POINT PREVALENCE SURVEY OF HEALTHCARE ASSOCIATED INFECTIONS, MEDICAL DEVICE USAGE AND ANTIMICROBIAL USAGE

Frequently Asked Questions

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1   Overview

1.1   What is a Healthcare Associated Infection (HAI*)?

In this survey a Healthcare Associated Infection (HAI) was defined as any infection that occurred more than two days after a patient has been admitted to a hospital. A prevalent HAI is one where the patient has symptoms of a HAI or is being treated for a HAI on the day of the survey.
* In Wales 'HCAI' is used normally, HAI is used by ECDC and for the purposes of this ECDC PPS

1.2   What is Medical Device Usage (MDU)?

In this survey medical device usage (MDU) was defined as the presence, in a patient at the time of the survey, of any of the following: a urinary catheter or peripheral venous catheter or a breathing tube (intubation).

1.3   What is Antimicrobial Usage (AMU)?

In this survey antimicrobial usage (AMU) was defined as a patient receiving, at the time of the survey, any of the following medications: systemic (oral and parenteral) antibacterials, antifungals and tuberculosis therapy but excluding antivirals and all topical agents with the exception of oral suspensions of Nystatin.

1.4   What is a prevalence survey?

A prevalence survey is a count of the number of patients with HAI, MDU and/or AMU at a particular time as a proportion of the total number of patients who were being treated in hospital. This survey gives a snap-shot picture of the number of patients with HAI/MDU/AMU in Welsh hospitals. The report contains information for individual hospitals at the time of survey only, and not for all times.

1.5   Why was this survey undertaken?

It is important to know the prevalence of HAI, MDU and AMU in Welsh hospitals to allow the government and local hospitals to plan effective ways to reduce HAI. With this information both national and local infection control plans can be targeted most effectively.

1.6   Who undertook the survey?

The Healthcare Associated Infection and Antimicrobial Resistance Programme teams in Public Health Wales led and supported the survey. Within each hospital, Infection control staff, pharmacists and ward staff collected the data by completing questionnaires, which were then sent to Public Health Wales for data entry, quality assurance and analysis. Public Health Wales is indebted to the local Infection Prevention and Control Teams (IPCTs), pharmacists and ward staff in all of the participating hospitals. Their collaboration is gratefully acknowledged.

1.7   When was the survey undertaken?

Hospitals were surveyed during November 2011.

1.8   Where was the survey undertaken?

The survey was undertaken in every NHS Health Board (7) and Trust (1) providing in-patient care in Wales; in total 86 hospitals were surveyed, both acute and community.

1.9   Which patients were included?

All patients who were present on the ward at 8am on the morning of the survey with the exception of day patients were eligible for inclusion in the survey. Patients admitted to or transferred into the ward after 8am were excluded. Patients who left the ward before they were surveyed were not followed up and were, therefore, excluded from the survey.

1.10   What were the aim and objectives of the survey?

The aim of the survey was to measure HAI, MDU and antimicrobial prescribing prevalence in Welsh Hospitals.

The objectives of the survey were:

- To estimate the total burden (prevalence) of HAI, MDU and AMU

- To describe patients, invasive procedures, infections and prescribed antimicrobials

- To disseminate results to those who need to know at local, regional, national and EU level

- To provide a standardised tool for hospitals to identify targets for quality improvement.

1.11   Were these objectives met?

Yes, the report contains discussion on each of these topics.

1.12   What does the report tell us?

The final report contains information on how many patients in Welsh hospitals had a HAI at the time of the survey, what type of HAI those patients had and what specialty they were being treated in. It also reports how many invasive devices, such as catheters, patients were being treated with and which antibiotics they were prescribed on the day of survey.

1.13   What does the report not tell us?

The report does not provide details of how the patient acquired their HAI and does not report on the cleanliness of the hospitals or the overall infection prevention and control practices of healthcare staff within the hospitals. This was not the aim of the survey.

2   Methodology of Survey

2.1   How many patients were included in the survey?

The survey included 9094 in-patients in 86 hospitals (75% of patients in 20 acute hospitals and 25% in 66 community hospitals).

2.2   How was prevalence calculated?

Prevalence of HAI was calculated by dividing the total number of in-patients diagnosed with a HAI by the total number of in-patients. Prevalence of medical device usage was calculated by dividing the total number of in-patients with one or more medical devices in place by the total number of in-patients. Prevalence of antimicrobial usage was calculated by dividing the total number of in-patients receiving one or more antimicrobials by the total number of in-patients.

2.3   What definitions of HAI were used?

A Healthcare Associated Infection (HAI) was defined as any infection that occurs 48 hours or more after a patient has been admitted to a hospital. The European Centre for Disease Control and Prevention (ECDC) has defined specific types of infection for use in surveillance. These definitions have been internationally recognised as standard definitions for HAI types. The ECDC definitions of HAI were used in this survey.

2.4 What types of HAI were included in the survey?

This survey included every type of HAI defined by the ECDC in patients. Therefore the full range of HAI types found in hospital in-patients which met the survey definitions was examined. HAI are grouped into 13 broad categories by the ECDC based on the main physiological systems and surgical interventions.

These are:
- Surgical Site Infections,
- Pneumonia,
- Lower Respiratory Tract Infections other than Pneumonia,
- Urinary Tract Infections,
- Bloodstream Infections,
- Bone and Joint Infections,
- Central Nervous System Infections.
- Cardiovascular System Infections,
- Eye, Ear, Nose, Throat and Mouth Infections Systemic Infections,
- Gastrointestinal Infections,
- Reproductive System Infections,
- Skin and Soft Tissue Infections,
- Systemic Infections

2.5 How was the study designed?

The ECDC protocol for PPS studies in Europe was used. In Wales, community hospitals were surveyed in addition to acute sector hospitals to reflect the full range of responsibilities of Welsh NHS Health Boards.

2.6 How were the data collected?

Data collection forms were prepared by the Welsh Healthcare Associated Infection Programme (WHAIP) team, Public Health Wales, based on the model forms provided within the ECDC protocol. Ward staff, antimicrobial and ward pharmacists and ICTs were involved in completing the forms, extracting data from a number of sources available on the ward at the time of the survey. The completed forms were returned to Public Health Wales for scanning, quality assurance and data analysis.

2.7 What is the difference between number of infections and number of patients with HAI?

Some patients were found to have more than one HAI. Prevalence was calculated using the number of inpatients with HAI compared to the total number of inpatients.

In some instances within the report the total number of infections is reported, this number is always greater than the total number of patients who have HAI. It is important to consider the total number of infections because this gives a clearer picture of what type of HAI patients have. (This is also true for MDU and AMU).

2.8 What is the difference between acute and non-acute hospitals?

Acute hospitals are hospitals that provide a wide range of specialist care and treatment for patients. They include consultation with specialist clinicians, emergency treatment following accidents, routine, complex and life saving surgery, specialist diagnostic procedures and close observation and short-term care of patients with health symptoms of concern. Non-acute hospitals are hospitals which offer long term care for psychiatric, elderly or community patients.

3 Results

3.1 What is the overall prevalence of HAI in hospitals in Wales?

The overall prevalence of HAI in Wales was 4.0%. Prevalence was higher in the acute sector (4.3%) as compared to the non-acute sector (3.2%), but this difference was not statistically significant.

3.2 How many patients had medical devices in place?

Overall 37.0% of patients surveyed had one or more medical devices in place; 45.9% of patients in the acute sector and 13.7% in the non-acute sector.

3.3 How many patients were receiving antimicrobials?

Overall 27.4% of patients surveyed were prescribed one or more antimicrobial. Usage was higher (32.7%) in the acute sector than the non-acute sector (13.5%).

3.4 Does a prevalence of 4% mean that if I go in to hospital I have a one in twenty-five chance of getting a HAI?

No. This means that at any one time, one in twenty-five inpatients in hospital will have a HAI. A prevalence survey counts the number of patients with HAI at a specific point in time. People with HAI tend to stay in hospital longer and those patients who stay in hospital for longer periods of treatment tend to be more seriously ill and therefore more at risk of contracting HAI. The large majority of patients are successfully treated in hospital and go home without acquiring a HAI.

3.5 Can you tell me what my chance is of contracting HAI during my hospital stay?

No. This is not shown by the prevalence survey. In order to calculate how likely a person is to get a HAI an incidence study would be required. This would look at all patients who were treated within the hospital on a regular basis over a defined time period.

3.6 What are the most common types of infections?

Urinary tract infections (UTIs) (20.9%) and surgical site infections (SSI) (19.6%) were the commonest HAI identified in the survey overall, followed by gastro-intestinal infections (GI) (11.5%), pneumonia (11%), and Bloodstream Infections (BSIs) (8.9%). Within the acute sector the top five types of HAI were SSIs (23.7%), UTIs (16.7%), pneumonia (12.3%), GI (11.7%) and BSIs (11%). For the non-acute sector they were UTIs (36.1%), infections of eyes / ear nose and throat (14.5%), skin and soft tissue infections (12.1%), lower respiratory tract infections (12.1%) and GI (10.8%).

3.7 What are the most serious types of infection?

HAI is a term for a group of conditions. Some can be treated easily and while they can be unpleasant they do not have a lasting impact on a patient's health. Some of these infections, if they remain untreated can progress to more serious conditions. Other types of HAI initially have a very serious effect on a patient's health, increasing their hospital stay, requiring further surgery, prolonged treatment with antibiotics and considerable distress to the patient e.g. SSIs.

3.8 Why do some hospitals have higher prevalence than others?

Some hospitals will have a higher prevalence of HAI, MDU and/or AMU due to a number of factors including in-patient age, case severity and

specialty mix, reflecting differing patient vulnerability to infection. Comparing unadjusted hospital prevalence is not scientifically correct as the hospital in question may have a much greater number of high risk patients within its care. Estimates of prevalence for a hospital are only for the time the survey was carried out and not for all times. The precision of prevalence estimates is determined by sample size. The precision of the estimate for smaller hospitals will be less. Individual hospital prevalence comparisons are limited because of week to week variability as well as differences in case mix, specialty distribution, length of stay and bed occupancy.

4   Discussion

4.1   Is there any evidence to show that HAI, MDU o r AMU are rising or falling?

For HAI and MDU a previous prevalence survey was conducted in 2006; however there are differences between that survey and the current one in terms of which patients and hospitals were included and in the definitions of infection used. It is possible by adjusting (stratifying) the 2011 data to compare it with 2006 **for the acute sector only**. Comparing 2006 and the adjusted 2011 data shows that there has been a statistically significant reduction in HAI in the acute sector (from 6.4% in 2006 to 4.4% in 2011). Since this was the first survey of its kind in community hospitals there is no baseline against which to measure whether HAI is rising or falling.

When considering HAI prevalence comparisons over time it is important to consider a number of factors before making any comparisons.

- The complexity of high-risk procedures increases with time
- The underlying health of the population is not constant
- The specialty mix will alter over time
- New therapies will increase the life expectancy of very ill patients who are more susceptible to infection
- The age of patients is increasing with time since people are living for longer
- Many procedures that were undertaken in hospital are now day procedures and therefore the hospital population are undergoing more complex procedures.

Medical device usage in the acute sector appears to be little changed between 2006 and 2011

Prevalence surveys of antimicrobial usage have taken place annually in hospitals in Wales in the last four years. The overall prevalence of

antimicrobial usage from previous surveys, which predominantly surveyed acute hospitals, were broadly similar to the results of this survey, which suggests little change in gross usage over the last four years. Ward antimicrobial usage data published in "Antibacterial Resistance and Usage in Wales 2005-2010", which gives data for acute hospitals, supports the suggestion that there has been little change.

4.2   Can the results be compared directly to the rest of Europe and the UK?

Comparisons of the results of prevalence surveys undertaken in different locations or in the same location at different times should be made with caution. In the published literature, case definitions vary; additionally, the prevalence of HAI is dependent on a number of factors that reflect differing patient vulnerability to infection and differences in admission policies and inpatient management policies and practices at the time of the survey. The length of stay of hospital inpatients will also affect the likelihood of diagnosing HAI and/or the risk of HAI in inpatients. Hospital size is an important factor known to affect prevalence and probably reflects variation in some or all of the factors listed above.

Comparison of the results of the large number of HAI prevalence surveys that have been published is therefore difficult. These studies have been undertaken in different countries, at different times, using different case definitions and data collection methods. Often important details of the methods used are unavailable. Personnel collecting the data can vary between surveys and it is often not clear how well data collectors have been trained. In addition, age and gender distribution, length of stay, case mix and underlying health of the population vary greatly across Europe. This limits the comparability of results from different surveys.

A pilot study from Europe published in the last year using the same protocol as this survey indicated an overall prevalence of 7.3%.These results in Wales compare favourably with that - a full report from ECDC is expected later this year and further comparison can be made at that point.

4.3   How do the results compare to recent studies in the UK and Europe?

Other UK countries (England and Scotland) carried out similar surveys at the same time as this survey and have published their data or intend to publish later this year. ECDC will publish all the data from European

countries participating later this year.

4.4 What does the survey tell us about organisms which cause infection (e.g. MRSA, *C. difficile* and *E. coli)*?

Not every HAI identified in the survey had microbiology results available. Often the results from samples sent to microbiology were not available at the time of survey. The percentages of organisms reported are therefore based on a subset of infections where the microbiology test results were available. This survey did not collect any information on the prevalence of microorganisms colonising patients who did not have a HAI.

The commonest organism associated with UTI was *Escherichia coli; Staphylococcus aureus* was the commonest organism associated with SSI. S. aureus was also the most common cause of BSIs, with *E. coli* the second most common. This may seem to be in contrast to the findings of the ongoing "Top Ten Bacteraemia" (BSI) surveillance, which has consistently shown that *E. coli* is the commonest cause of BSI in Wales, however this survey collects information on HAI whilst the "Top Ten Bacteraemia" surveillance collects data on the totality of BSI from community as well as healthcare associated sources, hence these results are consistent and suggest that community associated *E. coli* BSI is a significant part of the total burden of *E. coli* BSI seen. *Clostridium. difficile* was the commonest cause of GI infections within the survey.

Further notes on emerging organisms causing HAI:

E. coli is an organism that colonises the gut of both humans and animals. It is a common cause of urinary tract infections but can also cause more serious conditions such as blood stream infections.

S. aureus is a common organism found on the skin of humans, it is a common cause of a variety of infections, particularly skin and wound infections as well as those associated with vascular catheters.

4.5 Where does the work go from here?

This survey has developed a standardised prevalence surveillance method allowing the collection of robust data for this survey. This can be used in the future for HAI, MDU and AMU surveillance at international, national and local level. There are two key aspects to future prevalence

surveillance. The first is continued surveillance at a national level. The second is to use prevalence surveillance to undertake smaller local investigations more frequently as part of local hospitals infection prevention and control programmes of work.

5 HAI prevention and antimicrobial stewardship

5.1 5.1 What other surveillance programmes are undertaken in Wales?

The following healthcare associated infection surveillance programmes are mandatory in Wales. Every Health Board in Wales has to participate in the programmes and report their data to the Welsh Healthcare Associated Infection Programme (WHAIP). These data are then collated, statistically analysed and published by WHAIP.

Individual surveillance programmes:

- Blood stream (bacteraemia) infection surveillance
  - *Staphylococcus aureus* bacteraemia infection surveillance
  - Top ten bacteraemia infections surveillance
- *Clostridium difficile* surveillance
  - *Clostridium difficile* infection surveillance
  - *Clostridium difficile* ribotype Surveillance
- Infections in critical care surveillance
  - Central Venous Catheter (CVC) infections surveillance
  - Ventilator Associated Pneumonia (VAP) surveillance
- Hospital outbreak surveillance
- Surgical site infection (SSI) surveillance
  - Orthopaedic SSI surveillance
  - Caesarean section SSI surveillance

In addition, regular surveillance of both antimicrobial usage and resistance is conducted; more information is available from the Welsh Antimicrobial Resistance Programme (WARP) (see 5.3 below)

5.2 How will the results of this survey be used to reduce HAI?

These results will be used in conjunction with the recently published HAI framework of actions for Wales, Commitment to purpose: Eliminating

preventable healthcare associated infections (HCAI), to focus healthcare organisations' quality improvement plans for managing HAIs, medical devices and the use of antimicrobials. Efforts will be made to focus interventions in the areas that have the highest burden of HAIs, MDU and AMU. For the first time, detailed information is provided for the non-acute sector. This is a useful baseline for organisations to consider as they develop action plans to respond to the HAI action plan commitment to purpose, across the Health Boards. These results can be used to support the 1000 Lives Plus programme work to reduce the risks associated with medical devices. Health Boards and Trusts in Wales will be provided with further analyses and support from the WARP and WHAIP teams of Public Health Wales to support the use of these data for improvement / action plan development.

5.3   Where can I get more information?

- [Welsh Antimicrobial Resistance Programme (WARP) Website](#)

- [Welsh Healthcare Associated Infection Programme (WHAIP) Website](#)

- [1000 Lives Plus Website](#)