review of the Trust's water hygiene systems, resulting in a range of recommendations, which are being implemented.
- **Guy's theatres bronchoscope incident:** In March a bronchoscope was used on a patient without decontaminating following use on another patient immediately before on a surgical operating list for head and neck cases. The staff member wrongly assumed that the used scope was clean and had been set up for the next case. The donor patient tested negative for blood borne viruses and no actual harm was suffered. This is currently being treated as a Serious Incident (SI) and due to report to Serious Incident Assurance Panel (SIAP) on 30/05/23. The investigation has revealed some areas for improvement in practice in separation of clean and used bronchoscopes using visual cues including coloured tray liners. This will reduce the risk of the error recurring.
- **Royal Brompton and Harefield video-laryngoscope incident:** A number of new devices were brought into service without being set up on the tracking system. This meant that a small number

of patients had a procedure performed without the device ID being recorded. As a consequence a look back exercise would not be possible if required. These devices have now been added to the system and the process for ensuring this happens consistently is being reviewed.

- **Other:** A new IPC specialist in environmental infection control has been appointed during 2022/23.

10 High Consequence Infectious Diseases – Airborne (HCID-A) Centre

- The Trust continues to be part of the airborne high-consequence infectious diseases (HCID-A) network and has been integral to the development of management strategies and policies.
- In May to August 2022, the Trust responded to an international Mpox (previously Monkeypox) outbreak associated with gay, bisexual and men who have sex with men (GBMSM), caring for over 140 inpatients (the highest number of any HCID centre).
- Our extensive training programme led by our HCID clinical fellow and clinical nurse specialist enabled us to be well prepared and no nosocomial transmission events occurred (either to staff or other patients).
- The HCID service was able to rapidly adapt to PPE changes and develop safe PPE and waste management pathways to support colleagues in ED and sexual health as an unprecedented number of patients presented for testing.
- Clinicians in the Trust also informed the national epidemiological picture of Mpox.
- A virtual ward model was developed to support community management of non-severe cases.
- Paediatric HCID cases were managed in the community after careful assessment.
- In June 2022 the Advisory Committee on Dangerous Pathogens (ACDP) recommended that the strain of Monkeypox virus (MPXV) in community transmission within the UK (Clade IIb, B.1 lineage) should no longer be classified as an HCID, and then in January 2023, all of Clade II Mpox was no longer classified as an HCID. Meanwhile, Clade I of Mpox remains an HCID.
- Ongoing training continues including in-person PPE donning and doffing, e-learning, virtual desktop exercises, simulation centre training and large in-situ simulation exercises involving adult medicine, paediatrics and critical care in both areas.
- Our training programme was presented as a model to the national HCID-A network.
- The service hosted visits from colleagues representing centres in Cambridge and Denmark, the RAF and also by NHSE specialist commissioners.

11 Hand Hygiene and PPE Auditing

MEG (an electronic audit platform) was launched in September 2022 for auditing personal protective and hand hygiene auditing on our Royal Brompton and Harefield sites to standardise our approach across Trust.

11.1 Hand Hygiene Auditing (Guy's and St Thomas' and Evelina)

In 2022/23, hand hygiene audits undertaken by ward-based link practitioners returned a compliance rate of 89.8% (16,578 observations). Audits undertaken by infection prevention nurses showed a lower level of compliance at 66.2% (2,936 observations). This difference suggests that link practitioners are over estimating compliance and these findings are being addressed via monthly MEG audit training, increased infection prevention nurses' hand hygiene validation observations, and escalations via the monthly Infection Control Committee.

11.2 PPE Auditing (Guy's and St Thomas' & Evelina)

Overall compliance from audits undertaken by infection prevention nurses was 91% for 2022/23 (8,065 observations). Eye protection compliance continued to be the key PPE focus as several staff were observed as non-compliant; this has also been raised with local divisional management teams to monitor compliance at the frontline.

11.3 Hand Hygiene Auditing (Royal Brompton and Harefield)

Overall compliance from audits undertaken by infection prevention nurses was 95.4% for 2022/23 (17,443 observations).

11.4 PPE Auditing (Royal Brompton and Harefield)

Overall compliance from audits undertaken by infection prevention nurses was 96.5% for 2022/23 (18,117 observations).

12 Clinical Activity and Incidents

12.1 COVID-19 outbreaks

A number of COVID-19 outbreaks occurred across all clinical groups. A reduction in the level of harm and in the duration of outbreaks was seen with the Omicron variant (which first emerged in December 2019).

- **Integrated and Specialist Medicine:** 19 outbreaks affected 112 patients, of these 59% were attributed to definite healthcare association, 26% to probable hospital cases and 13% to indeterminate. Whole genome sequencing was utilised to understand links between cases and showed that the majority of outbreaks often had a single introduction
- **Heart, Lung, and Critical Care (Royal Brompton and Harefield sites):** seven outbreaks affected 39 patients, with 37% attributed to definite healthcare association, 29% to probable hospital cases, and 23% to indeterminate association.
- **Heart, Lung, and Critical Care (St Thomas' site):** nine outbreaks affected 59 patients; 44% of these were attributed to definite healthcare association, 27% to probable and 28% to indeterminate. Patients in this clinical group move between the various cardiovascular wards which is evident from genome sequencing which showed often two or more introductions of COVID-19 to these wards during outbreaks.
- **Cancer and Surgery:** 28 outbreaks affecting 122 patients.
 - **Haematology and Oncology wards** had seven COVID-19 outbreaks with 22 patients affected.
 - **Transplant, Renal and Urology wards** had 8 COVID-19 outbreaks, with 41 patients affected.
 - **Surgery** had seven COVID-19 outbreaks affecting 21 patients.
 - Whole genome sequencing presented a mixed picture: some outbreaks appeared to originate from a single introduction, whereas other were linked to multiple introductions.
 - The long stay of patient within this group and the tendency to congregate outside of the wards was a major contribution to some of the outbreaks. There was no reported SI or severe impact reported on affected patients. Some of the wards affected at the Guy's site has Nightingale-style bays which presents challenges with operational impact when outbreaks happen.
- **Evelina London.** Two COVID-19 outbreaks, one affecting three patients, three parents/siblings and two staff members was declared in January 2023. All parents were staying at Ronald MacDonald House (parent accommodation). Focus on communications and providing information and advice to RMCH regarding the outbreak and good infection prevention practice. The other affected three patients on the paediatric ward at Royal Brompton in December 2022. Sequencing identified three separate introductions.

12.2 Evelina London - Women's and Children's Healthcare Clinical Group

12.2.1 Evelina and Women's outbreaks

- Rotavirus outbreaks occurred on the paediatric ward at Royal Brompton, affecting six patients and one probable staff member in April 2022 and the cardiology ward in Evelina London affecting two patients in May 2022.
- An outbreak of Parainfluenza 3 was declared in July 2022, affecting two patients and one parent from the paediatric ward at Royal Brompton.
- An RSV outbreak was declared on Mountain Ward Long Term Ventilation (LTV) and High Dependency Unit (HDU) in October 2022, affecting five patients and three staff. Key issues and learning included the importance of hand hygiene, timely donning and doffing of PPE and the importance of environmental and equipment cleaning and assurance.

- An outbreak of RSV on Rose Ward at Royal Brompton occurred in November, affecting two patients across two bays. Issues identified included clutter within the environment and key actions included improvement of environmental cleaning, cleaning of shared equipment and playroom use.
- An outbreak of influenza A on Mountain Ward (HDU/LTV bay) affected nine patients, one parent and 14 staff who all exhibited respiratory symptoms. Key issues/learning included the correct donning and doffing of PPE, cleaning assurance and accessibility of vaccinations (the Vaccination Team commenced ward vaccination for staff, eligible children and parents) and the development of an influenza leaflet and IPC learning package to support learning from outbreaks.
- Norovirus outbreaks occurred on:
 - Mountain HDU, affecting four patients in May 2022.
 - Savannah (with sporadic cases on Sky Cardiology and Mountain) affecting four patient cases and eight staff with gastrointestinal symptoms in October 2022.
 - Sky Cardiology, affecting four patients and three parents/siblings in December 2022.
 - Rose Ward in January 2023, affecting nine patient cases, and one (probable linked) staff case and three (probable linked) parents.
 - Mountain (three patients) and Forest PICU (two patients, four probable staff) in March 2023.
 - Key issues/learning included timely stool testing, staff and parents not attending if unwell and quality of aprons. The apron quality has been escalated to the PPE Group.
- An outbreak of Astrovirus was declared on Sky Critical Care affecting two patients; four staff declared gastrointestinal symptoms in December 2022. There were challenges with isolating symptomatic cases in single side rooms due to staffing issues.
- A period of increased incidence of *Serratia marcescens* occurred within the NICU affecting 16 patients July/August 2022, some of whom were linked by typing. The incident resulted in the review of cleaning of shared reusable medical equipment, and a review of disinfectant used to clean incubators, with a decision and plan to implement Incidin™ (a new disinfectant).
- Two cases of *Serratia marcescens* (bacteraemia) were identified in blood cultures from patients being cared for in NICU in January and February 2023. Both strains are indistinguishable by typing, suggesting cross-infection. They are, however, different from the isolates from the August 2022 period of increased incidence of the same organism. Actions from the previous period of increased incidence were revisited.

12.2.2 Evelina and Women's incidents

- Maternity Services had an unannounced CQC visit in September 2022. The report, issued in September highlighted some environmental issues, which are being addressed.
- Increased rates of Group-A Streptococcal disease (GAS) and Invasive Group-A Streptococcal disease (iGAS) in Evelina Children's Hospital following an alert issued by UKHSA in December 2022. Treatment guidance and information for staff and patients was updated in response to this increased incidence.
- Incident review of potential harm for a child associated with the use of sporicidal wipes. An alert and updated use poster was circulated to remind staff to allow surfaces to fully dry before placing bare skin on just wiped surfaces.
- Successful HCID debrief following a paediatric case of Mpox.
- Possible healthcare-associated case of *Salmonella* was identified in a child in March 2023. The incident review concluded this case was very likely to represent chronic carriage / previous infection.

12.3 Heart, Lung and Critical Care Clinical Group

12.3.1 Guy's and St Thomas' sites

- The Heart, Lung and Critical Care Clinical Group has continued to build on and strengthen their link practitioner network and devised a number of improvement initiatives throughout 2022/23.
- Five influenza outbreaks affected 15 patients, one of which was reported as the cause of death on part 1a of a death certificate. This death was reviewed by the Patient Safety Group and Heart, Lung and Critical Care Clinical Group Incident Review which found no additional learning. The increase in influenza activity in the Trust reflected the rise in community cases between October 2022 and January 2023.

12.3.2 Royal Brompton and Harefield

- An outbreak of Parainfluenza 3 affecting seven patients within the Transplant Unit at Harefield Hospital was declared in July 2022.

12.3.3 Other

- In June 2022, theatre temperatures started exceeding acceptable levels affecting 4 theatres at the Royal Brompton Hospital. As risk mitigation the theatre team installed mobile air conditioning units with an extraction hose directed through the dirty utility air pressure stabiliser. This will have disrupted the displacement air flows in theatre, that aid reducing and diluting contamination. New chillers have now been installed to prevent a reoccurrence, and no patient safety incidents have been linked to this.
- A transplant patient was identified as having *Mycobacterium tuberculosis* in March 2022, resulting in a look-back investigation. No risks to patients were identified but warn and inform letters were sent to staff.
- In December 2022 a clinical staff member was confirmed to have military TB positive (smear positive in sputum). This resulted in some staff receiving informative letters.

12.4 Integrated and Specialist Medicine Clinical Group

- The Integrated and Specialist Medicine Clinical Group has continued to develop stronger and consolidated working relationship with the IPC team and continues to collaborate on all fronts to address the current and future IPC challenges for the Clinical Group and wider Trust.
- An influenza outbreak affected three patients on a stroke rehabilitation ward. This was identified at the same time as a COVID-19 outbreak, both thought to be community introductions from visitors.
- Two norovirus outbreaks were identified and managed on medical wards between January-March 2023, affecting seven patients. The source of introduction was not confirmed, with minimal loss to activity.
- An exposure to both staff and patients from an MDR *M. tuberculosis* positive patient occurred in the A&E department in March 2023. Following a review of this exposure warn and inform letters were sent to both patients and staff. Key learning included reviewing summary page on e-Noting for known conditions/diagnosis from previous hospital visits.

12.5 Cancer and Surgery Clinical Group

- The Clinical Group is pleased to welcome a new ward onto the Guy's site which will provide a much-improved environment for haemato-oncology in-patients.
- Improved support from the IPC team in the new structure will enable bespoke focus on Guy's site issues including patient placement to maximise IPC safety. An IPC committee for the Clinical Group is planned for 2023/24.
- The Guy's site had a total of three Influenza A outbreaks:
 - **Haematology ward:** five patients affect in October 2022.
 - **Renal Transplant ward:** six patients affected in December of 2022.
 - **Oncology ward:** eight patients affected in January 2023.
 - All of the 3 wards involved have Nightingale style bays which was challenging with the length of time areas were closed to admissions, creating an impact operationally.
- An RSV outbreak on the **Oncology ward** in March 2023 with five patients affected.
- *C. difficile* infection was mentioned as part 1A on a patient's a death certificate; triggering an SI. Learning from the SI review includes improved clarity when communicating results from the laboratory to clinical teams, and earlier review by the infection team.
- One case of *Listeria* was reported by UKHSA for a renal dialysis patient in January 2023. A review of food services was carried out and no issues were identified.

13 Training and Education

- At Guy's and St Thomas', mandatory IPC training continues to be delivered online to all new starters as well as return to monthly face to face updates. Overall, Trust compliance (including hand hygiene) training for clinical staff is 79% (a decrease from pre-pandemic trends) against the 95% Trust target. Plans are in place to improve compliance with mandatory training across the Trust.
- Active IPC link practitioner programmes are in place across the Trust. During 2022/23, a merged link practitioner programme across all sites was implemented.
- The Trust Annual IPC Conference was held in September 2022 involving 10 speakers and more than 200 delegates coming from across the Trust and some external partners.
- At Royal Brompton and Harefield, mandatory IPC training includes an educational video, competency assessment (PPE/hand hygiene), and E-learning, with different requirements for clinical and non-clinical staff. Overall compliance is >90%.
- Previously, Royal Brompton and Harefield compliance was renewed every two years. Recent changes implemented to align compliance with the rest of the Trust has meant training compliance was affected during Q3. There was 59% compliance in October 2022, rising to 69% by December 2022 as staff were informed of the need to renew training earlier than previously expected.
- At the Trust, bespoke education sessions are delivered regularly by IPC, often in clinical settings.

14 Governance, Policy, and Risk

14.1 Team structure

The IPC team is a multi-professional team comprising nurses, doctors, scientists, pharmacists, and others to support the Trust in meeting its obligations under the *Health and Social Care Act 2008 code of practice for prevention and control of infections and related guidance* and other relevant legislation and guidance from, for example, the Department of Health and Social Care, UKHSA, and the Care Quality Commission. The service is led by two Joint Directors of Infection Prevention and Control, with the Chief Nurse as executive lead.

14.1.1 Strategic review

- Following engagement with all the various Trust stakeholder groups, our strategic review to develop a merged IPC team across Guy's and St Thomas' and Evelina and Royal Brompton and Harefield hospitals delivered a new operating model in 2022 with a shared vision and purpose for our services.
- This created a centrally managed service with a strong site-based IPC team structure to guarantee responsiveness, combined with senior clinical leadership interfaced with Clinical Groups at a strategic level across the organisation.
- In particular, this included the establishment of a new surveillance and innovation unit, designed to rationalise resource and expertise, and the introduction of new expertise around environmental IPC.

14.2 Governance and assurance arrangements

- A quarterly Trust Infection Control Assurance Committee is chaired by the Chief Nurse and reports to the Trust board.
- It receives regular reports and updates from each Clinical Group and the following various sub-committees:
 - Trust Infection Control Committee
 - Clinical Group specific Infection Control Committees
 - Surgical Site Infection (SSI) Committee
 - Water and Ventilation Safety Committee
 - Decontamination Committee
 - Antimicrobial Stewardship Committee
 - Intravenous Line Governance Committee.
- The Trust Infection Control Committee Assurance Committee also receives reports or updates from our UKHSA Consultant in Communicable Disease Control, Clinical Commissioning Group and/or

Integrated Care Board IPC lead, Essentia (estates and facilities), Occupational Health, and Health and Safety.

- IPC also publishes a bi-annual and annual report. Any interim exceptional reporting to the Trust board is undertaken via existing reports from the Chief Nurse's Office.
- Occupational Health continue to record information on COVID-19 infectious disease in staff, occupational exposure of staff to body fluids (including sharps injuries), fit testing for respiratory PPE, and any issues with processes for occupational healthcare work clearance related to infectious diseases.
- The Trust Infection Control Assurance Committee includes a representative from the pathology laboratory, to ensure that appropriate laboratory support is in place for our services.
- IPC policies are agreed via either the quarterly Trust Infection Control and Decontamination Assurance Committee or the monthly Infection Control Committee. During 2022/23, work commenced on merging the key IPC policies to encompass Royal Brompton and Harefield and this process will continue in 2023/24 to implement merged policies.

14.3 Risk management

- IPC risks are included on a risk register, which is reviewed quarterly at the Trust Infection Control Assurance Committee. New risks in 2022/23 include:
 - Use of portable air conditioning units unregulated/may present unmanaged risk of infection
 - Ineffective decontamination of invasive medical devices
 - Non-compliance with the new cleaning standards
 - Unrecognised open TB in a clinical setting may spread to patients or staff
 - Vascular access service capacity, risk of line infections/injuries and staff resilience
 - Lack of technical integration following merger, ongoing issues for cross-site working
 - Epic/Bugsy implementation Oct 2023, risk of inadequate/inaccurate data migration
 - Lack of senior nurse out of hours cover for HCID-A service.
- Control of water-borne pathogens remains an ongoing risk.
- Essentia colleagues are leading the response to an external review of our water hygiene risk management processes, with a monthly review meeting with the Chief Nurse and Directors of Infection Prevention and Control to ensure progress.
- The COVID-19 Board Assurance Framework (BAF) has been updated throughout 2023/24. Actions arising from the BAF are being monitored via the Infection Control Committee.
- The Trust has adopted the new *National Infection Prevention and Control Manual* (NICPM) to guide its policies and procedures.

15 Applied Research

The IPC team is committed to the goals of the Trust as an Academic Health Science Centre in undertaking and implementing the findings of applied research. The Department of Infection hosts the Kings College London Centre for Clinical Infection and Diagnostics Research, which is focussed on applied research in healthcare-associated infection and antimicrobial resistance. During 2022/23 the IPC team contributed to several applied research projects resulting in peer-reviewed papers on topics including SARS-CoV-2 genomic analysis, epidemiology, serology, and diagnostics. Recently completed, presented or published applied research projects for the 2022/23 financial year include:

- Comparative evaluation of stand-alone HEPA-based air decontamination systems.
- Evaluating the dynamics of hospital COVID-19 contacts and subsequent conversion to SARS-CoV-2 infection.
- VRE point prevalence study in adult intensive care units in London.
- An evaluation of the impact of antimicrobial curtains in a clinical setting.
- Reducing false positive blood cultures in the Emergency Department using an initial specimen diversion device (KURIN).
- Smartphone technology to increase post-discharge patient response-rate (Isla).
- Recognising Surveillance as the Cornerstone for Quality Improvement (Identifying and reporting vascular access device-associated bacteraemia).
- Evaluation of clinical harm associated with Omicron hospital-onset COVID-19 infection.
- Ongoing comparative evaluation of stand-alone HEPA-based air decontamination systems.
- Cochrane review of interventions to prevent SSI for adults undergoing cardiac surgery.

- Ongoing evaluation of image-based digital post-discharge surveillance of SSIs.

16 Annual Plan

Table 1. IPC team objectives for 2023/24.

Mapped against the Trust's strategic priorities; 1=Patients, 2=People, 3=Partnerships.

People and workforce

- Develop further activities for maintaining mental and physical health (2)
- Ensure that training and development opportunities are available, including developing applied research skills (2)

Priority pathogens

- Pilot an intervention to reduce the risk of Gram-negative BSIs (1)

Improvement projects

Support the ongoing "Glove or no glove" campaign, and the wider sustainability agenda (1,2)
Focus on the IV to oral switch CQUIN objectives (1,3)
Renewed focus on differences in antimicrobial prescribing across our sites, developing further links across the Integrated Care System and Kings Health Partners (1,3)

Service review and redesign

- Implement the new operating model for the IPC team (1,2,3)
- Implement the new staffing model for the vascular access service and scope a vascular access service for the RB&H sites (1,2,3)
- Review IPC provision for community services (1,2,3)
- Review administrative services across the IPC service (1,2,3)
- Review and align policies and procedures to include Royal Brompton and Harefield sites and in reference to the national IPC policy set (2,3)

Digital / surveillance / innovation

- Optimise the functionality of our infection control software (ICNet) and audit system (MEG) and prepare for the roll-out of the electronic patient health record (1,3)
- Undertake an assessment of air disinfection systems (1,3)

Table 2. Strategic aims for the service over the next 3-5 years.

Patients

- Involve patients in the prevention and management of infection, including the involvement of patient representatives in Trust committees and service development
- Move from 'control' to 'prevention' of healthcare-associated infection, with a focus on optimizing the use of antimicrobial agents, improving patient safety around the use of vascular lines, reducing the risk of infection from the environment (especially water, air, and medical devices), and reducing the risk of surgical site infection

People

- Invest in training and education to remain an expert advisory clinical academic service
- Maintain a reputation that will attract a world class, diverse, multi-disciplinary team
- Implement a service model that meets the needs of our organisation / ICS

Partnerships

- Work more closely across the Integrated Care System to reduce infection risk
- Become an established centre for hospital epidemiology and implementing technology and innovation to reduce healthcare-associated infection and antimicrobial resistance and improve patient outcomes
- Develop equitable services across all sites, including community, which are well integrated with the new clinical groups.