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Understanding Infection Prevention and Control in Nursing Homes: A Qualitative Study

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Abstract

Infections have been identified as a priority issue in nursing homes (NHs). We conducted a qualitative study purposively sampling 10 NHs across the country where 6 to 8 employees were recruited (N = 73). Semi-structured, open-ended guides were used to conduct in-depth interviews. Data were audio-taped, transcribed and a content analysis was performed. Five themes emerged: ‘Residents’ Needs’, ‘Roles and Training’ ‘Using Infection Data’, ‘External Resources’ and ‘Focus on Hand Hygiene’. Infection prevention was a priority in the NHs visited. While all sites had hand hygiene programs, other recommended areas were not a focus and many sites were not aware of available resources. Developing ways to ensure effective, efficient and standardized infection prevention and control in NHs continues to be a national priority.

Keywords

Infection prevention; healthcare-associated infections; nursing homes; long-term care; qualitative

Introduction

In 2000, it was estimated that between 1.6 and 3.8 million infections occurred annually in nursing homes (NHs),¹ which is likely an underestimate of the problem. Increasingly,

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infections in NHs are associated with multi-drug resistant organisms (MDROs)²; and NH residents are considered a high risk population for MDRO infection and colonization in part due to the high degree of transfers between hospitals and NHs, and potentially because of the infection prevention and control (IPC) practices in the NHs.^{1, 3} Because infections are a leading cause of morbidity, hospital admission and mortality among residents,^{4, 5} IPC management is important. Yet, 15% of U.S. NHs receive deficiency citations for infection control annually, indicating a clear need for improvement.⁶ Therefore, the Department of Health and Human Services (DHHS) has identified IPC in NHs as a priority area.⁷

Infection prevention in NHs has evolved since the 1987 Omnibus Reconciliation Act, which mandated that each NH have an IPC program. It was recommended that NHs with 250 to 300 beds employ a fulltime infection preventionist (IP)⁸ and that the IPs working in NHs have specific qualifications and training in epidemiology and IPC. While a fulltime IP in a NH is not mandated, the role is becoming more common. In Maryland in 2003, 8.1% of NHs reported employing an IP, which increased to 44% in 2008.⁹ In a survey of Michigan NHs, it was found that 50% had a fulltime IP.¹⁰ Even when an IP is not present in a NH, a staff member is assigned responsibility for the IPC program. Most research and guidelines for IPC focuses on acute care not NHs.^{11–17} While there are some similarities in the structures, processes and personnel roles needed to implement effective IPC, there are also differences in the populations served, education and roles of staff providing care as well as availability of resources.^{8, 18, 19} Guidelines for IPC in long-term care (LTC) facilities have been developed,^{8, 18, 19} however, the extent that these guidelines are followed is not known. Furthermore, there is a dearth of federal or state data about infection rates, IPC programs, and the use of IP staff in NHs. To fill these gaps in knowledge, the aim of this study was to gain better understanding of how IPC programs are being implemented in NHs as well as the roles and responsibilities of employees responsible for IPC.

Material and methods

Our research team conducted a qualitative study. We followed the consolidated criteria for reporting qualitative research, which recommends the reporting of three domains: 1) research team and reflexivity, 2) study design, and 3) data analysis and reporting.²⁰

Research Team and Reflexivity

Our interdisciplinary team is multidisciplinary and no one had prior relationships with any of the study sites (see Table 1). Team members attended training sessions conducted by an expert qualitative consultant.

Study Design

We purposively sampled NHs with the goal of obtaining variation in geographic location, bed size, ownership status and three-year infection-related citation scores based on Online Survey, Certification and Reporting inspection survey data. Eligible sites were contacted via informational mailings, telephone and/or email, and if interested in participating a site coordinator was identified. The site coordinators recruited, from their facilities, six to eight experienced, English-speaking employees with various roles applicable to IPC. Semi-

structured interview guides (available upon request) and in-depth interviewing techniques were used.²¹ The guides were developed, reviewed and piloted by NH experts including IPs working within this setting and reflected our understanding of the significant issues of IPC in NHs from the literature and identified in guidelines.^{8, 18, 19} Using a semi-structured interview format facilitated the exploration of new ideas.

To allow maximum flexibility we used an interviewing team. While it was appropriate to have multiple interviewers, it was also important to minimize differences in interviewing technique and style.²² We reviewed all procedures to ensure sufficient uniformity across the interviewers to minimize the likelihood that differences in interview techniques were responsible for the type of information that was disclosed. Interviews were audiotaped, professionally transcribed and reviewed for accuracy. All procedures were approved by the Columbia University Medical Center Institutional Review Board and written informed consent was obtained from all participants. To encourage participation, an incentive of \$100 per participant was provided either directly to the interviewee or to the institution, depending upon the facility's preference and policy.

Data Analysis and Reporting

Transcripts were coded using NVivo qualitative data analysis software (QSR International Pty Ltd. Version 10, 2012) by a trained coding team (RIB, PKS, CCC). To ensure the coding scheme was well grounded in the data, supportable, and consistent in meaning, codes were systematically developed and documented. Two transcripts were double coded on a biweekly basis. Discrepancies were discussed until consensus was reached. In total, 16% of transcripts (12/73) were double coded and percent agreement was high throughout the process, averaging 97.6%. Using a conventional content analysis approach,²¹ all codes and site summaries were reviewed (PWS) to develop the themes; there were four primary codes and 32 subcodes that were reduced to the themes discussed in this report. Throughout the analysis and interpretation of the data weekly conference calls were to ensure consistent understanding by all study team members.

Results

From May to September 2013, 10 NHs were visited (see Table 2). Forty percent were non-profit, and bed size ranged from 40 to 204. Geographic location was diverse with 3 in the Northeast region, 3 in the West or Midwest, and 4 in the South. Facilities were evenly dispersed into the low and high three-year infection-related citation score categories. A total of 73 interviews were conducted. Often the participants served in multiple capacities; Table 3 shows these multiple roles by listing the participants' role as identified by the site coordinator and the corresponding interview guide that was used as well as the other roles identified in the interview process. Only 9 IPs were interviewed because of a leave of absence at one site. Table 4 lists the 5 themes that emerged, a short explanation, and provides exemplar quotes.

Residents' Needs

Many participants discussed the complexity of the residents' needs as well as tensions between the facility being the residents' home and the need for IPC. As elucidated in the quote in Table 4, this tension was related to the need for residents to have access to shared spaces, the facility being the residents' home, the ability of the resident to walk freely, space constraints (e.g., lack of single rooms) and risks of infection transmission. This was echoed by the nurse supervisor from site 3 when she said, "We worry about cross-contamination. ... We don't send them to general areas, such as therapy or the main dining room." The nurse supervisor from site 10 also stated, "...My patients have to be just like at home here. This is their home." When discussing contact isolation, the IP from site 2 stated, "It's a quality of life issue." Despite constraints, staff were resourceful and worked with the residents' needs. Sometimes they were able to overcome the tension between resident needs and infection prevention and other times they had to turn admissions away. The IP from site 2 stated, "There are ways around it. Sometimes it's putting [in] a commode to prevent them from sharing a bathroom. It's working with what you have. Sometimes we'll have an infection that we can't accept in the building based on room availability."

Roles and Training

As explicated in the two quotes in Table 4 (IPs from sites 4 and 2), the theme of roles and training captures the reality of the multiple roles that the person in charge of the IPC program had and the frequent lack of formal IPC training. All nine IPs discussed their multiple roles and responsibilities. As two different IPs (from sites 8 and 10) stated, they wore "many hats". Although all IPs were asked about training and experience in IPC, in only two instances did the IP speak of receiving formal training. The IP from site 10 described how she "went to a class that teaches the nurse how to be an infection control practitioner." However, she then stated the class was taken over 20 years ago and only recently had she received additional training after the facility received a deficiency citation related to IPC. The IP from site 5 described training that she received at her state's Association Directors of Nursing Administration and how "[the Association is] pulling that focus into infection control, and offering up additional courses...for certification, where you can get your CEUs [continuing education units]." It was much more common for infection prevention to be part of a job description as described by the IP from site 1, "they offered me the assistant director of nursing job and part of [that] job is infection control." Nevertheless, even with the multiple roles and minimal formal training, the people in charge of the IPC programs were viewed by their colleagues as experts. As the administrator from site 1 said, "She's the maven...the infection control guru in the building."

Using Infection Data

While some discussed the infection surveillance procedures mandated by federal and state regulatory agencies, many of the respondents described creative, homegrown ways for analyzing and using these data. This is exemplified in the Table 4 quote from the site 7 IP who described the use of color coded maps to help identify infection trends. Another example came from the IP at site 1 who discussed the reports that were formally reviewed each month, but also described how she kept a "scrapbook" to help her identify problems

more proactively. As she explained, “if I see something happening I can’t wait till the end of the month to step in...so that’s why I keep just a scrapbook. I call it my scrapbook with notes....if I see something happening on a unit, I am going to go up.” The IP at site 7 spoke of how she used the “maps” (see Table 4) to target education of different personnel based on the infection trends, “...if I have any trends, that’s when I’ll decide what in-services are needed”. Only the IP from site 3 spoke of using “CDC guidelines” or “McGeer” standardized infection definitions for surveillance. Others identified infections based on chart reviews and clinical signs and symptoms.

External Resources

Half of the IPs spoke of how they sought advice/recommendations from various external resources to help them fulfill their role. The most common resources mentioned were the Centers for Disease Control and Prevention (CDC) and/or their local Department of Health (DOH) (see Table 4 for quote from IP at site 1). As the IP from site 2 explained, “[When we have a problem I use] the CDC website, the DOH...” However, it is important to note that not all IPs knew of available external training resources. As the IP at site 5 answered when directly asked whether she had access to any resources available from state, federal and/or professional organizations, “Not currently, no.”

Focus on Hand Hygiene

An important focus of IPC programs in every facility visited was hand hygiene as described in the exemplar quote in Table 4 (IP from site 1). The IP from site 10 said, “The hand washing, [is] the single most important way [to prevent infection].” While all facilities focused on hand hygiene, monitoring compliance with the policies was frequently an informal process as illustrated in how the IP from site 10 answered when asked about monitoring staff compliance, “You know just walking through the halls, I might just do a spot check and see, oh, that person just took off their gloves. Let’s go see if the staff [washed their hands]... but, not always.” At site 1, monitoring processes were more formalized; however, there was still difficulty obtaining cooperation from all departments. As the IP explained, “Every department is responsible for doing a hand hygiene audit regardless of what their position is. I have to say one of the biggest problems is trying to get the audit... That could be improved on.”

Discussion

This qualitative study focused on IPC in NHs. While some findings were to be expected, others were surprising. Maximizing quality of life for the resident while minimizing transmission of infections is a known challenge facing NH staff. For most residents, the NH is their home and, therefore, much focus must be placed on comfort and dignity. Others have discussed how the use of shared spaces and group activities utilized by NHs to promote quality of life may facilitate the spread of infectious agents and contribute to the occurrence of outbreaks.²² Furthermore, it is well known that residents in NHs are often functionally impaired, which is a risk factor for both admission to a NH and development of infection.^{23–25}

The many roles and lack of IPC training is unfortunate but not surprising. In 2003, the Maryland DOH found that NH IPs in their state were less likely than IPs employed in acute care to receive formal training in IPC (i.e., 8% versus 95% respectively) and more likely to have additional non-infection related responsibilities.²⁶ The state partnered with the LTC industry trade associations and spearheaded regulatory, educational, and financial initiatives to improve this situation and achieved a fivefold increase in facilities employing a trained IP and quicker identification of outbreaks resulting in less disease.⁹ However, implementation of such programs uses resources and needs leadership. Furthermore, after the intervention in Maryland, only 44% of IPs managing IPC programs in LTC had training, indicating much work is still needed.¹⁰

All sites focused on hand hygiene; however, most NHs lacked formal policies regarding monitoring staff compliance. There is substantial evidence that audit and feedback can effectively improve the quality of care^{27–30}; and it was recently found that feedback was most effective when presented frequently and delivered by a supervisor or respected colleague.³¹ Unfortunately, other recommended practices (e.g., antimicrobial management and/or vaccination programs) did not receive consistent focus. Successful IPC programs are multifaceted, and the deficiencies found may be due to lack of education and/or increased difficulty in developing these areas due to the need for interdisciplinary collaboration and communication. In a recent qualitative study, researchers identified the 24-hour report as an important component of IPC programs in NHs; these reports enhance communication and allow residents who are receiving antibiotics to be tracked. However, it was found that the content of the reports varied considerably across facilities and that standardization would be beneficial.³² Similarly, the creative solutions identified in this study (e.g., use of scrapbooks and color coded maps) that NH staff have developed was encouraging. These processes should be systematically evaluated and effective interventions disseminated more widely.

An IPC program is a quality improvement program. As part of the Affordable Care Act (Section 6102), the Centers for Medicare & Medicaid Services (CMS) requires all NHs to develop Quality Assurance Performance Improvement (QAPI) programs in order to meet national quality standards. To help NHs meet these standards, a number of tools have been developed and disseminated on the CMS website.³³ However, in our study we did not find respondents referring to these tools or speaking about their IPC programs in terms of the elements of a QAPI program. In a national survey of 3,000 NH administrators, low use of QAPI tools such as flow charts (23%) has been found.³⁴ Others have found some NHs resistant to quality improvement interventions.³⁵

The use of rigorous qualitative procedures, representation of NHs from across the nation and the various personnel interviewed are strengths. Despite the attempt to obtain a diverse sample and various perspectives, the results might not be transferable. Nevertheless, findings from this study have important implications on the need for dissemination of readily available tools to assist providers in improving the quality of NH care.

The DHHS has made several key efforts to curb the persistence of healthcare-associated infections (HAI) including investing in “State HAI Coordinators” who are responsible for creating or expanding state-based HAI prevention activities; these individuals should be a

resource for NHs. The CDC has developed and disseminated many tools³⁶ including a LTC facility component in the National Healthcare Safety Network (NHSN) for infection surveillance and an interactive quality improvement teaching module geared to infection prevention entitled “Advancing Excellence in America’s Nursing Homes”³⁷. In addition to focusing on infection prevention, as part of their QAPI programs, the DHHS recommends that NHs join the NHSN LTC facility component.⁷ However, to date these efforts seem insufficient and not all staff knew of these resources. The American Medical Directors Association published clinical practice guidelines for common infections¹⁹ and the National Association of Directors of Nursing Administration in Long term Care has been increasingly focused on infection prevention the past few years.³⁸ The Association for Professionals in Infection Control and Epidemiology, representing IPs, also offers credentialing and educational resources.^{8, 9, 18, 39} However, some of these resources may be expensive in both time and money for the IPs working in NHs, especially with their other multiple responsibilities. Furthermore, the current available IP credentialing is not specific to geriatrics and/or NHs.

Conclusions

We identified tensions between IPC, social requirements of residents, and the need for increased training opportunities, especially for those in the role of IP. Inexpensive, easily accessible, NH specific tools and educational resources are available. Encouraging use of these tools may facilitate the wider uptake of currently available evidence-based guidelines, result in effective IPC programs, increase the standardization of process and outcome measurement, and improve the quality of care. The most effective means to disseminate these resources is through the partnership of multiple private and public organizations (e.g., NH owners, professional organizations, DOH, CDC and other federal organizations). While some NH sites spoke of creative solutions, collaborative comparative effectiveness research is needed to see if these methods should be implemented more widely. In order to make transformative processes associated with adoption of prevention practices and HAI research in NHs, a strong program evaluation component is needed. Last, an inexpensive IPC certification program specific to LTC may be helpful. Developing ways to ensure effective, efficient and standardized IPC interventions in NHs continues to be a priority facing our nation.

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References

1. Strausbaugh LJ, Joseph CL. The burden of infection in long-term care. *Infect Control Hosp Epidemiol.* 2000 Oct; 21(10):674–679.10.1086/501712 [PubMed: 11083186]
2. Richards C. Infections in residents of long-term care facilities: an agenda for research. Report of an expert panel. *J Am Geriatr Soc.* 2002 Mar; 50(3):570–576. [PubMed: 11943058]
3. Kahvecioglu D, Ramiah K, McMaughan D, et al. Multidrug-resistant organism infections in US nursing homes: a national study of prevalence, onset, and transmission across care settings, October 1, 2010–December 31, 2011. *Infect Control Hosp Epidemiol.* 2014 Oct; 35(Suppl 3):S48–55.10.1086/677835 [PubMed: 25222898]
4. Koch AM, Eriksen HM, Elstrom P, et al. Severe consequences of healthcare-associated infections among residents of nursing homes: a cohort study. *J Hosp Infect.* 2009 Mar; 71(3):269–274.10.1016/j.jhin.2008.10.032 [PubMed: 19147254]
5. Kusserow, R. Law & Health. Wolters Kluwer; 2013. Medicare Nursing Home Resident Hospitalization Rates Merit Additional Monitoring. Available at: <http://health.wolterskluwerlb.com/2013/11/kusserows-corner-medicare-nursing-home-resident-hospitalization-rates-merit-additional-monitoring/>. Cited October 31, 2014
6. Castle NG, Wagner LM, Ferguson JC, Handler SM. Nursing home deficiency citations for safety. *J Aging Soc Policy.* 2011 Jan; 23(1):34–57.10.1080/08959420.2011.532011 [PubMed: 21207305]
7. U.S. Department of Health and Human Services. National action plan to prevent health care-associated infections: Road map to elimination. Washington, D.C: 2013. Available at: <http://www.health.gov/hai/pdfs/hai-action-plan-ltcf.pdf>. Cited August 14, 2014
8. Smith PW, Rusnak PG. Infection prevention and control in the long-term-care facility. SHEA Long-Term-Care Committee and APIC Guidelines Committee. *Infect Control Hosp Epidemiol.* 1997 Dec; 18(12):831–849. [PubMed: 9442408]
9. Roup BJ, Scaletta JM. How Maryland increased infection prevention and control activity in long-term care facilities, 2003–2008. *Am J Infect Control.* 2011 May; 39(4):292–295.10.1016/j.ajic.2010.09.004 [PubMed: 21458109]
10. Mody L, Langa KM, Saint S, Bradley SF. Preventing infections in nursing homes: a survey of infection control practices in southeast Michigan. *Am J Infect Control.* 2005 Oct; 33(8):489–492.10.1016/j.ajic.2005.01.011 [PubMed: 16216667]
11. Immunization of health-care workers: recommendations of the Advisory Committee on Immunization Practices (ACIP) and the Hospital Infection Control Practices Advisory Committee (HICPAC). *MMWR Recomm Rep.* 1997 Dec 26; 46(RR-18):1–42.
12. Boyce JM, Pittet D, et al. Healthcare Infection Control Practices Advisory Committee. Guideline for Hand Hygiene in Health-Care Settings. Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. *Infect Control Hosp Epidemiol.* 2002 Dec; 23(12 Suppl):S3–40. [PubMed: 12515399]
13. Gould CV, Umscheid CA, Agarwal RK, et al. Guideline for prevention of catheter-associated urinary tract infections 2009. *Infect Control Hosp Epidemiol.* 2010 Apr; 31(4):319–326.10.1086/651091 [PubMed: 20156062]
14. Rutala, WA.; Weber, DJ. HICPAC. Guideline for Disinfection and Sterilization in Healthcare Facilities. 2008. Available at: http://www.cdc.gov/hicpac/pdf/guidelines/disinfection_nov_2008.pdf. Cited September 15, 2011
15. Sehulster L, Chinn RY. CDC HICPAC. Guidelines for environmental infection control in healthcare facilities. Recommendations of CDC and the Health-care Infection Control Practices Advisory Committee (HICPAC). *MMWR Recomm Rep.* 2003 Jun 6; 52(RR-10):1–42. [PubMed: 12836624]
16. Siegel JD, Rhinehart E, Jackson M, et al. 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Health Care Settings. *Am J Infect Control.* 2007 Dec; 35(10 Suppl 2):S65–164.10.1016/j.ajic.2007.10.007 [PubMed: 18068815]
17. Siegel JD, Rhinehart E, Jackson M, et al. Management of multidrug-resistant organisms in health care settings, 2006. *Am J Infect Control.* 2007 Dec; 35(10 Suppl 2):S165–193.10.1016/j.ajic.2007.10.006 [PubMed: 18068814]

18. Smith PW, Bennett G, Bradley S, et al. SHEA/APIC Guideline: Infection prevention and control in the long-term care facility. *Am J Infect Control*. 2008 Sep; 36(7):504–535.10.1016/j.ajic.2008.06.001 [PubMed: 18786461]
19. American Medical Directors Association. *Common infections in the long-term care setting*. Columbia, MD: American Journal of Medical Directors Association; 2011.
20. 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 Dec; 19(6):349–357.10.1093/intqhc/mzm042 [PubMed: 17872937]
21. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. *Qual Health Res*. 2005 Nov; 15(9):1277–1288.10.1177/1049732305276687 [PubMed: 16204405]
22. Richards CL Jr. Infection control in long-term care facilities. *J Am Med Dir Assoc*. 2007 Mar; 8(3 Suppl):S18–25.10.1016/j.jamda.2006.12.002 [PubMed: 17336871]
23. Bradley SF. Issues in the management of resistant bacteria in long-term-care facilities. *Infect Control Hosp Epidemiol*. 1999 May; 20(5):362–366.10.1086/501637 [PubMed: 10349960]
24. Nicolle LE. Asymptomatic bacteriuria in the elderly. *Infect Dis Clin North Am*. 1997 Sep; 11(3): 647–662. [PubMed: 9378928]
25. Nicolle LE. Preventing infections in non-hospital settings: long-term care. *Emerg Infect Dis*. 2001 Mar-Apr;7(2):205–207.10.3201/eid0702.700205 [PubMed: 11294707]
26. Roup BJ, Roche JC, Pass M. Infection control program disparities between acute and long-term care facilities in Maryland. *Am J Infect Control*. 2006 Apr; 34(3):122–127.10.1016/j.ajic.2005.12.010 [PubMed: 16630974]
27. Elligsen M, Walker SA, Pinto R, et al. Audit and feedback to reduce broad-spectrum antibiotic use among intensive care unit patients: a controlled interrupted time series analysis. *Infect Control Hosp Epidemiol*. 2012 Apr; 33(4):354–361.10.1086/664757 [PubMed: 22418630]
28. Nyamtema AS, de Jong AB, Urassa DP, van Roosmalen J. Using audit to enhance quality of maternity care in resource limited countries: lessons learnt from rural Tanzania. *BMC Pregnancy Childbirth*. 2011; 11:94.10.1186/1471-2393-11-94 [PubMed: 22088168]
29. Tanvetyanon T, Lee JH, Fulp WJ, et al. Changes in the care of non-small-cell lung cancer after audit and feedback: the Florida initiative for quality cancer care. *J Oncol Pract*. 2014 Jul; 10(4):e247–254.10.1200/jop.2013.001275 [PubMed: 24737876]
30. Wald HL, Bandle B, Richard AA, et al. A Trial of electronic surveillance feedback for quality improvement at Nurses Improving Care for Healthsystem Elders (NICHE) hospitals. *Am J Infect Control*. 2014 Oct; 42(10 Suppl):S250–256.10.1016/j.ajic.2014.04.018 [PubMed: 25239718]
31. Ivers NM, Grimshaw JM, Jamtvedt G, et al. Growing Literature, Stagnant Science? Systematic Review, Meta-Regression and Cumulative Analysis of Audit and Feedback Interventions in Health Care. *J Gen Intern Med*. 2014 Jun 26.10.1007/s11606-014-2913-y
32. Fisch J, McNamara SE, Lansing BJ, Mody L. The 24-hour report as an effective monitoring and communication tool in infection prevention and control in nursing homes. *Am J Infect Control*. 2014 Oct; 42(10):1112–1114.10.1016/j.ajic.2014.07.001 [PubMed: 25278405]
33. Centers for Medicare & Medicaid Services. QAPI Tools. Baltimore, MD: 2014. Available at: <http://cms.gov/Medicare/Provider-Enrollment-and-Certification/QAPI/qapitools.html>. Cited December 19, 2014
34. Smith KM, Castle NG, Hyer K. Implementation of quality assurance and performance improvement programs in nursing homes: a brief report. *J Am Med Dir Assoc*. 2013 Jan; 14(1): 60–61.10.1016/j.jamda.2012.09.010 [PubMed: 23123004]
35. Rantz MJ, Zwygart-Stauffacher M, Flesner M, et al. Challenges of using quality improvement methods in nursing homes that “need improvement”. *J Am Med Dir Assoc*. 2012 Oct; 13(8):732–738.10.1016/j.jamda.2012.07.008 [PubMed: 22926322]
36. Centers for Disease Control and Prevention. *Nursing Homes and Assisted Living (Long-term Care Facilities)*. Atlanta, GA: 2014. Available at: <http://www.cdc.gov/longtermcare/>. Cited December 19, 2014
37. Advancing Excellence in America’s Nursing Homes. *Infections: Follow these seven simple steps to success*. Available at: <https://www.nhqualitycampaign.org/goalDetail.aspx?g=inf#tab1>. Cited December 19, 2014

38. The National Association Directors of Nursing Administration in Long Term Care. 2014.
Available at: <http://www.nadona.org/>. Cited December 19, 2014
39. Schweon, S.; Burdsall, D.; Hanchett, M., et al. Infection Preventionist's Guide to Long-Term Care.
Washington, DC: APIC; 2013. p. 16

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Table 1

Expertise of Research Team

	Nurse	Physician	Infection Preventionist	Epidemiologist	Health Economist	Health Service Researcher	Geriatric Experience
Investigators							
1	X					X	X
2				X		X	
3	X	X					
4					X	X	X
5						X	X
6				X			
7		X				X	X
8		X				X	X
9	X						X
Graduate Research Assistants							
1	X						
2	X						
3	X					X	X
4	X						
5	X					X	
6				X			
7	X		X				
8	X					X	X

Table 2

Characteristics of Nursing Homes Visited and Number of Interviews

Site	Region	Bed Size	Ownership	Number of interviews
1	Northeast	Large	Non-profit	8
2	South	Large	For profit	6
3	South	Small	Non-profit	8
4	Northeast	Small	Non-profit	8
5	West/Midwest	Large	For profit	8
6	West/Midwest	Medium	For profit	6
7	South	Medium	For profit	7
8	South	Medium	For profit	8
9	Northeast	Large	Non-profit	7
10	West/Midwest	Small	For profit	7

Note: Bed size categories are: Small= <92, Medium= 92–120, Large= >120

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Table 3

Characteristics of Interviewed Nursing Home Personnel

Role Identified by Site Coordinator and Primary Interview Guide Used	N	Overlapping Roles	Years in position at current facility Mean (SD)
Administrator	9	1 DON	3.0 (2.8)
Staff Development Coordinator/Risk Manager	4	2 IPs 1 Staff Nurse	6.0 (5.3)
Advanced Clinician	3	None	8.0 (4.2)
IP	9	5 DON/ADON 2 Staff Nurse 2 Staff Development Coordinators	4.6 (4.7)
DON/ADON	8	1 Administrator 5 IPs 1 MDS Coordinator	3.6 (3.1)
Staff Nurse	10	1 Staff Development Coordinator	2.9 (2.2)
Certified Nurse Aide	9		9.4 (7.4)
MDS Coordinator	11	1 ADON	3.8 (3.5)
Environmental Services	10	None	6.7 (6.5)
Total	73		5.0 (5.0)

Note: SD = Standard deviation; IP = Infection Preventionist; DON = Director of Nursing; ADON = Assistant Director of Nursing; RN = Registered Nurse; LPN/LVN = Licensed Practical Nurse/Licensed Vocational Nurse; MDS = Minimum Data Set

Table 4

Themes

Theme	Explanation	Exemplar Quotes
Residents' Needs	Tension exists between the facility being the residents' home and the need for effective infection prevention and control procedures.	"I had a dementia resident who was positive for C. diff. He was not heavily symptomatic. It wasn't like he was walking in the hallway and creating a disaster, but the potential is there, and it was just redirecting him...let's take him outside for some fresh air, let's make sure he's not going into the gym or into the dining room. If he's walking in the hallway, it's a little bit different, let's redirect him back to his room." IP site 2
Roles and Training	Many employees involved in infection control program had multiple other responsibilities and frequently lacked formal training in infection prevention and control.	"I do a lot...I do the employee health... Infection Control...unit audits.... a lot of chart work...audits for medical records...closed medical record files...speak at resident counsel and family counsel." IP site 4 "I don't have any official infection control licensure, I just learned by experience and from my peers...it's become my baby." IP site 2
Using Infection Data	Infection data were used to improve care despite variations in surveillance methods/ definitions.	"At the end of the month, I get a map of the facility. And I go through and I highlight the certain rooms that have the infection. And pink would represent urinary, blue would represent respiratory and so on. So that way you could see any trends that are going. You don't want to see a whole bunch of pink in one area because that shows you, ok, that might be hand-washing. So that's how we really kind of determine if we need to in-service our staff or not, is through those maps." IP site 7
External Resources	External resources were a source of information and support for some.	"We work hand-in-hand with the DOH ...and the CDC. I am on their website. They send me updates of what's going on..." IP site 1
Focus on Hand Hygiene	All infection prevention programs focused on hand hygiene. Monitoring staff compliance with hand hygiene policies was often informal.	"Well the most basic thing is hand-washing, the use of gloves, wash hands before and after the use of gloves. You do not use one glove from one resident to the other." IP site 1

Note: IP = infection preventionist; DOH = Department of Health; CDC = Centers for Disease Control and Prevention