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Original Study

Home Health Staff Perspectives on Infection Prevention and Control: Implications for Coronavirus Disease 2019



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A B S T R A C T

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Objectives: The role of home healthcare (HHC) services in providing care to vulnerable, often frail individuals with chronic conditions is critical. Effective infection prevention and control (IPC) in HHC is essential to keeping both healthcare workers and patients safe, especially in the event of an emerging infectious disease outbreak. Prior to the coronavirus disease 2019 pandemic, we explored successes and challenges with IPC from the perspectives of HHC staff.

Design: Qualitative descriptive study.

Setting and Participants: From May to November 2018, we conducted in-depth telephone interviews with 41 staff from 13 agencies across the nation.

Methods: Transcripts were coded by a multidisciplinary coding team, and several primary and sub-categories were identified using directed content analysis.

Results: Four primary categories were generated including (1) uniqueness of HHC; (2) IPC as a priority; (3) importance of education; and (4) keys to success and innovation. Participants perceived that IPC plays a big part in patient safety and reducing rehospitalizations, and protection of patients and staff was a major motivator for compliance with IPC. The identified challenges included the unpredictability of the home environment, patient/family dynamics, the intermittent nature of HHC, and staffing issues. Education was seen as a tool to improve staff, patient, caregiver and families' compliance with IPC. Keys to success and innovation included a leadership focus on quality, using agency infection data to improve quality, and a coordinated approach to patient care.

Conclusions and Implications: This qualitative work identified barriers to effective IPC in HHC, as well as important facilitators that HHC agencies can use to implement policies and procedures to improve patient care and keep staff safe. Leadership prioritization of IPC is key to implementing appropriate IPC policies and may be especially important in midst of a crisis such as coronavirus disease 2019.

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We certify that this work is novel. This qualitative work conducted prior to the emergence of coronavirus disease 2019 (COVID-19) identified barriers and facilitators to effective infection prevention and control in home healthcare.

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Home healthcare (HHC), defined as healthcare provided by skilled professionals to a person in their own home, is an expanding healthcare sector that plays a significant role in providing care following hospital discharge.¹ In 2017, about 3.4 million Medicare beneficiaries received HHC at a cost of \$17.7 billion.² Shorter hospital stays, increased use of medical devices at home, and an aging population with complex health conditions place patients at a high risk of developing an infection while receiving HHC.³ It is estimated that 17% of unplanned hospitalizations of HHC patients are caused by 4 types of infections: respiratory, wound, urinary tract, and intravenous catheter-related infections.⁴

The home environment presents specific challenges for HHC professionals implementing infection prevention and control (IPC)

policies and procedures because of a less controlled environment with fewer resources, the need to travel to patients' homes, and potential sanitation hazards.⁵ Existing IPC guidelines for HHC are largely based on evidence from acute care and may not account for all the difficulties clinicians encounter when going to and providing healthcare in a patient's home.⁶

Even under routine conditions, the quality of care and safety of HHC patients can be significantly affected by inadequate implementation of recommended IPC practices. This is especially important in the event of an emerging infectious disease outbreaks such as coronavirus disease 2019 (COVID-19),⁷ and therefore, it is essential to understand what constitutes effective IPC in HHC and what barriers and facilitators exist to implementing IPC policies and procedures in this setting. To address this knowledge gap, we qualitatively explored the perspectives of HHC staff across the nation on IPC in their agencies. Specifically, the objectives of this study were to (1) explore a range of HHC staff perspectives on agency-level IPC priorities and implementation of policies, and (2) describe challenges and successes associated with IPC in HHC agencies.

Methods

The quality framework of Donabedian guided this study.⁸ We followed the Consolidated Criteria for Reporting Qualitative Research ([Supplementary Material](#)).⁹ This research was approved by our Institutional Review Boards.

Research Team

The research team was interdisciplinary and included scientists with expertise in IPC in HHC, a nursing PhD student, and public health researchers with expertise in qualitative research (5 female members). Team members had no prior relationships with study sites.

Study Design

In this qualitative descriptive study,¹⁰ directed content analysis¹¹ was conducted to identify categories reflecting the theoretical framework and HHC IPC guidelines used to develop our interview guides. To select HHC agencies, we used December 2016 Provider of Services¹² and January 2017 Home Health Compare¹³ data with purposefully select those agencies eligible to participate in Medicare, and obtain variation in geographic region, rural/urban location, and Quality of Patient Care Star ratings.¹⁴ In a related study, we examined the impact of the Home Health Value-Based Purchasing¹⁵ pilot program and, therefore, we also oversampled agencies that participated in the program. Only agencies with at least 20 episodes of care (ie, with Quality of Patient Care Star Rating data) were included in the sample. In total, 115 HHC agencies were randomly selected and sent informational mailings; follow-up was conducted via telephone and e-mails. In the agencies that agreed to participate in the study ($n = 13$, 11.3%), administrators or clinical managers were asked to assist with identifying staff members who wished to participate in the interviews. Interested staff were encouraged to contact our research team to coordinate a time to be interviewed over-the-phone. For an agency to participate in the study, they must have had at least 2–5 English-speaking staff members who agreed to be interviewed about IPC infrastructure and policies, as well as quality improvement, at the agency. To encourage participation, each interviewee was given a \$100 gift card. Recruitment of agencies concluded when data saturation was achieved.¹⁶

Data Collection

We developed tailored interview guides (available upon request) based on participants' roles ([Table 1](#)). Development of guides was guided by our theoretical framework,⁸ HHC IPC guidelines,⁶ published literature,^{5,17} and research in other settings.^{18–21} After obtaining oral consent, semi-structured telephone interviews (lasting 45–90 minutes) were conducted between May to November 2018. Interviews were recorded and professionally transcribed; all transcripts were deidentified and reviewed for accuracy. Team members were encouraged to take field notes regarding observations not captured in interviews. To ensure uniformity of interviewing technique, the interviewing team held training sessions to review initial recordings and discuss issues. Weekly team meetings were held to discuss study progress, as well as feedback on the interview process.

Data Analysis

We used directed content analysis¹¹ to code the deidentified transcripts and identify primary and subcategories.¹¹ We also compared the primary and subcategories to uncover any similarities and differences within and among staff roles and agencies. Coding began as soon as first transcripts were available, and 5 initial transcripts were reviewed by all team members using inductive open coding.²² Weekly meetings were held to develop the initial codes. After three meetings, a draft codebook was compiled. Two more transcripts were coded by all coding team members to ensure consistency. A final codebook was created and iteratively refined throughout the coding process. For the remainder of the coding, every sixth transcript was double-coded; discrepancies were discussed until consensus was reached. Percent agreement was computed and found to be adequate (>86%). All transcripts were coded using NVivo 12 (QSR International, Burlington, MA).

Results

Agency and Participant Characteristics

Forty-one HHC staff from 13 agencies participated ([Table 2](#)). One-half of the agencies were located in rural areas (46.2%), had for-profit ownership (53.8%), a high Quality of Patient Care Star Rating (53.8%), and an average patient census of ≤ 100 (53.8%). Participants held various roles including administrator/clinical manager (39.0%), field nurse/home health aide (39.0%), nurse educator/quality improvement coordinator (17.1%), and infection preventionist (4.9%). The majority (82.9%) were employed full-time and were registered nurses (85.4%) with an average length of HHC experience of 12.4 years (standard deviation ± 10.7). A few participants ($n = 2$, 4.9%) were also physical therapists, in addition to having administrative roles at their agencies.

Four primary categories were generated from the data (1) uniqueness of HHC; (2) IPC as a priority; (3) importance of education; and (4) keys to success and innovation. See below for further explanation of the primary categories and [Table 3](#) for definitions of subcategories and exemplar quotes.

Uniqueness of HHC

We defined the first category, uniqueness of HHC, as comparisons made to other healthcare settings and descriptions of various situations (eg, emotional impact, unclean homes, working alone, and not knowing specific procedure) that agency staff encounter. As part of this category, we identified 4 subcategories described below.

Table 1
Summary of Interview Guides for Different Participants' Roles at Agency

Respondent Role	Topic	Sample Question(s)
Administrator/Clinical Manager	Information about participant's position at facility	Briefly tell me about your role and responsibilities at the agency... What other responsibilities do you have?
	Information about the agency	In your opinion, what are the top priorities for infection prevention and control at your agency?
	Changes or updated to IPC policies	Briefly describe how new policies and procedures related to infection control are created at your agency... How is information about infection control issues or changes in policies or procedures communicated by your agency?
Infection Preventionist/ Staff with Role in IPC	IPC responsibilities	Tell me about your work and activities related to infection control and prevention... How did you become involved in infection prevention and control at your agency?
	IPC policies and procedures	Can you briefly describe which infection control policies and procedures are in place at your agency? Does your agency track/monitor any conditions or infections?
	Compliance with IPC policies/procedures	How do you know if policies are being followed? Briefly describe what happens when an infection control policy or procedure is not followed...
Field RN/Aide	Services provided and patient care	How do you find out if a patient of yours has an infection? How is this communicated to you? Tell me about the role that your patients and their families/caregivers play in infection control...
	Role in IPC and priorities	In your opinion, how important is infection prevention and control in home care settings? Where would you say infection prevention ranks with other priorities for agency administrators?
	Facilitators and barriers	Tell me about your biggest success in infection control... In your opinion, what are the biggest challenges in carrying out good infection control in home healthcare?
Nurse Educator/Quality Improvement Coordinator	Quality and performance improvement	Is your agency part of any quality improvement initiatives at the local, state, or national level? What are they? Are any of these related to infection prevention and control?
	Resources and training	When an infection control issue arises, where/to whom do you go to for help/more information?

Unpredictability of the home environment

First, home health staff mentioned the unique aspects of providing healthcare in patients' homes and often compared those aspects with other institutional-based healthcare settings (eg, hospitals, nursing homes). Specifically, participants reported a certain level of unpredictability during home visits. For example, a coordinator stated, "Well, it's not the hospital where it's a controlled environment. You're going into patient's homes that sometimes aren't the cleanest... You just gotta do the best you can and try to be as clean and prevent infections as you can in the home... You're working with what you have." Staff described attempting to establish clean fields and implement universal precautions in a home, which may lack what they perceived as adequate cleanliness and sanitization. The presence of pets and/or pests was also discussed as adding to the variability during the home care visit. Lastly, there may be evidence of hoarding or the absence of adequate indoor plumbing, which can further complicate healthcare provision in the home. The sentiment of "doing the best you can" was echoed by several clinical staff who described different ways in which they dealt with these challenges including taking minimal supplies into homes that appear unsanitary.

Need to focus on the whole person and situation

Second, staff explained the necessity of assessing patients' home environments and social supports when developing patient care plans. As required in the Outcome and Assessment Information Set,²³ a mandated assessment for all Medicare-certified HHC agencies, participants highlighted this sociocultural assessment as one of the most important aspects of their job. Because some patients' home environments are challenging and some patients rely on others on care management, a thorough assessment of these barriers to care was described just as essential as performing tasks related to medical care such as wound care.

Intermittent nature of care

Third, in addition to challenges arising from patients' homes and lives, some staff described difficulties with ensuring patient, family, and caregiver compliance with treatments and IPC procedures because home health staff are not present in the home all of the time. In addition, staff discussed challenges related to care coordination, which included the limited operating hours of HHC agencies and difficulties with timely communication with on-call physicians. As a case manager described, "Our work day is 9:00 to 5:00. If there's something that happens after hours, there's no doctor to call.... We have to send the patient to the hospital."

Staffing challenges

Lastly, participants described staffing challenges faced by HHC agencies because of the aging workforce and poor retention and recruitment. Participants explained how this impacted patient care including adherence to IPC and how it affected current staff who had to take on additional responsibilities. As explained by a registered nurse (RN), "The nurses I can say, they are just so stressed up... They have too many patients to see, and they want to make sure that they covered everything. Now they are shortcutting, the tendency of shortcutting is you are giving a high percentage of committing mistakes." This inadequate staffing was compounded by the amount of travel required to go to and from patients' homes, especially in rural areas, and further exacerbated if other agency staff are unable to work because of illness. Another field RN described, "We're all over the place. If, as a visiting nurse, all your patients are concentrated in one area, you could probably get four to five done. If, for whatever reason, someone calls out sick and you have to go from point A to point B and it's a far distance, it might even just be three visits, depending on the traffic." In addition, the amount of chart documentation that HHC staff need to complete either during or after visiting patients results in increased workload.

Table 2
Characteristics of Participating Agencies and HHC Providers

Total Number of Participating Agencies	13 (100.00) N (%)
Census region	
Northeast	2 (15.4)
South	3 (23.1)
Midwest	5 (38.4)
West	3 (23.1)
Rural location	6 (46.2)
VBP program participation	5 (38.4)
Ownership status	
For-profit	7 (53.8)
Nonprofit	6 (46.2)
Hospital-based	2 (15.4)
Average patient census*	
≤100 current patients	7 (53.8)
Quality of patient care [†]	
High	7 (53.8)
Medium	2 (15.4)
Low	3 (23.0)
Total number of HHC providers	41 (100.00)
Role at agency	
Administrator/clinical manager	16 (39.0)
Infection preventionist/staff with role in IPC	2 (4.9)
Field RN/home health aide	16 (39.0)
Nurse educator/quality improvement	7 (17.1)
Highest level of education	
Post-baccalaureate and associate's	16 (39.0)
Bachelor's	18 (43.9)
Master's and doctorate	7 (17.1)
Full-time	34 (82.9)
Level of experience [‡]	Mean (SD)
Years in HHC	12.4 (10.7)
Years at current agency	6.5 (7.4)
Years in current position	3.2 (3.3)

VBP, value-based purchasing pilot program.

*Self-reported.

[†]High quality (≥4.49 stars and >92.49% influenza and pneumonia vaccination); medium quality (≥2.51 and ≤4.48 stars and ≥35 and ≤92.49% influenza and pneumonia vaccination); low quality (<2.51 stars and <35% influenza and pneumonia vaccination).

[‡]n = 40; 1 response not captured.

IPC as a Priority

This category was defined as agency and staff priorities in terms of IPC. During the interviews, almost all participants identified IPC as a major focus at their agencies, and we heard many reasons for that prioritization, including vulnerability of their patient population. Within IPC as a priority category, we identified 3 subcategories.

Focus on hand hygiene, bag technique, and equipment

With respect to specific IPC priorities, all participants stated that hand hygiene was a major focus of staff educational curricula and monitoring procedures at their agencies. In the words of one RN, “The most important aspects of infection control are education and hand-washing. It’s the single most proven way to keep infections down and it’s important to teach people to correctly wash their hands.” However, despite the focus on IPC, several supervisory staff described specific challenges with clinician adherence to proper hand hygiene protocols and over-reliance of field clinicians on hand sanitizers vs hand washing. Maintaining appropriate nursing bag technique to prevent transmission of microorganisms, a unique practice for HHC setting, and ensuring proper handling of equipment were also key IPC priorities at many agencies.

Important role in reducing rehospitalizations

There was also widespread acknowledgement that infections play a major role in driving hospitalizations and, oftentimes, IPC policies and procedures were revised and adopted at participating agencies as

a major quality improvement effort to reduce hospital admissions. One field RN said, “Our goal is to keep [patients] out of the hospital... we can lower that risk [of] hospitalization, simply by maintaining and teaching.”

Protection of patient/self

Finally, we heard from participants about their personal priorities around IPC. Patient safety and protection were described as a major motivator for compliance with IPC procedures as participants discussed their efforts to ensure that they do not transmit infections from one patient to the next. As explained by a home health aide, “For myself, I certainly don’t want to take one infection to another house, you know, going from one house to another.” Staff also talked about the importance of protecting themselves and their families from infections that could be acquired as a result of noncompliance.

Importance of Education

The third category, importance of education, was defined as perceptions of patient, caregiver and staff education about IPC and how that education impacts infections and IPC in the home environment. We identified 2 subcategories.

Staff education is vital

First, participants recognized the role of staff education in ensuring compliance with IPC procedures. All staff talked about education of agency staff as essential to keeping patients safe. Staff discussed prior experiences and consequences of insufficient training in IPC policies, procedures, and practices, and the ultimate impact upon the quality of patient care. Participants described ways in which staff are educated about IPC including at new employee orientation, and continuing education in the form of in-services, online modules, and off-site opportunities. Staff stressed that education provided by the agency needs to be repetitive for IPC procedures to become “second nature.” For staff in charge of IPC, designing and/or expanding an agency’s IPC program is a central job responsibility, which often involves creating curricula and leading staff trainings. Although most participants with this role described a comfort level with IPC education (regarding handwashing, bag technique, and prevention of transmission) that they were providing to staff, they expressed a desire for more educational material that they themselves could use to increase their own knowledge and grow their IPC program. Indeed, several participants with a role in IPC talked about their lack of formal training, as well as the limited number of resources focused on IPC specifically in HHC.

Education is key for patients, family, and caregivers

Second, participants discussed the importance of patients, family, and caregiver involvement in IPC and ensuring appropriate education and compliance with IPC policies. Field clinicians viewed teaching patients, family, and caregivers about IPC practices in the home as a fundamental (and ubiquitous) task. Many participants emphasized the importance of appropriate education and tools for patients, families, and caregivers to prepare them to be effective partners in IPC. As explained by an RN, “The most important [issue] for me as a nurse in the home health setting is to teach the patient and the caregiver... They’re doing their care, and the nurses will not be there for a long period of time, it’s just for a specific period of time, so the most important aspect of home health setting is teaching... Overwhelmingly, education was seen by staff as a tool to improve and overcome patient, family member, and caregivers’ lack of compliance with IPC practices. Noncompliance was viewed as a major challenge; many participants gave detailed accounts of the lengths they went to teach patients and their families and caregivers about wound care, environmental sanitization, and medication adherence.

Table 3
Descriptions of Categories and Subcategories

Subcategories	Description	Exemplar Quotes
Category 1. Uniqueness of HHC: Description of HHC compared with other healthcare settings, and the different situations that agency staff encounter in various homes (eg, emotional impact, unclean homes, working alone and not knowing specific procedure)		
Unpredictability of the home environment	Staff safety and other issues that are unique to working in a patient's home	<p>"It's hard in home health. Sometimes, I'm just at a loss. How do you make this happen when these people are living in what they're living in?... Because a person can look like they got it all together on the outside, and then you get into their home and hoarding situations, infestations of animals... You just have to start and build trust." – Administrator, Agency 6</p> <p>"For me is the home environment... You can be absolutely aseptic the whole time you're in there. [But] if there's dog poop 10 feet away from you when you're doing wound care, that's a problem. Some of the home environments are not appropriate for certain kinds of patients. There's no way I can get them healed in that environment." – Field RN, Agency 8</p> <p>"Well, I think what we have done in those situations when we discover those houses, we take minimal supplies." – Administrator, Agency 2</p>
Need to focus on the whole person and situation	Recognition of the need to assess patients' home environments and social supports when developing patient care plans	<p>You're really looking at the entire patient's psychosocial and everything. It's not as task-oriented as other areas where you're going in, and you're just doing wound care." – Quality improvement director, Agency 3</p> <p>"In the homes, we oversee just about everything. I mean, it depends on what kind of home you go in... If it's not as clean of a home, then you have more dynamics to deal with. Or if it's a dysfunctional family, you have more dynamics to deal with." – Field RN, Agency 7</p>
Intermittent nature of care	Discussion of the challenges related to providing intermittent care to patients and working within the constraints of 'regular working hours' when coordinating patient care	<p>"As a home health [provider], we are only there X amount of hours every week with the patients. The rest of it is up to them. The rest of it is up to family." – Field RN, Agency 4</p> <p>"We have on-call at night that people may be having to be seen at night if something happens to – their wound dressing falls off or something else going on, they may need to have visits." – Administrator, Agency 3</p>
Staffing challenges	Difficulties faced by agency staff which are not often experienced in other healthcare settings (eg, retention, illness, workload, travel)	<p>"More than 40% of our aides are over the age of 60. ... We're struggling to recruit and replace the workforce." – Administrator, Agency 5</p> <p>"[Since] we can't secure somebody, get them through our training process before they are moving on to work for somebody else, [therefore] our RNs are actually functioning in that CNA role. So, if somebody needs help with bathing, dressing, or grooming, our RNs are picking up that duty." – Administrator, Agency 9</p> <p>"We didn't always have [supervisors]—you know, we had such turnover and now we have regular hospice nursing supervisors and clinical supervisors for home care, both nursing and therapy, so they help to make sure that their staff are adhering to [our infection] surveillance program." Quality improvement director, Agency 1</p>
Category 2. IPC as a priority: Description of agency and staff priorities in the context of IPC through areas of: staff adherence to hand hygiene and bag/equipment handling techniques, reducing hospitalizations, personal beliefs about IPC, and self-protection habits.		
Focus on hand hygiene, bag technique, and equipment	Explanation of hand washing (and maybe sanitization too) in home environment; expectation that IPC procedures should be "second nature" to all agency staff	<p>"We use reusable antimicrobial sheets that we lay down before we put down our bags, and just really we are stressing sanitizing between every single interaction with a patient, as well as all of our equipment." – Administrator, Agency 8</p> <p>It's just repetition, repetition, repetition. You just got to keep doing it. Then [handwashing is] going to become second nature..." – Field RN, Agency 6</p>

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Table 3 (continued)

Subcategories	Description	Exemplar Quotes
Important role in reducing rehospitalizations	Recognition that infections play a major role in hospital readmissions and the need to focus on improving IPC in order to decrease hospitalizations	<p>“Because a lot of our patients are immunosuppressed, and we’re doing a lot more procedures in the home, and we have to be very diligent with infection control.”</p> <p>- Administrator, Agency 7</p> <p>“Not only infection rates, but what’s our incident rate? What is our rehospitalization rate? Those are priorities as well. I know a lot of times it’s unpreventable, but we want to make sure did we do what we should have done to prevent that ER visit or the hospitalization visit.” – Field RN, Agency 9</p>
Protection of patient/self	Particular habits or concerns that are related to IPC (like self-protection); can include personal understanding/beliefs around IPC	<p>“...[IPC] is very important. Not just for patients but also for what I’m bringing home...I just don’t want to bring anything home.” – Field RN, Agency 10</p> <p>“I have different shoes when I come into my car, and then when I go home, I remove my uniform... I just leave in the garage. I don’t want to come [to my house] with that.” – Aide, Agency 12</p>
Category 3. Importance of education: Perception of how patient/caregiver and staff education about IPC impacts infections in the home environment		
Staff education is vital	Recognition of the importance that staff education plays in ensuring compliance with IPC; expectation that IPC procedures should be ‘second nature’ to all agency staff	<p>“[Staff education] is just a lot of repetition over and over until you really get used to it.” – Field RN, Agency 6</p> <p>I’d like to have a better grasp of [IPC] myself. I don’t feel like I know enough.” – Clinical manager, Agency 11</p> <p>“I actually had no previous experience in home care or formally in infection prevention when I came to this role, which is a challenge ... When I look at what resources are out there... [it is] very much geared toward the inpatient world.” – Infection preventionist, Agency 10</p>
Education is key for patients, family, and caregivers	Discussion of the importance of patients, family and caregiver involvement in IPC and ensuring appropriate education and compliance with IPC policies	<p>“We have to keep this in-service continuously going...that includes the education not only for our employees, but how they will transfer the knowledge to the respective families and patients as well.” - Administrator, Agency 4</p> <p>“I think it’s a little harder... for family caregivers to use gloves. We tell them the importance and some may understand the importance of it, but I think, because it’s their loved one, they don’t necessarily have that same level of importance.” – Aide, Agency 7</p>
Category 4. Keys to success and innovation: Unique factors that help to prevent/control infections and improve quality; can include incentives, support from leadership, staff education and resources, care coordination and communication, and use of infection data to drive improvement		
Culture of overall quality and patient satisfaction	Description of the agency’s focus on quality improvement	<p>“We’ve come a long way... [Now,] new staff are oriented to the [agency] expectations. We have a higher compliance rate, and we’ve had joint commission surveys where we have not had any infections tags or anything. I know in the beginning, there was a lot of education and reinforcement.” - Quality improvement director, Agency 1</p> <p>“We kind of have a saying [at this agency] that doing the right thing is not always easy, sometimes it’s darn well hard, but it’s always the right thing to do. We try to live by that in everything we do.” – Field RN, Agency 9</p> <p>“[Our leadership] makes sure you have what you need.” – Clinical manager, Agency 13</p>
Setting up staff for success through education	Devoted resources/procedures to staff training (eg, orientation, continuing education, pamphlets) as well as retraining after outbreaks or non-compliance	<p>“We really stay up-to-date on what’s current...” – Administrator, Agency 9</p> <p>“In the six months I’ve been here, I’ve seen a decrease in infections because of some of the systems that were put into place, the educational assistant, and the things that are on our charting now, our documentation.” – Quality improvement director, Agency 13</p>

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Table 3 (continued)

Subcategories	Description	Exemplar Quotes
Coordinated approach to patient care	Care coordination within the agency (eg, flow of information across the agency staff, patients, caregivers and other providers) which assists, helps, motivates or is a barrier for agency staff related to IPC; direct, multi-modal communication	<p>“When there is an update or a change in anything, that’s something that we address during that [interdisciplinary monthly] meeting” – Field RN, Agency 4</p> <p>“... the biggest thing that’s helped us is we have secure texting, and now we can all text in a group. ... It’s easier to communicate” – Clinical manager, Agency 6</p> <p>“We can do case communications which are a permanent part of the [patient’s] record. If we’re sending a message to a physician, it can be recorded that way... You can also send a message that’s not a permanent part of their record, but that other staff can see. So it’s the easiest way to get [the message] to everybody quickly.” – Field RN, Agency 10</p>
Using Data to Improve Care	Description of how the agency collects infection data and how the data are used for process and quality improvement	<p>“We found last year that our [staff flu vaccination] percentage had dipped from the previous year... We really took that as a quality initiative to really bump up how are we going to increase our rates... We were able to have almost a 12% increase last year based on the quality improvement initiatives we took. We’re carrying that over this year as well.” – Infection preventionist, Agency 3</p> <p>“Infection control. Well, I would say that it’s a work in progress. Our urinary tract infections have dropped a little bit, but they’re still above the national average... I did have national [data] across the board from all the state... Everywhere, patients have low scores with medications. So, we developed a new tool, and our percent went up 20%. That’s a big deal.” – Clinical manager, Agency 1</p>

Keys to Success and Innovation

Although we heard about many challenges and difficulties facing home health agencies, we also learned about several programs, initiatives, and policies put in place by agency leadership that were perceived by participants as aiding staff in properly implementing IPC practices, and ultimately improving the quality of patient care, which we coded as keys to success and innovation. Within this category, we identified 4 subcategories.

Culture of overall quality and patient satisfaction

One major facilitator voiced by participants was their leadership’s focus on or an overall culture of quality and patient satisfaction present at the agency. The emphasis on quality influenced IPC policies and practices at those agencies, by highlighting the importance of IPC upon quality of patient care and patient satisfaction. Staff explained that with a leadership focused on quality, not only was it an asset to the agency overall, but prioritization also supported individual clinicians in successfully preventing and reducing infections among their patients. Furthermore, having leadership support and encouragement allowed staff members to take on IPC as a key initiative. As explained by an RN, “My director —she’s given a lot of it over to me and allows me to... teach and to take control so that I know exactly what my nurses and my therapists have been taught... That’s been very helpful to me, to allow me to take that on as my project because I’m passionate about it.”

Setting up staff for success through education

Many participants talked about how their respective agencies changed policies and/or devoted resources to staff training either at orientation, for continuing education, or conference attendance. In some cases, this was done in an effort to retrain staff in response to an outbreak or cases of noncompliance. Having an agency dedicate time and money toward staff education (whether preemptive or reactive) was viewed as critical for clinicians to be able to provide quality care to their patients, and, therefore, we coded it under keys to success and innovation category.

Coordinated approach to patient care

Third, several participants described specific ways in which agencies have improved teamwork and care coordination. Care planning meetings that included all staff involved in direct patient care, as well as other means of direct, multimodal communication among disciplines, were mentioned by several participants. Given the nature of HHC and that clinicians are often in the field and rarely in the office, reliance on communication tools such as secure text messaging was described as an enabler of effective and timely communication.

Using data to improve care

Finally, some agencies described utilizing real-time data, such as data from their electronic medical records, as a key to success because they were able to direct their often-limited resources to target specific areas for improvement, often related to IPC. Presenting these data at monthly staff meetings was described as a strategy to facilitate discussion and identify solutions. Others discussed organizing smaller teams (eg, by practice areas), which allowed leadership and supervisors to achieve buy-in, input, and ownership of quality improvement projects by agency staff. As a quality improvement director described, “Instead of talking as a big group about our quality outcomes and assessments and performance improvement projects, we’re really broken down into smaller groups. We have a north team, east team, south team. We actually are really working just individually right with that team and the team manager to really look at their own outcomes and trying to help them to improve.”

Discussion

This study was conducted in the year prior to the COVID-19 pandemic, with data collection ending in November 2018, thereby giving insight into challenges faced by HHC staff and how their agencies respond to these challenges without the added stress of a global pandemic. Several challenges discussed by HHC staff were related to the uniqueness of the setting in which care was provided and their potential negative impacts upon patient safety. These have been reported in previous work in the HHC setting²⁴ as well as other

residential settings, including nursing homes.¹⁸ The unpredictability of the home environment including issues with sanitation and cleanliness were perceived as a major barrier in providing effective patient care. Participants also recognized the need to focus on the whole person and situation, given the impact that social determinants of health (ie, financial, home environment, support system) have on safe transitions to home.²⁴

A major challenge facing HHC agencies is recruiting and retaining qualified clinical staff.²⁵ In our study, inadequate staffing was further exacerbated by staff illness and this problem will likely intensify within the context of COVID-19. When faced with an outbreak, acute care hospitals plan for a surge of infected patients and HHC agencies and other receiving facilities prepare to increase their client load and provide care to patients discharged early from hospitals.²⁶ From prior work during the 2009 H1N1 influenza pandemic²⁷ and early accounts from COVID-19 outbreak,^{28–30} many US HHC agencies reported reduced capacity to respond to a surge in patients and to care for patients who may be infected. There are reports of HHC workers having to choose between taking care of their patients or their children who are no longer in school,³¹ as well as reports about the lack of personal protective equipment (PPE) in the HHC setting.^{32–34}

As in nursing homes,¹⁸ the top IPC priority at participating HHC agencies was ensuring compliance with hand hygiene. Proper PPE usage (donning and doffing) has been cited as particularly challenging for HHC staff, as well as disposing of used and/or contaminated PPE.³⁵ Our findings indicate that patient safety, as well as self-protection and protection of family members are major motivators for HHC providers. During the COVID-19 pandemic, there have been recent reports about PPE and other supply shortages in HHC,^{28,30,33,34} which may affect the willingness of HHC workers to provide care in patient homes.³⁶

In our study, participants described workforce issues as having a negative impact on the quality of care provided including adherence to IPC policies, as well as their workload, which may lead to provider dissatisfaction and burnout. Pittman et al examined the use of residency programs by HHC agencies as a potential pipeline of clinical staff and found that only 2% of agencies offered residencies due to a lack of available preceptors and costs associated with implementing programs.³⁷ Given HHC workforce shortages, future work should examine innovative solutions to increasing the numbers of qualified staff, particularly in the event of state or national emergencies.

Issues around care coordination and communication with providers in the community in the context of transitions of care have been described previously.^{38,39} In a qualitative study examining care coordination for recently discharged patients, Jones et al described difficulties with identifying physicians responsible for patients' care and effectively communicating with physicians to guide appropriate care and treatment.⁴⁰ In our study, staff described challenges related to the intermittent nature of care provided to HHC patients, along with time constraints associated with "regular working hours" as a major barrier to effective and timely communication. These findings underscore the need to enhance and streamline communication between HHC agencies and other healthcare providers in the community in order to prioritize patient safety. In addition, they highlight the potential that telemedicine and information technology can have in transforming communication and care in HHC.^{25,41} In the context of the COVID-19 pandemic, surveys from April and June 2020 suggest that HHC agencies have rapidly increased their telemedicine capabilities to care for current patients, handle increased client load, and triage potentially infected patients.^{28,30}

Another unique challenge with implementing IPC in HHC was a shift in the care responsibility to patients, families and informal caregivers when staff are not present. Staff expressed willingness and enthusiasm to engage and educate patients, families, and informal caregivers, and richly described creative ways they have used to engage them in IPC resulting in improved health and avoidance of

rehospitalizations. However, when those engagement and educational methods failed and patients, families, and informal caregivers remained disengaged, staff expressed their frustration and described the likelihood of future infections and other health complications for those patients despite their efforts.

Although participants identified significant barriers to IPC in HHC, they also shared multiple strategies to overcome these barriers. Namely, staff identified prioritization of IPC by agency leadership as a key to successfully preventing and reducing infections overall for the agency and individual clinicians. For those agencies, prioritization of IPC can give staff a solid foundation from which to respond to an infectious disease crisis, such as the current COVID-19 pandemic. In addition, with the increased focus on quality improvement in HHC and federal regulations requiring HHC agencies to have a Quality Assurance and Performance Improvement (QAPI) plan in place,⁴² some participating HHC agencies collaborated with external partners including consultants, professional organizations and departments of health for quality improvement, and IPC educational resources. Agencies affiliated with larger health systems and those participating in quality improvement initiatives reported the benefits of these relationships in terms of the increased availability of resources and educational opportunities. These federal initiatives resulted in a clear focus among HHC administrators and staff on improving quality of care, with IPC as one of the top priorities described by participants. These external relationships and partnerships can be particularly vital for HHC agencies during state or national emergencies, like the COVID-19 pandemic.

Limitations

We utilized rigorous methods to increase credibility, transferability, dependability, and confirmability of study findings. Despite our attempt to obtain various perspectives across a diverse sample of HHC agencies, the results might not be transferable. Participants may differ from those that chose not to participate. In addition, we did not conduct member-checking. Finally, we did not specifically ask participants about emergency preparedness during our interviews, and thus, cannot make specific recommendations related to the COVID-19 pandemic. However, because our findings on IPC do have important implications for the current and future pandemics, as well as future home health policy and practice, we discussed our findings in that context.

Conclusions and Implications

This qualitative work conducted prior to the emergence of COVID-19 pandemic identified barriers and challenges to effective IPC in HHC, as well as important facilitators that home healthcare agencies can use to implement policies and procedures to improve patient and healthcare worker safety. Understanding more about how agency-level IPC policies and practices impact HHC staff and patient care can inform future IPC changes in the home health care industry. Leadership prioritization of IPC is key to implementing appropriate IPC policies and may be especially important in midst of a crisis such as the emergence of COVID-19.

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Supplementary Material

InHOME Codebook

Codes

Names	Description
1. Agency-level policies	Facts about policies in place. Specific agency policies related to infection prevention and control – Examples: Cleanliness/sanitization; hand hygiene/bag technique; vaccinations (staff/patient)
Flu vaccination policies for agency staff	Specific policies around influenza vaccination for agency staff; wearing masks; flu vaccine clinics for staff
Flu vaccination policies for patients and families	Specific policies around influenza vaccination for patients/families; whether a flu vaccine clinic is offered, if agency staff can administer vaccines to patients/families, or if patients/families are not offered vaccines from agency staff
2. Scope of care	Facts about the range of disciplines/services offered by the agency (eg, assisted living, range of services and disciplines–phlebotomy, hospice and physical therapy)
The above are factual the below are perceptions about the processes	
3. Agency priorities	Description of agency priorities in the context of infection prevention and control and quality improvement
Handwashing is our priority	Agency staff often described handwashing as a top priority/focus for the agency
4. Care coordination	The flow of information across the agency staff, patients, caregivers and other providers. Care coordination within the agency which assists, helps, motivates or is a barrier for agency staff related to infection prevention and control; How do they work as a team?; thoughts/feelings; any improvements?
Care coordination challenges	Challenges experienced by agency staff with regard to care coordination
Care coordination outside agency	Care coordination with PCP, pharmacist, hospital
Care coordination within agency	Care coordination with other disciplines at the agency (PT/OT/ST/SW)
Tools	Tools/programs used (Examples: EHR/messaging app, paper logs) to enhance communication and monitor care quality.
5. Compliance	Direct care staff, compliance with recommended/required policies/procedures. (Anecdotes, personal experiences)
Consequences of noncompliance	What happens when someone doesn't follow the rules; Examples: "retrain/reinforce"
Monitoring compliance of staff	How does the agency management specifically monitor compliance with policies related to infection prevention and control (handwashing/bag technique); Examples: Patient survey - telephone call; bag/trunk checks; handwashing checks during staff meetings; supervisory visits (quarterly/annually). Any difficulties and reasons why or why not staff comply with infection prevention and control policies
Reasons for noncompliance	Potential reasons that agency staff may not follow infection control policies and procedures
6. Education	Education provided to staff, patients, caregivers and family members by the agency.
Patient/caregiver education	How patient and caregivers are educated.
Staff education	How staff are educated. Devoted resources/procedures to training (eg, orientation, continuing education, pamphlets...) for staff as well as retraining after outbreaks or non-compliance
Continuing staff education	Description of infection prevention and control education provided to staff members on an on-going basis at staff meetings, skills fairs, or yearly competency checks
Education after noncompliance	Description of staff education provided if policy non-compliance was observed
New staff education	Description of infection prevention and control education provided to new staff members at orientation or on-boarding
Opportunities for improvement	Thoughts about ways to improve staff education and training at the agency; includes needs and perceptions
7. Emerging themes	For codes/subcodes which may not fit under the 6 overarching themes of Agency-level Policies, Scope of Care, Communication, Compliance, Regulatory and/or other External Barriers/Facilitators, and Uniqueness of Home Health Care Environment
Agency needs	How can you be better supported in preventing infections in your current role?; also other agency needs that are mentioned throughout the interview
Importance of education	Perception of how patient and staff education about IPC impacts infections (or lack of) in the home environment (Example: "education is key")
Personal IPC priorities	Particular habits or concerns that are related to IPC (possibly like self-protection, etc); can include personal understanding/beliefs around infection prevention and control
'Second nature'	Explanation of hand washing (and maybe sanitization too) in home environment; expectation that IPC procedures should be "second nature" to all agency staff
8. Infection prevention and monitoring	Various infection prevention processes and monitoring/tracking in place at the agency
Data collection and tracking methods	Description of how the agency collects infection data (paper log, EHR, etc) and if/how it tracks and reports (to agency staff, QI committee, hospital board, etc) infection trends that may be happening.
Infection prevention organization and operation	How are infections prevented at the agency? By whom? (ie, personnel, committees, hospital resources); supplies provided by agency
Patients with infections	Care and identification of patients with infections; how does the agency learn that a px has an infection upon admission; what happens if an existing px is suspected of having an infection?
9. Quality improvement	What the agency is doing to improve quality of care
QAPI-QI committee	Description of structure and goals of agency QAPI/QI committee
10. Regulatory and other external barriers/facilitators	External factors that improve or hinder infection prevention/control or quality improvement at an agency, including patient acuity if tied to CMS reimbursement of referral sources
Agency reputation	Reputation, which may be impacted by publically reported data that impact the public and others' perception of agency quality (Examples: star rating, websites, etc.)
Collaborations - Affiliations	Any collaborations-affiliations that appear to be assisting, helping, and motivating agencies related to infection prevention and control
External initiatives	Quality and infection prevention initiatives that agencies can choose to be a part of (usually started by CMS, DOH, etc.)

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Names	Description
External policies - Reimbursement driving quality or compliance External resources	Payment models tied to quality indicators and surveys, which in turn, drive agency compliance with policies and procedures related to infection prevention and control External resources that are assisting, helping, and motivating agencies related to infection prevention and control- Websites (from any external sources) that appear to be assisting, helping, and motivating agencies related to infection prevention and control. DOH-related resources that appear to be assisting, helping, and motivating agencies related to infection prevention and control. Can also be other investments by agency (outside surveyor/monitoring) or external consultant.
Keys to success - Innovation	What is unique at that agency that is helping to prevent/control infections and improve quality? Can include any incentives provided to staff to enhance policy/procedure compliance
11. Uniqueness of the home healthcare setting	Factors related to patient care and infection prevention, control and quality that are unique to home health care (not experienced in other healthcare settings). The unique environment descriptors compared with other healthcare settings, and the different situations that agency staff encounter in various homes (eg, emotional impact, unclean homes, working alone and not knowing specific procedure)
Cleanliness and sanitizing Family dynamics/role	Explanation of IPC in home environment (hand hygiene/bag technique, "second nature") Added layer of patient care in home environment (described as barrier and sometimes a facilitator). Patient/family role in IPC in home environment. Expectation (from agency staff) of patient/family role in IPC in home environment (patient/family expected to feel responsibility toward maintaining cleanliness/sanitization)
Patient acuity Patient and caregiver compliance Patient as family	Description of patient acuity and how it impacts level of care provided by agency Patient/caregiver compliance with recommended procedures, specific experiences or challenges faced Added feeling of responsibility toward patient on behalf of agency staff member due to time spent with patient in their home, lack of family, etc.
Staffing challenges in HH environment	Difficulties faced by agency staff who are not experienced in other healthcare settings (Examples: sick employees, time driving, etc.)
Unpredictability of home health	Staff safety and other issues that are unique to working in a patient's home

**Consolidated Criteria for Reporting Qualitative Studies (COREQ):
32-item Checklist**

No. Item	Guide Questions/Description	Reported on Page Number
Domain 1: Research team and reflexivity		
Personal characteristics		
1. Inter interviewer/facilitator	"The research team was interdisciplinary and included scientists with expertise in IPC in HHC, a nursing PhD student, and public health researchers with expertise in qualitative research (5 females)."	Page 4
2. Credentials	See above	Page 4
3. Occupation	See above	Page 4
4. Sex	See above	Page 4
5. Experience and training	"The research team was interdisciplinary and included scientists with expertise in IPC in HHC, a nursing PhD student, and public health researchers with expertise in qualitative research (5 females)." "To ensure uniformity of interviewing technique, the interviewing team held training sessions to review initial recordings and discuss issues. Weekly team meetings were held to discuss study progress, as well as feedback on the interview process."	Page 4 Page 5
Relationship with participants		
6. Relationship established	"Team members had no prior relationships with study sites."	Page 4
7. Participant knowledge of the interviewer	"Team members had no prior relationships with study sites."	Page 4
8. Interviewer characteristics	"The research team was interdisciplinary and included scientists with expertise in IPC in HHC, a nursing PhD student, and public health researchers with expertise in qualitative research (5 females)."	Page 4
Domain 2: Study design		
Theoretical framework		
9. Methodological orientation and theory	"Donabedian's quality framework guided this study. ⁸ We followed the Consolidated Criteria for Reporting Qualitative Research (Supplementary Material). ⁹ " "We used directed content analysis ¹¹ to code the deidentified transcripts and identify primary and subcategories. ¹¹ We also compared the primary and subcategories to uncover any similarities and differences within and among staff roles and agencies. Coding began as soon as first transcripts were available, and 5 initial transcripts were reviewed by all team members using inductive open coding. ²² "	Page 4 Page 5
Participant selection		
10. Sampling	"To select HHC agencies, we used December 2016 Provider of Services ¹² and January 2017 Home Health Compare ¹³ data to purposively select those agencies eligible to participate in Medicare, and obtain variation in geographic region, rural/urban location and Quality of Patient Care (QoPC) Star ratings. ¹⁴ For a related study, we also oversampled agencies competing in the Home Health Value-Based Purchasing (HHVBP) ¹⁵ pilot program. Only agencies with at least 20 episodes of care (ie, with QoPC Star Rating data) were included in the sample. In total, 115 HHC agencies were randomly selected and sent informational mailings; follow-up was conducted via telephone and emails."	Page 4
11. Method of approach	"In total, 115 HHC agencies were randomly selected and sent informational mailings; follow-up was conducted via telephone and emails. At agencies that agreed to participate in the study (n = 13, 11.3%), administrators or clinical managers were asked to assist with identifying staff members who wished to participate in the interviews. Interested staff were encouraged to contact our research team to coordinate a time to be interviewed over-the-phone. In order for an agency to participate in the study, they must have had at least 2-5 English-speaking staff members who agreed to be interviewed about IPC infrastructure and policies, as well as quality improvement, at the agency. To encourage participation, each interviewee was given a \$100 gift card. Recruitment of agencies concluded when data saturation was achieved. ¹⁶ "	Page 4
12. Sample size	"Forty-one HHC staff from thirteen agencies participated (Table 2)."	Page 5
13. Nonparticipation	"In total, 115 HHC agencies were randomly selected and sent informational mailings; follow-up was conducted via telephone and emails." "Forty-one HHC staff from thirteen agencies participated."	Page 4 Page 5
Setting		
14. Setting of data collection	"Interested staff were encouraged to contact our research team to coordinate a time to be interviewed over-the-phone." "After obtaining oral consent, semi-structured telephone interviews (lasting 45-90 minutes) were conducted between May to November 2018."	Page 4
15. Presence of nonparticipants	See above	Page 4

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No. Item	Guide Questions/Description	Reported on Page Number
16. Description of sample	“Forty-one HHC staff from thirteen agencies participated (Table 2). Half of the agencies were located in rural areas (46.2%), had for-profit ownership (53.8%), a high Quality of Patient Care Star Rating (53.8%), and an average patient census of ≤ 100 (53.8%). Participants held various roles including administrator/clinical manager (39.0%), field nurse/home health aide (39.0%), nurse educator/quality improvement coordinator (17.1%), and infection preventionist (4.9%). The majority (82.9%) were employed full-time, and were registered nurses (85.4%) with an average length of HHC experience of 12.4 years (SD \pm 10.7). A few participants (n = 2, 4.9%) were also physical therapists, in addition to having administrative roles at their agencies.”	Page 5
Data collection		
17. Interview guide	“We developed tailored interview guides (available upon request) based on participants’ roles (Table 1). Development of guides was guided by our theoretical framework, ⁸ HHC IPC guidelines, ⁶ published literature, ^{5,17} and research in other settings. ^{18–21} ”	Page 4
18. Repeat interviews	“After obtaining oral consent, semi-structured telephone interviews (lasting 45–90 minutes) were conducted between May to November 2018.”	Page 4
19. Audio/visual recording	“Interviews were recorded and professionally transcribed; all transcripts were deidentified and reviewed for accuracy.”	Page 5
20. Field notes	“Team members were encouraged to take field notes regarding observations not captured in the interview.”	Page 5
21. Duration	“After obtaining oral consent, semi-structured telephone interviews (lasting 45–90 minutes) were conducted between May to November 2018.”	Page 4
22. Data saturation	“Forty-one HHC staff from thirteen agencies participated (Table 2).”	Page 5
23. Transcripts returned	“Additionally, we did not conduct member-checking.”	Page 14
Domain 3: Analysis and findings		
Data analysis		
24. Number of data coders	“The research team was interdisciplinary and included scientists with expertise in IPC in HHC, a nursing PhD student, and public health researchers with expertise in qualitative research (5 females).”	Page 4
25. Description of the coding tree	“Four primary categories were generated from the data (1) uniqueness of HHC; (2) IPC as a priority, (3) importance of education; and (4) keys to success and innovation. See below for further explanation of the primary categories and Table 3 for definitions of subcategories and exemplar quotes.”	Page 6
26. Derivation of themes	“We used directed content analysis ¹¹ to code the deidentified transcripts and identify primary and subcategories. ¹¹ We also compared the primary and subcategories to uncover any similarities and differences within and among staff roles and agencies. Coding began as soon as first transcripts were available, and 5 initial transcripts were reviewed by all team members using inductive open coding. ²² Weekly meetings were held to develop the initial codes. After three meetings, a draft codebook was compiled. Two more transcripts were coded by all coding team members to ensure consistency. A final codebook was created and iteratively refined throughout the coding process. For the remainder of the coding, every sixth transcript was double-coded; discrepancies were discussed until consensus was reached. Percent agreement was computed and found to be adequate (>86%).”	Page 5
27. Software	All transcripts were analyzed using NVivo 12 (QSR International).	Page 5
28. Participant checking	“Additionally, we did not conduct member-checking.”	Page 14
Reporting		
29. Quotations presented	See results section and Table 1.	Pages 5–12, 19
30. Data and findings consistent	See results section	Pages 5–12
31. Clarity of major themes	See results section	Pages 5–12
32. Clarity of minor themes	See results section	Pages 5–12

Developed from Tong et al.⁹