## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>About ARHAI Scotland</td>
<td>1</td>
</tr>
<tr>
<td>ARHAI Scotland Activities in 2021</td>
<td>3</td>
</tr>
<tr>
<td>Infection Prevention and Control Guidance</td>
<td>4</td>
</tr>
<tr>
<td>Reducing Risk in the Healthcare Built Environment</td>
<td>7</td>
</tr>
<tr>
<td>Antimicrobial Resistance</td>
<td>9</td>
</tr>
<tr>
<td>Surveillance and Monitoring</td>
<td>12</td>
</tr>
<tr>
<td>Incidents and Outbreaks</td>
<td>32</td>
</tr>
<tr>
<td>List of Abbreviations and Acronyms</td>
<td>34</td>
</tr>
<tr>
<td>Appendix 1 – Publication Metadata</td>
<td>36</td>
</tr>
<tr>
<td>Appendix 2 – Early Access Details</td>
<td>52</td>
</tr>
<tr>
<td>Appendix 3 – NSS and Official Statistics</td>
<td>53</td>
</tr>
</tbody>
</table>
About ARHAI Scotland

ARHAI Scotland’s overall mission is to

**Improve the health and wellbeing of the population by reducing the burden of infection and antimicrobial resistance within Scottish care settings.**

We will do this by establishing a robust evidence base for practice and building mechanisms for monitoring key priority areas; connecting with the wider health and social care and public health system; and collaborating with key delivery partners including NHSScotland health boards, care providers and other national bodies as commissioned by the Scottish Government.
The work of ARHAI Scotland is underpinned by delivering a wide range of functions, working with stakeholders across health and care and beyond to fulfil these functions. ARHAI Scotland’s functions are:

- Surveillance and monitoring of infections and antimicrobial resistance to assess their impact on health
- Clinical assurance to reduce risk in the built healthcare environment
- Co-ordination of national Infection Prevention and Control (IPC) and Antimicrobial Resistance (AMR) programmes
- Expert Infection Prevention and Control/Antimicrobial Resistance advice and horizon scanning
- Effective preparation and response to Healthcare associated infections (HCAI) outbreaks and incidents
- Supporting the ongoing development of a confident, knowledgeable and competent IPC workforce in collaboration with NHS Education for Scotland
- Enabling good professional practice
- Research and innovation to provide evidence for action
- Develop and maintain national evidence-based IPC guidance for Scotland
ARHAI Scotland Activities in 2021

Healthcare associated infections (HCAIs) continue to represent a threat to patient safety in NHSScotland and to safe care, wherever that is delivered. This annual report reflects some of the key work delivered by ARHAI Scotland to support Infection Prevention and Control (IPC), HCAI prevention and tackling Antimicrobial Resistance (AMR) during 2021. This planned work was undertaken alongside reactive provision of IPC expert advice throughout 2021.

Click below to read more about ARHAI Scotland's work in 2021.
In 2021, development of a new chapter for the NIPCM commenced (Chapter 4), which will cover infection prevention and control (IPC) in the built environment and decontamination. Chapter 4 is planned for release in 2022 and will initially exist as a repository for evidence reviews and tools relating to IPC in the built environment. This will include delivery of appropriate decontamination methods within health and care settings and risk mitigation for water-based pathogens. Content will be developed with stakeholder engagement and learning from Scottish outbreaks and incidents.
In addition to the core chapters, the NIPCM also contains multiple appendices and supporting materials which are constantly being updated as the evidence base evolves. In 2021, a new appendix was added, Appendix 17 which provides information on Aerosol Generating Procedures (AGPs) and post-AGP fallow times.

In recognition of the volume of expansion within the NIPCM throughout the COVID-19 pandemic, work will be undertaken in 2022 to refresh the NIPCM design, content and functionality and this will be done in conjunction with our stakeholders.

**Care Home IPC Manual**

In May 2021, a *Care Home IPC Manual* that is context specific for older people and adult Care Homes was published in the NIPCM. The content of the Care Home Infection Prevention and Control Manual (IPCM) is aligned to the evidence based NIPCM and is intended to be used by all those involved in care provision for all older people and adult care homes registered with the Care Inspectorate in Scotland. The Care Home IPCM was co-produced in collaboration with a variety of national and local key stakeholders. Working in partnership with Health Facilities Scotland, ARHAI Scotland supported the development of a National Cleaning Specification, which forms part of the Care Home IPCM. Several webinars were developed and delivered across a variety of community health and care sectors in 2021. These webinars supported the adoption and implementation of national IPC guidance through the application of SICPs as well as enhanced measures of TBPs.

**COVID-19 Guidance**

As the pandemic progressed through 2021, COVID-19 guidance was developed at pace across the UK. ARHAI Scotland with input on key decisions from the Scottish Government COVID-19 Nosocomial Review Group (CNRG) developed and published Scottish specific COVID-19 IPC guidance. Setting-specific guidance was published in the NIPCM in the form of addenda for acute, care home, and community settings. These COVID-19 addenda contained all relevant IPC guidance in the context of Scottish policy and public health mitigation measures, a ‘one stop shop’ for all COVID-19 IPC guidance. In November 2021, these COVID-19 addenda were superseded.
by the NIPCM Scottish Winter (2021/22) Respiratory Infections Infection Prevention and Control Addendum. This signalled a change in the pandemic response and recognised the risk of re-emergence of other winter respiratory viruses in addition to COVID-19, which had the ability to impact health and care services. Further detail on the development of COVID-19 evidence and development of guidance is provided in the COVID-19 Timeline Appendix.

In 2022, work will begin on transitioning from COVID-19 guidance back to the SICPs and TBPs within the NIPCM and Care Home IPCM. Evidence gaps in the NIPCM identified through various ARHAI Scotland rapid reviews conducted during the pandemic will be addressed in systematic literature review updates following the NIPCM methodology.

Infection Prevention and Control Education

NHS Education for Scotland (NES) and ARHAI Scotland work collaboratively to facilitate the translation of evidence-based IPC guidance into robust educational outputs for health and social care staff across Scotland. In 2021, a key area of focus was the transition from the COVID-19 Addenda (Acute, Care Home and Community Health and Care Settings) to the Winter 21/22 Respiratory Infections in Health and Care Settings Infection Prevention and Control Addendum. NES were commissioned to develop supplementary educational IPC resources to support and educate health and social care staff, students, and volunteers in Scotland on the guidance change and encourage organisations to consider key points when preparing staff for the winter season. Further detail on development of educational materials to support the COVID-19 response is provided in the COVID-19 Timeline Appendix.
Reducing Risk in the Healthcare Built Environment

Throughout 2021, there continued to be a focus on reducing risk in the healthcare built environment - from the design, construction and adaptation phases of buildings and associated environments, to how they are occupied and maintained by the health and social care teams using them. ARHAI Scotland are supporting the assessment of associated infection prevention and control risks at all stages. During incidents and outbreaks, ARHAI Scotland have supported Infection Prevention and Control Teams and NHSScotland health boards with the provision of expert subject matter knowledge.

COVID-19 has ignited the need for a focus on ventilation in all health and social care environments and local focus on ventilation in the healthcare built environment has increased with a direct correlation to patient safety.

Expert IPC advice was provided during the development and updating of guidance for reducing risk in the healthcare built environment in a range of settings during 2021. This included reviewing technical memoranda and supporting the development of best practice statements for decontamination alongside identification of priorities for new guidance.

The focus for the year ahead is developing Chapter 4 of the National Infection Prevention and Control Manual (NIPCM) content, tools and evidence to support the safe management of risks from the complex components within the built environment.

Clinical Assurance and IPC for Major Infrastructure Projects

NHS Scotland Assure was formally launched in June 2021 following the request from the Scottish Government for National Services Scotland (NSS) to work with national stakeholders and develop a new national body that aims to reduce risk in the healthcare built environment including risks posed by infectious hazards. An integral workstream of NHS Scotland Assure was the development of the Assurance Service which reviews the design, construction, and maintenance of major infrastructure developments within NHS Scotland at key stages. ARHAI Scotland provided IPC support as
subject matter experts in the development of key stage review processes, ensuring an overarching focus on IPC and that infection risk is considered during all stages of the building lifecycle. Supporting materials for each stage in the building lifecycle were developed to support NHSScotland health boards in demonstrating compliance at all the key stages in the build.

During 2021, ARHAI Scotland supported the completion of eight project reviews. The reviews involve a multidisciplinary Assurance Service team reviewing all the evidence and documentation submitted by the NHSScotland health board and, as a group, agreeing if the evidence demonstrates that the project is being managed and delivered in accordance with national guidance.

In 2022, continued IPC expertise will be provided to the NHSScotland Assurance Service alongside the development of supporting educational resources on the review process and delivery of workshops for IPC teams on the role of IPC in construction projects.

**Healthcare Built Environment Education**

During 2021, NES and ARHAI also worked collaboratively to identify, develop and deliver learning and development opportunities for the specialist healthcare built environment workforce. The vision being to provide the skills and capabilities to prevent infection and other risks and improve safety in the healthcare built environment. Senior leadership development webinars were developed alongside a healthcare built environment (HBE) Knowledge and Skills Framework and an [HBE Learn Zone](#) was created within the NES digital platform TURAS.

The future focus of educational activities includes supporting a relaunch of the NIPCM and development of HBE resources to support clinical staff and compliment Chapter 4 of the NIPCM.
Antimicrobial Resistance

Antimicrobial Resistance (AMR) arises when micro-organisms, such as bacteria, develop the ability to withstand antimicrobial treatments making infections harder to treat which could result in severe disease and potentially death.

In January 2019, the UK Government published a five-year national action plan ‘Tackling antimicrobial resistance 2019–2024’ as well as a vision for AMR in 20 years ‘Contained and controlled: The UK’s 20-year vision for antimicrobial resistance’. The UK action plan acknowledges that a ‘One Health’ approach is required to mitigate the threat from AMR. Antimicrobial use and spread of infection in humans, animals and the environment contribute to the development of resistant infections. The ‘One Health’ approach to AMR accepts that the health of humans, animals and the environment are interconnected and that a co-ordinated cross sectoral response is needed to address the threat from AMR. Actions to tackle AMR in Scotland, within the United Kingdom and internationally are underway with ARHAI Scotland playing an important role. ARHAI Scotland coordinates the implementation of the UK AMR National Action Plan in Scotland by delivery partners through the Scottish One Health National AMR Action Plan (SOHNAAP) group.

During 2021, ARHAI Scotland monitored and reported trends in antibiotic use to assess the impact of the COVID 19 pandemic on prescribing behaviour and antibiotic consumption in humans. This assessment used near real time monitoring of weekly trends in antibiotics used for respiratory infection with reporting for action within NHSScotland health boards. This was undertaken alongside surveillance of AMR including monitoring unusual phenotypes for the emergence of new and unusual AMR. Reassuringly there were no new emerging pathogens or increasing trends observed during 2021. Effective, clinically meaningful intelligence on antibiotic use and AMR was provided to stakeholders through Discovery Dashboards to inform and influence practice to contain and control AMR. This enabled NHSScotland health boards to track local progress against Scottish Government standards on antibiotic use and to identify areas for targeted local improvement activity. AMR has remained largely stable throughout this period in Scotland. In
addition, Scotland’s Healthy Animals website was further developed to support veterinarians, livestock industry and animal keepers with advice on biosecurity and antimicrobial stewardship in animal health.

In 2022, work will continue assessing the impact of NHS remobilisation from COVID-19 and generating evidence for optimisation of antibiotic prescribing. Preliminary analysis of patient level antibiotic use in acute hospitals will be undertaken to investigate how changes in patient case mix have impacted on hospital level antibiotic use.

Collaborative work with the Scottish Environment Protection Agency and Scotland’s Rural College is planned around enterococci, and in particular, vancomycin, linezolid and tigecycline resistance, adopting a One Health approach. A fuller understanding on the contextual and behavioural factors driving trends in antibiotic use in animal health will be developed through engagement with stakeholders.

Comprehensive data and intelligence from 2021 will be published in the annual Scottish One Health Antimicrobial Use and Antimicrobial Resistance (SONAAR) report providing information on antibiotic use and resistance to antibiotics in humans and animals. The reports are published in November to coincide with World Antibiotic Awareness Day and European Antibiotic Awareness Week. The reports are available on the Antimicrobial resistance - One Health | National Services Scotland (nhs.scot) website.
Causes of Antibiotic resistance

Antibiotic resistance happens when bacteria change and become resistant to the antibiotics used to treat the infections they cause.

- Over-prescribing of antibiotics
- Patients not finishing their treatment
- Over-use of antibiotics in livestock and fish farming
- Poor infection control in hospitals and clinics
- Lack of hygiene and poor sanitation
- Lack of new antibiotics being developed
Surveillance and Monitoring

Surveillance of Healthcare Associated Infection in Scotland

Healthcare associated infections (HCAI) represent a threat to patient safety and can contribute to morbidity and mortality in an already vulnerable population. A significant proportion of HCAI are avoidable and prevention of these infections provides an opportunity to improve patient outcomes and reduce unnecessary costs within healthcare systems.

The mandatory National Surveillance Programme in Scotland has been developed to monitor the burden of key HCAI, providing intelligence to inform the development of interventions and monitor their impact.

During 2021, three key infection types were included in the National Surveillance Programme:

- *Clostridioides difficile* infection (CDI)
- *Escherichia coli* bacteraemia (ECB)
- *Staphylococcus aureus* bacteraemia (SAB)

Trends in key HCAI rates continued to be published quarterly in 2021 and provided in NSS Discovery, supporting local NHSScotland health boards with quality improvement and reduction strategies.
Surveillance of HCAI during the pandemic

Surveillance continued during the pandemic with surgical site infection surveillance and some enhanced elements of *E. coli* and *S. aureus* bacteraemia surveillance paused to support the pandemic response.

Surveillance priorities for 2022

- Develop epidemiological intelligence to support reducing risk in the healthcare built environment
- Further investigation into the impact of the pandemic on other HCAI
- Development of wider Gram-negative bacteraemia surveillance to support the UK Antimicrobial resistance (AMR) National Action Plan
- Development of smarter solutions for surveillance of HCAI, maximising clinical effectiveness whilst reducing burden of data collection
The impact of the pandemic on healthcare activity and the inpatient population

Since the onset of the COVID-19 pandemic, there have been changes in healthcare delivery, activity and the inpatient population (including patients being treated for COVID-19). While more services resumed in 2021, hospital activity levels have not yet returned to pre-pandemic levels. This continued disruption to healthcare delivery and the patient population changes the risk of other types of healthcare associated infections (HCAI). Changes in HCAI epidemiology are multifactorial and must be interpreted in the context of these wider healthcare changes.

There was an increase in hospital activity in 2021 but activity has not yet reached pre-pandemic levels

An increase of 8.7% in the number of patients admitted to acute hospitals in 2021 compared to 2020

605,923 in 2021 compared to 557,265 in 2020

Admissions to acute hospitals in 2021 remained 18.5% lower than in 2019

An increase of 9.2% in total occupied bed days in 2021 compared to 2020

5,696,926 in 2021 compared to 5,218,675 in 2020

Total occupied bed days in 2021 remained 6.4% lower than in 2019
An increase of 4.9% in the number of emergency admissions within acute hospitals in 2021 compared to 2020

470,542 in 2021 compared to 448,409 in 2020

Emergency admissions in 2021 remained 9.2% lower than in 2019

An increase of 4.2% in elective admissions within acute hospitals in 2021 compared to 2020

84,420 in 2021 compared to 81,046 in 2020

Elective admissions in 2021 remained 34.2% lower than in 2019
An increase of **20.2%** in day cases within acute hospitals in 2021 compared to 2020

348,677 in 2021 compared to 290,058 in 2020

Day cases in 2021 remained **21.7% lower** than in 2019

There was no difference in the proportion of acute inpatients aged 65 and over in 2021 (42.5%) compared to 2020 (42.6%), but there was a larger proportion of patients aged 65 and over compared to 2019

The proportion of acute inpatients aged 65 and over in 2021 was **2.7% higher** than in 2019
**Clostridioides difficile infection**

**Epidemiological Data**

In **2021**, there were **1,135** cases of *Clostridioides difficile Infection (CDI)* reported in patients aged 15 years and older in Scotland.

**Compared** to **1,088** cases in **2020**

The **annual incidence rate** was **20.8** per 100,000 population.

The rate has **remained stable** between **2020** and **2021**.

There has been a **5.8% year-on-year decrease** over the last 5 years.

**Healthcare associated CDI**

- **859** cases
- **Annual incidence rate** of **15.1** per 100,000 bed days

The rate has remained **stable** between **2020** and **2021**.

**Community associated CDI**

- **276** cases
- **Annual incidence rate** of **5.0** per 100,000 population

The rate has remained **stable** between **2020** and **2021**.

There has been a **7.9% year-on-year decrease** over the last 5 years.
2021 funnel plot analysis

NHS Ayrshire & Arran, NHS Highland and NHS Lanarkshire had higher than average rates of healthcare associated CDI compared with the Scottish average rate.

NHS Dumfries & Galloway and NHS Lothian had higher than average rates of community associated CDI compared with the Scottish average rate.

**Note:** the NHSScotland health board rates are not adjusted for differences in the patient population.

Three improvement plans were developed by NHSScotland health boards during 2021 in response to higher than average rates of healthcare associated CDI.

**All cause case fatality**

In 2021, the 30 day all cause case fatality rates for CDI in patients aged 15 years and older was **11.6%**.

The rate has remained stable between 2017 and 2021.

The rates are not adjusted for differences in the patient population over time.
Molecular Epidemiological Data

As part of the epidemiological surveillance of CDI, the Scottish Salmonella, Shigella and Clostridioides difficile Reference Laboratory carry out polymerase chain reaction (PCR) ribotyping of subsets of Clostridioides difficile (C. difficile) isolates (under a representative snapshot, and severe cases and/or outbreaks typing schemes).

In 2021, the most common ribotypes isolated in Scotland (based on a representative sample, n=258) were:

- 10.9% ribotype 002
- 10.9% ribotype 015
- 10.9% ribotype 078
- 10.1% ribotype 005
- 10.1% ribotype 014
- 4.7% ribotype 020
- 4.3% ribotype 023
- 3.9% ribotype 026
- 3.5% ribotype 106

PCR ribotyping surveillance is currently being replaced by Whole Genome Sequencing (WGS). This will aid interpretation of epidemiological links and allow early warning triggers to be developed to quickly identify linked cases or outbreaks.

Scottish Antimicrobial Prescribing Group (SAPG) coordinates a national framework for antimicrobial stewardship to improve antibiotic use supporting reduced risk from CDI. Updated advice on antimicrobial management of CDI was issued by the Scottish Antimicrobial Prescribing Group.
Staphylococcus aureus bacteraemia

Epidemiological Data

In 2021, there were 1,590 cases of Staphylococcus aureus bacteraemia (SAB) reported in Scotland.

Compared to 1,501 cases in 2020,

The annual incidence rate was 29.1 per 100,000 population.

The rate has remained stable between 2020 and 2021.

The rate has remained stable over the last 5 years.

96.4% (n = 1,533) of all SAB cases were Meticillin-sensitive Staphylococcus aureus (MSSA).

The rate has remained stable between 2020 and 2021.

The rate has remained stable over the last 5 years.

3.6% (n = 57) of all SAB cases were Meticillin-resistant Staphylococcus aureus (MRSA).

The rate has remained stable between 2020 and 2021.

There has been an 11.5% year-on-year decrease over the last 5 years.
In **2021**, the **cases and rates** of SAB were

<table>
<thead>
<tr>
<th>Healthcare associated SAB</th>
<th>Community associated SAB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1,034 cases</strong></td>
<td><strong>556 cases</strong></td>
</tr>
<tr>
<td>Annual incidence rate of</td>
<td>Annual incidence rate of</td>
</tr>
<tr>
<td><strong>18.1</strong> per 100,000 bed days</td>
<td><strong>10.2</strong> per 100,000 population</td>
</tr>
</tbody>
</table>

The rate has remained stable between **2020** and **2021**.

### 2021 funnel plot analysis

**NHS Tayside** had a **higher rate** of healthcare associated SAB compared with the **Scottish average rate**.

**NHS Dumfries & Galloway** had a **higher rate** of community associated SAB compared with the **Scottish average rate**.

**Note**: the **NHSScotland health board rates** are **not adjusted** for differences in the patient population.

During **2021**, no **NHSScotland health boards** were required to develop improvement plans due to **higher than average quarterly rates** of healthcare associated SAB.
All cause case fatality

In 2021, the 30 day all cause case fatality rates for SAB were

- **22.8%** for MRSA
- **20.1%** for MSSA

The MRSA case fatality rate has remained stable between 2017 and 2021.

There has been a 3.9% year-on-year increase in the MSSA case fatality rate between 2017 and 2021.

Note: the rates are not adjusted for differences in the patient population over time.
In 2021, the **3 most common** entry points for healthcare associated SAB were

- **28.5%** Vascular access device (VAD)
- **21.1%** Skin and soft tissue
- **19.9%** Could not be determined by clinical team

*Voluntary data due to the COVID-19 pandemic, completed for 81.7% of healthcare associated SAB cases

In 2021, the **3 most common** entry points for community associated SAB were

- **37.7%** Skin and soft tissue
- **33.8%** Could not be determined by clinical team
- **12.6%** Illicit drug injection sites from people who inject drugs (PWID)

*Voluntary data due to the COVID-19 pandemic, completed for 82.6% of community associated SAB cases

In 2021, **83%** of audited patients underwent a clinical risk assessment in line with National MRSA screening policy. This remains **below** the **90%** key performance indicator.
Gram-negative bacteraemia

Epidemiological Data

In 2021, there were **5,600** Gram-negative bacteraemia in Scotland caused by **5** key Gram-negative pathogens.

*E. coli* is the most common cause of Gram-negative bacteraemia

- **76.6%** Escherichia coli
- **13.3%** Klebsiella pneumoniae
- **4.4%** Klebsiella oxytoca
- **4.7%** Acinetobacter species
- **1.0%** Pseudomonas aeruginosa

In 2021, there were **4,292** cases of *Escherichia coli* bacteraemia (ECB) reported in Scotland.

Compared to **4,206** cases in 2020, the annual incidence rate was **78.5** per 100,000 population.

The rate has remained stable between 2020 to 2021.

There has been a **3.4%** year-on-year decrease over the last 5 years.
In 2021, the cases and rates of ECB were

<table>
<thead>
<tr>
<th>Healthcare associated ECB</th>
<th>Community associated ECB</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,113 cases</td>
<td>2,179 cases</td>
</tr>
<tr>
<td>Annual incidence rate of</td>
<td>Annual incidence rate of</td>
</tr>
<tr>
<td>37.1 per 100,000 bed days</td>
<td>39.9 per 100,000 population</td>
</tr>
</tbody>
</table>

There has been a 6.4% decrease in the rate between 2020 and 2021.
The rate has remained stable between 2020 and 2021.

2,113 cases

2,179 cases

2021 funnel plot analysis

NHS Ayrshire & Arran, NHS Forth Valley and NHS Tayside all had higher rates of healthcare associated ECB compared with the Scottish average rate.

NHS Ayrshire & Arran and NHS Dumfries & Galloway both had higher rates of community associated ECB compared with the Scottish average rate.

Note: the NHSScotland health board rates are not adjusted for differences in the patient population.

Three improvement plans were developed by NHSScotland health boards during 2021 in response to higher than average rates of healthcare associated ECB.

All cause case fatality

In 2021, the 30 day all cause case fatality rates for ECB was 14.3%.
The rate has remained stable between 2017 and 2021.
The rates are not adjusted for differences in the patient population over time.
In 2021, the **3 most common** primary infections for healthcare associated ECB were

- **24.8%** Catheter associated urinary tract infection
- **22.7%** Lower urinary tract infection
- **16.1%** Hepatobiliary infection

*Voluntary data due to the COVID-19 pandemic, completed for 88.4% of healthcare associated ECB cases.

In 2021, the **3 most common** primary infections for community associated ECB were

- **36.1%** Lower urinary tract infection
- **28.2%** Hepatobiliary infection
- **14.1%** Pyelonephritis

*Voluntary data due to the COVID-19 pandemic, completed for 88.8% of community associated ECB cases.*
Admission screening for Carbapenemase-Producing Enterobacterales (CPE), an important group of Gram-negative organisms, is a key intervention in healthcare.

In 2021, 82% of audited patients underwent a clinical risk assessment in line with national CPE screening policy.

**ARHAI Scotland** coordinates the sharing of urinary tract infection (UTI) reduction resources. These include:

- **National Hydration Campaign** which aims to convey the public health benefits of good hydration in terms of UTI prevention
- **National Catheter Passport** which gives information on how to care for urinary catheters at home as well as a clinical section for a nurse, doctor or carer
ARHAI Scotland continued to monitor hospital transmission of COVID-19 using the hospital onset COVID-19 surveillance system during 2021. This system monitors nosocomial COVID-19 infections (patients testing positive for COVID-19 on day eight of admission onwards). The intelligence has been used to provide critical evidence to inform infection prevention and control measures, guidance and government policy. Further detail on the development of COVID-19 epidemiology and intelligence is provided in the COVID-19 Timeline Appendix.

### Hospital onset status timeline

Hospital onset is divided into 4 categories: non-hospital, indeterminate, probable and definite.

<table>
<thead>
<tr>
<th>Non-hospital</th>
<th>Indeterminate</th>
<th>Probable</th>
<th>Definite</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Day of admission</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Day of positive test within in-patient stay

### Epidemiological Data

In 2021 there were **3,746 cases** of nosocomial COVID-19 infection, compared to **3,395** in the 2020 pandemic period of March to December.

Testing availability and testing policy has evolved through the pandemic in hospitals and the community, therefore comparison between COVID-19 pandemic years should be treated with caution.

32.3% of patients testing positive during an inpatient stay were nosocomial cases (excluding patients tested in the community and admitted to hospital).
<table>
<thead>
<tr>
<th>Hospital onset status</th>
<th>2020* Number of cases</th>
<th>2020* %</th>
<th>2021 Number of cases</th>
<th>2021 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definite hospital onset (day 15+ of admission)</td>
<td>2,395</td>
<td>22.8%</td>
<td>2,595</td>
<td>21.8%</td>
</tr>
<tr>
<td>Probable hospital onset (days 8-14)</td>
<td>1,000</td>
<td>9.5%</td>
<td>1,151</td>
<td>9.7%</td>
</tr>
<tr>
<td>Indeterminate hospital onset (days 3-7)</td>
<td>791</td>
<td>7.5%</td>
<td>1,080</td>
<td>9.1%</td>
</tr>
<tr>
<td>Non-hospital onset (days 1 and 2)</td>
<td>6,338</td>
<td>60.2%</td>
<td>7,051</td>
<td>59.4%</td>
</tr>
<tr>
<td><strong>Total hospital onset COVID-19 cases</strong></td>
<td><strong>10,524</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>11,877</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

* 2020 pandemic period of March to December
Patients with nosocomial COVID-19 were older than other COVID-19 cases (those diagnosed during the first week of their inpatient stay or in the community).

The median age of nosocomial COVID-19 was 79, which was significantly higher than a median age of 66 for other patients first diagnosed in hospital (p<0.001).

60.8% of all nosocomial COVID-19 cases in 2021 (definite and probable hospital onset) were aged 75 and over, which reflects the older age distribution of the hospital population.

Incidence of nosocomial cases of COVID-19 over time

Incidence of nosocomial cases of COVID-19 have followed trends observed in the population overall, which during 2021 corresponded to the emergence of new variants.
During the pandemic, asymptomatic testing has been used for early identification and subsequent management of asymptomatic and pre-symptomatic COVID-19 cases, reducing the risk of onward transmission.

**All nosocomial cases**

<table>
<thead>
<tr>
<th>Symptomatic</th>
<th>Asymptomatic</th>
</tr>
</thead>
<tbody>
<tr>
<td>35.6%</td>
<td>64.4%</td>
</tr>
</tbody>
</table>

at time of test.*

* Voluntary data from August 2021 onwards (963 cases, 62.7% complete)

**All cause case fatality**

951 (25.4%) patients with nosocomial COVID-19 in 2021 died within 28 days of their first positive sample. This was lower than 2020. A lower all cause case fatality rate in 2021 may be reflective of: vaccination; better treatment options for COVID-19; variants with reduced severity; increased ascertainment of mild cases due to asymptomatic testing.

<table>
<thead>
<tr>
<th>Hospital onset status</th>
<th>2020: Total COVID-19 Cases</th>
<th>2020: All cause Case Fatality within 28 Days</th>
<th>2020: All cause Case Fatality %</th>
<th>2021: Total COVID-19 Cases</th>
<th>2021: All cause Case Fatality within 28 Days</th>
<th>2021: All cause Case Fatality %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nosocomial Infections (Day 8 of admission onwards)</td>
<td>3,395</td>
<td>1,043</td>
<td>30.7%</td>
<td>3,746</td>
<td>951</td>
<td>25.4%</td>
</tr>
<tr>
<td>Non-Hospital and Indeterminate hospital onset (Days 1-7 of admission)</td>
<td>7,114</td>
<td>1,808</td>
<td>25.4%</td>
<td>8,080</td>
<td>1,265</td>
<td>15.7%</td>
</tr>
<tr>
<td>Total</td>
<td>10,509</td>
<td>2,851</td>
<td>27.1%</td>
<td>11,826</td>
<td>2,216</td>
<td>18.7%</td>
</tr>
</tbody>
</table>

Differences in case fatality rates between cases of nosocomial COVID-19 and other cases of COVID-19 diagnosed during an inpatient stay can be attributed to differences in the age distributions and underlying health conditions of the two groups. After adjusting for these factors there was no increased risk in case fatality for nosocomial COVID-19, compared to other cases first diagnosed in hospital.
Incidents and Outbreaks

ARHAI Scotland support local Infection Prevention and Control Teams and Health Protection Teams to prevent, prepare for, and manage outbreaks and incidents, as well as share lessons learned throughout Scotland.

ARHAI Scotland use an Outbreak Reporting Tool (ORT) to collect and analyse COVID-19 cluster data and other incidents assessed using the Healthcare Infection Incident Assessment Tool (HIIAT) in line with Chapter 3 of the National Infection Prevention and Control Manual (NIPCM). This system continued to evolve during 2021 and has enabled comprehensive and timely reporting of outbreaks and incidents across NHS Scotland and sharing of best practice in managing and preventing incidents. The establishment of regular meetings has allowed this sharing to be achieved in a real-time, proactive environment covering COVID-19 and non-COVID-19 incidents and outbreaks.

In 2021, there were 118 healthcare infection incidents and outbreaks (excluding COVID-19 clusters).

Incidents and outbreaks reported as HIIATs are categorised as Red, Amber or Green. Of the total number of reports, there were:

- **23 Red**
- **22 Amber**
- **73 Green**

Of the total number of incidents and outbreaks in 2021:

- **12.7% (n = 15)** of incidents were bloodstream infection incidents
- **11.9% (n = 14)** of incidents were gastrointestinal incidents (excluding Norovirus)
- **5.1% (n = 6)** of incidents were respiratory infection incidents (excluding COVID-19)
- **4.2% (n = 5)** of incidents were urinary tract infection incidents
Development of incident and outbreak assessment

The HIIAT tool requires Infection Prevention and Control Teams (IPCT) or Health Protection Teams (HPT) within NHSScotland health boards to assess every healthcare infection incident. For example: all outbreaks and incidents (including decontamination incidents and near misses) in any healthcare setting as outlined in Chapter 3 of the NIPCM. During 2022, the HIIAT tool will be revised in collaboration with stakeholders. The aim is to address some inconsistencies that may occur with the assessment of risk criteria. This will provide a more structured approach for the NHSScotland health boards in determining risk associated with an incident or outbreak and consistency in the subsequent reporting across all levels.

Norovirus outbreaks

Norovirus spreads very easily and there is a risk of outbreaks in any place where there are shared living spaces such as in hospitals.

NHSScotland health boards reported 21 closures due to Norovirus in 2021. This is a decrease of 62.5% from 56 closures in 2020.

- **Wards**: 2021 - 20 ward closures, 2020 - 16 ward closures
- **Bays**: 2021 - 1 bay closure, 2020 - 40 bay closures

There were 107 suspected or confirmed cases of Norovirus associated with reported ward or bay closures in 2021. This is a decrease of 58.4% from 257 cases in 2020.

- 2021 - 107 cases, 2020 - 257 cases
### List of Abbreviations and Acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGP</td>
<td>Aerosol Generating Procedure</td>
</tr>
<tr>
<td>AMR</td>
<td>Antimicrobial Resistance</td>
</tr>
<tr>
<td>ARHAI</td>
<td>Antimicrobial Resistance and Healthcare Associated Infections</td>
</tr>
<tr>
<td>CDI</td>
<td><em>Clostridioides difficile</em> Infection</td>
</tr>
<tr>
<td>CDW</td>
<td>Corporate Data Warehouse</td>
</tr>
<tr>
<td>C. difficile</td>
<td><em>Clostridioides difficile</em></td>
</tr>
<tr>
<td>CNRG</td>
<td>COVID-19 Nosocomial Review Group</td>
</tr>
<tr>
<td>COVID-19</td>
<td>Coronavirus disease 2019 COVID-19</td>
</tr>
<tr>
<td>CPE</td>
<td>Carbapenemase-Producing Enterobacterales</td>
</tr>
<tr>
<td>CRA</td>
<td>Clinical Risk Assessment</td>
</tr>
<tr>
<td>E. coli</td>
<td><em>Escherichia coli</em></td>
</tr>
<tr>
<td>ECB</td>
<td><em>Escherichia coli</em> Bacteraemia</td>
</tr>
<tr>
<td>ECOSS</td>
<td>Electronic Communication of Surveillance in Scotland</td>
</tr>
<tr>
<td>HBE</td>
<td>Healthcare Built Environment</td>
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<tr>
<td>HCAI</td>
<td>Healthcare Associated Infection</td>
</tr>
<tr>
<td>HIIAT</td>
<td>Healthcare Infection Incident Assessment Tool</td>
</tr>
<tr>
<td>HIORT</td>
<td>Healthcare Infection, Incident and Outbreak Reporting Template</td>
</tr>
<tr>
<td>HPT</td>
<td>Health Protection Team</td>
</tr>
<tr>
<td>IPC</td>
<td>Infection Prevention and Control</td>
</tr>
<tr>
<td>IPCM</td>
<td>Infection Prevention Control Manual</td>
</tr>
<tr>
<td>IPCT</td>
<td>Infection Prevention and Control Team</td>
</tr>
<tr>
<td>ISD</td>
<td>Information Services Division</td>
</tr>
<tr>
<td>MRSA</td>
<td>Meticillin-resistant <em>Staphylococcus aureus</em></td>
</tr>
<tr>
<td>MSSA</td>
<td>Meticillin-sensitive <em>Staphylococcus aureus</em></td>
</tr>
<tr>
<td>NES</td>
<td>NHS Education for Scotland</td>
</tr>
<tr>
<td>NHS</td>
<td>National Health Service</td>
</tr>
<tr>
<td>NIPCM</td>
<td>National Infection Prevention and Control Manual</td>
</tr>
<tr>
<td>NNU</td>
<td>Neonatal Unit</td>
</tr>
<tr>
<td>NRS</td>
<td>National Records of Scotland</td>
</tr>
<tr>
<td>NSS</td>
<td>National Services Scotland</td>
</tr>
<tr>
<td>ORT</td>
<td>Outbreak Reporting Tool</td>
</tr>
<tr>
<td>PCR</td>
<td>Polymerase Chain Reaction</td>
</tr>
<tr>
<td>PWID</td>
<td>People Who Inject Drugs</td>
</tr>
<tr>
<td>RAPID</td>
<td>Rapid Admission Preliminary Inpatient Data</td>
</tr>
<tr>
<td>S. aureus</td>
<td><em>Staphylococcus aureus</em></td>
</tr>
<tr>
<td>SAB</td>
<td><em>Staphylococcus aureus</em> Bacteraemia</td>
</tr>
</tbody>
</table>
SAPG  Scottish Antimicrobial Prescribing Group
SICPs  Standard Infection Control Precautions
SMR   Scottish Morbidity Record
SONAAR Scottish One Health Antimicrobial Use and Antimicrobial Resistance
SOHNAAP Scottish One Health National AMR Action Plan
SSI   Surgical Site Infection
TBPst Transmission Based Precautions
UK    United Kingdom
UTI   Urinary Tract Infection
VAD   Vascular Access Device
VHF   Viral Haemorrhagic Fever
WGS   Whole Genome Sequencing
XDR-TB Extremely Drug Resistant-Tuberculosis
Appendix 1 – Publication metadata

Publication title
ARHAI Scotland 2021 Annual Report

Description
This release provides information on healthcare associated infections in Scotland for the period January to December 2021.

Theme
Healthcare associated infections in Scotland

Topic
Healthcare associated infections
Infection prevention and control

Format
Online resource (PDF)

Data source(s)
Infection Prevention and Control Guidance: N/A

Reducing Risk in the Healthcare Built Environment: N/A

Antimicrobial Resistance: N/A

The impact of the pandemic on healthcare activity and the inpatient population:

Acute hospital admissions data: Public Health Scotland SMR01

Total occupied bed days: Public Health Scotland ISD(S)1


Acute admissions by patient age: Public Health Scotland SMR01

**Clostridioides difficile infection:**

Case data: Electronic Communication of Surveillance in Scotland (ECOSS)

Data linkage source: general / acute inpatient and day case Scottish Morbidity Records (SMR01): Public Health Scotland

Healthcare associated denominator: total occupied bed days: Public Health Scotland ISD(S)1

Community associated denominator: National Records of Scotland (NRS) mid-year population estimates

**Staphylococcus aureus bacteraemia:**

Case data: ECOSS Enhanced Surveillance Web Tool

Healthcare associated denominator: total occupied bed days: Public Health Scotland ISD(S)1
Community associated denominator: NRS mid-year population estimates

**Gram-negative bacteraemia:**

Case data: ECOSS and ECOSS Enhanced Surveillance Web Tool

Healthcare associated denominator: total occupied bed days: Public Health Scotland ISD(S)1

Community associated denominator: NRS mid-year population estimates

**Hospital onset COVID-19:**

Case data: ECOSS and Corporate Data Warehouse (CDW)

Admissions data: Rapid Admission Preliminary Inpatient Data (RAPID), validated/supplemented by local patient admissions systems.

**Incidents and Outbreaks:** healthcare infection incidents reported to National Services Scotland (NSS) through the Healthcare Infection, Incident and Outbreak Reporting Template (HIIORT) reporting process and the ARHAI Outbreak Reporting Tool (ORT).

**Norovirus outbreaks:** Norovirus outbreaks reported to NSS.

**Date that data are acquired**

**Infection Prevention and Control Guidance:** N/A

**Reducing Risk in the Healthcare Built Environment:** N/A

**Antimicrobial Resistance:** N/A

**The impact of the pandemic on healthcare activity and the inpatient population:** 28 June 2021

**Clostridioides difficile infection:** 22 April 2022

**Staphylococcus aureus bacteraemia:** 02 June 2022
Gram-negative bacteraemia: 07 July 2022 (with the exception of *Escherichia coli* bacteraemia)

*Escherichia coli* bacteraemia: 02 June 2022

Hospital onset COVID-19: 06 July 2021

Incidents and Outbreaks: 28 June 2022

Norovirus outbreaks: 07 July 2022

**Release date**

20 September 2022

**Frequency**

Annual

**Timeframe of data and timeliness**

The latest iteration of data are to 31 December 2021, therefore nine months in arrears.

**Norovirus outbreaks:** the data are reported on a weekly basis by NHSScotland health boards and the reporting method has capacity to be retrospective due to only being reported when the bay/ward has reopened. Therefore, the data should not be used for benchmarking or comparison but only for NHSScotland health boards assessment for risk and outbreak preparedness.

**Continuity of data**

**Infection Prevention and Control Guidance:** N/A

**Reducing Risk in the Healthcare Built Environment:** N/A

**Antimicrobial Resistance:** N/A
The impact of the pandemic on healthcare activity and the inpatient population: None

**Clostridioides difficile infection**: changes in the hospital population and activity during 2020/21 may have affected the epidemiology of Clostridioides difficile infection and comparison of results should be interpreted with caution.

**Staphylococcus aureus bacteraemia**: changes in the hospital population and activity during 2020/21 may have affected the epidemiology of Staphylococcus aureus infection and comparison of results should be interpreted with caution.

**Gram-negative bacteraemia**: changes in the hospital population and activity during 2020/21 may have affected the epidemiology of Gram-negative bacteraemia and comparison of results should be interpreted with caution.

**Hospital onset COVID-19**: changes in the hospital population, hospital activity, COVID-19 testing, vaccination rates and circulation of different variants during 2020/21 may have affected the epidemiology of hospital onset COVID-19 cases and hospital onset COVID-19 mortality; comparison of results should be interpreted with caution.

**Incidents and Outbreaks**: changes in the hospital population and activity during 2020/21 may have affected the epidemiology of healthcare outbreaks and incidents and comparison of results should be interpreted with caution.

**Norovirus outbreaks**: changes in the hospital population and activity during 2020/21 may have affected the epidemiology of Norovirus outbreaks and comparison of results should be interpreted with caution.

**Revisions statement**

These data are not subject to planned major revisions. However, our aim is to continually improve the interpretation of the data and therefore analysis methods are regularly reviewed and may be updated in the future.
Revisions relevant to this publication

Infection Prevention and Control Guidance: N/A

Reducing Risk in the Healthcare Built Environment: N/A

Antimicrobial Resistance: N/A

The impact of the pandemic on healthcare activity and the inpatient population: N/A

*Clostridioides difficile* infection: details provided in quarterly publication https://www.hps.scot.nhs.uk/data/healthcare-associated-infection-quarterly-epidemiological-commentary/

*Staphylococcus aureus* bacteraemia: details provided in quarterly publication https://www.hps.scot.nhs.uk/data/healthcare-associated-infection-quarterly-epidemiological-commentary/

Gram-negative bacteraemia: none

*Escherichia coli* bacteraemia: details provided in quarterly publication https://www.hps.scot.nhs.uk/data/healthcare-associated-infection-quarterly-epidemiological-commentary/


Incidents and Outbreaks: N/A

Norovirus outbreaks: none
Concepts and definitions

Statistical significance:

Please note an increase or decrease stated in this report refers to a statistically significant change, and where a trend is referred to as stable, or there has been no change, this means that there has been no significant increase or decrease.

Case fatality:

*Clostridioides difficile* infection, *Staphylococcus aureus* bacteraemia and *Escherichia coli* bacteraemia: The definition of 30 day all cause case fatality is any death occurring within 30 days of the first positive specimen date within each infection episode. Therefore, the data includes deaths where *Clostridioides difficile* infection, *Staphylococcus aureus* bacteraemia or *Escherichia coli* bacteraemia may not have been either the underlying or contributory cause of death. All cause case fatality depends solely on the number of deaths identified and is not subject to bias that may be introduced as a result of inaccuracies in completion of the death certificate or coding of the cause of death. If more than one episode occurs in the 30 days prior to death, only the latest episode will be counted as a death. Some cases may not be able to be linked to NRS death data due to missing or invalid CHI numbers.

**Infection Prevention and Control Guidance:** N/A

**Reducing Risk in the Healthcare Built Environment:** N/A

**Antimicrobial Resistance:** N/A

**The impact of the pandemic on healthcare activity and the inpatient population:**

Acute hospital admissions data: total number of unique patients admitted to hospital in 2019, 2020 and 2021 as per Public Health Scotland SMR01.

Total occupied bed days: total number of occupied bed days for years 2017-2021, as per Public Health Scotland ISD(S)1.


Acute admissions by patient age: ages of unique patients admitted to acute hospitals in 2019, 2020 and 2021 as per Public Health Scotland SMR01.

*Clostridioides difficile infection:* details provided in quarterly publication https://www.hps.scot.nhs.uk/data/healthcare-associated-infection-quarterly-epidemiological-commentary/

*Staphylococcus aureus bacteraemia:* details provided in quarterly publication https://www.hps.scot.nhs.uk/data/healthcare-associated-infection-quarterly-epidemiological-commentary/

*Gram-negative bacteraemia:* gram-negative organisms including *Enterobacterales*, (comprising amongst others *Escherichia coli*, *Klebsiella oxytoca*, and *Klebsiella pneumoniae*), and non-fermenters, (comprising amongst others *Pseudomonas aeruginosa*, and *Acinetobacter* species), cause serious infections including bacteraemia, pneumonia, meningitis, and surgical site infections (SSIs). Gram-negative bacteraemia is a public health and clinical concern because of:

- the severity of infection, commonly occurring among vulnerable patients often at the extremes of life and/or with comorbidities
• the large number of cases of Gram-negative bacteraemias each year, and high prevalence of Gram-negative infections
• the association with receiving healthcare in community and healthcare settings
• their ability to become resistant to multiple classes of antibiotics, limiting treatment options

*Escherichia coli* bacteraemia: details provided in quarterly publication https://www.hps.scot.nhs.uk/data/healthcare-associated-infection-quarterly-epidemiological-commentary/


Incidents and Outbreaks: healthcare infection incidents reported to NSS. Healthcare associated infection incidents are defined within Chapter 3 of the National Infection Prevention and Control Manual http://www.nipcm.scot.nhs.uk/chapter-3-healthcare-infection-incidents-outbreaks-and-data-exceedance/

*Norovirus outbreaks*: outbreaks of Norovirus are defined as two or more linked cases associated with the same healthcare setting over a specified time period, and confirmed/suspected cases are as submitted by NHSScotland health boards as the number of cases associated with reported Norovirus outbreaks.

**Relevance and key uses of the statistics**

Infection Prevention and Control Guidance: N/A

Reducing Risk in the Healthcare Built Environment: N/A

Antimicrobial Resistance: N/A

**The impact of the pandemic on healthcare activity and the inpatient population**: figures provided are used for management information for resource planning, surveillance and research in NHS Scotland.
**Clostridioides difficile infection**: details provided in quarterly publication https://www.hps.scot.nhs.uk/data/healthcare-associated-infection-quarterly-epidemiological-commentary/

**Staphylococcus aureus bacteraemia**: details provided in quarterly publication https://www.hps.scot.nhs.uk/data/healthcare-associated-infection-quarterly-epidemiological-commentary/

**Gram-negative bacteraemia**: the outputs of the surveillance programme are intended to support the NHSScotland health boards in controlling and reducing the burden of Gram-negative bacteraemia.

**Escherichia coli bacteraemia**: details provided in quarterly publication https://www.hps.scot.nhs.uk/data/healthcare-associated-infection-quarterly-epidemiological-commentary/

**Hospital onset COVID-19**: details provided in weekly publication https://www.publichealthscotland.scot/publications/hospital-onset-covid-19-cases-in-scotland/

**Incidents and Outbreaks**: to identify risks or trends in the organisms, types of infection, procedures, patients, or clinical specialities associated with healthcare infection incidents and outbreaks. This informs the production of guidance, tools or policy and assists in preparing for, preventing, detecting and managing healthcare infection incidents and outbreaks.

**Norovirus outbreaks**: Norovirus outbreak data are used to provide more robust data on Norovirus outbreaks thus assisting preparedness for future seasons.

**Key to NHSScotland health boards**

AA = Ayrshire & Arran  
BR = Borders  
DG = Dumfries & Galloway  
FF = Fife  
FV = Forth Valley  
GGC = Greater Glasgow & Clyde
GJ = Golden Jubilee
GR = Grampian
HG = Highland
LN = Lanarkshire
LO = Lothian
OR = Orkney
SH = Shetland
TY = Tayside
WI = Western Isles

Accuracy

Infection Prevention and Control Guidance: N/A

Reducing Risk in the Healthcare Built Environment: N/A

Antimicrobial Resistance: N/A

The impact of the pandemic on healthcare activity and the inpatient population: details available as per each data source.

Clostridioides difficile infection: details provided in quarterly publication https://www.hps.scot.nhs.uk/data/healthcare-associated-infection-quarterly-epidemiological-commentary/

Staphylococcus aureus bacteraemia: details provided in quarterly publication https://www.hps.scot.nhs.uk/data/healthcare-associated-infection-quarterly-epidemiological-commentary/

Gram-negative bacteraemia: Gram-negative bacteraemia data are the product of the ECOSS. Participating laboratories routinely report all identifications of organisms, infection or microbiological intoxication and where possible the antimicrobial resistance data unless they are known to be of no clinical or public health importance. The collected data are used for the identification of single cases of severe disease, outbreaks, antimicrobial resistance patterns and longer-term trends in the incidence of laboratory reported infections, enhanced surveillance, health protection, analytical and statistical use.
Escherichia coli bacteraemia: details provided in quarterly publication https://www.hps.scot.nhs.uk/data/healthcare-associated-infection-quarterly-epidemiological-commentary/


Incidents and Outbreaks: NSS are aware that the healthcare infection incident assessment tool (HIIAT) is subjective and there is variation in how NHSScotland health boards assess and therefore report healthcare infection incidents.

Norovirus outbreaks: data are quality checked when reports first come in for accuracy and NHSScotland health boards are contacted if there are any data issues. The data are then added onto a spreadsheet holding all the 2020-2021 figures, where data are quality assured further before figures are reported.

Completeness

Infection Prevention and Control Guidance: N/A

Reducing Risk in the Healthcare Built Environment: N/A

Antimicrobial Resistance: N/A

The impact of the pandemic on healthcare activity and the inpatient population: details available as per each data source.

Clostridioides difficile infection: details provided in quarterly publication https://www.hps.scot.nhs.uk/data/healthcare-associated-infection-quarterly-epidemiological-commentary/

Staphylococcus aureus bacteraemia: details provided in quarterly publication https://www.hps.scot.nhs.uk/data/healthcare-associated-infection-quarterly-epidemiological-commentary/
**Gram-negative bacteraemia:** all data for the reporting period have been included in the analysis.

**Escherichia coli bacteraemia:** details provided in quarterly publication [https://www.hps.scot.nhs.uk/data/healthcare-associated-infection-quarterly-epidemiological-commentary/](https://www.hps.scot.nhs.uk/data/healthcare-associated-infection-quarterly-epidemiological-commentary/)


**Incidents and Outbreaks:** NSS are aware that the healthcare infection incident assessment tool (HIIAT) is subjective and there is variation in how NHSScotland health boards assess and therefore report healthcare infection incidents. The extent of variation in assessment and unreported incidents has not been fully quantified.

**Norovirus outbreaks:** NHSScotland health boards only send data when their ward/bay has reopened so data are included in a retrospective way.

**Comparability**

Changes in the hospital population and activity during 2020/21 may have affected the comparison of results and therefore should be interpreted with caution.

**Infection Prevention and Control Guidance:** N/A

**Reducing Risk in the Healthcare Built Environment:** N/A

**Antimicrobial Resistance:** N/A

**The impact of the pandemic on healthcare activity and the inpatient population:** N/A
**Clostridioides difficile infection:** details provided in quarterly publication
https://www.hps.scot.nhs.uk/data/healthcare-associated-infection-quarterly-epidemiological-commentary/

**Staphylococcus aureus bacteraemia:** details provided in quarterly publication
https://www.hps.scot.nhs.uk/data/healthcare-associated-infection-quarterly-epidemiological-commentary/

**Gram-negative bacteraemia:** details provided in annual publication

**Escherichia coli bacteraemia:** details provided in quarterly publication
https://www.hps.scot.nhs.uk/data/healthcare-associated-infection-quarterly-epidemiological-commentary/

**Hospital onset COVID-19:** details provided in weekly publication

**Incidents and Outbreaks:** N/A, reporting of all HCAI outbreaks is not mandatory elsewhere in the UK and comparable data are not published.

**Norovirus outbreaks:** United Kingdom Health Security Agency (UKHSA) produce a national Norovirus surveillance report, however, reporting is voluntary and not comparable to Scottish data collected through mandatory reporting
Accessibility

It is the policy of NSS to make its website and products accessible according to published guidelines.

Coherence and clarity

Development of guidance: all National Infection Prevention and Control Manual (NIPCM) reviews and resources are produced using a defined process which ensures clarity and coherence. https://www.nipcm.scot.nhs.uk/resources/development-process/

Value type and unit of measurement

Healthcare associated cases and incidence rates (per 100,000 total occupied bed days) for *Clostridioides difficile* infection, *Escherichia coli* bacteraemia and *Staphylococcus aureus* bacteraemia.

Community associated cases and incidence rates (per 100,000 population) for *Clostridioides difficile* infection, *Escherichia coli* bacteraemia and *Staphylococcus aureus* bacteraemia.

MRSA Clinical Risk Assessment (CRA) Uptake % = number of patients where CRA undertaken / all patients in audit sample.

Carbapenemase-Producing Enterobacterales (CPE) CRA Uptake % = number of patients where CRA undertaken / all patients in audit sample.

Count and proportion of COVID-19 cases by hospital onset status. Count and proportion of hospital onset COVID-19 cases with all cause fatality at 28 days.

Healthcare outbreaks and incidents: total number of reported incidents is counted, and reported as a proportion of infection type.

Norovirus outbreaks: number of wards/bays closed as a result of Norovirus outbreaks, and number of patients included within reported Norovirus outbreaks in hospitals.
Disclosure

The NSS protocol on Statistical Disclosure Protocol is followed.

Official Statistics designation

Not Assessed

UK Statistics Authority Assessment

Not Assessed

Last published

21 September 2021

Next published

September 2023

Date of first publication

25 May 2015

Help email

NSS.ARHAinfectioncontrol@nhs.scot

Date form completed

20 September 2022
Appendix 2 – Early Access Details

Pre-Release Access

Under terms of the ‘Pre-Release Access to Official Statistics (Scotland) Order 2008’, NSS is obliged to publish information on those receiving Pre-Release Access (‘Pre-Release Access’ refers to statistics in their final form prior to publication). The standard maximum Pre-Release Access is five working days. Shown below are details of those receiving standard Pre-Release Access.

Standard Pre-Release Access

Scottish Government Health Department

NHS Board Chief Executives

NHS Board Communication leads
Appendix 3 – NSS and Official Statistics

Our statistics comply with the *Code of Practice for Statistics* in terms of trustworthiness, high quality and public value. This also means that we keep data secure at all stages, through collection, processing, analysis and output production, and adhere to the ‘five safes’.