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“The Invisible Staff”: A Qualitative Analysis of Environmental Service Workers’ Perceptions of the VA *Clostridium difficile* Prevention Bundle Using a Human Factors Engineering Approach

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Abstract

Objectives: Using a novel human factors engineering approach, the Systems Engineering Initiative for Patient Safety model, we evaluated environmental service workers’ (ESWs) perceptions of barriers and facilitators influencing adherence to the nationally mandated Department of Veterans Affairs *Clostridium difficile* infection (CDI) prevention bundle.

Methods: A focus group of ESWs was conducted. Qualitative analysis was performed employing a visual matrix display to identify barrier/facilitator themes related to Department of Veterans Affairs CDI bundle adherence using the Systems Engineering Initiative for Patient Safety work system as a framework.

Results: Environmental service workers reported adequate cleaning supplies/equipment and displayed excellent knowledge of CDI hand hygiene requirements. Environmental service workers described current supervisory practices as providing an acceptable amount of time to clean CDI rooms, although other healthcare workers often pressured ESWs to clean rooms more quickly. Environmental service workers reported significant concern for CDI patients’ family members as well as suggesting uncertainty regarding the need for family members to follow infection prevention practices. Small and cluttered patient rooms made cleaning tasks more difficult, and ESW cleaning tasks were often interrupted by other healthcare workers. Environmental service

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workers did not feel comfortable asking physicians for more time to finish cleaning a room nor did ESWs feel comfortable pointing out lapses in physician hand hygiene.

Conclusions: Multiple work system components serve as barriers to and facilitators of ESW adherence to the nationally mandated Department of Veterans Affairs CDI bundle. Environmental service workers may represent an underappreciated resource for hospital infection prevention, and further efforts should be made to engage ESWs as members of the health care team.

Keywords

infection prevention; environmental service workers; environmental management; bundle; qualitative research; clostridium difficile; human factors; focus group; Veterans Affairs

Clostridium difficile infection (CDI) remains the most common healthcare-associated infection (HAI) in the United States.¹ The number of annual CDI cases approaches 500,000 with an associated 29,000 deaths.² Excess healthcare costs attributed to CDI are estimated at US \$4.8 billion annually.³ Clearly, the increasing burden of *C. difficile* is substantial with regard to morbidity, mortality, and healthcare economics.

Effective environmental cleaning and disinfection by environmental service workers (ESWs) are a cornerstone of CDI prevention and are recommended in evidence-based guidelines.⁴ For example, CDI patient rooms require a two-step process of cleaning with a detergent followed by disinfection with a sporicidal agent.⁵ Inadequate cleaning of the patient care environment is common and increases the risk of HAIs.⁶ More recently, environmental management of *C. difficile* has been the focus of research and quality improvement (QI) efforts.⁷

Hospital environmental cleaning and disinfection is a complex process, and previous research with ESWs suggests multiple factors influence this process.⁸ In addition to ESWs' knowledge and cleaning tools, their attitudes, normative beliefs, and subjective norms likely all interact to impact hospital cleaning effectiveness.⁸ However, barriers to CDI prevention from the ESW perspective using a systems approach have not been characterized. The Systems Engineering Initiative for Patient Safety (SEIPS) is a novel human factors engineering model for examining the complex interplay among structures, processes, and outcomes in healthcare.⁹ The SEIPS model has been used broadly in healthcare settings, including in the field of infection prevention (IP).^{10,11}

At the core of the SEIPS model is the work system that consists of multiple components: persons, tasks, tools and technologies, the physical environment, and organizational conditions (Fig. 1). These five components are interrelated and influence care processes, such as adherence to a CDI bundle in healthcare settings.

The Department of Veterans Affairs (VA) mandated implementation of a national CDI bundle at every VA hospital in early 2012. Key components of this bundle are environmental management, hand hygiene, contact precautions, and cultural transformation.¹² Implementation of such CDI bundles likely reduces CDI rates.¹³

We have previously performed a qualitative work system analysis, guided by the SEIPS model, in which VA healthcare workers (HCWs) in three focus groups described work system factors they identified as barriers to and facilitators of effective adherence to VA CDI bundle practices.¹⁴ Guided by the SEIPS model, we also conducted a focus group with ESWs and performed a work system analysis of the VA CDI prevention bundle specifically related to ESWs' interactions with CDI bundle components. In this article, we report on ESWs' perceptions of barriers and facilitators influencing adherence to the CDI bundle in their work setting.

METHODS

Design

This project used a qualitative descriptive approach to identify work system barriers to and facilitators of VA CDI bundle adherence from the perspective of ESWs. A focus group with ESWs was conducted. A focus group was selected as the qualitative method to elicit a diverse range of perceptions about CDI bundle adherence and to offer opportunities for group members to modify their comments after hearing feedback from others.¹⁵ As opposed to individual interviews or anonymous questionnaires, the spontaneity and interactions among group members elicit opinions and thoughts that might not otherwise be shared.¹⁶

In accordance with our institutional review board exemption policy and certification process, this project did not constitute research as defined under 45 CFR 46.102(d); therefore, this QI project was exempt from institutional review board. Focus group members were informed that this was a QI project, their participation was voluntary, and the confidentiality of their responses was maintained. The project had the approval of the ESW Service Chief at the facility.

Setting and Participants

A convenience sample was recruited from ESWs employed at the Blinded VA Medical Center, an 87-bed tertiary care hospital in an urban setting. Eligibility criteria included regularly working as an ESW on the medical and surgical inpatient units and the ability to understand English. E-mails were sent to all ESWs on these units to introduce the QI project and invite participation. Environmental service workers were also invited in-person at monthly staff meetings. The Blinded VA Medical Center has 73 full-time ESW positions: 35 day shift positions, 19 evening shift positions, and 19 overnight positions. Nine of the 73 full-time ESW positions are filled by women.

Procedure

After ESWs completed VA Form 10–3203 (Consent for Use of Picture and/or Voice), the focus group was conducted in a private conference room in September 2013. The meeting occurred during ESWs' regularly scheduled time. No compensation was provided, but lunch was provided.

Before group discussion began, the ESW participants completed a demographic questionnaire that elicited their sex, race, and years working in environmental services (ES)

at the medical center. Seven participants were recruited: six men and one woman. All were white and full-time ESWs. Average length of time worked for ES was 5.8 years (range =1–11 years), and all participants were Veterans.

Subsequently, the group facilitator (E.Y.) described the ground rules for confidentiality of the discussion and again reviewed the group's purpose—"to identify barriers to and facilitators of use of the VA's nationally mandated CDI prevention bundle." The group discussion was audio recorded with a digital recorder. The facilitator articulated a set of open-ended questions from an interview guide based on the SEIPS work system components and followed these questions with probes to elicit elaboration (See Appendix A for the interview guide). Questions from the interview guide were not provided to ESWs before the focus group. A co-author (N.S.) wrote field notes during the group to record nonverbal behaviors and track the flow of communication. Of note, the group facilitator and co-author did not have any supervisory responsibilities for the ESWs, thus avoiding a potential source of bias that could have influenced participants' responses. The group facilitator was an internal medicine chief resident at the Blinded VA Medical Center with training and experience in leading focus groups. Duration of the focus group was 60 minutes.

Qualitative Data Analysis

After any identifying information was removed from the recordings, a professional transcription service produced verbatim written transcripts from the recordings of the focus group. The first author listened to the audio recordings while reviewing the transcripts to confirm accuracy of transcription. Final versions of the transcripts were uploaded to NVivo 8 (QSR International, Melbourne, Australia) to store and manage the data.

A template organizing approach organized data into a priori categories consistent with the interview questions guided by the five SEIPS work system components: person, organization, tools, tasks, and environment.¹⁷ Two investigators (E.Y., H.M.) performed open line-by-line coding of transcripts with in vivo terminology (actual words) to classify text units within each work system component and then record on a visual matrix display.¹⁸ Subsequently the two coders grouped key text units into subthemes based on their similarity and fit with the five predetermined categories.^{19,20} Table 1 provides a more detailed description of the coding process.

Trustworthiness/Rigor

Criteria for rigor in qualitative analysis were addressed to enhance trustworthiness of the data.^{21–25} Dependability of findings was supported through the use of two coders for analyses. One coder had little clinical experience in infection control and was not involved in development of the interview guide or data collection; this contributed to trustworthiness of data because the coder's previous experience was less apt to influence the analysis. For confirmability, the two coders prepared theoretical and operational memos throughout the coding process to build an audit trail that describes their decision-making, which any observer could follow.²⁶ A member check established credibility; the first author reviewed preliminary findings with two participants in the focus group, and both validated that

findings captured the ideas they shared or heard from others around implementation of and adherence to the CDI bundle.

RESULTS

Results are summarized in a visual matrix display format in Table 2 and elaborated upon hereinafter.

Hand Hygiene

Environmental service workers displayed good knowledge of CDI hand hygiene, an element of the *Person* component of the SEIPS model. They were aware of the importance of hand washing after exiting a CDI room and knowledgeable of limitations of alcohol-based hand sanitizer. In addition, ESWs expressed concern regarding the possible misconception among some HCWs that alcohol-based hand sanitizer is an effective form of hand hygiene after exiting a CDI room, as exemplified by one comment: *“Some people just assume right away the alcohol will take care of that [C. difficile] and move on. I think that’s just misinformation.”*

Environmental service workers were further concerned that some HCWs performed the *Task* of hand washing too quickly to adequately remove *C. difficile* spores. Considering sinks and soap as *Tools* to complete the *Task* of hand washing, ESWs felt that the number of sinks and supply of soap were generally adequate, which facilitated hand hygiene adherence. From an *Organizational* barrier standpoint, most ESWs did not feel comfortable pointing out incorrect physician hand hygiene behavior:

“I know I would hesitate before I’d tell a tenured doctor, ‘Maybe you should wash your hands.’ Some doctors would thank you for reminding them, and some doctors would not.”

“We’re not the protocol police.”

“We are not qualified enough to say something like that. I would refer to us as the invisible staff.”

“Doctors are busy people. They’ve got huge responsibilities. If they are preoccupied with a problem or something like that, I can see where they might forget to wash their hands or follow procedure. But who does tell them if we don’t?”

Contact Isolation Precautions

Considering family members of patients as other *Persons* in the SEIPS model, family members’ exposure to CDI and nonadherence to contact isolation precautions (CIPs) were mentioned multiple times by ESWs as barriers to CIP adherence. Environmental service workers observed that family members do not regularly adhere to CIP, and registered nurses (RNs) have told ESWs that family members are not required to follow CIP. However, ESWs observed that some family members were upset when a patient’s roommate was placed in CIP, suggesting that family had some knowledge of the transmission risks. As one ESW

reported, *“I have had to deal with family members who were very upset [asking] ‘What did you put in the same room with my grandfather who just had open heart surgery?’”*

To address the nonadherence of family members to CIP, ESWs suggested that patients themselves could encourage their family members to follow CIP:

“I think a big advocate for that should be the patient himself. I mean if they are able to speak and if they’re just like, ‘You know, honey, I’m terribly sick and I certainly don’t want you to get it’. I mean even just tell the patient to please remind your visitors that they need to protect themselves from this.”

Environmental service workers also recognized the increasing burden of multidrug-resistant organisms (MDROs) and the associated increase in CIP: *“We have seen a huge rise in the last six, seven years in isolations: MRSA, C. diff, VRE, and the new ones that are coming out.”*

Use of isolation gowns (*Tools*) presented several barriers to optimal CIP adherence: The gowns were difficult to don and doff, and gowns increased perspiration while cleaning rooms: *“When I put on a gown and go into a room that’s 80 degrees, I’m just dripping sweat.”* ESWs also reported that accessing their supply cart for cleaning supplies occasionally required wearing CIP gowns outside of CDI patient rooms.

Relevant to *Organizational* policy and procedure, ESW did not feel family members were being adequately educated about CDI nor were CIPs adequately enforced with family members. Environmental service workers felt that the lack of a universal requirement for gown use when entering a CDI patient’s room was a significant barrier. Environmental service workers had also observed *C. difficile-positive* patients inappropriately admitted to double rooms.

Regarding the built *Environment*, ESWs described the lack of adequate space to accommodate family members as a large barrier. Consequently, ESWs had observed family members sleeping on the floor of CDI patients’ rooms due to lack of space. Many expressed concern for family members as demonstrated in one comment: *“We don’t have enough facilities... for relatives and loved ones. There should be more thought given to preparing ourselves for guests as well as the patients.”*

Environmental Management

Environmental service workers referenced the role of multiple *Persons* related to environmental management. Interruptions from HCWs, visitors, and moving patients (for nonmedical reasons) represented barriers by increasing ESWs’ cleaning time and workload. One ESW referred to moving patients for nonmedical reasons as *“musical beds.”*

“I’ve seen nurses move patients because they had three people down in the end of the ward, and she had one down on the other end, so they move them just for their convenience. They’re not supposed to, but it happens all the time... We get no consideration.”

Peer-to-peer ESW education and memorized cleaning protocols facilitated effective environmental management, but the quality of peer-to-peer teaching varied among ESWs. Suggesting a knowledge deficit, ESWs also reported a perception of RNs incorrectly cleaning equipment from CDI rooms.

Additional facilitators included motivation out of “selfpreservation” and the veteran status of some ESWs, which was described as increasing their work ethic.

“There’s an ethic about being a Veteran and working for the Veterans that makes you want to do a thorough, good job for everybody. Not to mention, there’s a selfish thing. I don’t want to take anything home with me.”

“I don’t consider it clean until I put my own mother in that bed, and I think everyone of us thinks that way.”

The *Task* of CDI room cleaning was consistently described as more time-consuming as compared with non-CDI rooms. Variation among individual patient rooms including size, layout, and features were noted to further influence the amount of time required to complete CDI room cleaning. Environmental service workers described the *Task* of cleaning a mix of CDI and non-CDI rooms as more challenging.

Some ESWs experienced initial confusion with the relatively more complex *Task* of the two-step cleaning solutions needed to effectively clean and disinfect CDI rooms. However, this two-step process was also referenced as a facilitator of effective room cleaning by identification of previously missed areas: *“You’re cleaning it twice basically... But it’s worthwhile because you’ll find stuff that missed sometimes by going over it again.”*

Environmental service workers felt that they usually had adequate time to clean CDI rooms and noted adequate preparation and cleaning process standardization as facilitators of room cleaning. *“I’d have to say, yeah, they give us plenty of time to clean the rooms decently.”* Environmental service workers’ cleaning supplies were considered *Tools* and generally found to be adequate and effective with occasional shortages and “hoarding” by ESWs. The CDI cleaning protocol itself was reported to be readily available on cleaning carts. The lack of a single, one-step cleaning agent for CDI rooms was cited as a *Tool* barrier. *“If we had a one-step disinfectant for everything, that would be ideal... in the case of C. diff, we have to use two chemicals.”*

Organizational barriers to environmental management were commonly related to “pressure” felt by ESWs from other HCWs to clean rooms quickly. Pressure was specifically perceived as coming from the emergency department (ED) to clean rooms quickly for patients admitted from the ED: *“I’ve got people breathing down my neck: ‘I need this room right now... ED has called four times about this room. When is it going to be done?’”*

Previous supervisors pressured ESWs to clean CDI rooms quickly, but ESWs described their current supervisor as recognizing that effective CDI room cleaning takes time:

“Six or seven years ago... the more [rooms] you could do, the better worker you were. And it’s only been within the last three or four years where people are starting to say, ‘Wait a minute. If it takes this long to clean a room, why rush

through it?’ And [current supervisor] settled on a common sense thing: Take your time. Do a good job. It’s worth it to take a little longer.”

Environmental service workers reported variable numbers of CDI patients and variable pace of discharges on different hospital wards. *“I’m hustling, hustling, hustling ‘cause I want to get as much of my stuff done because you know the afternoon can just explode with discharges.”* In addition, ESWs did not feel comfortable asking physicians to give them additional time to finish cleaning a room (before the physician using the room):

“You may have just started cleaning that room or be halfway done with it when a doctor and nurses come around on rounds and ‘boom,’ we have to get out, you know, simple as that. There’s no way for us to be able to finish our job and for the doctors to do their job... I would love to say, ‘Give me two minutes to finish the floor.’ But it’s really not our place.”

Several *Organizational* facilitators were also highlighted by ESWs. They felt that the VA takes CDI transmission reduction seriously and described CDI rooms as prioritized during their daily cleaning. Environmental service workers were aware of quality control monitoring and generally felt that the level of supervisory oversight was appropriate: *“For the most part, good workers are trusted to do a good job because they take pride in their work and they know why we are here.”* All ESWs attended an on-site microbiology class provided by a local technical college (1 hour weekly for 12 weeks) as part of their training. Some ESWs also suggested that better screening on admission for CDI might reduce cross-contamination.

Environmental barriers stated by ESWs were the overall small and cluttered nature of patient rooms: *“The rooms are so tiny. You walk in and there’s a recliner over there, and then the bed, and then let’s say you’ve got a wheelchair here with the patient in it eating breakfast.”* Double patient rooms were described as more prone to cleaning interruptions. Environmental service worker also expressed concern for the lack of a “triage area” for patients with pending CDI testing results. An *Environmental* facilitator was effective communication of the need for room cleaning via signs outside patient rooms and whiteboards on the patient wards.

DISCUSSION

Our qualitative evaluation of ESW perceptions of the nationally mandated VA CDI prevention bundle using the SEIPS model as a framework is the first of its kind. Environmental service worker focus group analysis suggests significant interactions among all SEIPS work system components, which function as both facilitators of and barriers to VA CDI bundle adherence.

Environmental service workers generally described adequate and effective *Tools* to accomplish hand hygiene and environmental management. Consistent with earlier VA ESW survey results, inadequate cleaning supplies were rarely reported.²⁷ However, CIP gowns, another tool, were a significant barrier to effective environmental management because they increased perspiration and made cleaning more awkward.

Reflecting the multiple *Persons* who interact in a given work system, many ESW comments were related to patients' family members. Most coded statements about CIP were related to family members' interactions with patients under CIP and family members' interactions with CIP themselves. Previous findings have suggested ambiguity of HCW responsibility for visitor/family member CIP adherence.¹⁴ Although no study to date has explicitly addressed visitor adherence specifically to CDI CIP, a recent review of hospital visitor adherence found variable and suboptimal adherence to infection control precautions as well as variable education of visitors regarding hospital IP.²⁸

Bridging both *Person* and *Organization* components, education of ESWs was robust and multimodal. Local policy (*Organization*) required ESW attendance at a technical college microbiology course, whereas institutional culture facilitated peer-to-peer education and cleaning protocol familiarity. Together, these factors likely contributed to a high level of knowledge (*Person*) among ESWs as they reported clear understanding of CDI transmission and IP practices. For example, ESWs expressed concern for inappropriate alcohol hand sanitizer use and insufficient hand washing time among HCWs caring for CDI patients. Of note, the higher knowledge level seen in our sample contrasts with previous VA ESW survey assessments of knowledge suggesting the need for improved ESW education.²⁷ Evaluation of the benefits of offering more in-depth education to ESWs, such as the microbiology course provided to our sample, is a direction for future research.

The time required to adequately complete the *Task* of environmental management was a frequent theme ESWs articulated. As expected, cleaning CDI rooms and terminal cleaning (i.e. discharge cleaning) of CDI rooms were described as highly time-consuming. Overall, however, ESWs felt they usually had adequate time to clean their assigned rooms, which is consistent with prior ESW survey data.²⁹

Environmental service workers described several *Organization* factors that influenced their awareness of time allowed to clean rooms. The ESWs characterized their current ESW leadership as appropriately recognizing the greater amount of time required to adequately clean a *C. difficile* room, whereas they described other HCWs as less cognizant and often exerting pressure on ESWs to clean rooms faster. This discrepancy between pressure from HCWs to clean rooms quickly, but the absence of such pressure from ESW leadership suggests that ESWs may perceive conflicting information on the time allowed to clean CDI rooms.

With the increasing burden of MDROs and increasing use of CIP,³⁰ the potential for additional pressure on ESWs to clean rooms quickly is concerning. The concept of moral distress (and the associated risk of burnout) may apply to ESWs in healthcare settings as well³¹ and may be heightened among Veteran ESWs caring for fellow Veterans. Moral distress occurs when an employee feels unable to act in away consistent with his or her values and obligations, and a common cause of moral distress includes concerns about patient safety.

Environmental service workers who believe they are not able to clean a CDI room in the optimal manner because of organizational pressure to make a bed available quickly are at

risk for moral distress. Interestingly, the VA has recently launched an initiative to confront moral distress experienced by employees.³² For example, QI teams within VA medical centers may identify situations causing moral distress and promote the implementation of strategies to address the underlying causes. Our findings suggest that these efforts should be explored with ESWs as well.

Environmental barriers largely centered on the small size and amount of clutter in patient rooms. However, the intuitive solution of larger patient rooms needs to be considered carefully, especially with recent evidence suggesting that larger rooms increase the risk of CDI (because of the increased area required for cleaning).³³ Again showing concern for family members, ESWs expressed unease with family members occasionally sleeping on patient room floors due to a lack of adequate waiting room space and accommodations. In light of recent studies indicating that hospital floors are a significant reservoir for healthcare-associated pathogens,³⁴ institutional efforts to safely and comfortably accommodate family members should be prioritized.

Patient safety culture is a prominent element of the SEIPS *Organizational* component. A key feature of a culture of patient safety is “collaboration across ranks and disciplines to seek solutions to patient safety problems.”³⁵ Despite an increasingly interdisciplinary approach to patient care, ESWs have been largely absent from interdisciplinary care teams.³⁶ Their self-description as “invisible staff” in our findings suggests that ESWs are quite aware of their exclusion from the traditional patient care team. This exclusion may also contribute to HCW unawareness of the burden and complexity of ESW room cleaning tasks, culminating in increased pressure from HCWs to complete room cleaning tasks quickly. Efforts to acknowledge the critical role of ESWs in HAI prevention and integrate them more as members of the care team are needed.

This project had several strengths. Although preliminary, our focus group is the first to solicit in-depth, open-ended responses from VA ESWs, thus generating rich data from the ESWs themselves. Previous ESW studies have relied on survey data with more restricted, predefined responses.²⁷ Our use of the SEIPS model is similarly advantageous; the SEIPS model is a practical framework with excellent clinical applicability.¹⁰ Development for use with ESWs represents a novel extension of the SEIPS model for real-life, clinical scenarios.

This project also had limitations. The use of a single, convenience sample of VA ESWs limits transferability of findings. The relatively homogeneity in group demographics and Veteran status (100%) was also a limitation. Focus groups conducted at multiple sites should also include non-VA and non-Veteran ESWs. The size of the focus group was somewhat smaller than groups between eight and 20 used in social science research. However, smaller groups consisting of four to six persons are considered to be optimal for healthcare QI efforts, particularly when sensitive issues, such as bundle adherence, are addressed.^{37,38}

Nonetheless, the quality and depth of insight from our ESW focus group suggest that future, larger studies with ESWs will continue to yield novel insights. Our findings, guided by the SEIPS model, could serve as the basis for more quantitative and qualitative investigations of the specific work system factors that ESWs and other health professionals recognized

as supporting adherence to the CDI bundle.¹⁴ Furthermore, the invited ESWs seemed to welcome the opportunity for focus group participation, suggesting that future ESW recruitment may be not be difficult.

CONCLUSIONS

Multiple work system components serve as barriers to and facilitators of ESW adherence to the nationally mandated VA CDI bundle. Environmental service workers may be an unrecognized, underappreciated, and untapped resource for hospital IP. Further efforts should be made to engage these “invisible staff” as part of the healthcare team and culture of patient safety while also ensuring adequate ESW cleaning time in the context of an increasing burden of MDROs.

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Appendix A.: Interview Guide for ESW Focus Group.

Primary questions are in bolded. Questions following are probes.

Introductory Questions:

Tell me about the process of cleaning patient’s room who had *C. difficile* (both terminal and daily cleaning).

What are the big differences between cleaning a *C. difficile* room and a non-*C. difficile* room?

Is there a difference between cleaning a room that had a known *C. difficile* patient versus enteric precautions?

Person

What do you know about the VA’s national *C. difficile* bundle?

What education have you received regarding cleaning *C. difficile* rooms?

Do you feel you have been adequately trained and educated to clean *C. difficile* rooms?

Are *C. difficile* rooms harder or more time-consuming to clean?

Organization

Do you feel the VA as a whole and/or our VA hospital makes reducing the transmission of *C. difficile* an organizational priority? How/Why?

Do you feel all members of the patient care team (MDs, RNs, CNAs, patient transport, and food service) appropriately share and take responsibility for reducing *C. difficile* transmission?

Do you feel the environmental services group takes reducing the transmission of *C. difficile* seriously?

How important does reducing the transmission of *C. difficile* seem to your supervisors?

Tools

What tools or devices do you regularly use to clean a *C. difficile* room?

What tools work well? What tools work poorly?

Are there additional tools you wish you had?

Do you ever have problems getting needed supplies (mops, cleaning products, etc.)?

How are you informed about which rooms need cleaning and when? How is this communicated to you?

Tasks

Do you feel you are given adequate time to clean *C. difficile* rooms?

How different are your tasks when cleaning a *C. difficile* room? Are there many repetitious tasks?

Are you able to change between *C. difficile* rooms and non-*C. difficile* rooms?

How often are you interrupted when cleaning a *C. difficile* room? Does this make returning to the cleaning process more challenging?

Is there a checklist of tasks to complete when cleaning a *C. difficile* room? Is this easily available or is this memorized by environmental services?

What are barriers to using contact isolation precautions for patients with *C. difficile* diarrhea in the hospital?

What slows you down when using isolation precautions before entering a patient's room?

When will you enter a known *C. difficile* patient's room without using contact precautions?

What do you like or find particularly useful about the current process of actually using isolation precautions?

How could contact isolation precautions be easier to use?

Environment

How does the layout or organization of the rooms affect your ability to clean them?

Does lighting, temperature, or humidity ever make your job more difficult?

Are the cleaning agents particularly strong-smelling or irritating to smell?

What are barriers to performing appropriate hand hygiene after cleaning a *C. difficile* room?

When you do not perform appropriate hand hygiene, what keeps you from doing so?

What do you like or find particularly useful about the current *C. difficile* hand hygiene process?

How could performing hand hygiene after caring for a *C. difficile* patient be easier?

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FIGURE 1.
Systems Engineering Initiative for Patient Safety Model.^{9,10}

TABLE 1.

Protocol for Coding

1. Development of matrix display for each of the 5 work system components.
2. Independent reading of the group transcript to achieve a deeper understanding of the whole gestalt.
3. Review and discussion of operational definitions and descriptions of the 5 work system components in select articles by model developer and studies using the model.
4. Independent coding of focus group, followed by comparison to evaluate consistency in coding text units under work system components in matrix.
5. Refinement of and agreement around operational definitions for each work system component to increase consistency in coding.
6. Independent coding of focus group again by 2 coders with follow-up comparison to evaluate consistency.
7. Follow-up comparisons to assess consistency between coders in coding text units.
8. Review of matrix data display for the focus group; text units under each work system component condensed into distinct themes by each coder.
9. Discussion of themes under each work system component to reach agreement between coders; agreed upon themes were then categorized as either barriers to or facilitators of CDI bundle adherence.

Through discussion among 3 team members, we developed a protocol for coding the focus group transcript that was followed by the 2 coders (2 coinvestigators).

TABLE 2.

Classification of Themes Identified in ESW Focus Group

CDI Bundle Components			
SEIPS Work System Components	Hand Hygiene	CIPs	Environmental Management
Person	<p><i>Aware that hand washing required after exiting CDI room.</i></p> <p><i>Knowledgeable of limitations and misconceptions regarding use of alcohol-based hand sanitizer for CDI.</i></p>	<p>Family members do not adhere to CIP. ESWs concerned about family members' exposure to CDI.</p> <p>ESWs feel patients could advocate for their family members to follow CIP.</p> <p>RNs have told ESWs that family members do not need to follow CIP.</p> <p>Family members upset when patient's roommate in double room placed in CIP.</p> <p>Some HCWs seem to lack education about and adherence to CIP.</p> <p><i>ESWs recognize the increasing burden of MDRs and increasing use of CIP.</i></p>	<p>Cleaning interruptions from visitors and other HCWs increases ESWs' cleaning time and workload.</p> <p>Moving patients to different rooms for nonmedical reasons increases ESWs' workload.</p> <p><i>Peer-peer education is important</i>, but quality of peer teaching is variable.</p> <p>ESWs have observed RNs incorrectly cleaning equipment from CDI rooms.</p> <p><i>Some ESWs are veterans, which increases their work ethic.</i></p> <p><i>"Self-preservation" motivates effective room cleaning.</i></p> <p><i>Most ESWs have CDI cleaning protocol memorized.</i></p>
Task	<p>Concerned that HCWs are washing hands too quickly.</p>	<p>None</p>	<p><i>ESWs focus on cleaning "high touch" areas in CDI rooms and use a standardized process.</i></p> <p>Cleaning CDI rooms takes more time, especially discharge cleaning.</p> <p>Cleaning time required varies by room size, layout, and features (e.g., curtains).</p> <p><i>ESWs usually have adequate time to clean rooms.</i></p> <p><i>Preparation is important for efficient and effective CDI room cleaning.</i></p> <p>Use of 2-step cleaning solutions for CDI rooms was initially confusing for some ESWs.</p> <p><i>Two-step cleaning process facilitates identification of missed areas</i></p> <p>Cleaning a mix of CDI and non-CDI rooms is more challenging.</p>
Tools	<p><i>No sinks and soap supplies adequate.</i></p>	<p>Gowns difficult to don/doff.</p> <p>Gowns increase perspiration while cleaning.</p> <p>Accessing supply cart occasionally requires wearing gowns outside CDI room.</p>	<p><i>Cleaning supplies usually adequate.</i></p> <p>Cleaning supplies occasionally "hoarded."</p> <p>Lack of single cleaning agent for CDI rooms.</p> <p><i>Current cleaning tools (e.g., mits, mops) are effective.</i></p> <p><i>CDI cleaning protocols readily available on cleaning carts.</i></p>
Organization	<p>ESW's not comfortable pointing out incorrect physician hand hygiene.</p>	<p>CIP not consistently enforced for family members; family members not educated about CDI/CIP</p> <p>Gowns not universally required for all entry to CDI rooms.</p> <p>CDI patients sometimes inappropriately admitted to double room.</p>	<p>No. CDI patients and pace of discharges varies by ward.</p> <p>Pressure from other HCWs to clean rooms quickly for patients admitted from ED; sometimes ED patients arrive at room before cleaning completed.</p> <p>Previous supervisors pressured ESWs to clean CDI rooms as quickly as possible; <i>current supervisor recognizes that cleaning CDI room well takes time (40 min).</i></p> <p>CDI test results not always known before placing patient into room.</p> <p>ESW's not comfortable asking physicians to give them extra time to finish cleaning a room.</p> <p><i>CDI rooms are prioritized and cleaned daily.</i></p> <p><i>ESW's aware of quality control monitoring, feel the level of oversight is appropriate.</i></p> <p><i>All ESWs attend microbiology class at local technical college for training.</i></p> <p><i>ESW's feel CDI transmission reduction is a VA priority.</i></p> <p><i>Better screening patients on admission for CDI could reduce cross-contamination.</i></p>
Environment	<p>None</p>	<p>Insufficient space to accommodate family members.</p> <p>Family members will sleep on floor of CDI patient room.</p>	<p>Small and cluttered patient rooms makes cleaning difficult.</p> <p>No "triage area" for patients with pending CDI testing.</p> <p>Cleaning interruptions more likely in double rooms.</p> <p><i>Signs and whiteboards effectively communicate need for room cleaning.</i></p>

Italicized text denotes facilitators to CDI bundle adherence. Normal text denotes barriers to CDI bundle adherence.

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