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Self-Reported National Healthcare Safety Network Knowledge and Enrollment: A National Survey of Nursing Homes

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Abstract

Predictors of nursing home staff knowledge of the National Healthcare Safety Network (NHSN) and facility enrollment were explored in a national survey. Facility participation in Quality Innovation Network-Quality Improvement Organization (QIN-QIO) initiatives was positively associated with both knowledge and enrollment. Also, engaging clinical personnel in decision-making on NHSN enrollment was positively associated with staff knowledge of NHSN.

Keywords

National Healthcare Safety Network; infection surveillance; nursing homes; long-term care facilities

BACKGROUND

The incidence of healthcare-associated infections (HAIs) in United States nursing homes (NHs) ranges from 1.0 to 7.4 million cases annually (1). Another study found a one-day point prevalence of 5.3 infections per 100 NH residents (2). These estimates, although derived from small samples of NHs, provide an understanding of the burden of HAIs in NHs.

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CONFLICTS OF INTEREST

None to disclose.

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To reduce this burden and improve infection data collection, the Centers for Disease Control and Prevention (CDC) launched the National Healthcare Safety Network (NHSN) Long-term Care Facility Component in 2012 to establish a national, standardized surveillance infrastructure for NHs to report and track the incidence of *Clostridioides difficile*, multidrug-resistant organisms, and urinary tract infections (3). The Department of Health and Human Services identified NHSN enrollment as one of five priority areas and a key first step in its 2013 action plan to mitigate HAIs in long-term care settings (4). In 2016, the Centers for Medicare & Medicaid Services (CMS) tasked regional Quality Innovation Network-Quality Improvement Organizations (QIN-QIOs) with supporting NHs to enroll and participate in NHSN. This study identifies and describes predictors of NH staff knowledge of NHSN and facility enrollment in order to understand if efforts to prioritize surveillance have impacted NHs.

METHODS

Survey

A national survey of NHs was conducted in 2017–2018. Directors of nursing (DONs) were contacted at eligible NHs, which were non-specialized, free-standing facilities with ≥ 30 beds and a CMS Certification and Survey Provider Enhanced Report (CASPER) dated 2014 or later to ensure they were operational and had adequate facility-level data for analysis. The random sample was identified from 2016 CASPER data and stratified by 14 QIN-QIO regions and NHSN enrollment status (30% were enrolled). Probability weights were computed based on these sampling strata and non-response predictors like ownership type and urban-rural indicators. Further details about the survey process have been published (5). The study was approved by the Columbia University institutional review board.

Variables

Respondents indicated their knowledge of NHSN and personnel involved in deciding about enrollment. Knowledge of NHSN was defined as knowing the facility's enrollment status; not knowing about NHSN was defined as not knowing enrollment status or, for non-enrolled, reporting non-enrollment due to not having heard of NHSN. Decision-makers included administrators (NH administrators, quality coordinators, Minimum Data Set coordinators), clinical staff (infection preventionists, DONs), multidisciplinary staff (administrators and clinicians were both involved), and corporate offices. Other self-reported variables included facility participation in CMS QIN-QIO initiatives, the infection preventionist's experience in infection control in months, and recent turnover of infection preventionists, administrators, and DONs (number of individuals in each position in the preceding three years). Data were linked with NH characteristics from CASPER, including: Medicare-certified bed count, ownership type, chain affiliation, hospital-based status, and quality of care measures (percent of residents with influenza and/or pneumococcal vaccinations). QIN-QIO region was also defined (6).

Analysis

Weighted bivariate analyses were computed, and Pearson's χ^2 or one-way ANOVAs were used to identify associations with staff knowledge of and facility enrollment in NHSN. Odds

ratios (ORs) and 95% confidence intervals (CIs) were computed from two multivariable logistic models, one for staff NHSN knowledge and the second for reported facility enrollment status among respondents who knew of NHSN. Data were analyzed using SAS 9.4 (SAS Institute Inc., Cary, NC).

RESULTS

Of the 1,820 NHs invited to participate, 892 returned complete surveys, an overall response rate of 49%. Facilities with complete survey and CASPER data for our variables of interest were included in the analyses ($n = 861$, weighted $n = 14,852$). Of these, 23.5% reported being enrolled, 38.2% not enrolled, and 38.3% did not know their enrollment status.

Knowledge of NHSN

Respondents at facilities that participated in QIN-QIO initiatives had 1.87 times greater odds (95% CI [1.27–2.76]) of knowing about NHSN (Table 1). Respondents who reported clinical staff involvement with NHSN decision-making had 2.23 times greater odds (95% CI [1.14, 4.35]) of knowing about NHSN than those reporting only administrative decision-makers. Conversely, respondents who were unaware of the facility decision-makers with respect to NHSN enrollment had lower odds of knowing about NHSN (OR = 0.14, 95% CI [0.08, 0.24]).

Respondents at larger facilities (200+ beds) were more likely to know about NHSN than respondents at facilities with 30–99 beds (OR = 2.90, 95% CI [1.34, 6.27]). Knowledge of NHSN was not significantly different by QIN-QIO region, ownership type, chain affiliation, hospital-based status, and quality of care measures.

Enrollment

Involvement in QIN-QIO initiatives was a significant predictor of NHSN enrollment; after controlling for all other variables, NHs involved in QIN-QIOs had 5.77 times greater odds of being enrolled compared to those who were not (95% CI [3.15, 10.55]) (Table 2). Compared to those with administrative decision-makers, NHs with corporate offices as the sole NHSN decision-maker (OR = 0.17, 95% CI [0.05, 0.57]) and those who did not know the decision-maker (OR = 0.08, 95% CI [0.02, 0.28]) were less likely to report being enrolled.

DISCUSSION

This is the first nationally representative study to identify predictors of NH knowledge of NHSN and facility enrollment in NHSN. QIN-QIO involvement strongly influenced both knowledge and enrollment, demonstrating the importance of these partnerships with NHs in promoting NHSN. Similarly, the positive impact of QIN-QIO initiatives to recruit NHs, provide educational resources, and give individualized support to navigate enrollment and reporting (7,8), is reflected in the NHSN enrollment increases from 1.8% ($n = 279$) in December 2015 (9) to 18.7% ($n = 2,922$) in December 2018 (10) of approximately 15,600 NHs.

High percentages of survey respondents did not know about NHSN and/or did not know the NHSN enrollment decision-makers at their facility, showing a need for continued involvement by CMS, CDC, and QIN-QIOs in dissemination and user support. The factors contributing to lack of knowledge about NHSN are not yet well understood. We found that facilities engaging clinical staff in decision-making concerning NHSN and larger facilities (200+ beds) had increased staff awareness. We did not find an association between awareness and staff turnover.

Previous studies have focused on enrollment and reporting. A qualitative study found that some staff at enrolled and non-enrolled facilities were not aware of NHSN; in enrolled facilities with staff awareness, NHSN was integrated into an overall prioritization of infection prevention and was regularly communicated across staff levels (8). Two national studies found that large facilities were more likely to adopt NHSN in early years and subsequently (9,11). NHSN remains voluntary in most states, and other priorities compete for staff attention. In order to build upon current investments, especially successful QIN-QIO partnerships with NHs, further understanding is needed of the costs associated with continued efforts to expand NHSN participation, for NHs and for local, state, and national stakeholders.

This study was based on self-reported data from NH staff, and we did not have concurrent NHSN enrollment data to confirm facilities' enrollment status. Survey respondents may have been more active in infection control initiatives than non-respondents. Facility level differences between respondents and non-respondents were analyzed, and there were some differences (5); however, probability weights were used to adjust for potential response bias.

CONCLUSIONS

Future efforts to engage NHs to participate in NHSN should target clinical staff along with administrators. Existing resources can be leveraged to educate NH staff and assist with NHSN enrollment. Sustained involvement of CMS, CDC, and QIN-QIOs and continuing support for enrollment and participation are crucial for the viability and efficacy of NHSN in NHs.

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Highlights

- Nearly 40% of nursing homes (NHs) in a national survey are unaware of the National Healthcare Safety Network (NHSN)
- NHs where clinical staff are involved in decision-making are more likely to know about NHSN
- NHs participating in regional partnerships (QIN-QIOs) are more likely to know about NHSN and enroll

Table 1:

Weighted Bivariate and Multivariable Estimates for Nursing Homes by Staff Knowledge of NHSN

	All n=14852	Know NHSN n=7022	Don't Know n=7830		Adjusted Estimates
	% (SE)			P	OR (95% CI)
Self-reported Facility Characteristics					
Participation in QIN-QIO activities	36.5 (1.8)	47.6 (2.7)	26.5 (2.3)	<.001	1.87 (1.27–2.76)
Decision-maker for NHSN					
Administrator(s) only	11.7 (1.2)	14.8 (2.0)	8.9 (1.5)	0.017	referent
Clinical staff only	17.3 (1.4)	29.4 (2.4)	6.5 (1.3)	<.001	2.23 (1.14–4.35)
Both	22.8 (1.6)	33.9 (2.5)	12.8 (1.8)	<.001	1.44 (0.78–2.67)
Corporate only	4.3 (0.8)	5.6 (1.3)	3.1 (0.9)	0.11	1.04 (0.38–2.84)
Don't know decision-maker	43.9 (1.9)	16.2 (2.0)	68.7 (2.5)	<.001	0.14 (0.08–0.24)
Experience of person in charge of IC					
At any facility					
>36 months	54.4 (1.7)	57.8 (2.4)	50.9 (2.4)	0.043	referent
12–36 months	18.7 (1.3)	18.2 (1.9)	19.2 (1.9)	0.70	1.04 (0.55–1.96)
12 months	26.9 (1.5)	24.0 (2.1)	29.9 (2.2)	0.05	0.78 (0.44–1.38)
At current facility					
>36 months	35.5 (1.6)	40.3 (2.4)	30.8 (2.2)	0.004	referent
12–36 months	24.4 (1.5)	22.8 (2.0)	25.9 (2.1)	0.29	0.88 (0.47–1.64)
12 months	40.1 (1.7)	36.8 (2.3)	43.3 (2.4)	0.05	0.76 (0.42–1.36)
Facility Characteristics from CASPER					
Bed size					
30–99	45.9 (1.9)	40.8 (2.6)	50.5 (2.6)	0.010	referent
100–199	47.3 (1.9)	50.2 (2.7)	44.6 (2.6)	0.14	1.42 (0.93–2.18)
200+	6.8 (0.9)	9.0 (1.5)	4.8 (1.0)	0.019	2.90 (1.34–6.27)
Ownership type					
Government	6.7 (0.9)	6.3 (1.2)	7.1 (1.2)	0.62	0.54 (0.26–1.13)
For profit	69.2 (1.7)	67.7 (2.4)	70.5 (2.3)	0.40	0.86 (0.56–1.34)
Not for profit	24.1 (1.5)	26.0 (2.2)	22.4 (2.1)	0.23	referent
Chain-affiliated	56.6 (1.9)	53.8 (2.7)	59.1 (2.6)	0.16	0.89 (0.59–1.34)
Hospital-based	0.9 (0.3)	1.0 (0.4)	0.7 (0.3)	0.52	1.94 (0.75–5.00)
Quality of care measures, mean (SE)					
Percent with influenza vaccinations	67.5 (0.8)	68.7 (1.2)	66.5 (1.2)	0.15	1.00 (0.99–1.01)
Percent with pneumococcal vaccinations	65.0 (1.0)	66.1 (1.4)	64.1 (1.5)	0.27	1.00 (0.99–1.01)

Note: Controlled for turnover of infection preventionists, administrators and directors of nursing in the previous 3 years and for QIN-QIO region. NHSN, National Healthcare Safety Network; NH, nursing home; QIN-QIO, Quality Innovation Network-Quality Improvement Organization; IC, infection control; OR, odds ratio; CI, confidence interval; SE, standard error.

Table 2:

Weighted Bivariate and Multivariable Estimates for Nursing Homes by Enrollment in NHSN

	Enrolled n=3502	Not Enrolled n=3520		Adjusted Estimates
	% (SE)		P	OR (95% CI)
Self-reported Facility Characteristics				
<i>Participation in QIN-QIO activities</i>	67.9 (3.5)	27.4 (3.5)	<.001	5.77 (3.15–10.55)
<i>Decision-maker for NHSN</i>				
Administrator(s) only	17.1 (2.8)	12.6 (2.7)	0.26	referent
Clinical staff only	37.1 (3.5)	21.8 (3.3)	0.002	1.02 (0.46–2.26)
Both	39.2 (3.5)	28.7 (3.6)	0.038	0.91 (0.43–1.93)
Corporate only	2.7 (1.0)	8.4 (2.3)	0.008	0.17 (0.05–0.57)
Don't know decision-maker	3.9 (1.6)	28.5 (3.6)	<.001	0.08 (0.02–0.28)
<i>Experience of person in charge of IC</i>				
<i>At any facility</i>				
>36 months	56.4 (3.2)	59.6 (3.6)	0.51	referent
12–36 months	17.8 (2.5)	18.6 (2.8)	0.84	0.85 (0.32–2.29)
12 months	25.7 (2.8)	21.8 (3.0)	0.35	0.89 (0.34–2.29)
<i>At current facility</i>				
>36 months	40.2 (3.2)	40.4 (3.6)	0.97	referent
12–36 months	24.9 (2.8)	20.2 (2.9)	0.25	2.09 (0.78–5.56)
12 months	34.9 (3.1)	39.4 (3.6)	0.34	1.47 (0.58–3.74)
Facility Characteristics from CASPER				
<i>Bed size</i>				
30–99	44.2 (3.6)	37.4 (3.8)	0.20	referent
100–199	49.6 (3.6)	50.8 (4.0)	0.83	0.92 (0.49–1.71)
200+	6.2 (1.5)	11.8 (2.5)	0.044	0.44 (0.17–1.13)
<i>Ownership type</i>				
Not for profit	28.5 (3.1)	23.5 (3.1)	0.26	referent
For profit	64.8 (3.3)	70.7 (3.4)	0.21	0.81 (0.43–1.55)
Government	6.7 (1.6)	5.8 (1.6)	0.69	0.58 (0.18–1.87)
<i>Chain-affiliated</i>	57.5 (3.5)	50.1 (4.0)	0.16	1.69 (0.91–3.13)
<i>Hospital-based</i>	2.0 (0.8)	0.1 (0.1)	<.001	8.25 (0.75–90.67)
<i>Quality of care measures, mean (SE)</i>				
Percent with influenza vaccinations	69.6 (1.7)	67.8 (1.6)	0.40	0.99 (0.98–1.01)
Percent with pneumococcal vaccinations	69.2 (2.0)	63.0 (2.0)	0.013	1.01 (1.00–1.02)

Note: Controlled for turnover of infection preventionists, administrators and directors of nursing in the previous 3 years and for QIN-QIO region. NHSN, National Healthcare Safety Network; NH, nursing home; QIN-QIO, Quality Innovation Network-Quality Improvement Organization; IC, infection control; OR, odds ratio; CI, confidence interval; SE, standard error.