



The *Journal of Hospital Infection* – a history of infection prevention and control in 100 volumes

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The editorial that introduced the very first issue of the *Journal of Hospital Infection (JHI)* in March 1980 commented that nosocomial infection continued to be an important and expensive problem throughout the world [1]. It explained how *JHI* originated from a desire amongst infection control professionals to have a single journal publishing research on all aspects of hospital infection; specifically, it cited epidemiology, surveillance, administration, isolation, hygiene, disinfection and sterilization. This objective was, in itself, eminently laudable, but serendipitously, *JHI* was launched on the threshold of an era of major change in health care that presented major challenges and opportunities for infection prevention and control (IPC) that could not have been foreseen.

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Since the first issue of *JHI*, the total number of National Health Service hospital beds in England has fallen by over half, and similar reductions have occurred in many other countries [2]. However, this reduction has occurred because patients are discharged from hospital sooner. In fact, the number and complexity of patients treated in hospitals has increased significantly; intensive care bed numbers have increased at a rate of approximately 4% per year [3], whilst in 1980, both bone marrow transplant and solid organ transplant services were in their infancy. Although reports of antibiotic-resistant Gram-positive and Gram-negative bacteria featured in *JHI* right from the beginning, the multi-drug-resistant Gram-negative bacteria and *Candida* spp. [4,5] that are over-riding concerns today were for the future. Laboratory technologies have also moved on apace, particularly with the advent of molecular biology, which has revolutionized the diagnosis and epidemiological investigation of healthcare-associated infections (HCAI).

The opening words in *JHI* 38 years and 100 volumes ago remain just as relevant today; nosocomial infection continues to be an important and expensive problem throughout the world. This article will recount 38 years of IPC history, told through 100 volumes of *JHI*.

Organization and awareness of infection prevention and control

In the early 1980s, there was far less appreciation of the importance of IPC than there is today. However, in the UK, things began to change after two serious outbreaks of nosocomial infection in England in the mid-1980s. In 1984, an outbreak of salmonella food poisoning at Stanley Royd Psychiatric Hospital in Yorkshire led to the deaths of 19 elderly residents [6], and in 1985, an outbreak of Legionnaire's disease in a hospital in Stafford claimed 22 lives amongst 68 confirmed cases [7]. Following those incidents, local management of IPC was strengthened nationally. In 1988, *JHI* reported on a 1986 survey undertaken by a Hospital Infection Society (HIS) Working Party into infection control organization in hospitals [8]. By then, 98% had infection control officers (82% of whom were

medical microbiologists) and 92% had infection control committees. The proportion of health districts with an infection control nurse (ICN) had risen from 64% in 1979 to 89%. However, there was still some way to go, and the study noted that there was only one ICN per 785 acute hospital beds, compared with 741 in 1979 [8]; at this time, it was not uncommon for a single ICN to be responsible for several hospitals in a health district.

Even in mid-1992, most hospitals in the UK had no specific budget for IPC [9], and it was really only around the turn of the millennium that the importance of IPC became widely recognized. Of course, *JHI* was there to report on developments within the UK [10,11]. However, the growing interest in HCAI was a worldwide phenomenon, and in 2001, *JHI* began to publish a series of accounts of the state of IPC in different countries [12].

Measuring performance in infection prevention and control

The first real performance measures in IPC were probably point prevalence studies. In 1982, *JHI* published its first supplement, providing a comprehensive analysis of an infection prevalence survey undertaken in mid-1980 involving 43 hospitals in England and Wales [13]. Of 18,163 patients studied, 19.1% were infected; the rate of HCAI was 9.2% [14]. A second study of 37,111 patients from 157 centres in the UK and Ireland was conducted in 1993 and 1994, and showed a similar mean HCAI prevalence rate of 9.0% [15]. Since then, many other countries have published HCAI prevalence studies in *JHI*. Among the first such studies were from Germany and Norway, which reported rather lower rates of 3.5% [16] and 6.1% [17]. A three-year Greek study from 1994 to 1996 found annual rates of 6.8%, 5.5% and 5.9% [18]; however, the prevalence of antibiotic usage among the hospitalized patients was remarkably high at 49.3%, 47.3% and 52.7%.

In 1997, a national surgical site infection (SSI) surveillance service in England was established. This collated and published SSI rates that could be used for benchmarking and to identify the prevalence of SSI. However, the validity of data collected through the national service has been questioned repeatedly in the columns of *JHI* [19,20]. Prevention of SSI is now a global matter, and *JHI* marked publication of the World Health Organization (WHO) global guidelines for the prevention of SSI with a special section in 2017 [21].

Mandatory surveillance in parts of the UK for meticillin-resistant *Staphylococcus aureus* (MRSA) bloodstream infections (BSI) and *Clostridium difficile* was introduced more than a decade ago, and is described later in this article. BSI reporting in England was extended to include *Escherichia coli* from June 2011 [22], and later *Klebsiella* spp. and *Pseudomonas aeruginosa*, but the preventability of these infections remains debatable; in one study, only 19% of episodes had a potentially preventable cause [23]. However, *JHI* aims to be at the forefront of reporting on the prevention and control of infections with Gram-negative bacteria [24].

In 2003, Harbarth *et al.* reviewed the literature on the preventability of HCAI, and estimated that at least 20% of all nosocomial infections were preventable [25]. However, a decade earlier, in 1993, the contribution of good IPC to the quality of clinical care was already becoming recognized [26]. In that year, Millward *et al.* reported on an audit tool that they

suggested could be used nationally to monitor basic standards of IPC [27]. The audit tool also showed that wards with link nurses obtained significantly higher scores, and that staff education directly improved standards of infection control [27]. Strategies for education in IPC became an area of growing interest. In 1995, Seto reviewed the recently published Association for Practitioners in Infection Control manual, which identified that infection control education is really a form of adult education in which there are two important priorities: to teach what the student wants to know, and to deliver knowledge that the student can use [28]. Since then, *JHI* has published many papers exploring every imaginable means of delivering education, from humour [29] to delivery by means of the latest technologies [30].

Guidelines are not only valuable in their own right, but they also provide standards against which IPC performance can be measured. *JHI* has published many guidelines over the years. As well as those produced by HIS, *JHI* has been the repository for important guidelines produced by other bodies. In 2001, *JHI* announced the epic Project, national evidence-based guidelines for preventing HCAI [31]. The guidelines were published in *JHI* in December 2003 [32], and subsequent updates have also been published in *JHI*.

There is also a need for awareness of the potential adverse impacts of IPC interventions. In particular, isolation of patients can affect both patient satisfaction and safety. In a systematic review, Abad *et al.* found that isolated patients had an eight-fold increase in adverse events related to supportive care failures [33].

Chronicling developments in practice

Over the life of *JHI*, there have been major developments across health care. New clinical services have developed, premises for delivery of health care have changed, and laboratory technology has advanced exponentially.

In 1980, most transplant services were only just becoming established. In 1982, Rogers wrote a leading article on preventing infection in bone marrow transplantation [34]. Interestingly, the value of systemic antibiotics (then co-trimoxazole) as prophylaxis against BSI was discussed at length, a subject that has been returned to recently with the current focus on preventing Gram-negative BSI, and which remains controversial [35]. In 1983, an article reporting the experience of the first 29 heart transplants performed at Papworth Hospital in England was published. Only one patient died of infection (disseminated toxoplasmosis), with a lower degree of immunosuppression credited for the lack of serious infectious morbidity [36]. It was not until 1999 that *JHI* published a review article on infections in solid organ transplant recipients [37].

In the 1990s, the UK embarked on a hospital building programme funded by private finance initiatives that set new challenges for IPC practitioners, both in ensuring that the design was right and that adequate services were provided once hospitals opened. As well as reports of individual experiences [38], *JHI* published working group recommendations [39] to try to help infection control teams, many of whom had little previous experience of planning and construction of new hospitals.

In 1990, *JHI* published articles on state-of-the-art typing of micro-organisms [40,41], which provide a salutary reminder of

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