Collecting national data on hospital-acquired infections

Approximately 10% of patients acquire an infection while in hospital (Emmerson et al, 1996). On average such infections increase mortality seven-fold, patient costs three-fold and the length of stay by 11 days. In financial terms the estimated cost of hospital-acquired infection (HAI) for the financial year 1994–95 was approximately £1 billion (Plowman et al, 2000). Like road traffic accidents not all HAIs are preventable but expert opinion suggests that the number of infections could be reduced by 15–30%.

At the heart of such reduction strategies is improved compliance with infection control policies, of which those relating to hand hygiene are considered to be paramount. Given the serious clinical, financial and political impact of HAI on NHS resources it is not surprising that the Department of Health (DoH) is keen to see that such infections are carefully monitored. At the heart of such surveillance is regular and consistent data collection across a range of different clinical settings.

EXISTING SCHEMES

The Nosocomial Infection National Surveillance Scheme (NINSS) was established in March 1996, jointly funded by the DoH and the Public Health Laboratory Service (PHLS). This is a voluntary national reporting scheme based on observations from America in the mid-1980s which showed that feedback of HAI data to clinicians reduced infections by 32% (Haley et al, 1985).

However, in late 1999 it was recognized that changes to the structure and function of the surveillance scheme would be required and a report was commissioned to evaluate NINSS. This report took evidence from the NINSS team, senior staff in PHLS, the DoH, and a broad range of clinical, managerial and infection control staff. The value of the scheme was recognized but it was found that data collection was laborious and the turnaround of data to clinicians was slow. It was also clear that hospital participation was often intermittent rather than continuous.

The recommendations were for a new scheme managed by a steering committee that would look at a smaller number of modules with a quicker turnaround. In response the DoH formed the Healthcare Associated Infection Surveillance Steering Group (HAISSG) which first met in September 2000 chaired by a trust chief executive. The HAISSG has representatives from the PHLS, the DoH, the Infection Control Nurses Association, the Association of Medical Microbiologists, surgeons, regional epidemiologists, infection control doctors, regional directors of public health and the Hospital Infection Society. The remit was to provide strategic advice to the DoH on HAI needs at local, regional and national levels including development and extension of NINSS.

One of the fundamental principles established by HAISSG was that wherever possible surveillance should be based on existing schemes for clinical audit. In particular this focussed on the need to involve clinicians in collecting clinical data rather than simply relying on infection control teams to police their clinical colleagues. A model has been developed around regional reporting with central collation at the Communicable Disease Surveillance Centre in London.

POLITICAL IMPERATIVES

The health minister, John Denham, addressed the launch of the Infection Control Week at the Infection Control Nurses Association meeting in October 2000. He referred to the formation of HAISSG and announced that a mandatory surveillance scheme for HAI would be launched in April 2001. At that stage it was thought that the initial focus of surveillance would be surgical wound infections and that data would be published 1 year later to both staff and patients in the NHS. Subsequently four sub-groups of HAISSG were formed: surveillance of methicillin-resistant *Staphylococcus aureus* (MRSA), surgical site infection, hospital-acquired bacteraemia and post-discharge surveillance (PDS). Parliament had become particularly concerned about MRSA in hospitals and the DoH was instructed to make MRSA surveillance a priority.

MRSA SURVEILLANCE

Since the early 1980s successive waves of MRSA have swept across the UK and it is now endemic in many hospitals and associated communities. While many patients are colonized with such strains a proportion have clinical evidence of infection with subsequent morbidity and mortality. It was agreed that bacteraemia is a reasonable marker for clinically relevant infection with MRSA and from April 2001 each trust has been required to report the numbers of patients with *Staph. aureus* bacteraemia (including MRSA) in each of their hospitals.

Establishing a valid denominator has been more difficult and at present data on bed occupancy (which is often not contemporaneous with the bacteraemia data) are used to establish a rate of MRSA bacteraemia per thousand occupied bed days. Publication was brought forward because the organization Dr Foster announced its intention to publish MRSA data in a national newspaper. The first report detailed MRSA bacteraemia rates from 0 to 0.69 per 1000 bed-days but with only 6 months' data the confidence intervals were large and more data will be needed to establish significant differences (PHLS, 2002). Some of the observed differences may relate to specialty groupings and local investigations are required to refine this surveillance. Specific interventions in surgical, renal or intensive

care units may reduce MRSA acquisition and subsequent infection.

SURGICAL SITE INFECTION

Currently the sub-group is concentrating on orthopaedic infections following total hip and total knee replacement surgery and it is intended to link across to other national surveillance such as the National Joint Replacement Registry. A number of centres across England, Wales, Scotland and Ireland are piloting a data set which can be readily entered into software, promptly return useful data to clinicians and have a real chance of influencing infection rates.

One of the keys to success in such a scheme will be well-supported information technology and sufficient additional resources to allow rapid and continuous surveillance. Already pilot data have shown interesting correlations between, for example, the seniority of the surgeon and the subsequent infection rate. Of the 2500 procedures currently evaluated the typical surgical infection rate is 2.5–3% (of which 20% are considered to be deep infections) leading to an average additional length of stay of 7 days.

HOSPITAL-ACQUIRED BACTERAEMIA

Another sub-group is looking at developing data sets for hospital-acquired bacteraemia with particular reference to those associated with devices. In particular there is known to be an association between bacteraemia and central venous catheterization and national guidelines (the EPIC project) have been published to attempt to minimize the risks of associated infection (Pratt et al, 2001). Attention was initially diverted towards rapidly establishing the MRSA bacteraemia data set. The hospital-acquired bacteraemia sub-group is now focussing on central venous catheter-related infections in adult intensive care units.

Currently the group is looking at existing data collection within intensive care units and the possibility of adding on additional fields to ensure regular and consistent data collection. The precise diagnosis of catheter-related bacteraemia remains a difficult area and it may be that simple correlations between typical blood culture isolates and catheterized patients may establish predictive rates of infection within units.

POST-DISCHARGE SURVEILLANCE

A significant proportion of elective surgery is now undertaken as day case procedures. It therefore follows that postoperative infection rates can only be accurately assessed if surveillance continues after discharge from hospital. In some cases significant postoperative infections result in re-hospitalization and further procedures whereas many minor wound infections pass unreported, with little associated morbidity.

Several methods of PDS have been evaluated including surgeon reporting, patient reporting, general practice reporting and laboratory reporting. Typically these show that patient reporting augmented by health-care professional reporting achieves the best results in terms of surgical site infections following hospital discharge. However, patient response is often low, particularly in those under 30 years or over 70 years, and patients from ethnic minorities. Response rates are increased when nurses are employed specifically to recruit patients. The exact time when PDS should be undertaken is not certain but around 3 weeks appears to be a reasonable cut-off point. Currently the PDS sub-group is reviewing patients who have undergone caesarean section and a number of pilot studies are underway in this area.

CONCLUSIONS

Mandatory surveillance of HAI is now established with *Staph. aureus* (including MRSA) bacteraemia reporting. The DoH wish to extend this alert organism surveillance to *Clostridium difficile* diarrhoea and glycopeptide-resistant enterococci bacteraemia. Other priorities are surgical site infection surveillance and PDS. The aim of all of these activities is to reduce HAIs.

Publishing data by trust or hospital inevitably leads to 'league tables'. It is clear that some primary care trusts might consider such information serves as a guide to the selection of health-care providers. However, it is more important for individual units to focus on reducing their own rates over time. This can be achieved by timely feedback of surveillance data to the clinicians and managers responsible and agreeing interventions with advice from the infection control teams. As some organisms traditionally considered to be hospital acquired inevitably spread into the community all health-care staff will need to accept their infection control responsibilities. HM

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KEY POINTS

- One in 10 patients acquire infection in hospital.
- Surveillance of hospital-acquired infection is now mandatory.
- The initial focus will be on alert organisms (e.g. methicillin-resistant *Staphylococcus aureus* and *Clostridium difficile*), orthopaedic infections and post-discharge surveillance.
- Surveillance must be owned by clinicians as part of clinical audit.
- Infection rates identify areas for local action to reduce hospital-acquired infections.
- Infection control teams can help clinicians and managers lower infection rates.