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Survey of acute hospital infection control resources and services in the Republic of Ireland

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Summary Following the development of national guidelines on the control of antimicrobial resistance in 2001, a survey was carried out in 2003 of all 68 acute hospitals in the Republic of Ireland on resources available and current practice to control and prevent nosocomial infection. Completed questionnaires were received from 66 hospitals (97%). The median number of acute inpatient beds per hospital was 156; this was 522 in regional/tertiary referral centres. Only 31 (47%) hospitals had on-site consultant microbiologist sessions, and there was an infection control nurse in 56 (85%) hospitals. Eighteen (29%) hospitals had an occupational health physician, and 48 (73%) hospitals had an infection control committee. There was a median of one isolation room for every 16 acute beds, and a median of five rooms with en-suite bathroom facilities per hospital in those hospitals that provided data. All hospitals had documented infection control policies, and these were available in electronic format in 25 (38%) hospitals. Fifty-five (83%) hospitals undertook surveillance of nosocomial infection, and alcohol-based hand hygiene facilities were available, either at a hand-washing sink or at the entrance to a ward, in 57 (86%) hospitals. In the Republic of Ireland, there remains a significant shortage of microbiologists/infection control doctors, occupational health physicians and infection control nurses. Isolation facilities are also inadequate. Although

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there is much agreement internationally on the importance of nosocomial infection and the priorities for surveillance, there are no agreed basic minimum standards for the resources and facilities necessary to control and prevent nosocomial infection.

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Introduction

The clinical and financial consequences of nosocomial infection are increasingly recognized. In a recent survey of nosocomial bacteraemia in a Belgian hospital, patients with bacteraemia had a significantly longer hospital stay, a significantly higher mortality and were associated with greater costs (€12 853) compared with controls.¹ Since the 1980s, it has been recognized that a pro-active programme of nosocomial surveillance and control is capable of potentially reducing the prevalence by 32%.² Therefore, there is considerable rationale for investing in this component of health service delivery at both local and national level.

Internationally, there have been efforts to co-ordinate hospital prevention activities and to determine whether or not a common approach can be adopted. In a questionnaire circulated to 223 hospital infection control physicians throughout Europe, there was considerable variation in the resources allocated, e.g. the presence or absence of full-time infection control nurses, and over two-thirds expressed the view that standardization of surveillance systems was a top priority.³ Initiatives established by the European Parliament and Council include HELICS (Hospital in Europe Link for Infection Control through Surveillance), EARSS (European Antimicrobial Resistance Surveillance Scheme) and ESAC (European Surveillance on Antimicrobial Consumption).⁴ Through these mechanisms, it is hoped to establish national surveillance networks as part of a Europe-wide strategy.

The organization and delivery of hospital infection control services in the Republic of Ireland are similar in many respects to those in the UK, as described recently.⁵ The infection control team is usually led by a consultant microbiologist, many of whom have partly trained or who have previously worked in the UK, and most infection control nurses are members of the Infection Control Nurses Association. Until the introduction of the EARSS programme, there was little if any prospective national surveillance carried out in Ireland.⁶

In 1999, a large national survey of methicillin-resistant *Staphylococcus aureus* (MRSA) was carried out in the Republic of Ireland in association

with colleagues in Northern Ireland, which revealed a higher prevalence rate of MRSA in the Republic of Ireland.^{7–10} In 2001, the Strategy for the Control of Antimicrobial Resistance in Ireland (SARI) was launched by the Department of Health and Children in Dublin (www.dohc.ie). The development of principles in relation to infection control in the hospital and in the community setting was amongst its main recommendations.¹¹ Arising from this, a working group decided to carry out a comprehensive survey to determine current resources for infection control, antibiotic stewardship and occupational health services in acute hospitals in Ireland. This article reports the results of that survey as they relate to infection control and occupational health.

Methods

The SARI Infection Control Subcommittee and the SARI Antibiotic Stewardship Subcommittee designed the survey questionnaire. The questionnaire was piloted in hospitals that included members of both committees. The final draft of the questionnaire was then circulated in September 2003 to the chief executives of all acute public hospitals, the complete list of which was obtained from the Irish Medical Directory and the Irish Department of Health and Children's reports on acute public hospital statistics. Private hospitals that carry out inpatient surgical procedures were also included in the survey.

Survey questionnaires were sent to all 68 acute public and private hospitals, and reminder letters were sent and telephone contact was made for non-responders up to the end of December 2003. Completed survey forms were scanned into a database using an automated optical reader (Teleform, Cardiff Software, Vista, CA, USA). Results were analysed using Microsoft Excel and EpiInfo.

Results

The main findings of the survey are shown in [Table 1](#). Questionnaires were received from 66

Table 1 Summary of results (N = 66)	
Hospital characteristics	Number of hospitals (%)
Hospital demography	
Acute general ('district') hospitals	40 (61)
Large regional or tertiary referral centres	11 (17)
Specialist hospitals (e.g. maternity, orthopaedic or paediatric)	15 (23)
Microbiology laboratory on site	
Consultant microbiologist on site	31 (47)
Off-site access to consultant microbiologist	16 (46)
Infection control nurse on site	56 (85)
Occupational health physician	
Occupational health physician on site	18 (27)
Off-site access to occupational health physician	29 (44)
Occupational health nurse	
Occupational health nurse on site	31 (47)
Off-site access to occupational health nurse	17 (26)
Staff screening for presence of, or immunity to, infectious disease	
Hepatitis B	62/62 (100)
Varicella-zoster	43/62 (69)
Tuberculosis (Mantoux testing)	38/62 (61)
Rubella	25/62 (40)
Measles	15/62 (24)
Staff vaccination	
Hepatitis B	64 (97)
Influenza	57 (89)
Rubella	19 (30)
BCG	9 (14)
Infection control committee	
On-site committee	48 (73)
Off-site committee	7 (11)
Single rooms available for isolation of patients with infection	63 (95)
Documented infection control policies	
Policies available in electronic format	25 (38)
Surveillance of nosocomial infection	55 (83)
Alcohol-based hand hygiene agents available	
At each handwashing sink	22 (39)
At entrance to every ward	16 (28)
At entrance to every isolation room	36 (63)
Beside every bed	11 (19)
Hand hygiene promotional activities in place	
Hand hygiene educational posters	60 (92)
Hand hygiene educational leaflets	27 (42)
Delivery of lectures and presentations	52 (80)
Active reminders to staff members	42 (65)
Other techniques (e.g. hand plating, fluorescent powder)	15 (23)

(97%) hospitals, although not all questions were answered by all of the respondents. Ten (15%) replies were received from private hospitals. The median number of acute inpatient beds for all hospitals was 156, but this varied widely between hospital types. The median number of acute beds

among specialist hospitals was 121 (range 35–250). Corresponding values for general hospitals and tertiary hospitals were 142 (range 53–350) and 522 (range 206–753), respectively.

There was a median of 0.6 (range 0.1–2.9) whole-time-equivalent consultant microbiologist

posts among the 31 (47%) hospitals with an on-site consultant microbiology service. There was a mean ratio of one infection control nurse for every 222 acute beds among the hospitals with one or more infection control nurses on site. The ratio for all hospital beds (acute, long stay, day care and intensive care) with or without on-site access was one per 248. The 10 hospitals without an infection control nurse on site comprised seven general hospitals, two maternity hospitals and one orthopaedic hospital.

Eleven (seven general, four specialist) hospitals had no on-site or off-site access to an occupational health physician or occupational health nurse. Occupational health issues were dealt with by an infection control nurse in 24 hospitals.

Among the 55 (85%) hospitals with an infection control committee, the membership of the committees included an infection control nurse in 52 (95%) hospitals, a senior administrator in 47 (86%) hospitals, a consultant microbiologist in 39 (71%) hospitals, a general physician in 38 (69%) hospitals, a general surgeon in 37 (67%) hospitals, an occupational health physician in 25 (46%) hospitals, and a sterile services manager in 18 (33%) hospitals.

Only nine hospitals had designated administrative/secretarial support for the infection control service, with a median of 0.4 whole-time-equivalents (range 0.1–1). Only six hospitals (9%) had a dedicated budget for infection control, 45 (79%) had a designated computer and 42 (71%) had access to the Internet. However, 47 out of 63 hospitals (75%) provided funding for continuing education and meeting attendance for infection control nurses.

Among the 63 (95%) hospitals with single rooms available for isolation, there was a median of one isolation room for every 16 acute beds (range 1.1–166). Amongst public hospitals, the highest median ratio of isolation rooms was in specialist hospitals (22.6, range 2.5–70). Fifty-five hospitals provided data on the number of isolation rooms with

en-suite bathroom facilities, with a median of five rooms (range 0–144) per hospital. For the 43 hospitals that reported having en-suite isolation rooms, there was a median of one en-suite room for every 18 acute beds (range 1.1–188).

Only nine (14%) hospitals reported having isolation rooms capable of negative pressure ventilation, with a total of 52 such rooms between them. Five of these hospitals had only one such room and three hospitals had 10 or more rooms, mainly in the Dublin area.

All 66 hospitals had documented infection control policies. The distribution of specific policies is shown in Table II. Other policies that were available included a general policy on isolation and transmission-based precautions in 26 (51%) hospitals, severe acute respiratory syndrome in six (12%) hospitals, tuberculosis in 16 (31%) hospitals, and Creutzfeldt Jakob disease in 12 (24%) hospitals. Many of these hospitals also listed policies particular to local specialities. Fifty-five hospitals (83%) undertook surveillance of nosocomial infection, the categories of which are outlined in Table III.

Sixty-four (97%) hospitals provided data on the ratio of handwashing sinks to acute beds. Twenty-nine hospitals (45%) had one handwashing sink for every one to five beds and a further 29 (45%) hospitals had one handwashing sink for every five to 10 beds. The remaining six hospitals had ratios ranging from one sink for every 10 beds to one sink for every 25 beds.

Discussion

This is the first comprehensive survey of facilities for the control and prevention of nosocomial infection in the Republic of Ireland, with a response rate of 97%. It reveals major gaps in the provision of resources and facilities, following the development of national guidelines for the control

Table II Infection control policies available in Irish hospitals ($N = 66$)

Policy	Hospitals with policy/hospitals that answered question (%)	Policy updated in past three years/hospitals with policy that answered question (%)
Urinary catheter care	47/64 (73)	39/47 (83)
Vascular catheter care	58/63 (92)	49/56 (88)
Decontamination of medical devices	49/62 (79)	37/46 (80)
Postoperative wound care	36/62 (58)	26/33 (79)
Hand hygiene	64/65 (98)	51/63 (81)
Decontamination of endoscopes	46/60 (77)	31/44 (70)
Ward/environmental hygiene	58/63 (92)	47/57 (82)
Healthcare risk waste	61/64 (95)	46/57 (81)
Meticillin-resistant <i>Staphylococcus aureus</i>	65/65 (100)	55/63 (87)

Table III Categories of surveillance of nosocomial infection in Irish hospitals (*N* = 55)

Type of surveillance	Hospitals (%)
Alert organism surveillance (e.g. MRSA)	46 (84)
Surgical site infection	17 (31)
CVC-related infection	23 (42)
Intensive-care-associated infection	19 (35)
Urinary tract infection	13 (24)
Bloodstream infection	33 (60)
Gastrointestinal infection	33 (60)

CVC, central venous catheter; MRSA, methicillin-resistant *Staphylococcus aureus*.

of antimicrobial resistance in 2001.¹¹ While the survey found that the number of consultant microbiologists and infection control nurses in post had increased since the 2001 report, there are still insufficient microbiologists/infection control doctors and occupational health physicians available, and many acute hospitals do not have infection control nurses on site. Furthermore, the number of isolation rooms, especially those with en-suite facilities, is worryingly low.

The organization and delivery of hospital infection control services in a number of countries have been reviewed in this journal recently.^{5,12–17} Most of these reports have described the background or history of infection control services and how these are organized at local and national level, but there is relatively little detail on resources and practices. However, a similar survey to that reported here was carried out amongst Italian hospitals in 2000; infection control physicians and infection control nurses were absent in 28.7% and 46.0% of Italian hospitals, respectively.¹² In many countries, such as Australia, a programme of healthcare infection prevention is part of national hospital standards and is a key component of hospital accreditation.¹³ Although there is close collaboration and professional association between infection control nurses and microbiologists in the Republic of Ireland and in the UK, the infrastructure and the provision of resources seem to be inferior in the Republic of Ireland, and the mandatory reporting of various nosocomial infections is now the norm in the UK.⁵

Although this questionnaire was drafted and distributed through a sub-committee of a national committee dealing with the prevention of antimicrobial resistance, there is no national infection control committee, unlike in France.¹⁴ In France, such a committee is appointed by the Ministry of Health and there are five regional co-ordinating centres, in contrast to many other countries where the organization and delivery of nosocomial

infection prevention is more decentralized. A number of the acute hospital networks in Ireland have a regional infection control committee, but these committees are purely advisory in nature and centralized co-ordination of infection control activities is lacking.

Ongoing surveillance is a characteristic feature of strategies to prevent nosocomial infection in both Spain and Germany.^{15,16} Key features of nosocomial infection prevention and control in The Netherlands include a relatively small number of acute hospitals (115 for a population of 16 million compared with 68 in Ireland for a population of 4 million), patient rooms with a maximum of four beds, and a national standard that recommends one infection control nurse per 250 beds and one medical microbiologist per 1000 beds.¹⁷ In terms of the development and spread of MRSA, the strategy in The Netherlands appears to have worked, especially the 'search and destroy' approach, to contain MRSA.

Recent efforts to provide European and global approaches to controlling and preventing nosocomial infection have focused on surveillance and future priorities.^{3,4} There is now reasonable consensus on the key strategies for surveillance. In North America, surveillance of nosocomial infection is intrinsically linked with quality initiatives in healthcare delivery and the recording of healthcare-associated events.¹⁸ However, greater clarity is required on the basic resources and facilities required for national and local infection programmes.

There is a need to agree the minimum resources and facilities required to prevent nosocomial infection at European level. Currently, there is no national programme of surveillance in Ireland, which is in breach of European regulations. From reviewing the organization of infection control in other countries and from descriptions of outbreaks in the literature, the extent of the resources available in many European hospitals is not clear. In particular, there is a need to define the minimum number of infection control nurses per acute hospital beds, in general and in tertiary referral centres, and whether or not the infection control doctor/microbiologist should always be based on site. In tandem with this, there is a need to agree a minimum number of isolation beds for an acute hospital and the minimum space between beds, as both factors are important components in preventing infection.

Increasingly, the public and politicians are becoming aware that the prevention and control of nosocomial infections are cost-effective, result in better utilization of healthcare facilities, and reduce patient morbidity but this requires

appropriate resources. Pittet *et al.* demonstrated that improved compliance with hand hygiene, associated with the appropriate resources to implement this and with other measures, can result in a reduction in nosocomial infection including MRSA transmission rates.¹⁹

Whilst there is now greater awareness in the Republic of Ireland of the need for improved resources to prevent and control nosocomial infection, much work needs to be done, especially in terms of the appointment of appropriate personnel and the provision of adequate isolation facilities. Nonetheless, the absence of a European or global consensus on the minimum resources for nosocomial infection prevention is a handicap as there is no agreed standard to bring to national agencies. Agreement on the definitions and priorities for the surveillance of nosocomial infection are welcome, but this needs to be linked to the minimum resources required to achieve this. The Irish Health Services Executive is currently developing a set of national standards for infection control in Ireland. These standards, when finalised, will hopefully inform the provision of appropriate resources while also establishing corporate responsibility for infection control within the Irish health service.

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