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<th>Abbreviation</th>
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<tbody>
<tr>
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<td>Antimicrobial Resistance</td>
</tr>
<tr>
<td>AMT</td>
<td>Antimicrobial Management Team</td>
</tr>
<tr>
<td>AOBDs</td>
<td>Acute Occupied Bed Days</td>
</tr>
<tr>
<td>BSI</td>
<td>Bloodstream Infection</td>
</tr>
<tr>
<td>CEL</td>
<td>Chief Executive Letter</td>
</tr>
<tr>
<td>CDI</td>
<td>Clostridium difficile Infection</td>
</tr>
<tr>
<td>CI</td>
<td>Confidence Intervals</td>
</tr>
<tr>
<td>CRA</td>
<td>Clinical Risk Assessment</td>
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<td>CNO</td>
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</tr>
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<td>Catheter-Related Infection</td>
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<tr>
<td>CR-BSI</td>
<td>CVC-Related Bloodstream Infection</td>
</tr>
<tr>
<td>CVC</td>
<td>Central Vascular Catheter</td>
</tr>
<tr>
<td>EARS-Net</td>
<td>European Antimicrobial Resistance Surveillance Network</td>
</tr>
<tr>
<td>ECDC</td>
<td>European Centre for Disease Prevention and Control</td>
</tr>
<tr>
<td>ECOSS</td>
<td>Electronic Communication of Surveillance in Scotland</td>
</tr>
<tr>
<td>EMRSA</td>
<td>Epidemic Meticillin Resistant Staphylococcus aureus</td>
</tr>
<tr>
<td>ESBL</td>
<td>Extended Spectrum Beta-lactamase</td>
</tr>
<tr>
<td>HAI</td>
<td>Healthcare Associated Infection</td>
</tr>
<tr>
<td>HAITF</td>
<td>HAI Task Force</td>
</tr>
<tr>
<td>HCW</td>
<td>Healthcare Worker</td>
</tr>
<tr>
<td>HDU</td>
<td>High Dependency Unit</td>
</tr>
<tr>
<td>HDL</td>
<td>Health Department Letter</td>
</tr>
<tr>
<td>HEI</td>
<td>Healthcare Environment Inspectorate</td>
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<td>HELICS</td>
<td>Hospitals in Europe Link for Infection Control through Surveillance</td>
</tr>
<tr>
<td>HIIAT</td>
<td>Hospital Infection Incident Assessment Tool</td>
</tr>
<tr>
<td>HPS</td>
<td>Health Protection Scotland</td>
</tr>
<tr>
<td>ICU</td>
<td>Intensive Care Unit</td>
</tr>
<tr>
<td>IPC</td>
<td>Infection Prevention and Control</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>KPI</td>
<td>Key Performance Indicator</td>
</tr>
<tr>
<td>MDR</td>
<td>Multidrug Resistant</td>
</tr>
<tr>
<td>MRSA</td>
<td>Meticillin Resistant Staphylococcus aureus</td>
</tr>
<tr>
<td>MSSA</td>
<td>Meticillin Sensitive Staphylococcus aureus</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>nCoV</td>
<td>Novel Coronavirus</td>
</tr>
<tr>
<td>NDM</td>
<td>New Delhi Metallo Beta-lactamase</td>
</tr>
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<td>NHS</td>
<td>National Health Service</td>
</tr>
<tr>
<td>NNU</td>
<td>Neonatal Units</td>
</tr>
<tr>
<td>NWTC</td>
<td>National Waiting Times Centre</td>
</tr>
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<td>OPCS</td>
<td>Office of Population Censuses and Surveys</td>
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<tr>
<td>PCR</td>
<td>Polymerase Chain Reaction</td>
</tr>
<tr>
<td>PDS</td>
<td>Post Discharge Surveillance</td>
</tr>
<tr>
<td>PPS</td>
<td>Point Prevalence Survey</td>
</tr>
<tr>
<td>PVC</td>
<td>Peripheral Vascular Catheter</td>
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<tr>
<td>PVL</td>
<td>Panton-Valentine Leukocidin</td>
</tr>
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<td>SAPG</td>
<td>Scottish Antimicrobial Prescribing Group</td>
</tr>
<tr>
<td>SEHD</td>
<td>Scottish Executive Health Department</td>
</tr>
<tr>
<td>SGHSCD</td>
<td>Scottish Government Health and Social Care Directorate</td>
</tr>
<tr>
<td>SICPs</td>
<td>Standard Infection Control Precautions</td>
</tr>
<tr>
<td>SICSAG</td>
<td>Scottish Intensive Care Society Audit Group</td>
</tr>
<tr>
<td>SIGN</td>
<td>Scottish Intercollegiate Guideline Network</td>
</tr>
<tr>
<td>SMRSARL</td>
<td>Scottish MRSA Reference Laboratory</td>
</tr>
<tr>
<td>SMVN</td>
<td>Scottish Microbiology and Virology Network</td>
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<td>SPSP</td>
<td>Scottish Patient Safety Programme</td>
</tr>
<tr>
<td>SSAIP</td>
<td>Scottish Surveillance of HAI Programme</td>
</tr>
<tr>
<td>SSI</td>
<td>Surgical Site Infection</td>
</tr>
<tr>
<td>SSSCDSL</td>
<td>Scottish <em>Salmonella, Shigella and Clostridium difficile</em> Reference Laboratory</td>
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<tr>
<td>UTI</td>
<td>Urinary Tract Infection</td>
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<td>WHO</td>
<td>World Health Organisation</td>
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<td>WSG</td>
<td>Water Safety Group</td>
</tr>
<tr>
<td>WSP</td>
<td>Water Safety Plans</td>
</tr>
<tr>
<td>VAP</td>
<td>Ventilator Associated Pneumonia</td>
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</tbody>
</table>
Foreword

Healthcare associated infections (HAI) are a significant threat to patient safety worldwide and contribute to avoidable harm in hospital patients. HAI are increasingly caused by multidrug resistant organisms and resistance to antimicrobials poses a continually evolving public health threat. The recent addition of antimicrobial resistance (AMR) to the UK National Security Risk Assessment Register highlights the necessity for action on AMR, including the prevention of HAI, in order that unnecessary antimicrobial use is halted and resistance contained.

This annual report reflects the HAI prevention and AMR containment work undertaken in NHSScotland during 2012. Real inroads have been made to reduce HAI and contain AMR in Scotland over the past few years. Publication of this report is intended to highlight the current epidemiology of HAI in NHSScotland, and the necessity to refocus priorities to ensure continuing success in the strategy to reduce HAI and contain AMR.

The results from the 2011 National Point Prevalence Survey (PPS) of HAI and Antimicrobial Prescribing indicated that approximately one in twenty patients in acute hospitals had a HAI at the time of survey. Whilst the prevalence of HAI was significantly lower, by approximately a third, compared with 2005/2006, HAI continue to place a burden on patients, hospitals and healthcare delivery in Scotland.

The results from the 2011 PPS indicated that the epidemiology of HAI had changed in the last five years confirming intelligence from the mandatory national surveillance programmes in Scotland. The proportion of HAI that were Clostridium difficile infection (CDI) was lower reflecting the significant decrease in CDI observed in the mandatory incidence data. Similarly, the prevalence of HAI where the causative organism was Meticillin Resistant Staphylococcus aureus (MRSA) was substantially lower and the prevalence of Meticillin Sensitive Staphylococcus aureus (MSSA) HAI was lower though to a much lesser extent. This reflects the different rates of decline observed in the incidence of MRSA and MSSA bacteraemia data and highlights the need to further elucidate reasons for this difference in the rate of decline. The significant reductions in the incidence of these HAI reported in recent years has not been realised in the last year and a change in strategy is required to continue to reduce the incidence of these key HAI.

Health Protection Scotland (HPS) commissioned Reference Laboratories continued to support the HAI and AMR agenda during 2012. The Scottish MRSA Reference Laboratory provides outbreak investigation support, epidemiological typing, antibiotic susceptibility testing and toxin testing including testing for the Panton-Valentine Leukocidin (PVL) gene, a toxin of public health concern. The Scottish Salmonella, Shigella and Clostridium difficile Reference Laboratory carries out ribotyping and antibiotic susceptibility testing to support outbreak investigations and monitor the distribution and emergence of ribotypes over time. This included the emergence of ribotype 078 as predominant in 2012 and identification of two new sporadic ribotypes, ribotypes 244 and 332, reported during 2012/13.

Surgical site infections (SSI) continue to place a significant burden on acute hospitals representing almost one fifth of all HAI. The current mandatory surveillance programme for surgical site infection includes SSI following hip arthroplasty and caesarean section surgery. The trends indicate little change in the incidence of hip arthroplasty or caesarean
section SSI during 2012. The results from the PPS indicate that SSI following general surgery including colorectal surgery and vascular surgery also contribute to the burden so extending surveillance beyond hip arthroplasty and caesarean section procedures might usefully be considered. As extension of surveillance has resource implications, therefore informatics needs to be explored for this purpose.

The PPS also identified the continuing burden from hospital associated urinary tract infections (UTI). The proportion of HAI that were UTI was higher in 2011 compared with 2006 (23.8% versus 15.6%). Almost a quarter of bloodstream infections (BSI), where the source could be identified, were secondary to UTI. *Escherichia coli* (*E. coli*) was the causative organism in half of all UTI where there was a positive microbiology report. These data informed the identification of catheter associated UTI (CAUTI) as a key priority for the Scottish Patient Safety Programme and Scottish Patient Safety Indicator outcome measure for 2013-2015. This increased burden of UTI likely contributed to the two fold rise in the prevalence of *E. coli* infections since 2006. This report describes some of the initial work to describe the epidemiology of *E. coli* and more broadly surveillance of carbapenemase producing Enterobacteriaceae. These surveillance systems will be further developed in 2013 and will inform HAI prevention and AMR containment strategies.

It is estimated that around 10% of all HAI develop in the context of outbreaks. HPS continued to provide outbreak and incident support to boards via the Chief Nursing Officer’s national framework algorithm during 2012. In total 31 outbreaks were referred to HPS under the algorithm and a further 16 were referred for information. The most commonly reported outbreaks were caused by norovirus. Understanding the sources of outbreaks allows development of evidence based control measures and tools to manage outbreaks.

Knowledge management of evidence to prevent and control HAI is critical to patient safety. Chapter One of the National Infection Control Manual was launched in 2012. This manual outlines Standard Infection Control Precautions which are intended for use by all staff, in all care settings, at all times, for all patients whether infection is known to be present or not ensuring the safety of patients, staff and visitors. Additional HAI topic specific guidance on prevention of CAUTI, CDI, vascular catheter related infection, SSI and norovirus feature in the HPS compendium of guidance – a ‘one stop shop’ for extant HAI guidance in Scotland.

In summary, the results from the national surveillance data presented in this report indicate that the significant decline in infection rates previously reported have not continued during 2012. Infection prevention and control measures require to be reassessed and targeted in new ways to ensure that NHSScotland are working towards zero preventable HAI, containing AMR and maximising safe care for every patient, every time, everywhere in healthcare.

Professor Jacqui Reilly
Lead Consultant HAI
Health Protection Scotland
Surgical Site Infection

Surgical site infection (SSI) is one of the most common Healthcare Associated Infection (HAI), estimated to account for 18.6% of inpatient HAI within NHSScotland.1 SSI cause excess morbidity and mortality and are estimated on average to double the cost of treatment, mainly due to the resultant increase in length of stay.2 SSI have serious consequences for patients affected as they can result in pain, suffering and in some cases require additional surgical intervention.3

Epidemiological Data

The Scottish Surveillance of HAI Programme (SSHAIP) within Health Protection Scotland (HPS) coordinates the SSI surveillance programme that is mandatory across all NHS boards in Scotland. All NHS boards are currently required to undertake surveillance for caesarean section and hip arthroplasty procedures as per the mandatory requirements of HDL 2006 (38) and CEL (11) 2009.4,5 SSI surveillance is conducted according to the HPS SSI surveillance protocol.6

A total of 309 cases of SSI following caesarean section procedures (n=15 768) were reported during 2012. Forty eight of these SSI were diagnosed during the inpatient stay. The remaining SSI (n=261) were diagnosed following discharge from hospital. The majority of SSI were diagnosed using post-discharge surveillance (PDS) methods (84.5%). The incidence of inpatient SSI was 0.3% (95% CI: 0.2 to 0.4) and the overall incidence for inpatient and PDS SSI was 2.0% (95% CI: 1.8 to 2.2). The incidence of SSI decreased significantly between 2008 and 2012 (Figure 1) for inpatient SSI (p=0.02) and all SSI (p<0.0001). The incidence of all SSI decreased from 2.2% in 2011 to 2.0% in 2012 though this was not significant.

The incidence of SSI following hip arthroplasty and caesarean section decreased, though not significantly between 2011 and 2012 and consideration for whether the irreducible minimum has been reached is required.
Figure 1: Incidence of SSI following caesarean section procedures in Scotland (inpatient and PDS to day 10), 2008 to 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>SSI incidence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>0.0</td>
</tr>
<tr>
<td>2009</td>
<td>0.5</td>
</tr>
<tr>
<td>2010</td>
<td>1.0</td>
</tr>
<tr>
<td>2011</td>
<td>1.5</td>
</tr>
<tr>
<td>2012</td>
<td>2.0</td>
</tr>
</tbody>
</table>

The majority of SSI occurring following caesarean section surgery were superficial though approximately a third of SSI diagnosed during the inpatient stay were deep or organ space (n=15) (Figure 2).

Figure 2: Proportion of SSI following caesarean section procedures (inpatient and PDS to day 10) in Scotland by SSI type, 2012

A total of 57 cases of SSI following hip arthroplasty procedures (n=7 886) were reported in 2012. Approximately 40% of these SSI were reported during the inpatient stay (n=23) and remainder were identified if the patient was readmitted to hospital in the 30 days following the procedure (n=34). The inpatient incidence of SSI was 0.3% (95% CI: 0.2 to 0.4) and the overall incidence of SSI was 0.7% (95% CI: 0.6 to 0.9). The incidence of SSI had remained stable between 2010 and 2012 with no significant change in the incidence in 2012 compared with the previous year (p≥0.05). Consideration as to whether the irreducible minimum has been reached for this procedure category is required (Figure 3).
Figure 3: Incidence of SSI following hip arthroplasty procedures in Scotland (inpatient and readmission to day 30), 2008 to 2012

Note: The decrease in incidence observed between 2009 and 2010 is partly due to the adjustment in 2010 of the Office of Population Censuses and Surveys (OPCS) classification of interventions and procedures codes.

The proportion of SSI that were deep and organ space identified post discharge was higher for hip arthroplasty than for caesarean section though this is likely due to the post discharge method of case ascertainment; only SSI where the patient is readmitted to hospital are captured post discharge thus the proportion of more severe SSI will be higher (Figure 4). The number of SSI following hip arthroplasty is small therefore these data should be interpreted with due caution.

Figure 4: Proportion of SSI following hip arthroplasty procedures (inpatient and readmission to day 30) in Scotland by SSI type, 2012

Quality Improvement and Interventions to Reduce SSI

HPS provide NHS boards with monthly SSI reports and monitor the SSI rate within each NHS board on a quarterly basis and feed this back to individual Infection Prevention and Control (IPC) Teams. Whilst national surveillance systems do not replace the need for local surveillance, these data may assist IPC Teams (IPCTs) with feedback of local results, assist in the identification of potential issues and identify areas for investigation and process improvement.
Quarterly exception reports are issued to boards where the incidence of SSI is higher than expected based on the national data and HPS ask the board to provide an action plan outlining measures they will be taking to reduce the incidence of SSI. In 2012, there were five exception reports issued to NHS boards in order to alert them to an increased rate of SSI relative to the national incidence rate. The exception reports produced were all for caesarean section procedures with no exception reports issued for hip arthroplasty. Whilst these higher than expected rates of SSI may have been reflective of the population at risk, reasons for these changes were investigated by local IPCTs with support provided by HPS.

The overarching aim of SSI surveillance is to reduce the incidence of infection following surgical intervention. Important factors for NHS boards in achieving this aim include improved IPC measures and implementing targeted interventions. HPS has supported these measures through collaborative working, development of quality improvement tools and providing support during outbreak/incident investigations.

An important aspect of SSI surveillance data is to monitor compliance with best practice as defined within clinical guidelines as this can assist in reducing infection rates. The Scottish Intercollegiate Guideline Network (SIGN) produce evidence based guidelines to promote best clinical practice. SIGN Guideline 104, “Antibiotic Prophylaxis in Surgery” for hip arthroplasty and caesarean section procedures is aimed at reducing inappropriate prophylactic prescribing. HPS have collaborated with the Scottish Antimicrobial Prescribing Group (SAPG) in order to enhance reporting of compliance with this guideline and this has resulted in the introduction of enhanced antibiotic prophylaxis quarterly reports being issued by HPS to local Antimicrobial Management Teams (AMTs) and SAPG for hip and caesarean section procedures. In addition, HPS reports compliance with SIGN Guideline 122, “Prophylaxis of venous thromboembolism”.

In 2012, HPS facilitated meetings for NHS boards to explore and share best working practices. The aim of these meetings was to use SSI data linked with improvement methodologies to reduce SSI and to share lessons learned.

The SSI quality improvement tool available on the HPS website was published in 2012, following a review of previously issued care bundles and published literature, to ensure that the most currently available evidence base informed the tool and that the tool had maximum usability to those staff involved in surgical patient care. The structure of the tool was revised to separate the key recommendations to follow the surgical patient pathway ensuring ease of use by different staff groups involved in different stages of patient care before, during and after surgery. Implementation of these quality improvement tools along with the Scottish Patient Safety Programme (SPSP) interventions and resources for SSI should continue to contribute to reducing these clinically significant infections.

There is a continuing burden of SSI in the acute inpatient population particularly in vascular and gastrointestinal surgery as demonstrated in the 2011 Scottish National Point Prevalence Survey (PPS) of HAIs and Antimicrobial Prescribing and from national data held by HPS for those boards currently performing voluntary SSI surveillance for these procedures. Consideration of local surveillance in these categories of surgery may provide additional patient benefit given the high prevalence of SSI and opportunities for prevention in these patient populations.
Healthcare Associated Infections in ICUs

Patients that require admission to intensive care units (ICU) are among the most severely ill, many may have underlying chronic illness and some degree of immunosuppression caused by their critical illness. The routine management of severely ill patients involves numerous invasive procedures placing them at an increased risk of HAI.

The 2011 PPS reported that almost a quarter of patients in ICU had a HAI at the time of the survey.1

Epidemiological Data

A total of 23 adult ICUs in Scotland collect data for this voluntary surveillance programme. All data are collected in accordance with the Hospital in Europe Link for Infection Control through Surveillance (HELICS) methodology and full details can be found in the ICU surveillance protocol.12 HAI data relating to bloodstream infection (BSI), central vascular catheter (CVC) related infection (CRI), CVC related bloodstream infection (CR-BSI) and pneumonia were collected. Data were collected using the WardWatcher system which is an IT system present in all ICUs. Units are also required to submit data on the delivery of the ventilator associated pneumonia (VAP) Bundle13 and the Central Line Insertion Bundle.14

A total of 356 infections were reported from 301 patients in 2011. The incidence of HAI was 4.7% (95% CI 4.2 to 5.3), this was a statistically significant reduction from 5.6% (95% CI 5.0 to 6.2) in 2010 (p=0.04).

Table 1 describes the incidence rates for ventilator associated pneumonia (VAP), BSI, CR-BSI and CRI.

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The incidence of HAI in Scottish ICUs decreased significantly between 2010 and 2011. Continued collaboration with SICSAG in the measurement of Quality Indicators for Critical Care will further improve patient safety in ICUs.
Table 1: Incidence rates in ICUs in Scotland by HAI type, 2011*

<table>
<thead>
<tr>
<th>HAI type</th>
<th>Incidence Rate</th>
<th>95% CI (Lower, Upper)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ventilator associated pneumonia</td>
<td>5.2 per 1000 invasive respiratory device days</td>
<td>4.5 to 6.1</td>
</tr>
<tr>
<td>Pneumonia (VAP and non-VAP)</td>
<td>3.9 per 1000 patient days</td>
<td>3.4 to 4.4</td>
</tr>
<tr>
<td>Bloodstream infection (All)</td>
<td>2.6 per 1000 patient days</td>
<td>2.2 to 3.1</td>
</tr>
<tr>
<td>Bloodstream infection (excluding central vascular catheter related bloodstream infection)</td>
<td>2.3 per 1000 patient days</td>
<td>1.9 to 2.7</td>
</tr>
<tr>
<td>Catheter related bloodstream infection</td>
<td>0.6 per 1000 CVC days</td>
<td>0.4 to 1.0</td>
</tr>
<tr>
<td>Central vascular catheter related infection (Local and general [not bloodstream infection])</td>
<td>0.7 per 1000 CVC days</td>
<td>0.5 to 1.0</td>
</tr>
</tbody>
</table>

Note: *2012 data not available at time of analysis.

Quality Improvement and Interventions to Reduce HAI in ICUs

The HAI in Scottish ICU surveillance programme has been developed collaboratively by the Scottish Intensive Care Society Audit Group (SICSAG), Information Services Division (ISD) and HPS. SICSAG are committed to reducing HAI in the critical care setting and in addition to their collaborative work with the surveillance programme, SICSAG have developed a set of Quality Indicators for Critical Care in Scotland.\(^\text{15}\) Within this are two indicators relating to HAI; ICU and High Dependency Units (HDUs) are required to have a surveillance system in place and to report on a monthly basis to staff and to SPSP.

In addition to the success of the HAI surveillance programme, the critical care workforce in Scotland, supported by SICSAG have a number of quality improvement tools in place as part of SPSP with the aim of reducing these HAI.\(^\text{15}\)
**Clostridioides difficile Infection**

*Clostridioides difficile* (C. difficile) infection (CDI) is a major cause of morbidity and mortality globally, with symptoms ranging from mild self-limiting diarrhoea to severe diarrhoea, pseudomembranous colitis, toxic megacolon and death. Important risk factors for CDI include old age and previous use of antibiotics.16

**Epidemiological Data**

Mandatory surveillance was implemented by HPS in October 2006 (initially focusing on patients aged ≥65 years as the age group most at risk), in order to measure the burden of disease and target interventions to reduce the risk of acquiring CDI while receiving healthcare in Scotland. This was extended to include all patients aged ≥15 years in April 2009.

In Scotland, all 14 NHS boards and a single Special Board (NHS National Waiting Times Centre (NWTC)) report cases of CDI to HPS and submit isolates for severe cases and outbreaks to the Scottish *Salmonella*, *Shigella* and *Clostridioides difficile* Reference Laboratory (SSSCDRL) according to a standard protocol.17

The data reported here are based on information from NHS board diagnostic laboratories and the SSSCDRL.

**Whilst the incidence of CDI has decreased significantly in Scotland since surveillance began, the incidence did not change significantly in 2012. This levelling trend points to the need for new strategies to reduce the burden of CDI.**

CDI cases and incidence rates are presented by NHS board. Cases are allocated to NHS boards based on the location of the diagnostic laboratory where the specimen was first tested. The surveillance does not distinguish between cases from acute hospitals, non-acute hospitals, and the community.

Full details of the methods may be obtained from the CDI surveillance protocol.17

Incidence rates of CDI in Scotland have continued to decrease between 2011 and 2012 in both age groups, though the overall trend has levelled compared to previous years (Figure 5).

From 2007 to 2012, a 78% reduction in the incidence rates of CDI (in patients aged ≥65) has been observed. The annual incidence rate for 2012 was 29.2 per 100 000 total...
bed days compared to 29.8 per 100,000 total bed days in 2011. This is a non-statistically significant decrease of 2.0% (95% CI: -15.2 to 13.3). Overall, variation in CDI incidence between NHS boards has been reduced substantially in this age group since 2007, which has been an important public health objective.

In patients aged 15–64 years, a 51% reduction in the incidence rates of CDI has been observed between 2009 and 2012. The annual incidence rate for 2012 was 37.1 per 100,000 acute bed days compared to 41.5 per 100,000 acute bed days in 2011. This is a non-statistically significant decrease of 10.6% (95% CI: -24.7 to 6.1).

Figure 5: Incidence rates of CDI in patients aged ≥65 and 15–64 years in Scotland per 100,000 bed days, October 2006 to December 2012

![Figure 5](image-url)

*surveillance in patients aged 15–64 years started April 2009

**Molecular Epidemiological Data**

Changes in the distribution of ribotypes from severe cases and outbreaks have been observed since 2008. There has been a decrease in the proportion of the previously predominant epidemic ribotypes 106, 001 and 027. While the prevalence of the other major types have increased (including ribotypes 002, 005, 014, 015, 020 and 023) as the epidemic ribotypes have decreased, the absolute number of each ribotype isolated has been relatively stable except for ribotype 078 which emerged to become the predominant ribotype in Scotland during 2012.18 There are currently more than 500 Polymerase Chain Reaction (PCR) ribotypes of *C. difficile* recognised and new ribotypes evolve naturally on a continuous basis and are reported increasingly around the world as efforts to sub-type *C. difficile* have increased. In Scotland, reporting of such sporadic new PCR ribotypes included ribotype 244 and 332 in 2012/13.

**Quality Improvement and Interventions to Reduce CDI**

Important factors in reducing the rates of CDI in Scotland include extensive efforts by the NHS boards to improve IPC measures, and by implementing targeted interventions. HPS has supported these measures through development of national guidance on prevention and control of CDI, and introduction of quality improvement tools, as well as additional support provided during outbreak/incident investigations. Moreover, collaboration
Please note CDI rates in this report have been updated due to a subsequent revision of the national figures of hospital activity. Please go to [http://www.hps.scot.nhs.uk/haiic/sshaip/publicationsdetail.aspx?id=50174](http://www.hps.scot.nhs.uk/haiic/sshaip/publicationsdetail.aspx?id=50174) for the newest revised data.

with ISD and other organisations through SAPG has supported the implementation of antimicrobial stewardship in all NHS boards since 2008 in order to reduce the risk of CDI.

Data on antimicrobial use published in January 2013 has highlighted the temporal relationship between the reduction in broad spectrum antibiotic use and the decrease in CDI incidence rates since 2008.\(^1\) A key component of the national antimicrobial stewardship programme (coordinated by SAPG) has been the development of antibiotic prescribing guidance which restricts the use of broad spectrum antibiotics in treatment and prophylaxis of infection. In both primary and secondary care, there has been considerable progress towards reduction in the use of cephalosporins, fluoroquinolones, co-amoxiclav and clindamycin – considered high-risk antibiotics for CDI.

The importance of reductions in the use of antimicrobials that are associated with high risk of CDI may also be inferred from changes in the prevalence of Scottish *C. difficile* ribotypes since 2008. Ribotypes 106, 001 and 027 were previously the most predominant ribotypes found in Scotland – accounting for 58% of all types in Scotland in 2009 isolated from severe cases and/or outbreaks compared to just 11% in 2012.

The predominance of these three types has previously been linked to the use of antibiotics due to possession of multiple resistances to cephalosporins, fluoroquinolones, erythromycin and clindamycin.\(^2\) More recently, ribotype 078 has emerged and become the dominant type in Scotland over the course of 2012. This ribotype is typically resistant to cephalosporins and clindamycin, though the reasons for the spread of 078 are not fully understood.\(^1\)

HPS commissions the SSSCDRL which has also played a key role in reducing CDI through establishing the background epidemiology of circulating strains and support during incident and outbreak investigations. The SSSCDRL, in collaboration with the Scottish Microbiology and Virology Network (SMVN) and HPS have also implemented guidance to improve diagnostic testing for *C. difficile*.\(^1\)

Despite the significant decline in incidence rates in Scotland, CDI remains a disease of public health concern and the recent levelling trends may point to the need for new strategies to reduce the burden of CDI in hospitals and the community even further.
Staphylococcus aureus (S. aureus) is a Gram positive bacterium which colonises the nasal cavity of about 30% of the healthy population. This colonisation is usually harmless. However, healthcare interventions may allow the bacterium to gain entry into body sites which are normally sterile, leading to infections. Amongst the most serious of S. aureus infections are bacteraemia infections.

In April 2009, the Scottish Government Health and Social Care Directorate (SGHSCD) announced the implementation of a National Screening Programme in Scotland to screen patients for meticillin resistant S. aureus (MRSA). The aim of screening is to identify patients who are colonised or infected with the organism. As colonisation carries a fifteen-fold increase in the risk of invasive MRSA infection, these patients can then be managed appropriately to reduce the risk of self-infection and of transmitting the organism to other patients.

Epidemiological Data

Scotland has had a mandatory MRSA bacteraemia surveillance programme since 2001, publishing quarterly reports of the numbers and rates of MRSA bacteraemias. This programme was extended in 2006 to include meticillin sensitive S. aureus (MSSA) bacteraemias. The Scottish S. aureus surveillance programme differs from similar programmes in many other countries by including both MRSA and MSSA bacteraemias and also by reporting on all S. aureus bacteraemias, rather than only those presumed to be associated with delivery of healthcare. Full details of the surveillance methods can be found in the protocol.

There has been a significant reduction in the overall incidence of S. aureus bacteraemias in Scotland since 2006 (p<0.001) (Figure 6). A total of 1 509 cases of S. aureus bacteraemia were reported in Scotland during 2012; 187 (12.4%) were meticillin resistant and the remaining 1322 (87.6%) were meticillin sensitive. The total number of S. aureus bacteraemias in Scotland in 2012 decreased by 6.2% compared with the number reported in 2011 (n=1 609). The annual incidence of S. aureus bacteraemia for Scotland in 2012 was 29.7 per 100 000 acute
occupied bed days (AOBDs). This was a non-statistically significant decrease of 5.8% compared to the previous year when the rate was 31.5 per 100 000 AOBDs ($p=0.09$).

**Figure 6:** Incidence rates of *S. aureus*, MRSA and MSSA bacteraemias in Scotland per 100 000 total AOBDs (four rolling quarters with 95% confidence intervals), January 2006 to December 2012

The *S. aureus* programme also monitors mupirocin use and resistance following implementation of the MRSA screening policy in Scotland. Mupirocin use decreased from 2008 to 2011 in both primary and secondary care. In this period, there was a 28% reduction in use of mupirocin in primary care and an 18% reduction in secondary care (Figure 7).

**Figure 7:** Mupirocin use in primary and secondary care in Scotland, 2008 to 2011

Note: *2012 data not available at time of analysis.** Use in secondary care based upon use in hospitals in 10 NHS boards (covering 81% of the Scottish population) in which data were available 2008 to 2011.
High level and low level resistance to mupirocin are monitored by HPS, as both are likely to result in treatment failure. The resistance results presented are for bacteraemia isolates only. This is because the reporting of *S. aureus* bacteraemia isolates to HPS and Scottish MRSA Reference Laboratory (SMRSARL) is mandatory, providing a better indication of the extent of mupirocin resistance.

During 2011, the high level mupirocin resistance proportion was 4% and the low level resistance was 1%. No significant changes in resistance proportions (including high and low level resistance) have been observed since 2008 (Figure 8).

**Figure 8**: Percentage of MRSA that were resistant to mupirocin (high level and low level) in bacteraemia isolates in Scotland, 2008 to 2011

![Graph showing percentages of mupirocin resistance in 2008 to 2011](image)

Note: *2012 data not available at time of analysis.

The initial concerns that changes in patterns of mupirocin use could lead to different patterns of resistance have not yet been realised. Mupirocin resistance will remain under surveillance to identify and communicate to the clinical community any early signals of changes in mupirocin resistance.

**Molecular Epidemiology Data**

The Scottish *S. aureus* bacteraemia surveillance programme has been supported since 2008 by a voluntary programme collecting typing data for MRSA (MRSA Voluntary Typing Scheme). This provides epidemiological information on strain typing, toxin production and antimicrobial resistance (AMR) in samples referred to the HPS commissioned SMRSARL as per protocol.26

The MRSA Voluntary Typing Scheme received 437 isolates during 2012. The majority of these were from superficial skin and upper respiratory tract specimens.

As reported in previous years, the epidemic strain MRSA-15 (EMRSA-15) was the predominant strain circulating in Scotland, with 361 isolates (83%). There were 22 EMRSA-16 isolates (5%). The category of ‘other’ accounted for the remaining 54 isolates (12%).

The most common antibacterial resistance identified was to ciprofloxacin, found in 384 isolates (88%). Erythromycin resistance was identified in 250 isolates (57%), with
trimethoprim resistance in 113 (26%) and tetracycline resistance in 50 isolates (11%). This was similar to resistance proportions reported in previous years.

Twenty one MRSA isolates had the Panton-Valentine Leukocidin (PVL) gene present. Most of these (n=16) originated from wound samples, with four isolates from skin and soft tissue specimens and one isolate from a lower respiratory tract specimen.

**Quality Improvement and Interventions to Reduce S. aureus Infection**

HPS continues to provide support to NHS boards in response to requests and offers support when NHS boards’ data indicates that help might be warranted. In undertaking this work HPS identifies lessons learned for other NHS boards. As always HPS shares this information with all IPCTs to promote optimal practice throughout Scotland. To prevent infections that could result in S. aureus bacteraemia, HPS is involved in reviewing evidence for practice and identifying the most important measures which if practiced regularly can minimise the risks of both primary infections and S. aureus bacteraemia. These recommendations and literature review are available online.\(^{27}\)

HPS has also continued to support NHS boards in the implementation of MRSA Clinical Risk Assessment (CRA) screening during 2012. A minimum of 90% compliance with application of the CRA is required to ensure that CRA based-screening is as effective as universal screening.\(^{21}\) In order to assess this, a Key Performance Indicator (KPI) to assess level of compliance was developed. A KPI monitoring tool provides NHS boards with local data on CRA compliance that can be used for quality improvement initiatives and will enable HPS to determine whether a minimum of 90% compliance is being achieved nationally ensuring the clinical effectiveness of the CRA screening policy.

Further investigation to elucidate the differences in the rate of decline in MRSA and MSSA bacteraemia rates will be initiated in 2013 including record linkage research to examine risk factors and evidence reviews on prevention strategies including MSSA screening.
Escherichia coli (E. coli) is the most common pathogen implicated in bacteraemia in community and healthcare settings. Bacteraemia develops usually as a complication of other infections, including urinary tract infection (UTI) and use of medical devices including vascular access devices.

E. coli is increasingly reported as the cause of HAI in patients in Scottish hospitals. The results from the 2011 PPS indicated that the proportion of HAI where E. coli was reported as the causative organism, increased from 3.1% in 2005/6 to 12.1% in 2011. The prevalence of HAI caused by E. coli has doubled from 0.3% in 2005/6 to 0.6% in 2011 however, the prevalence estimates are likely to be an underestimate, as not all cases of HAI have a microbiology report specifying the causative organism. While more than half of all E. coli HAI were UTI (57.5%) a substantial proportion were BSI (16.4%), the majority of which were secondary to UTI when the source could be determined.

Epidemiological Data

Data (laboratory reports) on Gram-negative bacteraemia and antimicrobial susceptibility are submitted to HPS via the Electronic Communication of Surveillance in Scotland (ECOSS) system and analysed in line with EARS-Net (European Antimicrobial Resistance Surveillance Network) surveillance definitions.

During 2011, the most currently available year of data, there were 3,836 cases of E. coli bacteraemia in Scotland. Incidence rates were calculated using National Records of Scotland (NRS) annual population estimates. The incidence increased each year from 67.1 per 100,000 persons in 2009 to 73.1 per 100,000 persons in 2011. There was a significant increasing year on year trend in the incidence of 4.4% per year (p=0.0003).

In the same three year period, reports of bacteraemia caused by other Gram-negatives such as Klebsiella pneumoniae (K. pneumoniae) only increased
moderately or in *Pseudomonas aeruginosa* (*P. aeruginosa*) and *Acinetobacter baumannii* (*A. baumannii*) decreased, suggesting that the increase in *E. coli* bacteraemias is not an artefact of increased sampling and testing due to increased awareness.\(^{19}\)

Increasing trends of *E. coli* bacteraemias without concomitant increases in other Gram-negative bacteraemias have also been reported in England, Wales and Northern Ireland between 2004 and 2011.\(^{29,30}\)

While increasing incidence of *E. coli* bacteraemia has been explained by increasing rates of resistance in England\(^{31}\) and in Europe,\(^{32}\) the increase in Scotland does not seem to have been driven by resistant strains as decreases in resistance to key antimicrobials have been observed in this period. Resistance to third generation cephalosporins showed an overall decreasing trend with some variation between the different drugs being monitored; the resistant proportions ranged from 10-14% in 2008 to 8-9% in 2011. Moreover, combined resistance to two or three key antimicrobials (cephalosporins, aminoglycosides and fluoroquinolones) has also decreased among *E. coli* from 2008 to 2011.\(^{19}\)

**Quality Improvement and Interventions to Reduce *E. coli* Infection**

In 2012, HPS presented options for national surveillance of *E. coli* bacteraemia to the SGHSCD in order to characterise the epidemiology in more detail and identify the primary causes leading to bacteraemia to enable targeted interventions aimed at preventing and controlling this important infection.
Carbapenemase-producing Enterobacteriaceae

arises through various mechanisms. Of particular concern, is the ability of bacteria to produce enzymes (carbapenemases) capable of inactivating carbapenems. NDM-1 (New Delhi Metallo Beta-lactamase) producers have spread rapidly in the Indian sub-continent and have been imported on multiple occasions into countries across Europe. Emergence of carbapenemase producing Enterobacteriaceae was recognised as a significant risk to public health in Europe by ECDC in 2010.\(^{33}\)

Scottish NHS board prescribing policies on the use of carbapenems recommend that these agents should be reserved for the treatment of more severe and life-threatening infections and infections caused by MDR organisms including extended spectrum beta-lactamase (ESBL) producers. However, there has been an 18% increase in use of carbapenems in Scotland between 2008 and 2011.\(^{19}\)

Molecular Epidemiological Data

In Scotland, carbapenemase-producers are monitored in all types of isolates through the AMR-Alert surveillance programme which prompt local laboratories to investigate specific infections further. In addition, changes in susceptibility to carbapenems are monitored in the national AMR surveillance in order to get the broadest possible capture of this resistance problem.

In Scotland, 25 carbapenemase producers (including enzymes of the following types: KPC, NDM-1, VIM, IMP, IMI, OXA-48) were reported in 2012, bringing the total number of reports to 79 since 2003 (Figure 9). Reports are geographically widespread in Scotland over the past four years; ten out of fourteen NHS boards have now reported at least one carbapenemase producer. To our knowledge there has been no spread of carbapenemases between individuals in Scotland.
Until recently, only one isolate of NDM-1 originating from a patient with a travel history had previously been detected in Scotland, but in 2012 four isolates of NDM-1 were isolated from patients in four different NHS boards. One of these was isolated from a UTI in an otherwise healthy person with neither documented travel history nor previous healthcare history.

It has been suggested that carbapenem use has increased as a result of rising resistance to broad spectrum agents, including resistance to third generation cephalosporins mediated by ESBL. However, as the occurrence of ESBL-producers among organisms causing BSI has decreased in Scotland since 2008, other reasons for the increased use of carbapenems need to be considered. This may include further investigation of the trends in resistant infections, and whether policy changes involving restrictions of other antimicrobials to control CDI has led to a greater tendency toward use of carbapenems.

The wide diversity of carbapenemase producing strains and the absence of history of foreign travel in many cases suggest that these resistant strains have emerged in Scotland through the introduction of specific strains and transferable genetic elements via routes that are currently not fully understood.

Quality Improvement and Interventions to Reduce Enterobacteriaceae Infection and Resistance to Carbapenems

The rapid emergence of diverse carbapenemases in multiple Gram-negative genera in Scotland mirrors experience in the rest of the UK, and highlights the need for strengthened local and national surveillance to prevent further spread. National guidance on IPC measures was developed in 2012/13 and is due for publication and further guidance on prescribing of carbapenems will be developed during 2013/14 by SAPG.
Norovirus Outbreaks in Care Settings

Outbreaks of norovirus continue to be a perennial winter challenge in all care settings. Norovirus is highly infectious and outbreaks spread quickly around closed communities such as hospitals and nursing homes - especially in the winter.\textsuperscript{36}

Data on the numbers of wards closed due to confirmed or suspected norovirus are collected by HPS on a weekly basis. The number of closed wards on a Monday morning is reported by each NHS board. The data represents an indication of the impact norovirus ward closures are having on NHSScotland and are made available to all NHS boards and others for outbreak preparedness and impact assessment. It should be noted that these data are unvalidated management information.

Figure 10 reports the number of wards closed on a Monday morning due to presumed or confirmed norovirus. During 2012/2013, the norovirus season started early but returned to normal levels by the first two weeks in January (weeks 1 and 2); the time period considered to be peak season in previous years.

NHSScotland can demonstrate clear system improvements which appear to be reducing the incidence and impact of outbreaks.\textsuperscript{37}

\textbf{Figure 10:} Number of wards closed on a Monday morning due to presumed or confirmed norovirus in Scotland by season, 2008 to 2013.

\textbf{Ward closures due to norovirus continue to impact on NHSScotland though there is evidence of system improvements reducing this impact.}
Quality Improvement and Interventions to Reduce Norovirus Infection

In 2012, the HPS Norovirus Guidance 2012 was updated to reflect the most up to date evidence in the literature.38 The guidance provides background information on norovirus outbreaks in hospitals and details how to minimise the impact and incidence of norovirus outbreaks.

Norovirus preparedness is aligned to the Scottish Government’s general preparedness work: Get Ready for Winter plans (http://www.readyscotland.org/). HPS provides a reminder to IPCTs approximately one month before the season starts and an alert as soon as the season has started. This enables the IPCTs to activate their norovirus preparedness plans. In addition after every season, an evaluation involving all NHS board IPCTs is carried out to learn lessons and share best practice, the results from which are used to inform changes to future guidance documents.
During 2012, 47 outbreaks and incidents were reported to HPS. Shared learning from outbreaks supports the strengthening of care systems and improved patient safety.

In 2009, the Chief Nursing Officer (CNO) for Scotland published a letter advising of a revised tool for assessing the severity of an incident or an outbreak and facilitating effective communication between boards, HPS and the SGHSCD. In the event of an outbreak or incident, NHS boards are required to assess the situation using the Hospital Infection Incident Assessment Tool (HIIAT).

In 2010, the CNO published a letter clarifying a national framework to support NHS boards when responding to HAI incidents/outbreaks, as well as Healthcare Environment Inspectorate (HEI) findings and surveillance exceedances. Following the algorithm within the framework, outbreaks that are either HIIAT Amber or Red should be referred to HPS for support and specialist advice.

During 2012, 31 HIIAT Red and Amber and 16 HIIAT Green outbreaks and incidents were reported to HPS who assisted in many outbreak investigations and in four outbreak debriefs during 2012. The most commonly reported outbreaks and incidents were caused by norovirus though there were also several CDI outbreaks reported in 2012. In addition, outbreaks and incidents of a variety of infection types across a range of care settings were reported. These included outbreaks of respiratory tract infection, BSI, SSI and skin and soft tissue infection caused by a variety of different organisms including *Acinetobacter* sp, *Klebsiella* sp, *Pseudomonas aeruginosa*, *Bordetella pertussis*, Parainfluenza virus, Group A and Group B streptococci and PVL positive MRSA. Colonisation with MDR organisms were also reported using HIIAT due to the significant public health concern associated with resistance to key, and in some cases last line, antimicrobials. These included colonisation with vancomycin resistant Enterococci (VRE) including an incident/outbreak of linezolid resistant VRE and a carbapenemase producing Enterobacteriaceae.
Toolkits have been produced by HPS for IPCTs to assist with outbreak preparedness and management in healthcare settings. In addition, HPS shares the information learned from these outbreaks with professional networks to strengthen care systems and reduce the risk to patients.

In addition to support requested for outbreaks and incidents, NHS boards may also request support from HPS under the CNO framework in any aspect of IPC. This may include support requested to assist with a targeted approach to reduce *S. aureus* bacteraemia or CDI or those who have specific challenges around decontamination issues. In 2012, HPS assisted six boards on matters related to *S. aureus* bacteraemias, or infections due to *C. difficile*. Under these support requests, HPS worked with the local team to define the problem clearly, analyse what is causing the problem, look for best possible solutions, check that the solutions are working and share the findings with the greater IPC community.
Hand Hygiene

Organisation’s (WHO) “5 Moments for Hand Hygiene” approach defines the key moments when healthcare workers (HCWs) should perform hand hygiene. Good hand hygiene i.e. cleaning hands at the right times and in the correct way is considered an effective means of reduction of HAI.

In 2006, HPS were tasked by the HAI Task Force (HAITF) to oversee the development and delivery of a National Hand Hygiene Campaign for Scotland. The objective of this campaign was to reduce avoidable infection amongst patients, staff, visitors and the general public by promoting improved hand hygiene practice/compliance in Scotland.

Bi-monthly hand hygiene auditing for opportunity compliance with the WHO 5 Moments by acute hospital HCWs continued in 2012. The overall (national) compliance and that of staff groups during the six bi-monthly audits in 2012 are described in Table 2.

Compliance with the 5 Moments for hand hygiene remained at 95% to 96% during 2012. Compliance by medical staff was significantly lower than overall national compliance.

There is currently little intelligence, at a national level in Scotland, on the monitoring of good hand hygiene technique. Future improvement work should continue to promote opportunity compliance with the WHO 5 Moments and seek to support best practice for hand hygiene technique. Alternate measures might be usefully explored as indicators for hand hygiene compliance.

Table 2: Bi-monthly compliance with hand hygiene with 95% confidence intervals, 2012

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<td>All Health Professionals</td>
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<td>Nurse</td>
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<td>National compliance</td>
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Development of Guidance

producing HAI related guidance across a wide range of areas. This guidance is intended to contribute to reducing all HAI and/or targeted to specific HAI.

Over the past year, the following guidance documents were reviewed/developed:

- Norovirus Outbreak Guidance and supporting materials
- General Outbreak Control Measure Trigger Tool
- Healthcare Outbreak Debrief tool
- Hospital Outbreak Checklist and Algorithms

The additions to the guidance included further information on closure of bays, cleaning frequencies and solutions, and communications.

Quality Improvement Tools

A number of quality improvement tools are being developed and updated by HPS aimed at optimising practices to prevent HAI. The key recommendations for practices and supporting literature reviews are available online.

- Preventing catheter associated urinary tract infections (acute and community settings)
- Preventing infections when inserting and maintaining a central vascular catheter (CVC)
- Preventing the transmission of *Clostridium difficile*
- Preventing infections when inserting and maintaining a peripheral vascular catheter (PVC)
- Preventing surgical site infections (SSI)
- Preventing contamination when taking blood for culture

Evidence based guidance is essential for a consistent and robust approach to preventing and controlling infection. During 2012, HPS have continued to ensure that national guidance is ‘fit for purpose’ and based on the most currently available evidence.
National Infection Prevention and Control Manual

The National Infection and Prevention and Control Manual aims to align evidence based practice recommendations with quality improvement and scrutiny by:

- providing straightforward practice requirements based on an assessment of the extant professional literature instigating consistency in practice and advice across NHSScotland;
- promoting the application of evidence based care processes by staff;
- complementing national improvement programs and providing a focus for the development of local measurement plans.

Chapter 1, Standard Infection Control Precautions (SICPs) of the National Infection Prevention and Control Manual for Scotland was published on 13th of January 2012 replacing the HPS Model Policies and continuing to take account of the current literature. The CNO published a letter on this date advising NHS boards of the expectation that they adopt the manual and that a compliance and data quality tool are utilised.

Chapter 1 was published as three distinct documents:

- the SICPs chapter is the practice guide, to be applied by all NHS staff;
- the literature reviews summarise the available evidence that underpins and informs the practical application of SICPs and highlights implications for research;
- a Compliance and Quality Improvement Data Collection Tool, that can be used to monitor and evidence compliance with SICPs as well as identifying, missed critical elements that require improvement.
**Pseudomonas aeruginosa** in Water Guidance

In recent years there has been an increase in published evidence relating to outbreaks and incidents in augmented care units due to *P. aeruginosa*. In 2012, the UK Department of Health published an addendum to the Health Technical Memorandum 04-01 *Water sources and potential Pseudomonas aeruginosa contamination of taps and water systems – Advice for augmented care units*.\(^{47}\) The document is concerned with controlling and minimising the risk of morbidity and mortality due to *P. aeruginosa* associated with water outlets.

Consequently, HPS have developed ‘Guidance for neonatal (NNUs) (levels 1, 2 & 3), adult and paediatric intensive care units (ICUs) in Scotland to minimise the risk of *Pseudomonas aeruginosa* infection from water’\(^{48}\) (in press). The guidance is concerned with controlling/minimising the risk of morbidity and mortality due to *P. aeruginosa* associated with water outlets and provides guidance on:

- assessing the risk to patients when water systems become contaminated with *P. aeruginosa* or other opportunistic pathogens;
- remedial actions to take when a water system becomes contaminated with *P. aeruginosa*;
- protocols for sampling, testing and monitoring water for *P. aeruginosa*;
- forming a Water Safety Group (WSG) and developing water safety plans (WSPs).

**Novel Coronavirus Guidance**

There are a variety of coronaviruses which can cause illnesses ranging from a common cold to pneumonia and acute respiratory distress syndrome. Novel Coronavirus (nCoV) cases have been recently identified worldwide and these have led to patients being placed in ICU with some patient deaths. To ensure safe patient management, HPS has published ‘Information and Infection Prevention and Control Precautions to Prevent the Transmission of Possible, Probable or Confirmed Novel Coronavirus Cases’\(^{49}\) along with a number of algorithms for use by local NHS boards.
Leaflets for the public

During 2012 a number of public leaflets were reviewed to ensure they are current and fit for purpose.50-53
These leaflets are:

- Healthcare Associated Infections – Information for the public
- *Clostridium difficile* infection – Information for hospital patients and visitors
- *Clostridium difficile* infection – Information for clients and visitors of care homes
- Washing clothes at home

Other information leaflets currently available include:54-55
- Norovirus - information for patients and their relatives and carers
- MRSA screening - information for patients

HAI Compendium of Guidance

The purpose of the HAI compendium is to provide NHS Scotland staff with all current HAI guidance, as well as the key messages from the guidance and all the associated supporting materials e.g. checklists, care bundles, patient information leaflets and training scenarios.56 The compendium is a living document and is updated on an ongoing basis.

The HAI compendium was kept current throughout 2012/13; including all new and updated HAI guidance reviewed/published during 2012/13.
References


48 Health Protection Scotland. Guidance for neonatal units (NNUs) (levels 1, 2 & 3) adult and paediatric intensive care units (ICUs) in Scotland to minimise the risk of Pseudomonas aeruginosa infection from water. HPS 2013 [cited 2013 May];Available from: URL: http://www.hps.scot.nhs.uk/haiic/ic/guidelinedetail.aspx?id=54784


