Executive Summary

This second national survey of the prevalence of Healthcare Associated Infection (HAI), and first comprehensive national survey of the prevalence of Antimicrobial (AM) use in Scotland included: 13 558 inpatients (94.6% of eligible patients) in 75 hospitals. This was inclusive of: all NHS acute (n=42), all independent (n=7), all NHS paediatric (n=3) and 25% of NHS non-acute (n=23) hospitals. Data were collected from 844 wards, inclusive of nine categorised specialties. The survey examined the prevalence of HAI, invasive device use and AM use in all these settings, and is the first of its kind to do so at a national level. The first HAI Point Prevalence Survey (PPS) in Scotland did not include independent hospitals or NHS paediatric hospitals and collected a limited dataset. Previous AM PPS in Scotland have been in selected hospitals only.

Acute hospitals

The prevalence of HAI was 4.9% (95% CI 4.4-5.4) in acute care and was significantly lower than the last survey. The epidemiology of HAI has changed substantially in last five years. UTI was identified as the most prevalent type of HAI in this PPS (22.6% of all HAI), many of these occurred in patients who had been catheterised. SSI remains a large proportion of all HAI (18.6%), particularly in orthopaedic, vascular and gastrointestinal surgery. The proportion of HAI that were pneumonia is higher than the last survey (17.5% versus 8.8%) and a quarter of these occurred in patients who had been intubated. BSI were more prevalent than the last PPS (10.8% versus 4.4%) and many of these patients had a CVC in situ prior to onset. Prevalence of PVC and CVC use has not changed in the last five years, although a significant reduction was seen in PVC use in ICU. The most common source of secondary BSI, when the origin could be determined, was UTI. The proportion of HAI which were GI infection was lower in this PPS than the last survey (6.8% versus 15.4%). The proportion of HAI that were skin and soft tissue infection was also lower (4.0% versus 11.0%). The highest prevalence of HAI was reported in ICU (16.1%) and surgery (6.3%).

Microbiology data indicated that Enterobacteriaceae were the most commonly identified organism group; accounting for a third of HAI in this PPS. Staphylococcus aureus remained a public health threat in hospitals and accounted for a quarter of all microbiology reports. Clostridium difficile accounted for 7.7% of microbiology reports compared with 17.6% in the last survey.

A third of all patients in acute hospitals were receiving one or more AM, indicating the overall burden of AM use has not changed in the two years since the last AM PPS in Scotland. The highest AM prevalence was reported in ICU, surgical and medical patients. Patients cared for in ICU, HDU and ICU/HDU mixed wards had significantly higher prevalence than general wards. The percentage of patients receiving three or more AM (polypharmacy) remains at around 10%. The most common indication for prescribing was community acquired infection. One in four AM were prescribed for hospital acquired infection; infections considered to be hospital acquired by the clinician or developing 48 hours or more after admission to hospital. This has not changed in the two years since the last survey. Prophylaxis accounted for 16.1% of AM (7.6% medical and 8.5% surgical).
Four of the most common diagnoses for prescribing (respiratory, skin and soft tissue, gastrointestinal and urinary tract infections) accounted for almost 80% of all prescribing. The three most common AM prescribed were amoxicillin (15.6%), co-amoxiclav (10.0%) and metronidazole (9.0%). Use of AM associated with a high risk of CDI has reduced since the survey in 2009. The percentage of all AM that were cephalosporins (3.1% versus 7.6%) and quinolones (5.1% versus 8.6%) is lower. Almost half (47.8%) of AM were administered parenterally. Compliance with local empirical prescribing policy has improved since the last survey (82.8% versus 81.8% for acute, non-acute and paediatric hospitals).

The majority of surgical prophylaxis was used in orthopaedic, GI tract and obstetrics and gynaecology procedures. The three most commonly prescribed AM for surgical prophylaxis were gentamicin, co-amoxiclav and flucloxacillin. Cefuroxime use was reported to be lower (11.4%) than reported two years ago (33.2%). A duration in excess of 24 hours was reported in almost a quarter (23.7%) of all surgical prophylaxis AM use, this was an improvement on the last survey (30%). A good level (83.2%) of compliance with surgical prophylaxis local prescribing policy was found. Medical prophylaxis was most commonly prescribed for general medical prophylaxis (29.0%) and prevention of UTI (20.6%).

**Non-acute hospitals**

The prevalence of HAI was 2.5% (95% CI 1.6-3.6) in non-acute hospitals. Overall, HAI prevalence in non-acute care was approximately a third lower than the last prevalence survey. The epidemiology of HAI has also changed substantially in non-acute hospitals. UTI was identified as the most prevalent type of HAI in this PPS; 39.0% of all HAI, a larger proportion than the previous survey (28.1%). Many of these UTI occurred in patients who had been catheterised prior to onset. There was a lower reported prevalence of skin and soft tissue infection compared to the last survey (9.8% versus 26.8%) and GI infection remained a high proportion of all HAI in this setting (12.2%). Prevalence of PVC and urinary catheter use had not significantly changed since 2005/2006. The majority of organisms responsible for HAI in non-acute care were; *Escherichia coli*, *S. aureus* and *C. difficile*.

The burden of overall AM use was significantly lower than in acute care (9.8% versus 32.3%). The most common indication for prescribing was hospital acquired infection (41.4%) and a quarter of antimicrobials were prescribed for community acquired infection. Prophylaxis accounted for 8.8% of AM, all of which were medical prophylaxis. Four of the most common diagnoses for prescribing (urinary tract, respiratory, skin and soft tissue and ENT infections) accounted for 76.3% of all prescribing. The three most common AM prescribed were amoxicillin, co-amoxiclav and trimethoprim. As expected a lower number of AM were administered parenterally (4.2%).

**Paediatric hospitals**

For the first time, HAI prevalence has been examined in paediatric hospitals in Scotland. The prevalence of HAI was not significantly different to the other settings (6.1% 95% CI 2.6-11.2). BSI and clinical sepsis were the most prevalent types of HAI accounting for a third of all HAI. The prevalence of CVC use was significantly higher in paediatric hospitals (19.3%) than in other settings including paediatric specialties within acute care (5.1%). PVC use in this setting (34.6%) was noted to be as prevalent as that in acute care (31.5%).
Almost half (46.5%) of all patients were receiving one or more AM, this was significantly higher than the AM prevalence reported in acute care. The highest AM prevalence was reported in paediatric medicine (51.6%). AM for community acquired and hospital acquired infection accounted for 31.7% and 27.4%, respectively. A third of AM were for prophylaxis, the majority of which were medical prophylaxis (25.9% of all AM).

Four of the most common diagnoses for prescribing (sepsis, respiratory, gastrointestinal and skin and soft tissue infections) accounted for 71.8% of all AM. The three most common AM prescribed were gentamicin, vancomycin and flucloxacillin. More than 80% of AM, both treatment and prophylaxis, were administered parenterally. The majority of surgical prophylaxis was used in orthopaedic and GI tract surgery. The three most commonly prescribed AM for surgical prophylaxis were cefotaxime (25.0%), cefuroxime (25.0%) and metronidazole (25.0%). A duration in excess of 24 hours was found in 68.8% of all surgical prophylaxis AM use. Almost one in four (23.7%) of all AM use was for medical prophylaxis. Medical prophylaxis was most commonly prescribed for prevention of respiratory infection (34.1%) and UTI (18.1%).

**Independent hospitals**

HAI prevalence was not significantly different to that in acute care, however the numbers were too small to infer much from these data (1.2%, 95% CI 0.4-6.3). The prevalence of PVC use was high in the independent hospitals overall (42.4%), but in line with that in surgical specialties in acute care (42.1%).

A third (36.9%) of all patients were on one or more AM, the overall burden was the same as that in NHS acute care. The most common indication for prescribing was surgical prophylaxis (86.1%). The majority of surgical prophylaxis AM were used for orthopaedic procedures. The three most common AM prescribed for surgical prophylaxis were cefuroxime (54.8%), co-amoxiclav (12.9%) and gentamicin (9.7%). Parenteral AM accounted for 90.3% of all surgical prophylaxis AM. All surgical prophylaxis AM were compliant with local prescribing policy. A duration in excess of 24 hours was reported in 9.7% of all surgical prophylaxis AM use.

**Summary**

The results of this PPS indicate that HAI is lower in acute and non-acute care than the last survey, and the epidemiology of HAI has changed thus IPC measures require to be refocused in this regard. The lower prevalence and changing epidemiology of HAI in acute and non-acute care suggest a temporal relationship with the implementation of the national programme of targeted HAI interventions in the intervening period. Improvements have been demonstrated in AM stewardship in the period since the last survey. This first description of HAI and AM use in paediatrics and independent hospitals has identified where potential future IPC and AM stewardship measures should be targeted. The results have enabled the identification of potential priority areas for future interventions to prevent and control HAI, for antimicrobial stewardship and future targeted incidence surveillance of HAI. These should be assessed for potential health impact and financial impact in order to inform future strategy for HAI prevention, control and management.