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How much time should long-term care and geriatric rehabilitation facilities (nursing homes) spend on infection control?

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Background: For hospitals, standards for the required number of infection control personnel are outdated and disputed. Such standards are not even available for long-term care and geriatric rehabilitation facilities (ie, nursing homes). This study addressed the question of how much time nursing homes should spend on infection control.

Methods: Through group discussions and individual sessions, experienced infection control practitioners, medical microbiologists, and nursing home doctors evaluated the time needed to perform infection control activities in a model nursing home.

Results: The number of hours needed was estimated as 513 per 100 beds, or 154 per 10,000 care-days per year.

Conclusion: Given that significant differences can be expected among the various facilities identified as nursing homes, long-term care facilities, or geriatric rehabilitation centers, as well as among countries, the standard that we propose for The Netherlands will not be generally applicable. However, the method we have used to determine this standard can be easily applied in other countries and settings.

Key Words: Infection control/methods; infection control/organization & administration; infection control practitioners; nursing homes/manpower.

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Since the 1970s, hospitals have been using an outdated and disputed standard of 1 infection control practitioner (ICP) per 250 hospital beds and 1 epidemiologist or medical microbiologist per 1000 hospital beds. This norm is based on the Study on the Efficacy of Nosocomial Infection Control (SENIC) and reflects the mean number of ICPs and hospital epidemiologists in US hospitals around 1976.^{1,2} Health care has changed significantly since that time, and several revised standards for hospitals have been proposed recently.³⁻⁷ A Canadian study and a Dutch study using the same methodology proposed a new standard of

1 ICP per 167 and 178 hospital beds, respectively.^{6,7} Because the number of hospital beds is not an official indicator for Dutch hospitals, the proposed standard for The Netherlands is 1 ICP per 5000 admissions and 1 medical microbiologist for infection control activities per 25,000 admissions.⁷

Over the past 2 decades, the care delivered by Dutch long-term care and geriatric rehabilitation facilities (ie, nursing homes) has become more complex and intensive. Moreover, geriatric rehabilitation has moved from hospitals to nursing homes. The more complex care for patients with chronic diseases also has increased the impact of multiresistant pathogens, such as methicillin-resistant *Staphylococcus aureus* and bacteria producing extended-spectrum betalactamases, and outbreaks with other microorganisms, such as norovirus. These changes have led to an increasing need for infection control measures in nursing homes and for infection control teams with expertise in this specific field of infection control.⁸ In contrast to hospitals, no standard specifying the number of personnel required for infection control has been established for nursing homes.

We addressed the question of how much time nursing homes should spend on infection control through a process of group discussions and individual evaluation of estimated times needed to perform defined infection control tasks by professionals with experience in infection control in nursing homes.

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PARTICIPANTS AND METHODS

With the help of Dutch professional societies, 10 ICPs (Dutch Society of Infection Prevention and Control in the Health Care Setting), 5 medical microbiologists (Dutch Society of Medical Microbiology, NVMM) and 5 nursing home doctors (Verenso; Dutch Society of Nursing Home Doctors and Social Geriatrists) were invited to participate. The participants were selected based on their practical experience with infection control in nursing homes. The participants were asked to indicate how much time they would need to perform listed activities in a model nursing home. Initially, the list of tasks was the same as that used for assessing infection control needs in Dutch hospitals.⁷ The participants had the opportunity to modify the list during the process. The model nursing home was a facility in Rotterdam with 144 registered beds, including 27 for long-term care, 54 for long-term psychogeriatric care, 36 for geriatric rehabilitation, 9 for psychogeriatric diagnostic observation, 9 for terminal-palliative care, and 9 for young patients with dementia. The number of care-days for geriatric care was 21,939 per year, and that for psychogeriatric care was 25,894 per year. The participants were explicitly asked to take their own experience as a starting point and convert this to the scale of the model nursing home.

The session started with each participant individually scoring the time needed to perform each task. When this was completed, small groups were formed to discuss the list of tasks and compare individual scores. Next, the results from the first scoring round were presented, after which the participants again indicated the hours needed to perform the listed tasks. Results of the second round were presented and discussed in a plenary session. A third and final scoring round followed the conclusion of the plenary discussion.

RESULTS

Ten ICPs, 5 medical microbiologists, and 4 nursing home doctors participated in the workshop, held on November 5, 2008. The original list of tasks was modified during the discussions, resulting in 9 specific areas of infection control activities and a tenth category of other, miscellaneous activities (Table 1). Because the differences between the second and third rounds of scoring were very small, the process was stopped after the third round. Based on the third round, the total number of hours needed for infection control activities in the model nursing home was estimated as 61.6 per month (7392 per year). Infection control practitioners account for 49% of this time

nursing home doctors for 37%, and medical microbiologists for 14%. These estimates are based on the mean scores from the third round. The results remain almost the same when the calculation is based on the median scores. Taking the indicators of the model nursing home, the number of hours required can be generalized to 513 per 100 beds, or 154 per 10,000 care-days per year.

DISCUSSION

The ICPs, nursing home doctors, and medical microbiologists, all of whom were actively involved in infection control in nursing homes, indicated in a structured process that nursing homes should spend about 150 hours per 10,000 care-days per year on infection control activities. Performing the tasks listed in Table 1 requires all 3 types of experts. The distribution of these tasks among the 3 experts should not necessarily be as indicated in this study. Who should perform specific tasks depends in part on specific skills held by specific experts, but otherwise can be determined based on individual judgment. Some tasks can be done by, for example, a quality control manager or administrative employee. The nursing home director should determine how the infection control tasks are executed and how much time should be spent on these tasks.

The small group discussion between the first and second scoring rounds resulted in changes in the scores, probably because the discussion led to a better consensus regarding the implications of the tasks. The general discussion between the second and third round had little effect on the scores.

The Canadian Infection Prevention and Control Alliance, using the same method and a comparable list of tasks, estimated the need for ICPs in long-term care facilities as 1 full-time equivalent (FTE) ICP per 150-250 beds.⁶ Setting 1 FTE at 1600 working hours per year, this comes to roughly 1090-1820 hours per 100 residents per year. A US study using a Delphi method asked 35 panel members (primarily ICPs) to indicate their estimates of staffing requirements for infection control in several health care settings.⁴ The panel estimated the need for 0.8 FTE for a long-term care facility with 100 beds, increasing to 3 FTE for a 500-bed facility. The Canadian and US estimates are much higher than our estimate of about 500 hours per 100 residents per year. The difference possibly can be explained by differences in medical specialization in nursing home medicine between The Netherlands and Canada and the United States.⁹ The model long-term care facility used in the Canadian study was assumed to include peritoneal and hemodialysis and ventilator-dependent care, which are seldom performed in Dutch nursing homes.

Table 1. Time needed for infection control tasks, hours per month

Task	ICPs (n = 10)			Nursing home doctors (n = 4)			Medical microbiologists (n = 5)		
	Mean	Median	Range	Mean	Median	Range	Mean	Median	Range
Surveillance	1.7	1.8	0.5-3.0	1.6	2	0.5-2.0	0.5	0.3	0.1-1.0
Committee work	3.0	3.0	1.0-5.0	1.4	1.5	0.7-2.0	0.4	0.5	0-1.0
Accessibility and availability beyond working hours	0.6	0.8	0-1.0	1.0	1.0	0.1-2.0	0.3	0.3	0-0.5
Keeping up to date by postgraduate courses, taking note of new products, procedures, policies, and literature	1.2	1.0	0.5-2.0	2.1	2.0	1.3-3.0	0.7	0.7	0.3-1.0
Teaching	1.6	1.8	1.0-2.0	1.0	0.9	0.5-1.5	0.3	0.2	0.1-0.5
Development, implementation, and auditing of guidelines and protocols	7.1	7.0	4.0-10	2.7	2.8	0.3-5.0	0.7	0.4	0.2-2.5
Counseling and consultation	2.7	2.6	1.5-4.0	3.9	4.0	0.7-7.0	0.9	1.1	0.2-1.5
Outbreak management	2.7	2.0	2.0-6.0	1.3	1.1	1.0-2.0	1.3	1.3	0.5-2.0
Activities in relation to (multi)resistant bacteria and reportable diseases	3.5	1.8	1.0-11	1.5	1.4	1.1-2.0	0.8	0.8	0.3-1.1
Other activities*	6.2	6.0	2.0-10.7	6.4	6.9	2.0-10	2.5	2.8	0.9-3.6

*Other activities include, among others, administration, management, research, projects, quality improvement, supervision, travel time between locations, and management of needlestick accidents.

Several studies have surveyed the actual time allotted to infection control in nursing homes. In Germany, a survey of 39 nursing homes found that a mean of 288 hours per 100 residents per year were devoted to infection control.¹⁰ In Maryland, the mean number of ICP staff was 0.3 FTE per 200 beds for long-term care facilities (range, 25-550 beds).¹¹ This means about 240 hours per 100 residents per year for infection control. In southeast Michigan, 35 nursing homes reported spending about 1100 hours per 100 residents per year.¹² A Canadian study of 488 long term-care facilities found a mean number of 0.6 FTE ICPs per 250 beds, or about 380 hours per 100 residents per year.¹³

Comparing these figures is difficult, because significant differences can be expected among facilities that are identified as nursing homes, long-term care facilities, or geriatric rehabilitation centers, as well as among countries. As a result, the standard that we propose for The Netherlands is not generally applicable. However, our method for determining this standard can be easily applied in other countries and settings.

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