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The expansion of National Healthcare Safety Network enrollment and reporting in nursing homes: Lessons learned from a national qualitative study

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Abstract

Background: This study explored nursing home (NH) personnel perceptions of the National Healthcare Safety Network (NHSN).

Methods: NHs were purposively sampled based on NHSN enrollment and reporting status, and other facility characteristics. We recruited NH personnel knowledgeable about the facility's decision-making processes and infection prevention program. Interviews were conducted over-the-phone and audio-recorded; transcripts were analyzed using conventional content analysis.

Results: We enrolled 14 NHs across the United States and interviewed 42 personnel. Six themes emerged: Benefits of NHSN, External Support and Motivation, Need for a Champion, Barriers, Risk Adjustment, and Data Integrity. We did not find substantive differences in perceptions of NHSN value related to participants' professional roles or enrollment category. Some participants from newly enrolled NHs felt well supported through the NHSN enrollment process, while participants from earlier enrolled NHs perceived the process to be burdensome. Among participants from non-enrolled NHs, as well as some from enrolled NHs, there was a lack of knowledge of NHSN.

Conclusions: This qualitative study helps fill a gap in our understanding of barriers and facilitators to NHSN enrollment and reporting in NHs. Improved understanding of factors influencing decision-making processes to enroll in and maintain reporting to NHSN is an important first step towards strengthening infection surveillance in NHs.

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Keywords

Infection surveillance; Long-term care; NHSN; Nursing homes

Annually, about 3 million health care−associated infections occur among nursing home (NH) residents nationwide.[1] For NH residents, these infections are the most frequent reason for acute care hospital transfer and 30-day readmission.[2] Not only do these infections and transitions reduce a resident's quality of life, but they can also increase transmission risk and contribute to overall health care costs.[3]

Nursing home enrollment and reporting of infections into the National Healthcare Safety Network (NHSN) have been a national priority since the long-term care facility component was launched in 2012 by the Centers for Disease Control and Prevention (CDC).[4] Despite this prioritization, only 301 NHs (1.9% of 15,700) enrolled in NHSN by March 2016, and there was a decline in reporting among enrollees between 2013 and 2014.[5] However, since early 2016, the landscape has changed because of an initiative funded by the Centers for Medicare & Medicaid Services (CMS) called the *Clostridium difficile* Infection (CDI) Reporting and Reduction Project.[6] This initiative, being implemented across the nation, utilizes regional learning collaboratives convened by the Quality Innovation Network −Quality Improvement Organizations (QIN-QIOs),[7] with the goal of promoting NHSN enrollment and reporting among long-term care facilities.[8] The QIN-QIOs, partnered with CMS and CDC, provide (1) individualized support for NH enrollment into the NHSN and reporting of CDI, (2) educational resources on CDI prevention and antibiotic stewardship, and (3) opportunities for sharing lessons learned. With these efforts, over 19% (n = 2,985) of NHs across the nation were enrolled in NHSN by September 2017.[9]

Various challenges to reporting to NHSN were identified during the CDI Reporting and Reduction Project, but such information was not collected in a systematic manner across the country.[10] Therefore, it is not yet known how best to expand NH enrollment into NHSN or sustain reporting. Despite the success of the QIN-QIOs in recruiting NHs into NHSN, facility-level reporting may not be sustained without this external support. Furthermore, the number of NHs that have joined NHSN remains relatively low, with a majority of NHs across the nation (81%, n = 12,715) not enrolled. We did not know if nonenrolled NHs lack awareness and knowledge of the NHSN system itself or lack resources (eg, adequate staffing, information technology), or if they question the utility of enrolling in NHSN. The purpose of this study was to explore the perceptions NH infection prevention personnel and decision makers have of the NHSN.

METHODS

Research team

The research team was interdisciplinary and included health services researchers with expertise in qualitative research or infection prevention in NH settings (P.W.S., A.W.D., A.T., R.D., and M.E.S.) as well as public health researchers with expertise in qualitative research (A.M.C. and D.Q.). The CDC staff involved in implementing the NHSN long-term

care facility component (N.S. and J.B.) provided information on NH enrollment and reporting and interpretation of the data but were not involved in the development or conducting of interviews.

Study design

We conducted a qualitative study following the Consolidated Criteria for Reporting Qualitative Research guidelines.[11] This study was guided by Rogers' diffusion of innovation theory, which describes how organizations pass through stages in the innovation-decision adoption process.[12] We used NHSN enrollment data (obtained from the CDC) merged with the Certification and Survey Provider Enhanced Reporting data (collected during state annual inspection surveys of all CMS-certified NHs) to select our sample.[13] Using 2015 CDC NHSN reporting data, we categorized NHs as (1) enrolled and consistent reporters (ie, enrolled for a full year, with at least 6 months of data submitted in the calendar year), (2) enrolled and inconsistent reporters (ie, enrolled for a full year and less than 6 months of data submitted in the calendar year), or (3) enrolled and inactive (ie, enrolled but did not submit data in the calendar year). Using the 2016 NHSN enrollment data, we identified those NHs that enrolled in NHSN that year and categorized them as newly enrolled. All other NHs were categorized as unenrolled, thus giving us 5 total NH enrollment categories.

NHs were sampled based on enrollment category as well as other characteristics found in the Certification and Survey Provider Enhanced Reporting data (eg, freestanding vs hospital-based and public vs Veterans Health Administration). We also sought variation in location by categorizing NHs into 4 geographic regions: east of the Mississippi, west of the Mississippi, New York, and California. Two hundred and thirty-six NHs were randomly selected and sent informational mailings. Follow-up phone calls and e-mails were made until sufficient NHs were enrolled, which in qualitative studies is based on theoretical saturation (ie, no new themes are emerging).[14]

To determine study eligibility, interested NHs were asked to confirm if they were currently enrolled or not enrolled in NHSN. We recruited up to 4 NHs in each of the 5 NHSN enrollment categories. Eligible, participating NHs identified 3 personnel who were knowledgeable about the facility's infection prevention program and decision-making processes. To encourage participation, each NH was provided a $100 gift card for each participating employee.

We developed tailored interview guides for enrolled and nonenrolled NHs (Table 1); the interview guide (available upon request) development was guided by theory, past experience, and knowledge of NHs and NHSN processes. After obtaining oral consent, semistructured telephone interviews were conducted by our interviewing team (A.M.C., M.E.S., D.Q., and P.W.S.) between May and September 2017. All interviews were audiotaped and professionally transcribed; transcripts were reviewed for accuracy and deidentified. To ensure there was sufficient uniformity in interview technique across the interviewers, the team reviewed the interview guides together during a training session and reviewed recordings and transcripts from other interviewers once the study began. Although site visits are sometimes preferred over telephone interviews, the cost of travel and difficulty with scheduling made this option less practical for this nationwide study.

Data analysis

Deidentified interview transcripts were coded using conventional content analysis, which is a qualitative research method used to determine the presence of themes[15]; coding began when the first transcripts became available. To gain an initial understanding of the data, 5 transcripts were read several times by coding team members (A.M.C., A.T., and R.D.), and then the transcript of each interview was coded independently through an inductive open coding process.[16] To develop initial codes, the coding team met weekly (supervised by P. W.S.) to discuss potential codes and subcodes.[17] After 3 meetings, a draft codebook was compiled. Two more transcripts were coded by all coding team members to ensure consistency, and a final codebook was created and iteratively refined throughout the coding process.[17,18] For the remainder of the coding, every fifth transcript was double coded; discrepancies were discussed until a consensus was reached. A percent agreement was computed on double-coded transcripts and found to be adequate (ie, >90%).

A thematic analysis was used to synthesize the coded narratives, looking for similarities and differences between respondents by role and NH enrollment status.[17,19] Throughout the data collection and analysis period, weekly debriefings occurred with all research team members to ensure a shared understanding of the data. All transcripts were analyzed using NVivo 11 (QSR International, Melbourne, Australia) software.

RESULTS

Fourteen NHs were enrolled, and theoretical saturation was achieved; 36 NHs declined to participate. There was adequate distribution across all NH enrollment categories (range, 2–4), with the most NHs in the newly enrolled category (Table 2). Nine NHs were located east of the Mississippi. The number of small NHs (ie, fewer than 100 beds) and large NHs (ie, 100 or more beds) was similar (n = 6 and 8, respectively).

Table 3 describes the 42 study participants with whom we conducted interviews; we interviewed 3 participants from each of the 14 recruited NHs. A majority of those interviewed held administrative or managerial positions (n = 27), a few were the minimum data set (MDS) coordinators (n = 3), and the rest were clinicians (n = 12). Almost 80% of the participants had an Associate or Bachelor’s-level education and had extensive experience working in long-term care settings (average = 18.4 years). Participants reported that they devoted an average of 24% of their time to infection prevention and control. Participants among the enrolled NHs that were consistently reporting to NHSN (n = 9) had been employed at those facilities for an average of 12.2 years and in their current positions for an average of 5.3 years. By contrast, participants from nonenrolled facilities (n = 6) were employed at the NHs for an average of 8.1 years and in their current positions an average of 3.6 years.

Six themes (Table 4) emerged: (1) benefits of NHSN, (2) external support and motivation, (3) need for a champion, (4) barriers, (5) risk adjustment, and (6) data integrity. Each of these themes is described below, and exemplar quotes are provided. For each quote, the participant role and facility NHSN enrollment category are given. Although we did not find differences in perceptions related to participants’ roles, there were differences in perceptions

by NH enrollment category. Specifically, among personnel from consistently reporting facilities, need for a champion and barriers were important themes; for personnel from newly enrolled NHs, external support and motivation was highlighted in many interviews. At nonenrolled NHs, personnel emphasized the benefits of NHSN and concerns about risk adjustment.

Benefits of NHSN

All study participants who worked at enrolled NHs reported that NHSN participation was improving the quality of care in NHs. That is, just the process of reporting improved awareness of infection prevention among NH leadership and clinicians and was believed to improve performance. For example, an administrator at a consistently reporting facility described how the process of reporting to NHSN was "bringing up questions on how we submit, what we submit. Sometimes I just think that it just sort of heightens our awareness. We find that we talk about it a little bit more." Similarly, a nurse in charge of quality improvement at a newly enrolled facility explained, "I just think overall it just makes you more aware of what's out there … It puts more of a process into place for us. If we know we have to report it, we know we're going to be accountable for it."

Participants also anticipated that quality improvement would occur by allowing public health officials and QIN-QIO staff to assess facility and regional trends. For example, an administrator at a facility that consistently reported to NHSN said, "On a national level, [NHSN enrollment] has some serious benefits. We're a facility by ourselves. We're trying to do the best by our residents, but if there's a much larger issue going on that we can't identify as an individual facility, but that [others] can see … then they have the ability to help us tackle something because they see a bigger picture." An infection preventionist (IP) at a consistently reporting facility stated, "If you had a bunch of CRE [carbapenem-resistant Enterobacteriaceae] cases that pop [*sic*] up in the same area, say—because if we're putting those into NHSN, the local nursing home on the other side of town's putting them in—they [public health officials] could, possibly, track outbreaks that we wouldn't necessarily know [about]."

In the 2 nonenrolled NHs, the staff interviewed did not know about NHSN prior to being recruited for the study. Nevertheless, they believed that, in general, a national infection surveillance system would be helpful in improving quality of care in NHs. As a director of nursing from a nonenrolled facility stated, "You always have so many people that come in, and they can bring stuff, so it's hard for a facility that would only have like one or two people that monitor infection control. Having a [surveillance] system would probably be very beneficial." A clinical manager from another nonenrolled facility said, "The advantage would be, we would know what the trends are. For instance, not only in our area, but it would also show if there's correlation, for instance, with the weather, if there's certain factors [dehydration] that may trigger the rate of infection in certain areas." There were also some employees of enrolled facilities who were not aware of NHSN but, when it was described, believed there would be benefits.

Another perceived benefit of NHSN was the ability of NHs to benchmark against each other, which was thought to encourage best practices. A clinician from a nonenrolled facility said,

"[A national infection surveillance system] would benefit us just to compare [our data] to all the different NHs around the state." Similarly, an administrator at a facility that inconsistently reported to NHSN described the benefit of making comparisons, stating, "You always like to see yourself in the upper part … it's kind of a little competitive thing in a way. You don't want to see yourself poor compared to other places. You want to be one of the best … I think it's nice to see where we are to keep where we are compared to other places to see if we're on track or not."

External support and motivation

Many participants discussed the importance of external support and education as motivating factors for NHs to enroll in NHSN and maintain reporting. For example, a clinician at a newly enrolled facility described how the regional QIN-QIO "sent people around to different NHs that wanted help [to] sign up. I did some of the paperwork. They signed me up. Bingo. I started tracking on NHSN." Similarly, as an administrator at another newly enrolled facility explained, "We were encouraged by [our QIN-QIO]" and joined NHSN because "it was recommended by her."

Many of the participants from enrolled NHs described the importance of training and education, with particular emphasis on the benefits of the learning collaboratives. For example, an administrator from a consistently reporting facility stated, "The collaborative gave us an information binder, went step by step. That collaborative, basically, set us up for a lot of success in our infection control programs through giving us different materials and different trainings." An IP from an enrolled-inactive facility said, "I think [our state] has done a wonderful job, in that they've got different groups, such as [a QIN-QIO] … All those groups are helping the different organizations come on board and giving them the opportunity to network together, to get education. They're helping them all get on board to be able to report into NHSN and not to fail."

Participants discussed how mandating reporting would help with sustainability and level the playing field in terms of time and effort needed for reporting. At a nonenrolled facility, an administrator explained that regulations were motivating them to further develop their infection prevention program. She said, "There are new regulations that are going into effect in November for nursing homes to have a QAPI [quality assurance process improvement] system. We have to now make plans for things that could happen in the future, and so infection control will definitely be a part of that QAPI plan."

Need for a champion

Throughout the interviews, participants from all enrollment categories stated that a motivated staff member is needed to ensure successful enrollment and sustained reporting to NHSN. For example, one administrator at a consistently reporting facility described how "it's important to our organization that we have somebody that's specifically designated [to infection prevention, surveillance, and antibiotic stewardship] so that we can assure we have our arms around everything." Furthermore, a clinician (ie, the IP) at this same facility stated, "Well, I don't want it to seem like I'm a one-man show. It's just that I'm the one in charge of it. I kind of develop things and get them going and get it out there."

Conversely, a lack of a champion was seen as problematic in enrolling and maintaining NHSN reporting. For example, an administrator at a nonenrolled facility described how "if it's just one person doing all of [the NHSN reporting], or if they have someone in facility that just specifically does infection control, that would actually be more of a benefit." Additionally, an administrator at an inconsistently reporting facility described the benefits of hiring a new IP, who became the champion, when she said, "[The IP] took over from someone who really was not vested in doing really anything. [The previous person] was checking a box. There is such a difference between checking a box to meet a goal and making something really work … making it worthwhile." Similarly, when asked what is needed to be successful in reporting to NHSN, a clinician at a newly enrolled facility replied, "A nurse that has a passion for it. Because it's more than just the data." Furthermore, an administrator at an inconsistently reporting facility stated, "You need to have the right person in the job and allow that person the time that [he or she] needs [to report to NHSN]."

Barriers

Some participants described the time needed for enrolling in and reporting to NHSN as a barrier without short-term benefit. Particularly for some, the enrollment process was seen as unduly burdensome. A clinician at an enrolled-inactive facility described the enrollment as a "very laborious process … You have to get things notarized and give 'em a copy of your home utility bill." This is in contrast to the experience of some newly enrolled NHs that felt well supported through their QIN-QIO, as discussed in the external support theme. Nevertheless, even some newly enrolled NHs found the process burdensome, as an MDS coordinator explained: "I would say that the most difficult part was just getting the information to them. It took a couple weeks because there is a document that needs to be notarized as well that I had to send in."

Once NHs were enrolled, the participants described time as a barrier to reporting infections into NHSN. An administrator at a consistently reporting facility stated, "The biggest drawback would just be taking time away. It is, basically, time that most staff members in long-term care don't have to begin with." Or, as another administrator at an inconsistently reporting facility said, "A disadvantage is that [reporting to NHSN] is a lot of work. It does require a lot of man hours in order to do it."

Additionally, participants at enrolled NHs thought it would be helpful if there was feedback regarding their reporting accuracy and performance compared with other participating NHs. When discussing the facility's IP and the experience with NHSN, an administrator at an inconsistently reporting facility stated, "I think if she got more feedback, if they would send us something saying, 'You guys are doing good,' or, 'We'd like to see improvement in this area.' It's like we're putting something in, and we never hear nothing [*sic*] back." This may be because of the lack of familiarity with the reports available in NHSN. As an IP from an enrolled facility stated, "I kind of would like to have someone show me how I can benefit from all those reports. I don't know. I don't have a whole lot of time to sit there and just play around with it." Additionally, other participants from the enrolled categories did not even know about the ability to access their own data.

Risk adjustment

When discussing possible nationwide implementation of NHSN, participants raised concerns about the possibility of developing poor reputations or poor quality ratings if benchmarked without sufficient risk adjustment. For example, an administrator at a nonenrolled facility described her concern in the following statement: “Every facility is different. If you’re comparing data from other NHs, sometimes it’s hard to compare.” A director of nursing at a consistently reporting facility stated, “We sorta get the bad rap in the nursing home as having these infections. I guess if we could start doing a comparison of the reporting from the hospital setting into the nursing home to see … where exactly maybe the infections are occurring and how they’re being treated.” Furthermore, as a clinician from a nonenrolled facility said, the lack of risk adjustment “is a disadvantage … when another facility is doing better with infection control and we’re not …. It could be frustrating.”

Data integrity

Participants also expressed concerns about data integrity in the event that NHSN enrollment becomes mandated by CMS. For example, an administrator at a newly enrolled facility hypothesized, “I think if it’s going to affect reimbursement or if it’s going to affect your certifications or ability to get licensures or anything like that in a negative way, I would question the data because people might start not being so forthcoming about what they’re reporting.” More generally, an administrator at a consistently reporting facility stated, “The information that you get is only as good as the proper inputting of that information, proper reporting. If you don’t have accurate data, then you’re not going to get accurate results.” Additionally, NHSN infection definitions are different than those used for Medicare and Medicaid reimbursement, such as those used in MDS assessments, which potentially causes a mismatch of infection burden and confusion among NH staff. One IP from a consistently reporting facility said, “CMS, like their MDS, minimum data sets they have different definitions than what NHSN has When we have a UTI [urinary tract infection] show up on our quality assurance indicators, then I have to show justification as to why, even though the CMS says this is a UTI, it really isn’t. I would like to see that [CMS and CDC] have better, I guess, a better communication, so that they’re on the same page.”

DISCUSSION

In this qualitative study, congruent with the diffusion of innovations theory that guided this study, we purposively sampled NHs and analyzed the data based on where the NH was on the NHSN adoption continuum.[12] Specifically, we captured the perspectives of personnel employed at NHs that were enrolled-consistent reporters, enrolled-inconsistent/inactive, and newly enrolled. Also, with the inclusion of nonenrolled facilities, we captured perspectives of potential late adopters. We were able to identify educational needs, facilitators, and barriers that NHs experience while enrolling and participating in NHSN. Furthermore, during the study period, efforts were underway by the QIN-QIOs to support NHs interested in enrolling in NHSN. Understanding the effectiveness of those efforts will assist public health professionals in promoting widespread adoption.

Study participants valued the NHSN, and the perceptions of that value did not differ substantively by NH enrollment group, nor did we see differences in perceptions by professional role. That is, even though not all personnel knew about NHSN (even when employed in an enrolled NH), when a national infection surveillance system was described, the personnel thought such a system would be helpful. Furthermore, many of the participants discussed the benefits of NHSN reporting in terms of allowing public health officials access to data to identify regional- and facility-level trends and respond with appropriate guidance. In terms of an innovation, enrollment in and reporting to NHSN (or a national infection surveillance system) were perceived as advantageous to a facility.

Among participants from facilities that consistently reported to NHSN, having a staff member who was invested in infection surveillance and who acted as a champion created sustainability in reporting for the facility. Additionally, among participants from enrolled NHs, just the act of reporting was described as raising the awareness of infection prevention among their staff. These findings are consistent with other patient safety reporting systems that have been associated with improved processes and outcomes, especially when they are embedded in wider quality improvement efforts and are managed by clinicians.[20,21] For example, CMS has increased focus on infection prevention in NHs, and although NHSN enrollment is not currently required nationwide, IPs must provide all staff with infection control training and education and participate in the facility's QAPI committee.[22] Elements of QAPI include surveillance concepts that may allow NHSN participation to be incorporated into an existing improvement effort.

Although it is not currently a requirement in most states, many participants employed at enrolled NHs perceived that mandatory NHSN reporting would help with sustainability and level the playing field in terms of time and effort needed to conduct infection surveillance at a facility. Indeed, some NHs were in the process of further developing their infection prevention program in response to CMS's new requirements of participation.[22] These regulations, which have increased the focus on infection prevention in NHs, may help improve the quality of care. In states with required infection control training or reporting, NHs have been found to have decreased deficiency citations.[23] Other researchers have found that mandating NH participation in quality improvement initiatives is more effective than voluntary efforts alone.[24] As described by Rogers, innovation decisions made by an authority (in this case, CMS) are responsible for the fastest rate of adoption, as opposed to collective or optional decisions to adopt.[12] Given that, along with recent findings and past research, requiring NHSN reporting could increase staffing and resources to prevent infections in NHs and increase capacity to improve resident quality of life and health care outcomes.

Despite discussing advantages of NHSN, some personnel perceived maintaining reporting as time-intensive and burdensome. Although understanding of the long-term potential, some participants (particularly at inconsistently enrolled and inactive NHs) suggested that, in the short run, they were not experiencing sufficient benefits, such as feedback related to regional surveillance, to offset the time costs related to NHSN enrollment and reporting. Even though the NHSN system does allow the facility to monitor its own progress, many of the participants from enrolled NHs were not aware of or did not know how to access those

reporting functions. The lack of self-tracking of trends may be a function of the system being relatively new to the NH environment. Unfortunately, in terms of technology adoption, personnel perceptions of intangible results and insufficient advantages to NHSN reporting can negatively impact the rate of adoption. Indeed, devoting resources to reporting may put an NH at a competitive disadvantage because NHSN is not currently required of all NHs and therefore uses already scarce resources. This is an issue when participants perceive there is a limited short-term benefit to the NH and the cost of participating in NHSN is high. However, if all NHs were required to enroll and report to NHSN, the "playing field" would be level. In other health care settings, such as acute care, the benefits of NHSN reporting and self-tracking have long been established. Indeed, after increased focus on health care–associated infections, including state and federal NHSN reporting mandates, the utility of having standardized infection surveillance measures and infrastructure in hospitals was demonstrated, and there have been remarkable improvements in some infection rates.[25]

Some participants (particularly at NHs enrolled prior to 2016) specifically described the process of NHSN enrollment as a drawback and challenging. Enrollment into NHSN starts with a staff member registering in Secure Access Management Services, which is designed to provide centralized access to public health information.[26] Although this process has worked in other settings, many of the participants perceived it as overly burdensome, specifically because only a limited number of individual staff members from each facility can register in Secure Access Management Services to access NHSN, and they must go through a number of steps, including notarization of documents, which may take weeks to complete. Additionally, access to NHSN is not provided at the facility level, but rather the individual staff level. With high staff turnover in NHs, this can lead to many NHs without staff members able to sign into NHSN and report. In terms of technology adoption, this perception (and experience) of complexity may be limiting the growth of NHSN enrollment and reporting.

The support from QIN-QIO staff seemed to mitigate negative perceptions of the enrollment process for some of the newly enrolled NHs. Specifically, some participants from NHs that enrolled in 2016 described the process as fairly straightforward, and even easy in some instances. A recent report authored by staff from a QIN-QIO and department of health described similar NHSN enrollment barriers for long-term care NHs in their region; however, the partnership between the two entities facilitated successful enrollment for a number of NHs.[10] For these NHs, QIN-QIO staff were acting as communication channels and provided direct, targeted assistance to NHs that had not yet learned about NHSN or may not have been ready to enroll prior to contact. Because of these recent findings, as well as ours, continued external support for enrollment and reporting is recommended. Additionally, the development of more user-friendly enrollment processes for NH staff may be helpful to promote the expansion of voluntary NHSN enrollment without additional support similar to what QIN-QIO staff provided.

External support in terms of training and education was desired by all of the participants, and previous research has found that increased educational resources for NH staff are related to decreased deficiency citations.[23] However, there are differences in regional availability of resources for NH staff education and training.[27] More specifically, training and education for

activities that are optional or perceived as unbeneficial may not be prioritized among other facility needs in smaller NHs and those in resource-challenged areas, and fewer economic resources can impact technology adoption. Furthermore, variability in education and training impacts patient care across the United States with regard to NH staff being able to identify and appropriately manage and treat any infections that may arise. Clearly, infection prevention and control educational materials and trainings tailored to the long-term care setting are needed and should be disseminated broadly.

Participants from enrolled NHs also expressed concerns about risk adjustment and perceived the lack of adjustment as a clear disadvantage potentially affecting facility reputation. These concerns about public reporting of quality measures are not new, nor are they unique to NHs.[28,29] Appropriate risk adjustment is needed so that NHs serving different populations may be compared. For acute care facilities reporting into NHSN, the CDC has developed a risk adjustment measure called the standardized infection ratio to account for variation in the hospitals reporting into the system.[30] With the surge of NH enrollment and reporting, data are now available to create similar risk adjustment models based on NH characteristics.

Data integrity was identified as a concern to some participants, particularly if NHSN data submission and individual facility infection rates become tied to Medicare and Medicaid reimbursement. In the case of acute care settings, some state health departments have validated NHSN data for hospitals, and the validation process has improved the quality of the data.[31–34] To date, there have been no published NHSN data validation studies for NHs. Furthermore, data entry and calculation errors by those entering the data can impact the validity of NHSN data. Some of the participants stated that NHSN definitions are different than other infection definitions used in the long-term care setting, such as those used in MDS assessments. Harmonizing definitions as well as conducting data validation studies would help improve NHSN data integrity for participating NHs and may encourage new facilities to report to NHSN.

There are strengths and limitations to this study; qualitative findings can be evaluated based on credibility, transferability, dependability, and confirmability.[35] To increase the credibility, data analyses were guided by NH personnel views of NHSN enrollment and reporting, and the themes were generated from the words, perspectives, and experiences of NH personnel that we interviewed. Additionally, the codebook and minutes of our weekly meetings provide an audit trail of the decisions that were made and increase the dependability and confirmability of the data. We recruited NHs that were enrolled and not enrolled in NHSN, as enrolled facilities may be different from those that are not. The representation from NHs across the nation and in various stages of NHSN adoption is a strength. However, because of the small sample size and only 2 nonenrolled NHs, our results may not be generalizable. Specifically, those who agreed to participate in our study could be different from those who did not. We recommend that future research have larger sample sizes that include all NH categories. Given these strengths and limitations, this study offers important insights into the facilitators and barriers NHs face while enrolling in and reporting to NHSN.

CONCLUSIONS

Increasing the understanding of the factors influencing the decision-making process to enroll in and maintain reporting to NHSN is an important first step toward expanding NHSN utilization by NHs. With NHSN reporting being relatively new in the NH setting, additional support and educational initiatives are needed. Recognizing the barriers to NHSN enables the CDC to implement changes to increase accessibility and utility of the system. Efforts are underway to simplify analysis reports and create data visualization tools to make infection data more understandable and meaningful to NH reporters. Partnerships with state health departments and QIN-QIOs continue to promote NHSN use while evaluating the quality and validity of data submitted by NHs. Regulatory requirements expanding infection prevention efforts in NHs are synergistic with our findings that staff want and need further training and support as well as a champion to promote effective infection prevention processes. These policy changes could impact the culture of NHs, allowing the IP to act as a champion for infection prevention and control and create the necessary capacity to sustain NHSN engagement. It is apparent that NHs perceive a benefit to participating in NHSN; however, although reporting remains voluntary, ongoing support and resources will be critical to make NHSN a key part of NH infection surveillance and prevention efforts.

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References

1. Herzig CT, Dick AW, Sorbero M, Pogorzelska-Maziarz M, Cohen CC, Larson EL, et al. Infection trends in US nursing homes, 2006–2013. J Am Med Dir Assoc 2017;18, 635e9–635.e20.
2. US Department of Health and Human Services, Office of Inspector General. Medicare nursing home resident hospitalization rates merit additional monitoring (OEI-06-11-00040). Available from: http://oig.hhs.gov/oei/reports/oei-06-11-00040.pdf. Accessed February 2, 2016.
3. Boockvar KS, Gruber-Baldini AL, Burton L, Zimmerman S, May C, Magaziner J. Outcomes of infection in nursing home residents with and without early hospital transfer. J Am Geriatr Soc 2005;53:590–6. [PubMed: 15817003]
4. Centers for Disease Control and Prevention. National Healthcare Safety Network (NHSN): tracking infections in long-term care facilities Available from: http://www.cdc.gov/nhsn/ltc/. Accessed September 23, 2018.
5. Palms DL, Mungai E, Eure T, Anttila A, Thompson ND, Dudeck MA, et al. The National Healthcare Safety Network long-term care facility component early reporting experience: January 2013-December 2015. Am J Infect Control 2018;46: 637–42. [PubMed: 29478758]
6. Centers for Medicaid & Medicare Services. Quality Innovation Network−Quality Improvement Organizations: reducing care delivery harm and promoting coordinated care Available from: https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/QualityImprovementOrgs/Downloads/Fact-Sheet-QIN-QIOs-Safe-Care-that-is-Person-and-Family-Centered-Reliable-and-Accessible.pdf. Accessed April 6, 2017.

7. Centers for Medicaid & Medicare Services. QIO program: Quality Innovation Network−Quality Improvement Organizations Available from: https://qioprogram.org/sites/default/files/QIN-QIO_Fact_Sheet_Aug2018_FINAL_508.pdf. Accessed August 16, 2018.
8. Centers for Medicare & Medicaid Services. CMS launches next phase of new quality improvement program Available from: https://www.cms.gov/newsroom/press-releases/cms-launches-next-phase-new-quality-improvement-program. Accessed December 30, 2015.
9. Centers for Disease Control and Prevention. NHSN e-News, December 2017 Available from: https://www.cdc.gov/nhsn/pdfs/newsletters/nhsn-nl-dec-2017-508.pdf. Accessed January 9, 2018.
10. Sutherland S, Meyer R. Long-term care facility National Healthcare Safety Network enrollment challenges, 2016. Am J Infect Control 2018;46:726–8. [PubMed: 29661624]
11. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care 2007;19:349–57. [PubMed: 17872937]
12. Rogers E Diffusion of innovations New York NY: The Free Press; 2003.
13. Cowles Research Group. The Online Survey Certification and Reporting (OSCAR) data Available from: http://www.longtermcareinfo.com/about_oscar.html. Accessed January 12, 2016.
14. Sandelowski M Sample size in qualitative research. Res Nurs Health 1995;18: 179–83. [PubMed: 7899572]
15. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. Qual Health Res 2005;15:1277–88. [PubMed: 16204405]
16. Benaquisto L Codes and coding. editor. In: Given LM, ed. The SAGE encyclopedia of qualitative research methods Thousand OaksCA): SAGE Publications; 1998:86–9.
17. Boyatzis RE. Transforming qualitative information: thematic analysis and code development Thousand OaksCA): SAGE Publications; 1998.
18. Crabtree BF, Miller WL. Doing qualitative research 2nd ed Thousand OaksCA: SAGE Publications; 1999.
19. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol 2006;3:77–101.
20. Lozito M, Whiteman K, Swanson-Biearman B, Barkhymer M, Stephens K. Good catch campaign: improving the perioperative culture of safety. AORN J 2018;107: 705–14. [PubMed: 29851048]
21. Stavropoulou C, Doherty C, Tosey P. How effective are incident-reporting systems for improving patient safety? A systematic literature review. Milbank Q 2015;93: 826–66. [PubMed: 26626987]
22. Centers for Medicare & Medicaid Services. Reform of requirements for long-term care facilities: final rule (CMS-3260-P) Available from: https://www.federalregister.gov/documents/2016/10/04/2016-23503/medicare-and-medicaid-programs-reform-of-requirements-for-long-term-care-facilities. Accessed June 26, 2017.
23. Cohen CC, Engberg J, Herzig CT, Dick AW, Stone PW. Nursing homes in states with infection control training or infection reporting have reduced infection control deficiency citations. Infect Control Hosp Epidemiol 2015;36:1475–6. [PubMed: 26350287]
24. Mukamel DB, Ye Z, Glance LG, Li Y. Does mandating nursing home participation in quality reporting make a difference? Evidence from Massachusetts. Med Care 2015;53:713–9. [PubMed: 26125418]
25. Centers for Disease Control and Prevention. National and state healthcare associated infections progress report Available from: http://www.cdc.gov/HAI/pdfs/progress-report/hai-progress-report.pdf. Accessed August 23, 2017.
26. Centers for Disease Control and Prevention. 5-step enrollment for long-term care facilities Available from: https://www.cdc.gov/nhsn/ltc/enroll.html. Accessed April 11, 2018.
27. Pogorzelska-Maziarz M, Carter EJ, Manning ML, Larson EL. State health department requirements for reporting of antibiotic-resistant infections by providers, United States, 2013 and 2015. Public Health Rep 2017;132:32–6. [PubMed: 28005484]
28. Murtaugh CM, Peng T, Aykan H, Maduro G. Risk adjustment and public reporting on home health care. Health Care Financ Rev 2007;28:77–94. [PubMed: 17645157]

29. Marcin JP, Li Z, Kravitz RL, Dai JJ, Rocke DM, Romano PS. The CABG surgery volume-outcome relationship: temporal trends and selection effects in California, 1998–2004. Health Serv Res 2008;43:174–92. [PubMed: 18211524]

30. Centers for Disease Control and Prevention. The standardized infection ratio (SIR) Available from: https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sir-guide.pdf. Accessed September 23, 2018.

31. Hazamy PA, Van Antwerpen C, Tserenpuntsag B, Haley VB, Tsivitis M, Doughty D, et al. Trends in validity of central line−associated bloodstream infection surveillance data, New York State, 2007–2010. Am J Infect Control 2013;41: 1200–4. [PubMed: 24035214]

32. Backman LA, Carusillo E, D'Aquila LN, Melchreit R, Fekieta R. Validation of surgical site infection surveillance data in colon procedures reported to the Connecticut Department of Public Health. Am J Infect Control 2017;45:690–1. [PubMed: 28549514]

33. Backman LA, Melchreit R, Rodriguez R. Validation of the surveillance and reporting of central line−associated bloodstream infection data to a state health department. Am J Infect Control 2010;38:832–8. [PubMed: 21093699]

34. Backman LA, Nobert G, Melchreit R, Fekieta R, Dembry LM. Validation of the surveillance and reporting of central line−associated bloodstream infection denominator data. Am J Infect Control 2014;42:28–33. [PubMed: 24176605]

35. Lincoln YS, Guba EG. Naturalistic inquiry Beverly HillsCA: SAGE Publications; 1985.

Table 1

Topic guides and sample questions

Audience	Topic	Topic description	Sample question (s)
All NHs	Information about participant's position at facility	Current role, education, prior experience, typical day/ responsibilities	*What are your responsibilities with that position? Do you have any other responsibilities/ roles at this facility?*
	Information about the facility	Facility priorities, infection prevention program (staff, responsibilities, etc.), infection identification and tracking processes	*Currently, what are the top priorities at the facility? How does infection prevention and control rank with those priorities?*
	State and regional initiatives	Facility participation in infection prevention/ QI initiatives, QIN-QIO involvement	*Is your facility a part of any collaborative or initiative for infection prevention or quality improvement?*
Enrolled NHs	NHSN enrollment	Familiarity with NHSN, decision-making process to enroll, staff roles as related to NHSN, facility resources needed for NHSN reporting	*Tell me what you know about NHSN…*
	NHSN reporting	Reporting process, staff involvement	*Can you briefly walk me through the reporting process?*
	NHSN resources	Dissemination of NHSN information at facility, resources for NHSN reporting, outside partnerships	*How is information about NHSN disseminated in your facility?*
	Outcomes and impact	Accessing reports/data through NHSN, benefits/ drawbacks to NHSN enrollment	*How do you think enrollment in NHSN has benefitted your facility? What are some of the disadvantages to being enrolled in NHSN?*
Nonenrolled NHs	NHSN awareness and perceived utility	Familiarity with NHSN, considerations about NHSN enrollment	*The Centers for Disease Control & Prevention (CDC) has a national infection tracking system called the National Healthcare Safety Network (NHSN). Tell me what you know about NHSN…*
	NHSN enrollment, decision-making, and capacity	Future decision-making about enrollment, facility resources needed for future NHSN enrollment and reporting	*At your facility, what is the biggest factor in deciding not to enroll in NHSN? Why?*
	Outcomes	Potential benefits/drawbacks to NHSN enrollment	*In your opinion, how would enrollment in NHSN benefit your facility? What would be some of the disadvantages of enrolling?*

NH, nursing home; *NHSN*, National Healthcare Safety Network; *QI*, Quality Improvement; *QIN-QIO*, Quality Innovation Network-Quality Improvement Organization.

Table 2

Characteristics of participating NHs

Facility characteristics	N (%)
NHSN enrollment	
Consistent reporter	3 (21.4)
Inconsistent reporter	2 (14.3)
Inactive	3 (21.4)
Newly enrolled in 2016	4 (28.6)
Nonenrolled	2 (14.3)
Region	
California	2 (14.3)
West of Mississippi (excluding California)	3 (21.4)
New York	3 (21.4)
East of Mississippi (excluding New York)	6 (42.9)
Other NH characteristics	
Size, <100 beds	6 (42.9)
Hospital-based	2 (15.4)
Government-owned	3 (21.4)
Not-for-profit	6 (42.9)
Total NHs	14 (100.0)

NH, nursing home; *NHSN*, National Healthcare Safety Network.

Table 3

Characteristics of qualitative interview participants

Participant characteristics	N (%)
Role at facility	
Administration/managerial *	27 (64.3)
Clinical †	12 (28.6)
Minimum data set coordinator	3 (7.1)
Highest level of education ‡	
Associate's	16 (39.0)
Bachelor's	18 (43.9)
Master's and doctorate	7 (17.1)
Full-time	39 (92.8)
Level of experience, mean (SD)	
Years in long-term care	18.4 (11.6)
Years at facility	11.1 (8.2)
Years in current position	5.9 (5.7)
Percent of time per week devoted to IPC	24
Total participants	42 (100.0)

IPC, infection prevention and control.

* Includes facility administrator, chief executive officer, executive director, director of nursing, assistant director of nursing, etc.

† Includes medical director, nurse practitioner, clinical educator, registered nurse, etc.

‡ n = 41; one response not captured.

Table 4

Descriptions of themes

Theme	Description
Benefits of NHSN	NHSN allows quality and process improvement by benchmarking against other NHs as well as assessing facility and regional trends.
External support and motivation	Federal and state resources and regulations are important in facilitating infection prevention education and enrollment in and reporting to NHSN, focusing on infection prevention and antibiotic stewardship.
Need for a champion	A champion is needed to drive the culture to improve infection prevention surveillance and antibiotic stewardship.
Barriers	Enrollment and reporting take time and resources without short-term benefit or feedback.
Risk adjustment	Concern about a facility getting a poor reputation or poor quality rating because of being benchmarked without sufficient risk adjustment.
Data integrity	Concern about data integrity as related to possible mandated NHSN enrollment.

NH, nursing home; *NHSN*, National Healthcare Safety Network.