



## Brief Report

## Influence of staff infection control training on infection-related quality measures in US nursing homes



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## Key Words:

Staff training  
Long-term care  
Infection prevention

Health care-associated infections are a leading cause of morbidity and mortality in US nursing home residents. Ongoing training of nursing home staff is vital to the implementation of infection prevention and control processes. Our aim was to describe associations between methods, frequency, and timing of staff infection prevention and control training and infection-related quality measures. In this national survey of nursing homes, timing of staff infection prevention and control training was associated with reduced indwelling urinary catheter use.

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Health care-associated infections (HAIs) are a leading cause of morbidity and mortality in nursing home (NH) residents, with between 1.6 and 3.8 million infections and about 388,000 deaths occurring annually.<sup>1</sup> Most HAIs are preventable<sup>2</sup> and in a recent national survey of NHs, considerable variations in resources and practices for infection prevention and control (IPC) activities were found, such as time dedicated to IPC, staff knowledge on IPC practices, and environmental decontamination practices.<sup>3</sup> In addition, there is variation in infection rates across facilities.<sup>4</sup> This indicates that HAIs are important quality indicators.<sup>5</sup> Since 2002, the Centers for Medicare and Medicaid Services has published quality measures (QMs) for both long-stay and short-stay NH residents on Nursing Home Compare ([www.medicare.gov/nursinghomecompare/](http://www.medicare.gov/nursinghomecompare/)), an online tool for consumers to distinguish between higher and lower quality NHs.<sup>6</sup> Several QMs are related to IPC, such as the percentage of residents with a urinary tract infection (UTI) or with an

indwelling urinary catheter. These infection-related QMs are used to calculate overall ratings for NHs (up to 5 stars possible).<sup>6</sup>

Training and education of NH staff is crucial to the implementation of and compliance with recommended IPC practices, especially for those providing direct patient care (ie, certified nursing assistants [CNAs]). Lack of knowledge on IPC topics is perceived to limit the ability of NH staff to adhere to IPC processes.<sup>7</sup> We aimed to describe relationships between methods, frequency, and timing of staff IPC training and infection-related QMs in a national sample of NHs.

## METHODS

A survey of 2,514 randomly sampled US NHs was conducted between December 2013 and December 2014 to describe the current state of NH IPC programs (response rate, 39%). The individual in charge of the IPC program was invited to complete the survey. A detailed description of the survey has been published elsewhere.<sup>8</sup>

For this analysis, the main exposures were derived from the survey and were related to staff IPC training: methods (computer-based training [yes or no], handouts/flyers [yes or no], and inservices [yes or no]); frequency (monthly/biweekly/weekly, quarterly, or annually); and timing (at new employee orientation and when an infection outbreak occurred vs other [only at new employee orientation, only when an infection outbreak occurred, or neither]) to evaluate intensity of training. See [Table A1](#) for a detailed list of variables.

Survey responses were linked with concurrent Certification and Survey Provider Enhanced Reporting data to evaluate facility characteristics and with averages from the last 3 quarters of 2015 QM

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Funded by the National Institute of Nursing Research (NINR) (grant No. R01NR013687). In addition, CCC received support from NINR grant No. T32 NR013454 and JLT received support from NINR grant No. T32 NR 009356-07. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. The study sponsor had no involvement in the study design; in the collection, analysis, or interpretation of data; in the writing of the manuscript; or in the decision to submit the manuscript for publication.

Conflicts of interest: None to report.

**Table 1**  
Bivariate analysis of associations between nursing home resident urinary catheter use quality measure and facility and infection prevention and control (IPC) characteristics

Variable	Total (n = 796)	<2.5% with catheter (n = 408)	≥2.5% with catheter (n = 388)	P value
<b>Facility characteristic</b>				
Bed size	120 ± 71	118 ± 76	122 ± 65	.22
Percent occupancy	82 ± 14	83 ± 14	81 ± 15	.02
Ownership				.96
For-profit	543 (68.2)	278 (68.2)	265 (68.3)	
Government/nonprofit	253 (31.8)	130 (31.9)	123 (31.7)	
Chain member	458 (57.5)	224 (54.9)	234 (60.3)	.12
<b>Staffing</b>				
RN hrd	0.73 ± 0.31	0.74 ± 0.32	0.72 ± 0.30	.60
LPN/LVN hrd	0.78 ± 0.34	0.77 ± 0.33	0.79 ± 0.35	.43
CNA hrd	2.42 ± 0.58	2.42 ± 0.59	2.42 ± 0.57	.96
<b>Payment source</b>				
% of residents on Medicaid	61 ± 20	62 ± 20	60 ± 20	.05
% of residents on Medicare	14 ± 10	13 ± 10	14 ± 11	.28
% of residents not on Medicaid or Medicare	25 ± 18	25 ± 17	26 ± 18	.05
<b>Setting</b>				
Metropolitan	578 (72.6)	304 (74.5)	304 (74.2)	
Nonmetropolitan with an urban population	191 (24.0)	87 (21.3)	99 (24.1)	
Rural	27 (3.4)	17 (4.2)	7 (1.7)	
<b>Region</b>				
Midwest	305 (28.3)	145 (35.5)	160 (41.2)	.37
Northeast	190 (23.9)	102 (25.0)	88 (22.7)	
South	235 (29.5)	128 (31.4)	107 (27.6)	
West	66 (8.3)	33 (8.1)	33 (8.5)	
IPC citation in the previous year	64 (8.0)	32 (7.8)	32 (8.3)	.83
<b>IPC program processes and resources</b>				
<b>Methods used to provide IPC training to staff</b>				
Computer-based	400 (50.3)	194 (51.1)	204 (49.8)	.48
Handouts/flyers in care units	618 (77.6)	304 (80.0)	310 (75.6)	.83
<b>Frequency of staff training on IPC topics</b>				
Monthly/biweekly/weekly	235 (29.5)	124 (30.4)	111 (28.6)	.15
Quarterly	221 (27.8)	101 (24.7)	120 (30.9)	
Annually	340 (42.7)	183 (44.9)	157 (40.5)	
<b>Timing of staff training on IPC topics</b>				
At new employee orientation	613 (77.0)	325 (79.7)	288 (74.2)	.07
When an infection outbreak occurred	567 (71.2)	301 (73.8)	266 (68.6)	.10
<b>Timing of staff training on IPC topics (combined)</b>				
At new employee orientation and when an infection outbreak occurred	522 (65.6)	284 (69.6)	238 (61.3)	.01
Other*	274 (34.4)	124 (30.4)	150 (38.7)	
<b>Methods to monitor compliance with hand hygiene policies</b>				
Proximity monitors	27 (3.6)	14 (3.6)	13 (3.5)	.93
Product consumption	107 (14.1)	61 (15.8)	46 (12.4)	.18
Provides feedback on hand hygiene to staff	578 (77.0)	297 (78.0)	281 (76.0)	.51
Financial resources provided for continuing education in IPC within the previous 2 y	388 (51.3)	201 (51.9)	187 (50.5)	.70
<b>Frequency of IPC committee meetings</b>				
Monthly/biweekly/weekly	484 (61.7)	250 (62.2)	234 (61.3)	.81
Quarterly	208 (26.6)	103 (25.6)	105 (27.5)	
Annually	92 (11.7)	49 (12.2)	43 (11.2)	
<b>IPC professional</b>				
<b>Highest level of professional training</b>				
CNA/LPN/LVN	108 (13.6)	61 (15.0)	47 (12.2)	.01
RN/BSN/MSN	670 (84.6)	343 (84.5)	327 (84.7)	
NP/MPH/MD	14 (1.8)	2 (0.5)	12 (3.1)	
<b>Years of experience</b>				
<b>In any nursing home</b>				
0-4.5	229 (32.1)	110 (30.3)	120 (33.6)	.52
5-13	243 (34.0)	124 (34.2)	123 (34.5)	
14-40	242 (33.9)	129 (35.5)	114 (31.9)	
<b>In current nursing home</b>				
0-1.7	232 (31.8)	126 (33.5)	108 (30.2)	.17
2-4.5	224 (30.7)	103 (27.4)	121 (33.8)	
5-35	273 (37.5)	147 (39.1)	129 (36.0)	
<b>Sum of other responsibilities, in addition to IPC</b>				
At least 2	446 (56.0)	226 (55.4)	220 (56.7)	.71
< 2	350 (44.0)	182 (44.6)	168 (43.3)	
Received specific training and/or certification in IPC	306 (40.3)	167 (42.9)	139 (37.5)	.12
Percent time spent on IPC activities per week	28 ± 21	29 ± 22	27 ± 20	.23

NOTE. Values are presented as mean ± standard deviation or n (%).

BSN, bachelor of science in nursing degree earned; CNA, certified nursing assistant; hrd, hours per resident per day; IPC, infection prevention and control; LPN, licensed practical nurse; LVN, licensed vocational nurse; MD, doctor of medicine degree earned; MPH, master of public health degree earned; MSN, master of science in nursing degree earned; NP, nurse practitioner; RN, registered nurse.

\*Other timing of training included only at orientation, only when an infection outbreak occurred, or neither.

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