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Bwrdd Iechyd Prifysgol
Bae Abertawe
Swansea Bay University
Health Board



Meeting Date	21 December 2021	Agenda Item	3.3
Report Title	Infection Prevention & Control: position update, challenges and recommendations		
Report Author	Delyth Davies, Head of Nursing, Infection Prevention & Control		
Report Sponsor	Gareth Howells, Executive Director of Nursing & Patient Experience		
Presented by	Gareth Howells, Executive Director of Nursing & Patient Experience		
Freedom of Information	Open		
Purpose of the Report	The paper will reviews the Health Board’s current position in relation to Healthcare Associated Infection (HCAI), including Tier 1 infections, COVID-19, outbreaks and increased incidence of infection, environmental factors, and identifies current gaps.		
Key Issues	<p>The Health Board has failed to achieve Tier 1 infection reductions.</p> <p>Nosocomial COVID-19 continues a risk to patients and services.</p> <p>Outbreaks and periods of increased incidence of antibiotic resistant infections is a current challenge, and presents increased risk.</p> <p>The existing healthcare environment is a risk for transmission of infection.</p> <p>There are gaps in knowledge on other hospital-acquired infections.</p> <p>The Infection Prevention & Control Team workforce is reduced and present a risk to business continuity.</p> <p>IPC governance processes and assurances are variable within Service Groups, with a pressing need for change.</p>		
Specific Action Required <i>(please choose one only)</i>	Information	Discussion	Assurance
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input checked="" type="checkbox"/>
Recommendations	<p>Members are asked to:</p> <ul style="list-style-type: none"> CONSIDER THE CURRENT HCAI POSITION AND APPROVE RECOMMENDATIONS 		

Infection Prevention & Control – position update, challenges and recommendations

1. INTRODUCTION

The Health Board continues to face significant challenges in relation to healthcare associated infections. This paper will set out the current position in relation to Health Board performance against key national infection reduction goals, any gaps in assurance, Infection Prevention & Control (IPC) team delivery challenges, other key risk, and proposals for improving this position.

2. BACKGROUND

Health care-associated infections (HCAI) are adverse events in the delivery of health care to the population. HCAI may affect patients, increasing morbidity and mortality, and may reduce the quality of life for patients. HCAI also has an impact on healthcare service provision, increasing length of stay and increasing costs relating to diagnosis and treatment.

This paper will review the Health Board's current position regarding:

- a. Welsh Government core HCAI infection reduction goals;
- b. summary of the impact of nosocomial (hospital-acquired) COVID-19 since the beginning of the pandemic;
- c. outbreaks and increased incidence of infection;
- d. environmental factors affecting infection transmission.
- e. a gap in knowledge of other healthcare, and specifically, hospital acquired infections;
- f. challenges to the delivery of a robust and efficient infection prevention programme;
- g. gaps in assurance.

A. Core Infection Reduction Goals

The Health Board's position in relation to the key infection indicators to the end of November 2021 is shown in [Appendix 1](#). A comparison with other acute Health Boards is provided. Swansea Bay University Health Board (SBUHB) has the highest incidence of *C. difficile*, *Staph. aureus* bacteraemia, *Klebsiella* bacteraemia and the third highest incidence of *E. coli* bacteraemia in Wales. This position is not acceptable. There has been a year-on-year increase in the number of cases of all these infections, with the exception of *Pseudomonas aeruginosa* bacteraemia as shown below:

Infection	Comparison 2021/22 Total to 30/11/21
<i>C. difficile</i>	139 (11% ↑)
<i>Staph aureus</i> BSI	97 (15% ↑)
<i>E. coli</i> BSI	210 (27% ↑)
<i>Klebsiella</i> BSI	69 (13% ↑)
<i>Ps. aeruginosa</i> BSI	14 (7% ↓)

The Welsh Government infection reduction targets for 2021/22 will not be achieved by SBUHB.

If current trends continue, there will be an annual increase in cases of all key infections: *C. difficile* – 27%↑, *Staph. aureus* bacteraemia – 18% ↑, *E. coli* bacteraemia – 29% ↑, *Klebsiella* bacteraemia – 10% ↑ , and *Pseudomonas aeruginosa* bacteraemia – 26% ↑.

Risk:

- Failure to achieve reductions in infection and ongoing risk to patient safety and the reputation of the organisation.

Recommendation / action:

- Service Groups must take ownership of driving improvements to reduce these infections, and ensure adherence to local and national IPC Policies and procedures in all areas.

B. COVID-19 Pandemic

COVID-19 is a highly transmissible virus, and this has shone a spotlight on IPC weak points within the NHS healthcare systems. The range of disease presentation, particularly from the second wave onwards, has demonstrated that many of those that were positive had few or no symptoms at the start of infection presentation. The peak of infectivity is approximately 2 days prior to onset of symptoms. As a result, many patients were admitted to hospital for other reasons and were found to be COVID-19 positive within 3 days of admission. Experience has shown that patients within the same bay as undetected cases went on to contract COVID-19.

From the beginning of the pandemic and following internal reviews of harm, there have been **more than 1,300 nosocomial cases** of COVID-19 (>840 cases of definite hospital acquired infection, i.e. after 15 or more days' admission; and >530 cases of probable hospital-acquired infection, i.e. more than 8 days' admission). Of the nosocomial cases, there have been **more than 450 deaths from any cause** following COVID-19 infection (any cause mortality rate has been approximately 33%).

COVID-19 has highlighted that the majority of inpatient settings are inadequate to mitigate against the transmission of an infection spread by an airborne route. Bed spacing is does not meet the required Hospital Building Note (HBN 04-01) requirement, with patient beds too close together.

Ventilation within the majority of inpatient settings, excluding intensive care settings, is wholly dependent on natural ventilation (approximately 2 air changes per hour), which is inadequate and does not meet the requirements of 6 air changes per hour (through mechanical ventilation) as recommended in the relevant Health Technical Memorandum (HTM 03-01).

Adequate physical distancing between beds, and the provision of good ventilation, are key in the hierarchy of controls for COVID-19 and other respiratory infections, such as influenza.

Conditions have been favourable for the transmission of this virus, spread by an airborne route. Recent experience in a SBUHB hospital highlighted the risks to patients from a doubly vaccinated patient who was identified as having a low level COVID-19 positive result within hours of transfer. Other patients who were exposed to this case for approximately 5 hours, all of whom were doubly vaccinated, subsequently tested positive for COVID-19.

Risk:

- Ongoing risks associated with identification of asymptomatic COVID-19 cases, mitigated by admission and regular screening. Nosocomial COVID-19 will continue to have a significant impact on patient and staff safety, and on maintaining service provision.

Recommendation / action:

- Service Groups to review lessons identified from the pandemic to date and drive improvements, and ensure performance against national guidance is implemented.

C. Outbreaks and Increased Incidence of infection

- *Heterogeneous glycopeptide intermediate resistant Staph. aureus (hGISA) in Renal Unit*

Within the renal unit in Morriston Hospital, at the end of October, a patient who is a persistent carrier of MRSA was identified as having a bloodstream infection with MRSA exhibiting intermediate resistant to glycopeptides.

A second case has since been identified within the same renal unit. Typing has identified that transmission has occurred between the two patients, although the exact route of transmission has not been identified.

The patients do not attend the renal unit on the same day, and thus transmission via direct contact, and contact via staff hands, is not considered to be a factor. However, environmental contamination is considered to be a potential source.

Glycopeptide antibiotics are used as a last resort for treatment of serious infections with resistant *Staph. aureus*. Thus, the emergence of intermediate resistance to these glycopeptide antibiotics is of serious concern, particularly in this patient population.

This is the first case of hGISA identified in Swansea Bay UHB, and possibly in Wales. There are very few studies published relating to outbreaks of hGISA.

Risk:

- Risk of further transmission and risk of potentially untreatable multi-resistant *Staph. aureus* infections.

Recommendation / action:

- Continued vigilance and full adherence to IPC practices, and monitoring for additional cases. High level environmental cleaning and disinfection.
- ***Glycopeptide Resistant Enterococcus faecium (GRE) in Trauma and Orthopaedics.***

A significantly increased incidence of GRE *Enterococcus faecium* has been identified in Morriston Hospitals three trauma and orthopaedic wards over a period of months. Due to a current absence of typing results to date, it has not been possible to confirm evidence of transmission.

Risk:

- An extremely vulnerable patient group with a risk of further transmission and of potentially difficult to treat infections.

Recommendation / action:

- Morriston Hospital Service Group is undertaking further investigation. Public Health Wales Consultant Microbiology and Healthcare Epidemiology colleagues and the Infection Prevention & Control Team are supporting this. The investigation will be multi-disciplinary and will involve a retrospective and ongoing review of laboratory results to establish potential case numbers, a clinical review of cases of infection, review of the use of vancomycin in orthopaedic surgical practices, review of practices and the environment.
- Support from the Public Health Wales Healthcare Associated Infection Programme Team, who will visit site on 15th December 2021, and undertake a peer review.
- ***Previous outbreak of extensively multi-drug resistant Carbapenemase-producing Enterobacteriaceae (CPE)***

In 2019, there was a significant outbreak of this CPE in a surgical ward (Ward G) in Morriston Hospital. This was controlled only by emptying the ward and undertaking deep cleaning and disinfection with advanced technologies. A number of the patients involved are known to still be colonised with these CPE and have been readmitted since the initial outbreak. High vigilance in identifying these patients on admission, isolating them and taking appropriate precautions is essential in preventing these CPE from becoming endemic in our hospital.

Risk:

- Risk of not identifying CPE carriers on admission and of potential for future transmission. Welsh Clinical Portal currently does not display an 'infection alert'. This has been identified on the Risk Register.

Recommendation / action:

- Currently dependent on the IPC team reviewing ICNet for information on readmissions, and notifying admitting wards so that appropriate IPC precautions can be implemented.
- Further development of Signal to identify patients with organisms of significance on admission.

D. Environmental factors impacting on infection transmission

These factors can be summarised as follows:

- Current healthcare estate not compliant with current Hospital Building Notes, and refurbishments and reconfiguration do not address increasing single room capacity, adequate bed spacing, and good ventilation requirements. Derogation to the building standards occurs to meet service demands in relation to provision of numbers of available beds.
- Refurbishments and new builds should aim to comply with a minimum of 50% single room capacity; adequate spacing between beds; mechanical ventilation to provide six air changes per hour.
- The current healthcare estate in many areas is in a poor state of repair, which compromises the ability to clean effectively patient care areas.
- Effective cleaning and decontamination of bed areas on patient transfer or discharge particularly in the case of patients with transmissible infections, is compromised by the division of cleaning tasks.
- Currently, prior to the environmental cleaning undertaken by Hotel Services, nursing staff are required to undertake the cleaning and disinfection of patient equipment, including beds, and other items of care equipment. This places additional workload on a nursing workforce that is already stretched. A delay in this nurse cleaning delays the cleaning by Hotel Services, which delays turn-around times. The outcome of nursing cleaning is frequently sub-standard.
- Lack of decant facilities compromises the ability to undertake effective deep cleaning and disinfection. This is particularly important in the case of periods of increased incidence of *C. difficile*, and extensively antibiotic-resistant infections.

Risk:

- The existing healthcare environment continues to compromise safe, quality care.

- Nurses undertaking equipment cleaning activities is not a cost-effective solution and, understandably, nurses will focus on clinical activities. Patient care equipment may not be cleaned effectively on discharge or transfer.
- There is a potential for prolonged environmental contaminants.

Recommendation:

- A dedicated and specially trained resource within Hotels Services to undertake all elements of cleaning and disinfection on transfer and discharge of patients.
- Ideally, in addition to a dedicated rapid response team for wards, there should be a rapid response team dedicated specifically for unscheduled care areas, such as A&E, acute medical admission units, and surgical admission units, ensuring a more effective turn-around of these beds.

E. Gap in knowledge of other healthcare, and specifically, hospital acquired infections

The Health Board has systems and processes in place to monitor cases of the core Tier 1 infections. *C. difficile* is a consequence of antibiotic prescribing for preceding infections. Blood stream infections are often a consequence of a preceding infection also; up to a half of *E. coli* blood stream infections (bacteraemia) are as a result of a preceding urinary tract infection. A urinary tract infection, hepato-biliary infections and pneumonia will often precede blood stream infections caused by *Klebsiella spp.* Treatment of these infections can lead also to the development of antimicrobial resistance.

There are currently no systems in place within the Health Board for the surveillance of those hospital-acquired infections (HAI) that constitute the largest proportion of all HAI.

The 2017 Point Prevalence Survey (PPS) of Healthcare Associated Infections identified the prevalence of HAI in the three acute hospitals in SBUHB. The PPS also identified the composition of HAI types. The largest proportion of HAI were:

- Urinary tract infection
- Surgical site infections
- Pneumonia
- Systemic infections

See tables in [Appendix 2](#) for further details.

The recent identification of GRE in trauma and orthopaedics has highlighted that, as a specialty, and as a Health Board, we do not know the rate of surgical site infection.

Risk:

- Lack of surveillance for significant HAI, and as a consequence, increased trends in infection may be missed. Clinical audit within departments does not appear to identify infection rates. Surveillance of these infections is a critical

and key component to an effective IPC programme and is integral to assurance processes for clinical outcomes and patient safety.

- Resource not available within the IPC Team to extend and broaden surveillance programmes.

Recommendation / action:

- Investment in a dedicated resource to undertake Surgical Site Surveillance. This resource could sit within the IPC Team, or within Service Groups, with support and direction from the corporate IPC Team in relation to surveillance definitions and methods.
- Additional resource required to undertake point prevalence surveys on HAI catheter-associated urinary tract infection; HAI pneumonia; and cannula/device-related infections.

F. Challenges to the delivery of a robust and efficient infection prevention programme

The current IPC team is relatively small, with a large remit in terms of acute beds, mental health & learning disability beds, and community and primary care.

Over the last two years, the IPC team has provided a reactive service in relation to the management of infections, periods of increased incidence and outbreaks. The team also provides education and training, undertakes assurance audits, and has provided a 7-day service. There is a desire within the team to undertake a more proactive role, but this has not been possible due to service pressures and demands and the existing workforce.

The team currently carries vacancies.

- The position of the Assistant Director of Nursing for Infection Prevention & Control has not been replaced.
- There are two substantive Band 6 vacancies (in the process of recruitment).
- Band 7 Maternity Leave, and
- Impending Band 7 vacancy from February 2022.

Risk:

- Challenge to cover existing services
- Insufficient resource to cover a 7-day service, as this depletes also the resource available Monday – Friday.
- Resilience of the IPC workforce.
- Potential ‘burnout’.
- As a specialist service, it is not possible to use bank staff. Any new recruits to the team will not have relevant specialist IPC training and experience. Consequently, even with recruitment into vacancies, there will still be a deficit in knowledge and experience and in senior IPC experience in particular.
- Provision of specialist IPC advice and support is currently inadequate.

Recommendation / action:

- Suspend the 7-day service until the resource returns to pre-vacancy levels of staffing and experience.
- Consider an option for providing an on-call service for weekend cover. This will require staff agreement and funding. Guidance on on-call provision also includes compensatory rest and, as such, this may not be a feasible option, as it would deplete the resource available for weekdays.
- Undertake a service review of the corporate IPC team and service, and develop a business case to meet the requirements for a robust and sustainable quality Infection Prevention & Control service, that reflects the World Health Organisation Guidelines on Core Components on Infection Prevention and Control Programmes.
- Within this review, the Health Board could consider establishing a Director of Infection Control (as in many English NHS Trust). In addition, consideration could be given to the establishment of a role of a Consultant Practitioner in Infection Prevention. Within that role is a significant element for research and education, ensuring Health Board programmes and initiatives remain evidence-based, and leading on the establishment of the Health Board as a centre for excellence and research in the field of infection prevention & control.

G. Gaps in assurance.

Governance processes for IPC within Service Groups are variable.

Despite national HCAI strategies and a Code of Practice, IPC responsibility is not embedded across the Health Board.

There is insufficient evidence that “infection prevention & control is everyone’s business”, with an expectation that IPC is the responsibility of a small Health Board IPC team.

There is a lack of engagement in IPC practices by all groups of staff, with compliance with Level 1 Standard Infection Control Precautions training being 81.34% in October 2021. Compliance with Level 2 Standard 18.65% in October 2021. The number of staff that have undertaken this mandatory IPC training may be higher, but the limitations of the current ESR system is such that assurance cannot be given.

Compliance with basic IPC practices, such as ‘bare below the elbow’, hand hygiene and the correct use of PPE is inconsistent. Despite the challenges presented by COVID19, staff continue to be inconsistent with the use of PPE.

Medical engagement in post infection reviews, and in infection reduction and antimicrobial stewardship quality improvements, remains poor.

Unless there is a significant change in culture and an acceptance of responsibility for patient safety and quality care, from an IPC-perspective, it will not be possible for the

Health Board to achieve infection reduction. Patients will continue to be at risk from healthcare associated infection and antimicrobial resistance.

Change, and a desire for quality improvement, must come from, and be led by, the Service Groups. This has to be a joint endeavour and priority for the Service Group Triumvirate, and the responsibility for change shared equally. There has to be a joint commitment.

Recommendation / action:

- Service Groups must review their governance arrangements for IPC.
- Service Groups should establish an HCAI Quality Priority Board, or Service Group Infection Control Committee, that reports into the Health Board's Infection Control Committee. While the incidence of infection remains high, Service Group HCAI Quality Priority Board or ICC should meet monthly. There should be medical representation for these meetings to be quorate, as without medical engagement, improvements are unlikely to be sustained.
- Service Groups must lead on HCAI Quality Priorities and develop their action plans, which must be reviewed and monitored through their governance processes, and report through to the Health Board HCAI Quality Priority Groups and Infection Control Committee.
- Service Groups should establish dedicated sessions for clinical staff to drive through HCAI, and other quality and safety, quality improvement programmes.

3. GOVERNANCE AND RISK ISSUES

The population served by Swansea Bay University Health Board should expect to receive safe and quality services. Yet the incidence of some key infections is higher within this health board than others in NHS Wales.

A review of shared responsibility in relation to healthcare associated infection is overdue. Avoidable HCAI is an adverse event, with potentially life-changing and life-threatening consequences for patients.

All Service Groups should review governance processes for IPC as a priority. Infection reduction quality improvement programmes, reflecting the risks within each Service Group, should be identified and agreed, with support from the corporate Infection Prevention & Control team. Collaboration will be key to the success of quality improvement.

A review of a robust Infection Prevention and Control service is priority.

Reducing HCAI is a quality driver for safe care. There will be a benefit to patients and the organisation in reducing excess length of stay, and other costs associated with HCAI.

4. SUMMARY OF CORE RECOMMENDATIONS

Specific recommendations are listed throughout this report, but the following are key to progressing the reductions required.

- Service Delivery Groups must review their current governance arrangements for Infection Prevention and Control.
- Service Delivery Groups must establish an HCAI Quality Priority Board, or Service Group Infection Control Committee, that reports into the Health Board's Infection Control Committee.
- Service Groups must lead on HCAI Quality Priorities and develop their action plans, which must be reviewed and monitored through their governance processes, and report through to the Health Board HCAI Quality Priority Groups and Infection Control Committee.
- There should be appropriate clinical representation (Medical and Nursing) for these meetings to be quorate, as without medical engagement in particular, improvements are unlikely to be sustained.
- This group must be used to drive improvements, and ensure performance against national guidance is implemented, including full adherence to IPC practices, high level environmental cleaning and disinfection, and scrutiny of individual cases and outbreaks.
- To ensure scrutiny and learning, each individual case of Staph Aureus and Clostridium Difficile to be reviewed by the local clinical team and presented to the Group Medical and Nursing Directors, including an RCA and lessons learnt.
- In ¼ 1 of 22/23, this will be expanded to include individual cases of E. coli and Klebsiella
- A summary of all cases to be presented to the Health Board Medical and Nursing Director on a monthly basis, including the outcome of the RCAs, lessons learnt and actions implemented to prevent re-occurrence.
- The Health Board to establish a Director of Infection Control as well a role of a Consultant Practitioner in Infection Prevention. Within that role is a significant element for research and education, ensuring Health Board programmes and initiatives remain evidence-based, and leading on the establishment of the Health Board as a centre for excellence and research in the field of infection prevention & control.

5. FINANCIAL IMPLICATIONS

Please refer to associated HCAI costs in [Appendix 3](#). The information provided in this appendix uses estimates from Scottish NHS reference cost in a recently published study on bed-days lost, and costs associated with the inpatient burden of healthcare-associated infection.

6. RECOMMENDATION

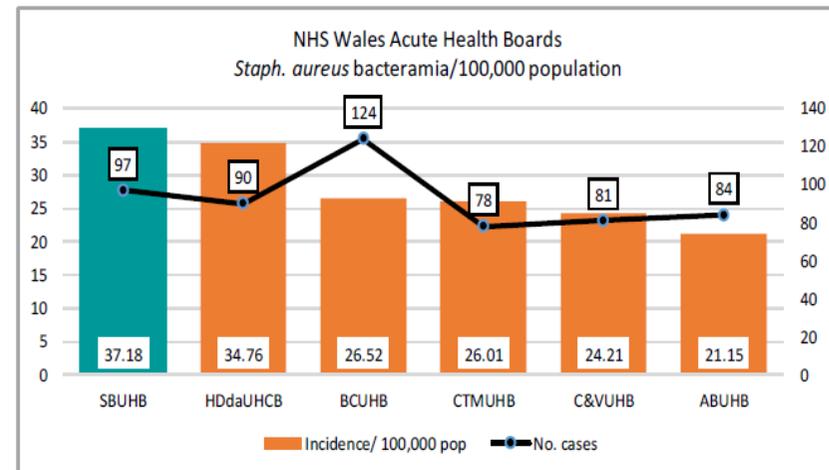
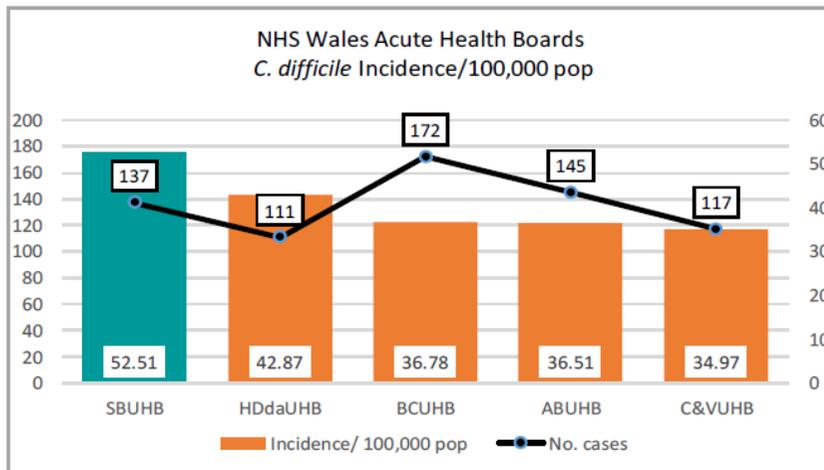
The Management Board is asked to:

- Consider the Infection Prevention & Control position update, and the challenges and risk identified.
- Consider the recommendations and actions put forward within the body of the report.
- Support the need for improved, clear and shared responsibility for HCAI within Service Groups.
- Consider and support the proposal for a review of the IPC service, workforce and IPC programme.

Governance and Assurance		
Link to Enabling Objectives <i>(please choose)</i>	Supporting better health and wellbeing by actively promoting and empowering people to live well in resilient communities	
	Partnerships for Improving Health and Wellbeing	<input type="checkbox"/>
	Co-Production and Health Literacy	<input type="checkbox"/>
	Digitally Enabled Health and Wellbeing	<input type="checkbox"/>
	Deliver better care through excellent health and care services achieving the outcomes that matter most to people	
	Best Value Outcomes and High Quality Care	<input checked="" type="checkbox"/>
	Partnerships for Care	<input type="checkbox"/>
	Excellent Staff	<input type="checkbox"/>
	Digitally Enabled Care	<input type="checkbox"/>
Outstanding Research, Innovation, Education and Learning	<input type="checkbox"/>	
Health and Care Standards		
<i>(please choose)</i>	Staying Healthy	<input type="checkbox"/>
	Safe Care	<input checked="" type="checkbox"/>
	Effective Care	<input type="checkbox"/>
	Dignified Care	<input type="checkbox"/>
	Timely Care	<input type="checkbox"/>
	Individual Care	<input type="checkbox"/>
	Staff and Resources	<input type="checkbox"/>
Quality, Safety and Patient Experience		
Effective infection prevention and control needs to be everybody's business and must be part of everyday healthcare practice and be based on the best available evidence so that people are protected from preventable healthcare associated infections.		
Financial Implications		
See associated costs in Appendix 3		
Legal Implications (including equality and diversity assessment)		
Potential litigation in relation to avoidable healthcare associated infection.		
Staffing Implications		
Investment in specialist IPC staff and identification of IPC Champions, with dedicated sessions for HCAI quality priorities.		
Long Term Implications (including the impact of the Well-being of Future Generations (Wales) Act 2015)		
A healthier Wales: preventing infections		
Report History		
Appendices	Appendix 1 – Swansea Bay University Health Board, Cumulative HCAI Performance against Tier 1 Targets 2021/22 Performance Comparison with NHS Wales to 30 th November 2021. Appendix 2 - 2017 Point Prevalence Survey of Infection Findings Appendix 3 - Bed-days lost and costs associated with HCAI	

**Appendix 1: Swansea Bay University Health Board, Cumulative HCAI Performance against Tier 1 Targets 2021/22
Performance Comparison with NHS Wales to 30th November 2021**

**Tier 1 Infections in NHS Wales Acute Health Boards,
Cumulative incidence/100,000 population, Apr-Nov 2021**



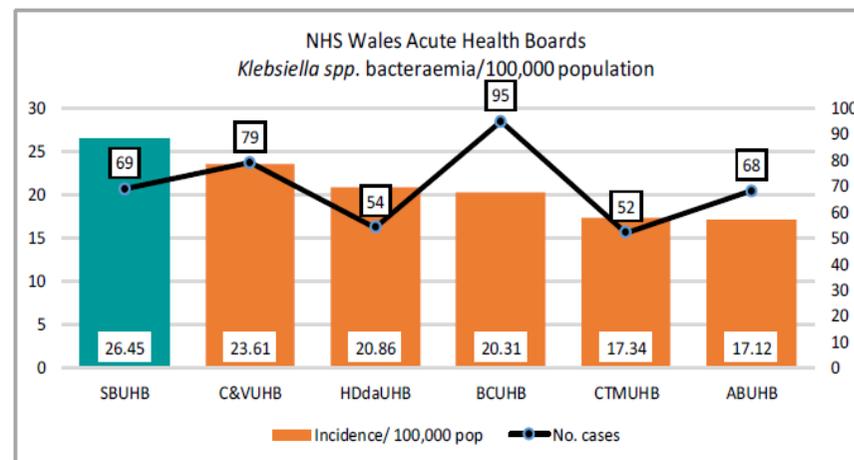
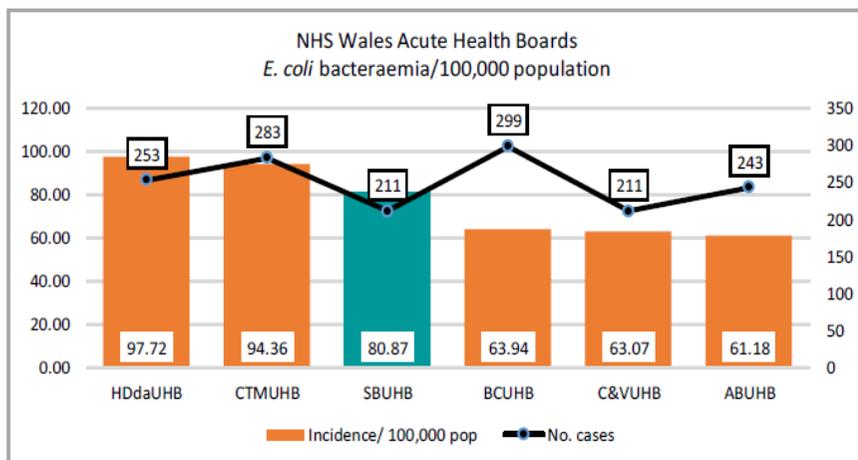
C. difficile

	No. cases	Incidence/ 100,000 pop	% Yr-onYr comparison	Rank in NHS Wales
SBUHB	137	52.51	10%	6
HDdaUHB	111	42.87	26%	5
BCUHB	172	36.78	16%	4
ABUHB	145	36.51	41%	3
C&VUHB	117	34.97	113%	2
CTMUHB	99	33.01	13%	1

***Staph. aureus* Bacteraemia**

	No. cases	Incidence/ 100,000 pop	% Yr-onYr comparison	Rank in NHS Wales
SBUHB	97	37.18	15%	6
HDdaUHCb	90	34.76	50%	5
BCUHB	124	26.52	20%	4
CTMUHB	78	26.01	3%	3
C&VUHB	81	24.21	-5%	2
ABUHB	84	21.15	-12%	1

Tier 1 Infections in NHS Wales Acute Health Boards, Cumulative incidence/100,000 population, Apr-Nov 2021



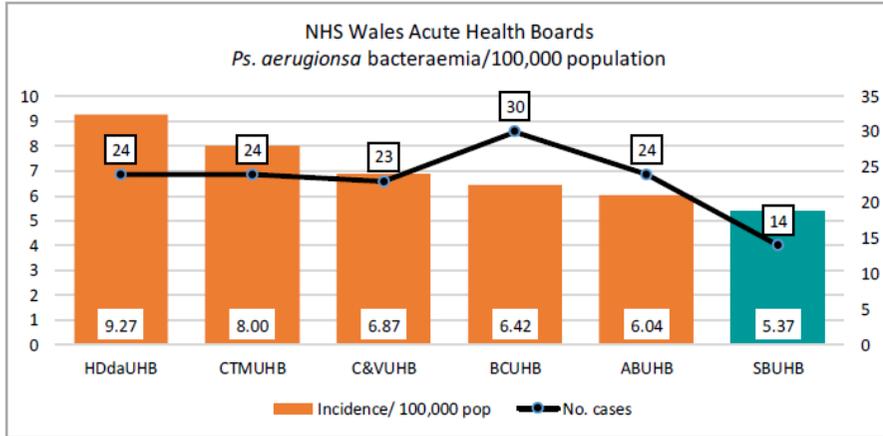
E. coli Bacteraemia

	No. cases	Incidence/ 100,000 pop	% Yr-onYr comparison	Rank in NHS Wales
HDdaUHB	253	97.72	19%	6
CTMUHB	283	94.36	27%	5
SBUHB	211	80.87	27%	4
BCUHB	299	63.94	1%	3
C&VUHB	211	63.07	13%	2
ABUHB	243	61.18	16%	1

Klebsiella spp. Bacteraemia

	No. cases	Incidence/ 100,000 pop	% Yr-onYr comparison	Rank in NHS Wales
SBUHB	69	26.45	13%	6
C&VUHB	79	23.61	34%	5
HDdaUHB	54	20.86	32%	4
BCUHB	95	20.31	28%	3
CTMUHB	52	17.34	-19%	2
ABUHB	68	17.12	-14%	1

Tier 1 Infections in NHS Wales Acute Health Boards, Cumulative incidence/100,000 population, Apr-Nov 2021

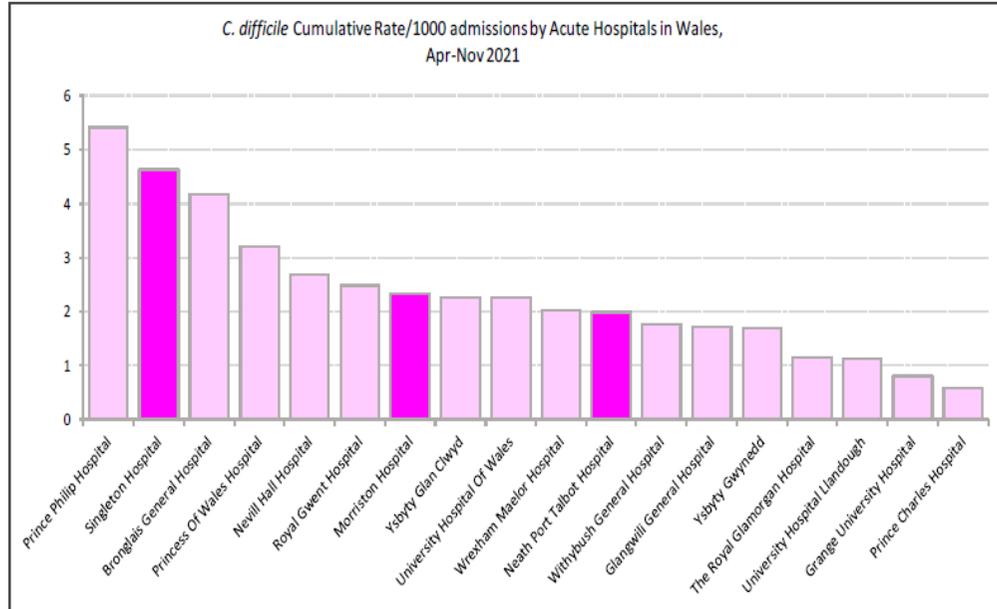


Pseudomonas aeruginosa Bacteraemia

	No. cases	Incidence/ 100,000 pop	% Yr-onYr comparison	Rank in NHS Wales
HDdaUHB	24	9.27	26%	6
CTMUHB	24	8.00	33%	5
C&VUHB	23	6.87	5%	4
BCUHB	30	6.42	20%	3
ABUHB	24	6.04	60%	2
SBUHB	14	5.37	-7%	1



Tier 1 Infections in NHS Wales Acute Hospitals, Cumulative incidence/1,000 admissions, Apr-Sep 2021: *C. difficile*

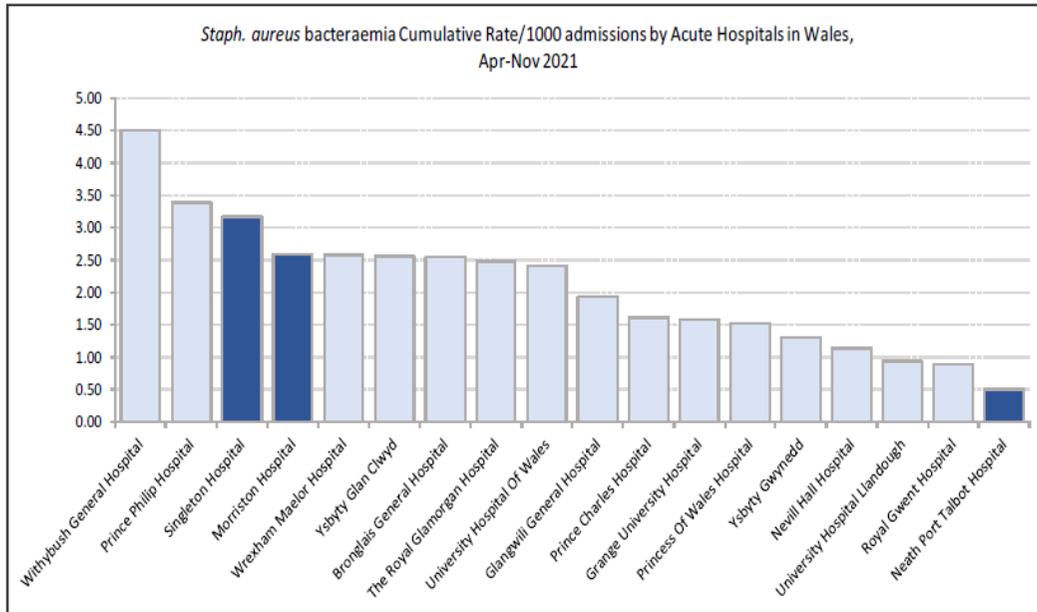


C. difficile

HB	Acute Hospital	Cumulative Rate/1000 admissions	Rank
Aneurin Bevan UHB	Grange University Hospital	0.8	2
	Nevill Hall Hospital	2.69	14
	Royal Gwent Hospital	2.49	13
Betsi Cadwaladr UHB	Wrexham Maelor Hospital	2.03	9
	Ysbyty Glan Clwyd	2.27	11
	Ysbyty Gwynedd	1.69	5
Cardiff and Vale UHB	University Hospital Llandough	1.13	3
	University Hospital Of Wales	2.27	10
Cwm Taf Morgannwg UHB	Prince Charles Hospital	0.58	1
	Princess Of Wales Hospital	3.21	15
	The Royal Glamorgan Hospital	1.15	4
Hywel Dda UHB	Bronglais General Hospital	4.18	16
	Glangwili General Hospital	1.71	6
	Prince Philip Hospital	5.42	18
	Withybush General Hospital	1.77	7
Swansea Bay UHB	Morrison Hospital	2.33	12
	Neath Port Talbot Hospital	1.99	8
	Singleton Hospital	4.63	17



Tier 1 Infections in NHS Wales Acute Hospitals, Cumulative incidence/1,000 admissions, Apr-Sep 2021: *Staph. aureus* bacteraemia

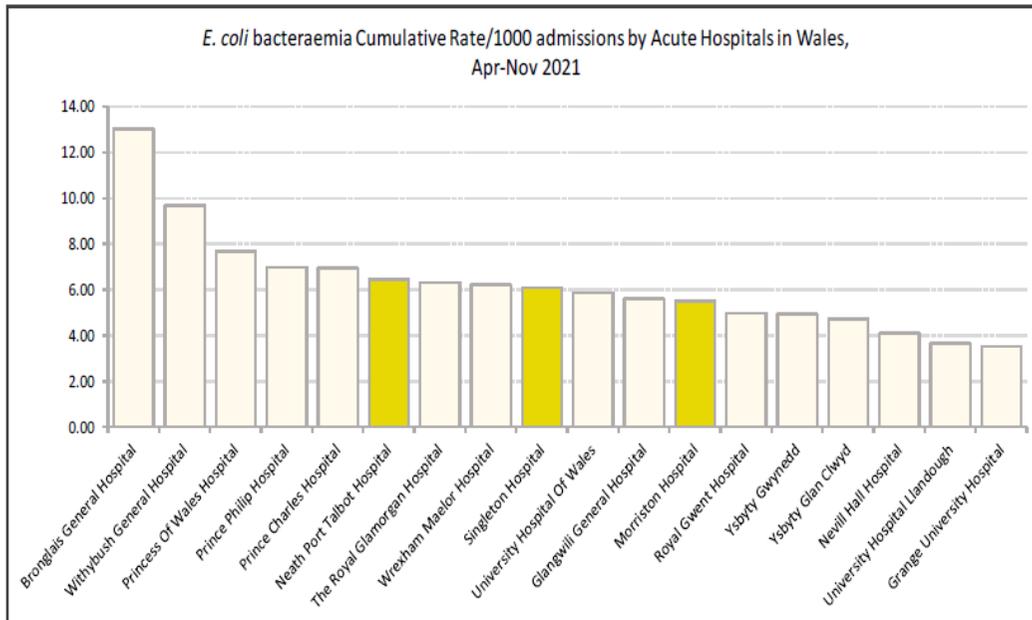


Staph. aureus bacteraemia

HB	Acute Hospital	Cumulative Rate/1000 admissions	Rank
Aneurin Bevan UHB	Grange University Hospital	1.58	7
	Nevill Hall Hospital	1.13	4
	Royal Gwent Hospital	0.89	2
Betsi Cadwaladr UHB	Wrexham Maelor Hospital	2.58	14
	Ysbyty Glan Clwyd	2.56	13
	Ysbyty Gwynedd	1.31	5
Cardiff and Vale UHB	University Hospital Llandough	0.94	3
	University Hospital Of Wales	2.41	10
Cwm Taf Morgannwg UHB	Prince Charles Hospital	1.61	8
	Princess Of Wales Hospital	1.52	6
	The Royal Glamorgan Hospital	2.49	11
Hywel Dda UHB	Bronlais General Hospital	2.55	12
	Glangwili General Hospital	1.93	9
	Prince Philip Hospital	3.39	17
	Wwithybush General Hospital	4.50	18
Swansea Bay UHB	Morrison Hospital	2.59	15
	Neath Port Talbot Hospital	0.50	1
	Singleton Hospital	3.17	16



Tier 1 Infections in NHS Wales Acute Hospitals, Cumulative incidence/1,000 admissions, Apr-Sep 2021: *E. coli* Bacteraemia

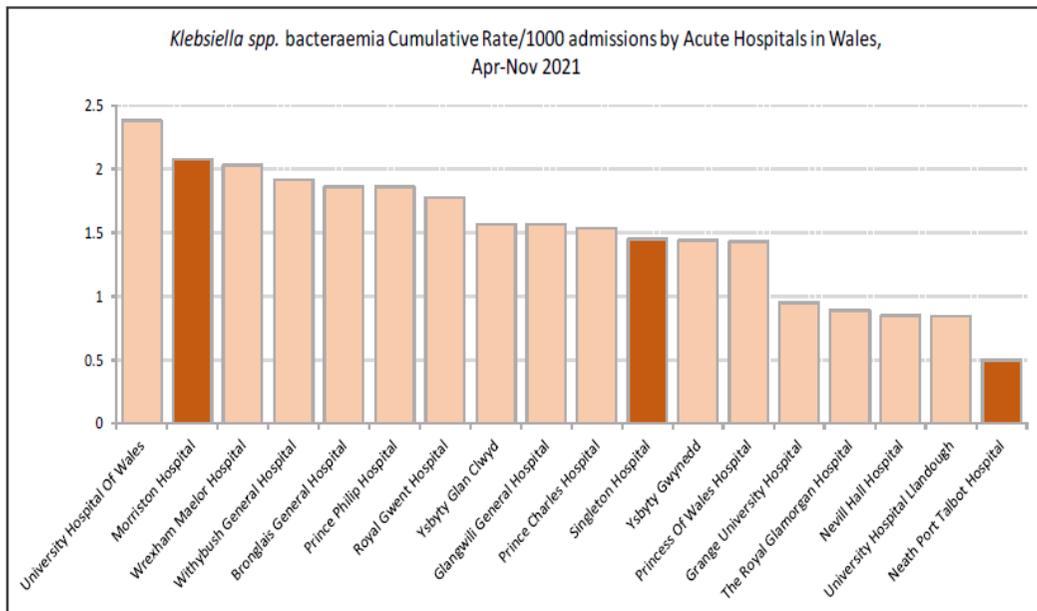


E. coli bacteraemia

HB	Acute Hospital	Cumulative Rate/1000 admissions	Rank
Aneurin Bevan UHB	Grange University Hospital	3.52	1
	Nevill Hall Hospital	4.10	3
	Royal Gwent Hospital	4.99	6
Betsi Cadwaladr UHB	Wrexham Maelor Hospital	6.21	11
	Ysbyty Glan Clwyd	4.73	4
	Ysbyty Gwynedd	4.93	5
Cardiff and Vale UHB	University Hospital Llandough	3.66	2
	University Hospital Of Wales	5.86	9
Cwm Taf Morgannwg UHB	Prince Charles Hospital	6.94	14
	Princess Of Wales Hospital	7.67	16
	The Royal Glamorgan Hospital	6.32	12
Hywel Dda UHB	Bronglais General Hospital	13.00	18
	Glangwili General Hospital	5.58	8
	Prince Philip Hospital	6.95	15
	Withybush General Hospital	9.68	17
	Singleton Hospital	6.08	10
Swansea Bay UHB	Morrison Hospital	5.50	7
	Neath Port Talbot Hospital	6.46	13
	Singleton Hospital	6.08	10



Tier 1 Infections in NHS Wales Acute Hospitals, Cumulative incidence/1,000 admissions, Apr-Sep 2021: *Klebsiella spp. bacteraemia*

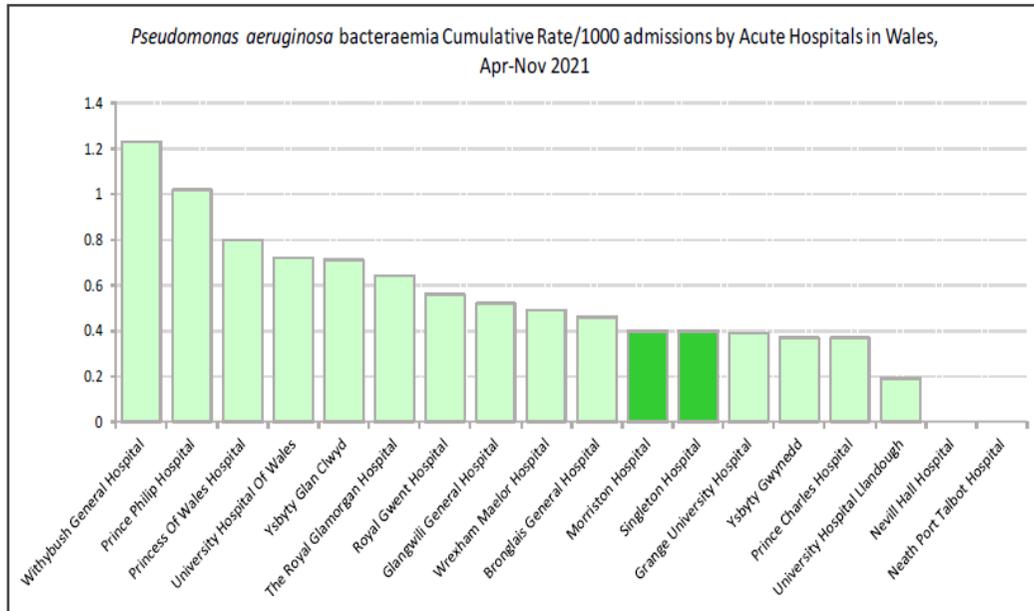


Klebsiella spp. bacteraemia

HB	Acute Hospital	Cumulative Rate/1000 admissions	Rank
Aneurin Bevan UHB	Grange University Hospital	0.95	5
	Nevill Hall Hospital	0.85	3
	Royal Gwent Hospital	1.77	12
Betsi Cadwaladr UHB	Wrexham Maelor Hospital	2.03	16
	Ysbyty Glan Clwyd	1.56	11
	Ysbyty Gwynedd	1.44	7
Cardiff and Vale UHB	University Hospital Llandough	0.84	2
	University Hospital Of Wales	2.38	18
Cwm Taf Morgannwg UHB	Prince Charles Hospital	1.53	9
	Princess Of Wales Hospital	1.43	6
	The Royal Glamorgan Hospital	0.89	4
Hywel Dda UHB	Bronglais General Hospital	1.86	14
	Glangwili General Hospital	1.56	10
	Prince Philip Hospital	1.86	13
	Withybush General Hospital	1.91	15
Swansea Bay UHB	Morryston Hospital	2.08	17
	Neath Port Talbot Hospital	0.50	1
	Singleton Hospital	1.45	8



Tier 1 Infections in NHS Wales Acute Hospitals, Cumulative incidence/1,000 admissions, Apr-Sep 2021: *Ps. aeruginosa* bacteraemia



Pseudomonas aeruginosa bacteraemia

HB	Acute Hospital	Cumulative Rate/1000 admissions	Rank
Aneurin Bevan UHB	Grange University Hospital	0.39	6
	Nevill Hall Hospital	0.00	1
	Royal Gwent Hospital	0.56	12
Betsi Cadwaladr UHB	Wrexham Maelor Hospital	0.49	10
	Ysbyty Glan Clwyd	0.71	14
	Ysbyty Gwynedd	0.37	5
Cardiff and Vale UHB	University Hospital Llandough	0.19	3
	University Hospital Of Wales	0.72	15
Cwm Taf Morgannwg UHB	Prince Charles Hospital	0.37	4
	Princess Of Wales Hospital	0.80	16
	The Royal Glamorgan Hospital	0.64	13
Hywel Dda UHB	Bronglais General Hospital	0.46	9
	Glangwili General Hospital	0.52	11
	Prince Philip Hospital	1.02	17
	Wwithybush General Hospital	1.23	18
Swansea Bay UHB	Morrison Hospital	0.40	8
	Neath Port Talbot Hospital	0.00	1
	Singleton Hospital	0.40	7



Appendix 2: 2017 Point Prevalence Survey of Infection Findings

Prevalence of hospital-acquired infections in SBUHB Hospitals

Table 1 – HAI prevalence in all hospitals

	No. patients surveyed	No. patients with one or more HAIs	% of patients with one or more HAIs	
			2017	2011
Acute hospitals				
Morriston	616	44	7.1	2.4
Neath Port Talbot	143	7	4.9	3.7
Princess of Wales	358	24	6.7	2.5
Singleton	307	17	5.5	3.3
ABMU acute	1,424	92	6.5	2.8
Wales acute	6,400	352	5.5	4.3

Composition of hospital-acquired infections in SBUHB acute hospitals

Table 2 – Composition of HAI types in acute hospitals

	Abertawe Bro Morgannwg UHB		Wales	
	No. of HAI	% of HAI	No. of HAI	% of HAI
UTI	17	17.7	60	16.0
SSI	15	15.6	41	10.9
Pneumonia	14	14.6	70	18.7
Systemic	13	13.5	31	8.3
BSI	9	9.4	35	9.3
GI	7	7.3	40	10.7
Bone/joint	6	6.3	13	3.5
LRT	5	5.2	29	7.7
Skin/soft tissue	4	4.2	27	7.2
Eye/ENT	3	3.1	10	2.7
CRI-PVC	1	1.0	5	1.3
Neonatal	1	1.0	3	0.8
CNS	1	1.0	1	0.3
Other	0	0.0	4	1.1
CRI-CVC	0	0.0	2	0.5
CVS	0	0.0	2	0.5
Reprod tract	0	0.0	2	0.5
All HAI types	96		375	

Appendix 3: Bed-days lost and costs associated with HCAI

A study was undertaken in NHS Scotland to estimate the costs associated with HCAI, including excess length of stay. This study, published in August 2021, used Scottish NHS reference costs to estimate unit costs for bed-days. This study is the first in the UK to report whole-hospital incidence associated infection for approximately 20 years.

Full details of methods and findings are published in *Bed-days and costs associated with the inpatient burden of healthcare-associated infection in the UK*, in the Journal of Hospital Infection 114 (2021) 43 – 50: <https://doi.org/10.1016/j.jhin.2020.12.027>

Excess length of stay and bed-days lost due to healthcare associated infection, by type.

Table 1: Average excess LOS and bed-days lost by HCAI type in Scotland

HCAI	Average excess LOS per HCAI	Total annual bed-days lost to HCAI (NHS Scotland acute hospitals) (95% CI)
BSI	11.4 (5.8–17.0)	15,830 (7550–23,950)
GI	6.0 (–0.7 to 12.7)	7,540 (0–16,100)
LRI	7.3 (1.8–12.7)	7,600 (1300–13,540)
PN	16.3 (7.5–25.5)	10,270 (4170–16,380)
SSI	9.8 (4.5–15.0)	10,030 (4190–15,900)
UTI	–1.0 (–4.3 to 2.3)	0 (0–4,180)
Other	14.0 (–3.9 to 31.8)	6,650 (0–16,360)
All HAI	7.8 (5.7–9.9)	58,010 (41,730–74,840)

Key: LOS, length of stay; HCAI, healthcare-associated infection; CI, confidence interval; BSI, bloodstream infection; GI, gastrointestinal infection; LRI, lower respiratory tract infection; PN, pneumonia; SSI, surgical site infection; UTI, urinary tract infection; ‘Other’ includes: SST, skin soft tissue; BJ, bone and joint; CV, cardiovascular; EENT, eye, ear, nose, and throat; and SI, systemic infection.

Table 2: Average excess LOS and bed-days lost by Tier 1 blood stream infection (BSI) in Swansea Bay UHB, April – November 2021

	Tier 1 BSI in SBU Apr - Nov 2021	Average excess LOS per HAI	Total bed-days lost to Tier 1 BSI Apr-Nov 21
<i>Staph. aureus</i> BSI	97	11.4	1,105.80
<i>E. coli</i> BSI	211	11.4	2,405.40
<i>Klebsiella spp.</i> BSI	69	11.4	786.60
<i>Ps. aeruginosa</i> BSI	14	11.4	159.60
All Tier 1 BSI	391	11.4	4,457.40

Chart 1: Distribution of BSI by organism cultured in Swansea Bay UHB, April – November 2021

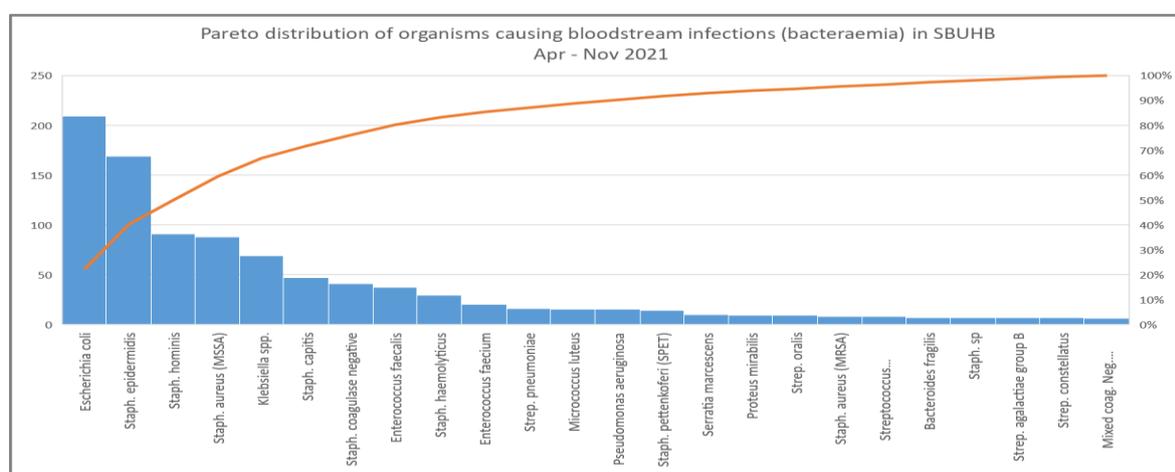


Table 3: Average excess LOS and bed-days lost by all blood stream infection (BSI) in Swansea Bay UHB, by acute hospital site, April – November 2021

Hospital	All BSI SBUHB	Average excess LOS per BSI	Total bed-days lost to all BSI Apr-Nov 21
Morrison Hospital	825	11.4	9,405.00
Neath Port Talbot Hospital	27	11.4	307.80
Singleton Hospital	240	11.4	2,736.00
Total	1,092	11.4	12,448.80

Table 4: Cost per case for each healthcare associated infection (HCAI) type and annual cost of HCAI in NHS Scotland

HAI	Cost per case for each HAI type and overall (£)		Annual cost in NHS Scotland (£ million)	
	Total cost per case (£)	Direct cost per case (£)	Total cost (£m)	Direct cost (£m)
BSI	9,109 (3,511–28,210)	5,917 (2,552–15,438)	12.65 (4.82–38.96)	8.22 (3.45–21.94)
GI	4,794 (445–19,835)	3,114 (192–10,401)	6.02 (0.52–24.83)	3.91 (0.24–14.11)
LRI	5,833 (1,729–20,019)	3,789 (1,234–11,684)	6.07 (1.66–21.25)	3.94 (1.17–11.84)
PN	13,024 (4,808–45,061)	8,460 (3,432–23,548)	8.20 (2.99–25.88)	5.33 (2.01–14.44)
SSI	7,830 (2,987–24,993)	5,086 (2,095–14,433)	8.01 (2.95–27.02)	5.20 (1.96–13.45)
UTI	0 (0–2,109)	0 (0–1,304)	0 (0–3.63)	0 (0–2.21)
Other	11,186 (0–45,319)	7,266 (0–26,523)	5.31 (0.05–24.45)	3.45 (0–12.77)
All HAI	6,232 (2,733–18,181)	4,048 (1,927–9,591)	46.35 (19.43–128.81)	30.11 (14.12–74.46)

Table 5: Cost per case for each healthcare associated bloodstream infection in SBUHB, April – November 2021

HCAI	Cases (Apr–Nov 2021)	Cost per case for each HCAI type and overall (£)		Total cost in SBUHB (Apr–Nov 2021) (£ million)	
		Total cost per case (£)	Direct cost per case (£)	Total cost (£m)	Direct cost (£m)
Tier 1 BSI	391	9,109	5,917	3.56	2.31
All BSI	1092	9,109	5,917	9.95	6.46