A National Survey of Infection Control and Antimicrobial Stewardship Structures in Irish Long-Term Care Facilities

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Abstract

**Background:** Information on infection prevention and control (IPC) and antimicrobial stewardship activities in Irish long term care facilities (LTCFs) is limited.

**Methods:** A survey detailing IPC and antimicrobial stewardship activities, including staffing and bed capacity was circulated to Irish LTCFs.

**Results:** Sixty-nine LTCFs (61 public, eight private) were surveyed, 56 (81%) had an IPC practitioner. Thirty-five (51%) LTCFs had an IPC committee which met on average five times (range 1 - 10) in the previous year. LTCFs with IPC practitioners based solely in the facility (n=17) were more likely to have an IPC committee (p = 0.027). Antimicrobial guidelines were available in 28% (n=19) and 16% (n = 11) had an antimicrobial stewardship committee in place. Medical care was provided by general practitioners (n=35, 51%), physicians employed by the LTCFs (n=24, 35%) or both (n=10, 14%). Medical care and activities was coordinated in 45% (n=31) of LTCFs. These LTCFs were more likely to have an IPC committee (p<0.001), medical staff training (p<0.001) and antimicrobial guidelines (p=0.005) in place.

**Conclusion:** This study indicates that there are significant gaps in Irish LTCFs’ IPC and antibiotic stewardship programmes and governance structures highlighting the need for specific LTCF national initiatives.
**Background**

Healthcare associated infection (HCAI) and the consequences of increasing rates of antimicrobial resistance are potentially serious health threats for frail elderly people, including those living in long-term care facilities (LTCFs). Residents may acquire multi-drug-resistant organisms (e.g., meticillin resistant *Staphylococcus aureus* or extended spectrum β-lactamase producing organisms) in both hospital and LTCF settings. In addition, if appropriate infection prevention and control (IPC) standards are not maintained, these organisms may spread to other residents. Good IPC practice and antimicrobial stewardship is essential in all healthcare settings to prevent HCAI and the emergence of antimicrobial resistance and are essential components of a patient/resident quality and safety programme.

In comparison to the acute care setting, programmes for the prevention and control of HCAI in LTCFs has tended to be less well-organised and less resourced. National information on IPC and antimicrobial stewardship programmes in healthcare facilities is essential to enable health authorities to plan preventative programmes and track the effect of improvement initiatives. In the Republic of Ireland, such information is predominantly from the acute hospital setting. Reports from other countries indicate that IPC and antimicrobial stewardship resources and structures in the setting of LTCF are inadequate. For example, a 2006 European survey found major gaps in LTCF in many countries, including lack of governance structures, inadequate national LTCF IPC policies, lack of awareness of the relevance of HCAI in this setting, and major gaps in IPC expertise.

The Republic of Ireland has a mixed public (Health Services Executive, HSE) and private healthcare system. The public health care system is financed primarily through taxation including an income-related health levy. In 2009, the total number of LTCFs in Ireland was
598, with 453 (75%) privately and 145 (25%) publicly owned. (Source: private communication from HSE and Nursing Homes Ireland).

In Ireland, IPC practitioners can either work in a specific private or public LTCF (‘internal’ IPC practitioner), or are community based with responsibility for a number of LTCFs in their catchment area (‘external’ IPC practitioner). The provision of day-to-day medical care is variable with three possible scenarios. Firstly; residents may, depending on the geographical location of the LTCF, retain their personal primary care physician/gp (GP) or opt to register with a new GP. The second scenario is where the LTCF employs a medical officer. Finally, a LTCF may have a combination of personal GPs attending residents and also employ a medical officer. In addition to the scenarios described above, specialist hospital physicians (e.g., geriatric physicians) may have a contract with the public health system to provide a range of services to a LTCF (‘external’ physician) but do not provide day-to-day medical care.

The aim of this study was to survey IPC and antimicrobial stewardship resources in Irish LTCFs, for the first time, with a view to informing national patient safety and HCAI preventative programmes.

**Methods**

The survey was a component of the 2010 Healthcare-Associated Infection in Long-Term Care Facilities (HALT) study coordinated by the European Centre of Disease Control and took place in Ireland in June 2010. In Ireland, participation in the survey was voluntary and coordinated by the Health Protection Surveillance Centre. A call for participation was disseminated through representative professional organisations, the public health community services and Nursing Home Ireland (representative organisation for private nursing homes
operators). In addition, the Health Protection Surveillance Centre, which is the national centre for surveillance of HCAI in Ireland utilised a standard mailing list to contact IPC nurses with responsibility for LTCFs to encourage them to enrol their facilities.

A number of regional education workshops were provided by the coordinating centre for participating LTCFs to provide training on data collection. Each facility nominated a lead person, who had attended one of the workshops, to coordinate the survey. This lead person role included; data collection which in some facilities involved training local staff, and submission of the results to the national centre. The following information was collected from each participating LTCF; type and ownership (public or private), number of; beds, single rooms, attending physicians and the availability of medical coordination, presence of; round-the-clock licensed nurses, IPC practitioners, protocols, training and surveillance activities. Medical coordination was defined as co-ordination of medical activities and the standardisation of practices/policies in the LTCF by a designated medical doctor. Doctors who undertook this role were called a ‘coordinating physician’. Data was also collected on antimicrobial stewardship activities including availability of local antimicrobial guidelines, training and audit.

Data was collected in paper format with subsequent local transcription of data into a stand-alone Microsoft Access-based software application, developed by the European HALT study group. Each LTCF was assigned a unique identification number. An electronic copy of the anonymised data from each LTCF was then forwarded securely to the HPSC by e-mail. Statistical analyses were carried out using OpenEpi Version 2.3.1 (http://www.openepi.com/). The Chi-squared test or Fisher’s exact test were used for statistical analysis on categorical variables as appropriate. The t-test was used for statistical analysis on numerical variables.
Results

Sixty-nine LTCFs completed the questionnaire (61 in public and eight in private ownership). Twenty-seven (39%) were classified as general nursing homes, seven (10%) cared for residents with intellectual disability and the remaining 35 (51%) provided a mix of care (including residential, psychiatric, physically-disabled, rehabilitation, palliative, sanatorium or other). The median number of beds per LTCF was 47, (range 10 to 382), and 27% of the beds were in single patient rooms.

Twenty-four hour licensed nursing care was available in all LTCFs. Medical care was provided by the patient’s personal GP in 51% (n=35), a medical officer employed by the facility in 35% (n=24) and both in 14% (n=10). In the 35 LTCFs under GP medical care, there was a wide range in the number of GPs caring for residents within a LTCF, ranging from one GP for 100 residents to eight GPs for 11 residents. The number of personal GPs providing medical care did not correlate with the size of the LTCF (correlation coefficient = -0.07) (Figure 1). There was no difference between the number of attending GPs in general LTCFs compared to intellectually disabled facilities (p = 0.301, correlation coefficient = -0.6) and mixed facilities (p = 0.8309, correlation coefficient = 0.14 ).

![Figure 1: Lack of correlation between LTCF size and number of personal general practitioners (GPs) providing medical care in 35 LTCFs where medical care is provided solely by personal GPs](image-url)
There was an IPC practitioner in post in 56 LTCFs (81%), but in 39 (70%) of these facilities, this person was an ‘external’ IPC practitioner. Nurses accounted for 88%, (n=49) of IPC practitioners, medical doctors 3.5% (n=2) and in 9% (n=5) the speciality of that person was unknown. There was no association between the presence of an IPC practitioner and LTCF size (when LTCF were divided into two groups of < 50 beds and > 50 beds, p = 0.65, OR = 1.34, 95% CI = 0.39, 4.76); presence of an IPC committee, (p = 0.84, OR = 1.15, 95% CI = 0.28, 4.73); a HCAI surveillance programme (p = 0.60, OR = 0.6711, 95% CI = 0.1536, 3.577), or an antibiotic stewardship committee (p value = 0.08). Facilities with an ‘internal’ IPC practitioner were more likely to have an IPC committee in place when compared with those with an ‘external’ IPC practitioner, p = 0.027, OR = 4.1; 95% CI = 1.163, 16.93. However, there was no association between presence of an ‘internal’ IPC practitioner and presence of a HCAI surveillance programme (p = 0.67, OR = 1.4; 95% CI = 0.3, 5.54) or an antibiotic stewardship committee (p = 0.64, OR = 1.4; 95% CI = 0.3, 5.7).

Coordination of medical activity was provided in 45% (n = 31) of LTCFs by either a GP (13%, n = 9), a designated medical officer employed by the LTCF (28%, n = 19) or an external physician (4%, n=3). These doctors were called coordinating physicians. On average 57 hours a month was devoted to medical coordination but this varied considerably by LTCF (range 6 – 202 hours). The most common tasks were provision of medical care (98%), coordination of vaccination policy (74%) and development of an IPC and antibiotic policy (19%). A ‘coordinating physician’ was more likely to be present in facilities that employed a medical officer (n=23, 70%) compared to facilities with GP only care (n=8, 23%), p <0.001, OR =7.491; 95% CI = 2.585, 23.43.

Thirty-five (51%) LTCFs had an IPC committee which met on average five times (range 1 - 10) in the previous year. The majority (86%; n=59) had an IPC training programme for
nursing and paramedical staff, however only 22% (n=15) had such a programme for medical staff. LTCFs with a coordinating physician were more likely to have an IPC committee (76%) compared to those without (33%), p<0.001, OR=6.088, 95% CI =2.07, 19.41. Similarly, presence of a coordinating physician was associated with IPC training of medical staff (42% versus 5%), p<0.001, OR = 12.16, 95% CI = 2.747, 87.04).

Most LTCFs had IPC protocols available including hand hygiene (99%), management of meticillin resistant *Staphylococcus aureus* colonised residents (97%) and management of urinary catheter care (90%). Hand hygiene training was provided in the year prior to the survey in 88.4% (n=61) of facilities. Alcohol-based hand rub was available in 68 (98.6%) of facilities. Audits on IPC practices and procedures were undertaken in 48% (n= 33) and a HCAI surveillance programme was present in 20.3% (n=14) of LTCFs. Details of IPC activities are summarised in Table 1.

### Table 1: Description of IPC activities in 69 Irish LTCFs

<table>
<thead>
<tr>
<th>Infection Prevention and Control Activities and Protocols</th>
<th>Number of LTCFs (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control activities</strong></td>
<td></td>
</tr>
<tr>
<td>IPC(^a) training of nursing/paramedical staff</td>
<td>59 (86)</td>
</tr>
<tr>
<td>Hand hygiene activities</td>
<td>58 (84)</td>
</tr>
<tr>
<td>Management of outbreaks</td>
<td>57 (83)</td>
</tr>
<tr>
<td>Decisions on transmission-based precautions for residents</td>
<td>54 (78)</td>
</tr>
<tr>
<td>Audits on infection policies and procedures</td>
<td>33 (48)</td>
</tr>
<tr>
<td>IPC(^a) training of GPs/medical staff</td>
<td>15 (22)</td>
</tr>
<tr>
<td><strong>Written protocols</strong></td>
<td></td>
</tr>
<tr>
<td>Hand hygiene</td>
<td>68 (99)</td>
</tr>
<tr>
<td>Management of MRSA</td>
<td>67 (97)</td>
</tr>
<tr>
<td>Management of urinary catheter care</td>
<td>62 (90)</td>
</tr>
<tr>
<td>Enteral feeding</td>
<td>59 (86)</td>
</tr>
<tr>
<td><strong>Programme of surveillance of HCAI(^b)</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>14 (20.3)</td>
</tr>
<tr>
<td>No</td>
<td>52 (75.4)</td>
</tr>
<tr>
<td>Unknown</td>
<td>3 (4.3)</td>
</tr>
<tr>
<td><strong>Hand hygiene training organised previous year</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>61 (88.4)</td>
</tr>
<tr>
<td>No</td>
<td>7 (10.1)</td>
</tr>
<tr>
<td>Unknown</td>
<td>1 (1.4)</td>
</tr>
</tbody>
</table>

\(^a\) IPC, Infection Prevention and Control; \(^b\) HCAI, Healthcare associated infections
Guidelines for appropriate antimicrobial use were available in only 28% (n=19) of LTCFs. Antimicrobial guidelines were more likely to have place in LTCFs with a coordinating physician (45%) compared to facilities without (14%), p = 0.005, OR = 5.134, 95% CI = 1.614, 18.36. Only 16% (n = 11) had an antimicrobial stewardship committee and all of these facilities had antimicrobial guidelines and advised the collection of microbiological samples prior to commencing empiric antimicrobial therapy. Details of antibiotic stewardship activities are outlined in Figure 2.

![Figure 2: Summary of antimicrobial stewardship activities in 69 Irish LTCFs](image)

* Permission required for prescribing restricted antimicrobials

Discussion

This is first time that IPC and antimicrobial stewardship organisation, resources and policies have been described in Irish LTCFs. Overall, 42% public and 1.7% private Irish LTCF participated in this survey. Due to the low level of participation from private facilities the conclusions drawn are more likely to reflect practice in LTCFs that are in public ownership in Ireland.
This study indicates that there are significant gaps in Irish LTCFs’ IPC and antibiotic stewardship programmes and governance structures when compared to international best practice guidance and national standards. (7;8) The finding that 81% of facilities had access to an IPC practitioner compares favourably with a 2006 German study which found that 66% of LTCFs had qualified IPC personnel. (5) However, a limitation of this study is that information on the number of dedicated IPC hours available to each facility was not collected. This warrants further investigation given that 70% of the IPC practitioners in post had responsibility for other facilities. Only 51% of LTCFs had an IPC committee in place and 16% an antimicrobial stewardship committee, which suggest that many IPC professionals are working within an inadequate support structure. (7-9) It is notable that LTCFs with an ‘internal’ IPC practitioner were more likely to have an IPC committee in place, which suggests that on-site presence has a positive impact on IPC governance structures.

The finding that one in five LTCFs had a HCAI surveillance programme in place, while less than half undertook audits of IPC policies and procedures is of concern, as these are fundamental elements to enable facilities to effectively manage and control HCAI. (8;10;11) The disparity noted between the availability of IPC training for nursing and paramedic staff (86%) compared to medical staff (22%) was also observed in a Scottish (64% versus 2%) and Canadian study (83% versus 18%). (6;12) The number of facilities that were providing IPC training for nurses and paramedic staff was greater than those with an IPC practitioner in place, thus indicating that alternative training methods was being provided (though details of this training was not captured in the survey).

The finding that the number of GPs did not correlate with the size of the facility is interesting and may reflect the complex arrangements for GP care in Irish LTCFs and the rural location of some of the facilities. A survey of German LTCFs suggested that a high ratio of physicians to residents complicates the introduction and compliance with IPC guidelines. (5) It is also
likely that multiple prescribers in a LTCF in the absence of antimicrobial stewardship governance structures and prescribing guidelines could have a deleterious effect on the appropriateness of antimicrobial prescribing and the emergence of antimicrobial resistance in that facility. However, the issues relating to multiple physicians attending LTCFs must be balanced against the need for the residents to have access to a high quality medical service.

In this survey, over 50% of the facilities surveyed had no formal medical coordination in post. LTCFs with a coordinating physician were more likely to have an IPC committee, medical staff IPC training and antimicrobial prescribing guidelines in place. This is an interesting finding that warrants further investigation of the potential benefits of a medical coordination, given the reported wide variation in time commitment to and responsibility of the post.

Limitations of this survey include poor coverage of private facilities, lack of information on dedicated IPC practitioner hours and information on how IPC training was delivered. In addition there was a potential recruitment bias in that LTCFs with community IPC nurses in their catchment area were more likely to participate because IPC nurses were specifically contacted by the coordinating centre. However, this survey was the first time that information of this nature was collected from the long term care sector on a national basis and serves as an important benchmark for the Irish healthcare service.

In summary, this is the first time that IPC and antimicrobial stewardship structures have been described in Irish LTCFs. The variation in potential antimicrobial prescribers and deficits in IPC and antimicrobial stewardship governance highlights the need for specific LTCF national initiatives. While a reasonable coverage of public LTCFs was achieved, there is a need for a more comprehensive national survey on infection control activities and resources in the LTCF setting in order to inform future preventative strategies.
Reference List


