1   **Preventing and Controlling Human Noroviruses in South Carolina Long-term Care**
2   **Facilities: An Analysis of Institutional Policies and procedures**

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ABSTRACT

Background: Long-term care (LTC) facilities are the number one setting for human norovirus (HuNoV) outbreaks in the U.S. (60%).

Methods: We aimed to determine alignment of policies and procedures in LTC facilities in South Carolina (SC) with Centers for Disease Control and Prevention (CDC) recommendations and to determine readability based on Federal Plain Language Guidelines and Microsoft Word readability statistics.

Results: Most facilities (21) had procedures for hand hygiene but recommendations for handwashing events and duration varied greatly. Less than half (11) had separate procedures devoted to HuNoV outbreak control. Fifteen required disinfection of bodily fluids. Seven had procedures for exclusion of sick staff during an outbreak. Both hand hygiene and bodily fluid clean-up procedures had low mean scores for readability. Mean Flesch Reading Ease and Flesch-Kincaid Grade Level for both procedures were in the range of “difficult” to understand.

Conclusions: Most LTC policies and procedures were not consistent with CDC recommendations for HuNoV. Moreover, readability of all procedures is needed so LTC workers can easily understand and implement prevention and control procedures.

Preventing and Controlling Human Noroviruses in South Carolina Long-term Care Facilities: An Analysis of Institutional Policies and Procedures

BACKGROUND

Long-term care (LTC) facilities are an ideal environment for acute gastroenteritis (AGE). The close living arrangements and frequent contact between residents, staff, and visitors facilitate the spread of pathogens associated with AGE. Older adults, who represent a large proportion of LTC facility residents, are highly susceptible to AGE due to the greater likelihood of comorbidities and declining immunity.¹

According to the Centers for Disease Control and Prevention (CDC), LTC facilities are the most common setting for outbreaks associated with human noroviruses (HuNoV) (60%), a leading cause of AGE in the U.S.² To prevent HuNoV outbreaks in LTC facilities, evidence-based prevention and control strategies are needed with institutional policies and procedures as a source for communicating such strategies. Policies and procedures, common in healthcare settings, can inform and influence decisions thus improving consistency of actions established by laws and regulations, standards of best practice, and institutional executive decisions. For these policies and procedures to be effective, they should be based on best practices as well as be easy to read and understand.³

We hypothesize inclusion of guidelines to prevent and control HuNoV in most LTC facility policies and procedures is limited. The purpose of our study was: (1) to determine alignment of policies and procedures from a sample of LTC facilities in South Carolina (SC) with CDC recommendations for prevention and control of HuNoV and (2) to determine readability of policies and procedures determined by agreement with the Federal Plain Language Guidelines and Microsoft Word Readability statistics.

METHODS

All materials and methods used in this study were approved by the Clemson University Institutional Review Board (IRB). Informed consent was obtained before data collection began.

Selection of Institutional Procedures

Institutional policies and procedures (hereafter referred to as procedures) related to the prevention and control of HuNoV were requested from 26 LTC facilities in SC during site visits conducted as part of a larger study. Requested topical procedures included: (1) hand hygiene, (2) HuNoV outbreak management, (3) environmental sanitation, (4) clean-up of bodily fluids, (5) dress code, and (6) laundry. Facilities that did not provide procedures during the site visit were contacted up to three times by phone. Nearly all (n=24) provided procedures. One facility did not provide copies because the corporate office would not allow them to do so; the other never sent copies for unknown reasons.

Coding Manual

A two-part coding manual was created to analyze procedures (Table 1). Part 1 determined alignment of procedure content with two CDC guidance documents^{4, 5} based on 6 distinct topics (85 items). The first 4 topics (i.e., hand hygiene, outbreak management, environmental sanitation, and bodily fluid clean-up) are documented strategies to prevent and control HuNoV infections.⁴ Procedures on dress code and laundry were also included because worker hygiene and handling of contaminated laundry can prevent the spread of HuNoV. The items in Part 2 (26 items) were used to calculate readability scores for stand-alone (independent document addressing procedures for only one topic) hand hygiene and bodily fluid clean-up procedures based on the Federal Plain Language Guidelines.⁶ Hand hygiene procedures were selected because the CDC recommends hand hygiene as “the single most important method to prevent”

HuNoV.⁴ Additionally, persons infected with HuNoV can produce large volumes of diarrhea and/or vomit which are highly concentrated with the virus.¹⁴ Thus, we believe bodily fluid clean-up procedures are crucial in preventing HuNoV transmission in LTC facilities, which led us to also evaluate the readability of these procedures.

Table 1: Summary of Coding Manual Used for Analysis of Procedures in Long-term Care Facilities in South Carolina

	Topics
Part 1: Content of Procedures (85 items)	1. Hand hygiene (11 items) 2. Outbreak management (20 items) 3. Environmental sanitation (14 items) 4. Bodily fluid clean-up (13 items) 5. Dress code (11 items) 6. Laundry (12 items)
Part 2: Federal Plain Language Readability (26 items)	1. Organization of the document (3 items) 2. Verb usage (5 items) 3. Noun and pronoun usage (2 items) 4. Other word issues (5 items) 5. Sentence organization (2 items) 6. Paragraph organization (4 items) 7. Aids to clarity (5 items)

A coding sheet corresponding to the coding manual was created on SurveyMonkey®. The coding manual and sheet were piloted by two trained coders using procedures from two LTC facilities. After piloting, the coding manual and sheet were modified. The same two coders independently coded procedures for all facilities (N=24). A third coder reconciled differences.

Data Analysis

All categorical responses were converted to numeric values for statistical analysis. For each item in Part 1, the number of facilities in compliance was determined. The readability scores were calculated using two methods – Federal Plain Language Guidelines and Microsoft Word Readability statistics. First a total score was calculated based on Part 2 of the coding manual, which assessed alignment with the Federal Plain Language Guidelines. Descriptive

statistics (mean, standard deviation, and range) were then calculated using Microsoft Excel for 6 of the 7 Federal Plain Language topics. One topic (paragraph organization) was analyzed separately for procedures written in paragraph form. Secondly, Microsoft Word 2010 was used to generate two readability statistics – Flesch Reading Ease and Flesch-Kincaid Reading Level. Descriptive statistics (mean, standard deviation, and range) were calculated for both.

RESULTS

The number of facilities that provided procedures and the number of procedures provided for each topic are reported in Table 2. Some procedures (e.g., infection control) addressed multiple strategies in the same document so might have been counted multiple times. The number of procedures provided by a LTC facility ranged from 1-15. Although some facilities did not provide procedures for certain topics, it does not necessarily mean that they did not have a procedure for that topic. Sometimes a facility simply could not find a procedure for a specific topic.

Table 2: Number of Procedures from 24 Long-term Care Facilities in South Carolina

Procedure topic	Number of facilities	Number of procedures*
Hand hygiene	22	37
Outbreak management	13	18
Environmental sanitation	20	40
Bodily fluid clean-up	15	12
Dress code	23	26
Laundry	18	41

*Some facilities provided more than one procedure for specific topics.

Hand Hygiene

Most facilities (21) required hands be washed with soap and water, but detail varied greatly. For example, many (14) described when and how to wash hands and use hand sanitizers with 3 including diagrams showing individual handwashing steps. Others (7) either mentioned handwashing steps or when to wash hands but not both. Length of handwashing also varied with 15 facilities requiring hands be washed for ≥ 20 seconds, 8 for ≥ 15 seconds, and 7 for 10-15

seconds. Furthermore, the length of handwashing sometimes (6) varied across different procedure topics from the same facility (e.g., hand hygiene procedures versus environmental sanitation procedures). In a few (3) handwashing length even varied within the same procedure. For example, step-by-step written procedures mentioned one length while a diagram showing handwashing steps suggested a different length. Nearly all (22) listed contamination events that should prompt handwashing. All of those 22 facilities required hands be washed when soiled with bodily fluids and after removing gloves. Not many (5) required handwashing after changing bed pans or resident briefs; before and after feeding residents (6); after contact with inanimate surfaces of resident surroundings (8); and when moving from one resident to another (1). Hand sanitizers, as an alternative to handwashing when hands were not visibly soiled, were cited in most (19) facility procedures.

Outbreak Management

Approximately half (13) had procedures for infection control during outbreaks of HuNoV or AGE. Two of the 13 provided *Clostridium difficile* outbreak management procedures, which LTC facility Directors stated during on-site interviews were also used during an HuNoV outbreak. Two others used fact sheets on HuNoV outbreaks authored by the CDC or Occupational Safety and Health Administration as their outbreak management procedures.

Half (12) had procedures for isolating or cohorting sick residents but only 4 recommended ceasing the transfer of sick residents between wards or other facilities. Seven had detailed procedures on exclusion of sick staff during an outbreak with 2 requiring exclusion until 48-72 hours after resolution of symptoms. None of the other facilities mentioned a specific time. Four required that specific staff be assigned to care for sick residents. Few had procedures for

109 screening (3) excluding (1), restricting (6), or communicating with (5) visitors about HuNoV
110 during an outbreak.

111 **Environmental Sanitation**

112 Twenty had procedures for environmental sanitation. Of those, 7 mentioned general
113 cleaning in other topical procedures, such as infection control, outbreak management, and
114 laundry. Cleaning before pathogen removal (sanitizing or disinfecting) from surfaces was
115 required by nearly all (20) but most did not provide detailed instructions on how to clean. On the
116 other hand, a few (3) mentioned cleaning surfaces with soap and water but did not mention a
117 pathogen removal step (sanitizing or disinfecting) after cleaning.

118 Ten facilities had procedures for sanitizing surfaces, 20 had procedures for disinfecting,
119 and 9 had both. However, the terms “sanitizing” and “disinfecting” were often misused and in
120 some procedures (5), they were even used interchangeably. Only 9 had procedures for both
121 sanitizing and disinfecting.

122 Twelve did not include the proper pathogen removal step for high-touch surfaces. A few
123 (8) had cleaning procedures for high-touch surfaces, such as door knobs and hand rails.
124 However, those procedures recommended “cleaning” high-touch surfaces, not disinfecting.

125 The type of disinfectant mentioned in environmental sanitation procedures varied among
126 facilities – 12 recommended chlorine bleach, 11 an EPA-registered disinfectant, and 7
127 recommended both. Of those that recommended using chlorine bleach, only 7 required using
128 chlorine bleach at a concentration of 5000 ppm and 5 required 1000 ppm. Others (4) required
129 concentrations as low as 100 ppm.

130 **Bodily Fluid Clean-Up**

Fifteen facilities had procedures on cleaning up bodily fluids. Of those, 4 included bodily fluid clean-up procedures in other topical procedures, such as housekeeping and infection control. All 15 facilities had procedures focused on bodily fluid clean-up and not specifically on vomit and fecal matter. None included cleaning with soap and water before disinfection. Fifteen included a disinfection step in their bodily fluid clean-up procedures. Thirteen recommended using chlorine bleach to disinfect and 7 an EPA-registered disinfectant. Concentration levels for using chlorine bleach to disinfect varied – 5 mentioned using a solution of 5000 ppm and 3 a solution of 500 ppm-5000 ppm. Four mentioned disinfecting with a 500 ppm chlorine solution for small spills (<10 ml) and for larger spills (>10 ml) a 5000 ppm chlorine solution was recommended to “clean” the spill first then disinfect with a 500 ppm chlorine solution. Not all facilities required staff to wear personal protective equipment when cleaning up bodily fluids – 15 required gloves, 12 a gown, 10 a mask, and 9 shoe covers.

Dress Code

Procedures addressing worker dress code were available at all but one facility (23) with 11 of those listing dress code in an employee handbook. All 23 required that worker clothing be clean and neat and 21 had requirements on wearing jewelry, with types of jewelry allowed to be worn varying widely. For example, 8 allowed workers to wear a wedding set/engagement ring and 5 a watch. A few allowed other rings (4), a plain wedding band only (2), stud earrings (2), a necklace (1), and a bracelet (1). Most (20) required workers to keep fingernails trimmed and maintained with half (12) disallowing artificial fingernails and 7 disallowing fingernail polish.

Laundry

Most (18) facilities had written procedures for separating laundry contaminated with bodily fluids from other laundry with 16 requiring careful handling and no agitation. Less than

half (10) required laundry be washed in water 151-200°F (66-93°C), and only 11 required a sanitizing agent be added during washing. Of the 11 requiring addition of a sanitizing agent, all required adding chlorine bleach with 2 also allowing quaternary ammonium and 1 an EPA-registered disinfectant. Among facilities that recommended using chlorine as a sanitizing agent, 2 listed concentrations of 50-150 ppm and 1 >200 ppm.

Table 3: Readability Scores and Word Readability Statistics for Hand Hygiene and Bodily Fluid Clean-up Procedures in Long-term Care Facilities in South Carolina

Category	Maximum possible score*	Hand Hygiene Procedures (n=21)			Bodily Fluid Clean-up Procedures (n=11)		
		Mean score	Standard Deviation	Range	Mean score	Standard Deviation	Range
Federal Plain Language Guidelines							
Policy organization	4	3.2	0.7	2-4	2.4	0.8	2-4
Word usage							
Verbs	6	3.4	0.7	2-4	3.1	1	2-4
Nouns/pronouns	4	2.2	0.8	1-3	1.7	0.7	1-3
Other word issues	6	5.1	1.3	2-6	5.5	0.7	4-6
Sentence usage	2	1.7	0.5	1-2	1.4	0.5	1-2
Aids for clarity	6	4.1	1.0	3-6	3.9	1	3-5
Total†	28	20	1.7	15-22	18	2.8	15-22
Word Readability Statistics							
Flesch Reading Ease‡	~120	50	11.2	39-80	51	6	43-60
Flesch-Kincaid Grade Level§	-	9	2	4-12	9	~1	7-11

^{*} The maximum possible score is the highest score that could be earned for each category.

[†] The total score is a sum of all categories within the Federal Plain Language Guidelines

[‡] Flesch Reading scale: 0-29 = very difficult; 30-50= difficult; 51-59= fairly difficult; 60-69= standard; 70-79= fairly easy; 80-89= easy

[§] Flesch Kincaid Grade Level presents U.S. school grade level required to understand the text.

Readability of Hand Hygiene and Bodily Fluid Clean-up Procedures

Mean readability scores based on Federal Plain Language Guidelines for hand hygiene and bodily fluid clean-up procedures were 20 and 18, respectively, of a maximum of 28 (Table 3). The sub scores were low for both procedures for verb usage and noun/pronoun usage. Mean Flesch Reading Ease score was 50 of 120 for hand hygiene procedures and 51 of 120 for bodily

fluid clean-up procedures. Both hand hygiene and bodily fluid clean-up procedures were at a 9th grade reading level according to the Flesch-Kincaid score.

DISCUSSION

Hand Hygiene

Addressing proper handwashing in procedures is critical as improper handwashing might not remove microbial contaminants and contaminated hands could spread HuNoV to healthy persons and/or environmental surfaces.⁷ Physical removal, not inactivation, reduces numbers of viral particles on hands, including HuNoV, so washing hands for an appropriate length of time is essential.⁸ One plausible reason for the inconsistency in length of handwashing is there are no uniform standards for handwashing duration. For example, the CDC “Guidelines for Hand Hygiene in Health-Care Settings”⁹ recommends washing for ≥ 15 seconds. Yet, in their HuNoV outbreak management guidelines,⁴ the CDC recommends washing hands for 20 seconds. Research must be conducted to validate the length of handwashing to better ensure consistency across recommendations.

Most had procedures that mentioned hand sanitizers as an alternative. The primary concern with such procedures is the efficacy of hand sanitizers against HuNoV depends on product formulation with only a few formulations of alcohol-based hand rubs achieving significant reduction of the virus.¹⁰ Because there is variation in efficacy of hand sanitizers against HuNoV at this time, it is best for individuals in LTC facilities to wash hands instead of using hand sanitizers, particularly when there is a possibility hands have been contaminated by bodily fluids.

Healthcare staff’s hands could become contaminated in many events such as after changing bed pans, after contact with surfaces surrounding residents, and when moving from one

resident to another.⁹ Therefore, it is critical that the types of contamination events requiring handwashing be expanded to include events where hands could possibly be contaminated with bodily fluids, such as vomit and fecal matter.

Outbreak Management

HuNoV and other non-enveloped enteric viruses can persist on surfaces for long periods¹¹ and can be much more resistant to disinfection than bacteria and enveloped viruses.^{7, 12, 13} Therefore, we believe it is important to have outbreak management procedure specifically designed for HuNoV. LTC facilities lacking proper procedures for HuNoV outbreak management will be challenged to control viral transmission to residents and staff resulting in prolonged outbreaks.

HuNoV are extremely contagious because of their relatively low infectious dose¹⁴ and can easily be transmitted from person-to-person and from contaminated environmental surfaces.⁴ Therefore, residents with a HuNoV infection should be placed in a single occupancy room or cohorted from healthy residents to minimize viral transmission during an outbreak.⁵ For example, a study by Johnston et al.¹⁵ reported psychiatric patients at a tertiary care hospital had a significantly higher attack rate (19%) than patients in the coronary care unit (5%). The authors hypothesized that this difference in attack rate was due to the fact that psychiatric patients were encouraged to participate in group activities which offered greater opportunity for transmission of HuNoV. On the other hand, coronary care patients were in private rooms with little opportunity for transmission of the virus to other patients.

Because HuNoV can be shed in feces even after symptoms are resolved,¹⁴ sick staff should be excluded for at least 48 hours after resolution of symptoms.^{4, 5} Vivancos et al.¹⁶ showed that outbreaks where staff were excluded for 72 hours had lower overall attack rates than

those where staff were only excluded for 48 hours due to reduced numbers of cases among staff rather than among residents.

During a HuNoV outbreak, visitors should be screened for the presence of AGE symptoms, and those with symptoms should not be allowed to enter to prevent introduction of HuNoV to the facility.⁵ Moreover, restricting visitors from entering the facility during an outbreak could prevent subsequent spread within the facility. A study by Gallimore et al.¹⁷ reported environmental surfaces contacted by parents of hospital patients were more often contaminated with HuNoV than environmental surfaces contacted by staff. These authors hypothesized that parents were less likely to wash their hands than staff. If excluding visitors is not feasible, visitors should be educated about the outbreak and control strategies such as increased hand hygiene.⁵

Environmental Sanitation

Environmental surfaces play a major role in HuNoV transmission because HuNoV can persist on hard, non-porous surfaces for weeks.¹¹ Proper cleaning procedures are required to interrupt environmental HuNoV transmission. Organic matter on surfaces can reduce the effectiveness of sanitizers and disinfectants, so surfaces must be properly cleaned before sanitizing or disinfecting.^{7, 12} Cleaning with soap and water alone will not eliminate HuNoV from contaminated surfaces.⁷ To achieve proper elimination of HuNoV, contaminated surfaces must be cleaned then treated with a pathogen removal step.

Both sanitizers and disinfectants are antimicrobial products regulated by the U.S. Environmental Protection Agency (EPA). Although their active ingredients might be similar, major differences exist between them. Sanitizers reduce but do not eliminate bacterial populations from a surface whereas disinfectants eliminate fungi, viruses, and bacteria.

Moreover, sanitizers are generally used on food-contact and soft surfaces while disinfectants are used on hard, non-food-contact surfaces and any surface (food-contact or non-food-contact) contaminated with bodily fluids.^{4, 18} To achieve proper elimination of HuNoV from environmental surfaces contaminated with vomit and fecal matter, disinfectants, not sanitizers, must be used.⁴

The type of pathogen removal step to be used depends on the type of contamination event. Many different types of contamination events occur in LTC facilities, so both sanitizing and disinfecting procedures should be included in facility procedures. Sanitization of surfaces may be sufficient for day-to-day sanitation activities, but a disinfectant should be used on contaminated or potentially contaminated surfaces. For example, bathroom surfaces are likely to become contaminated with many types of enteric pathogens through contact with contaminated hands of persons after using the toilet.⁷ Because of the high probability of bathroom surfaces being contaminated, they should be disinfected not sanitized.

Routine cleaning and disinfection of high-touch surfaces in healthcare facilities is also recommended.⁵ An outbreak of HuNoV at a veterans LTC facility showed that high-touch surfaces in sick residents' surroundings (e.g., bedrails and bedside table) as well as high-touch surfaces not in close proximity to sick residents (e.g., elevator call button in the basement used by staff only) can become contaminated with HuNoV,¹⁹ so these surfaces should be disinfected not sanitized.

Disinfectants can include different active ingredients (e.g., chlorine compounds, quaternary ammonium compounds, iodophor compounds, alcohol, and phenolic compounds), but most of them are not effective against HuNoV or might not be effective if used at the wrong concentration.¹³ The CDC recommends using chlorine bleach at a concentration of 1000-5000

ppm or another EPA-registered product effective against HuNoV to interrupt transmission via contaminated surfaces.⁴ Only disinfectants, used at the proper concentration, can disrupt environmental HuNoV transmission.

Bodily Fluid Clean-Up

After a vomit/fecal episode, stricter cleaning and disinfecting procedures are required as the vomit/fecal matter of persons with HuNoV contain high numbers of viral particles.¹⁴ Initial cleaning of vomit/feces and other organic matter from surfaces is needed to achieve effective disinfectant activity.^{7, 12} If contaminated surfaces are not properly disinfected, HuNoV can be spread to other areas of the facility, putting more residents at risk.

Type of disinfectant to use and concentration level listed varied greatly in the bodily fluid clean-up procedures we collected. This is of concern because small volumes of bodily fluids (<10 ml) can contain sufficient infectious particles to cause illness. For example, just one milliliter of vomit from a person infected with HuNoV can contain an estimated 10^7 viral particles.¹⁴ When disinfecting surfaces after a vomiting or diarrheal event, CDC recommends using chlorine bleach at 1000-5000 ppm.⁴ Without proper cleaning and disinfection of bodily fluid episodes, as well as a wide area surrounding episodes, HuNoV outbreaks can become prolonged. For example, a HuNoV outbreak at a hotel lasted 2 months after infection control measures were implemented including cleaning, but not disinfecting, of surfaces contaminated with vomit.²⁰

CDC recommends wearing at a minimum a gown and gloves upon entry to areas contaminated with vomit or feces and wearing a mask, eye protection, or a face shield when caring for a person who is vomiting.⁵ Not wearing a face mask could result in employees becoming infected with HuNoV due to inhalation of aerosolized particles.⁴ In fact, Friesma et

al.²¹ reported that wearing a face mask when in contact with vomit significantly decreased attack rates of staff.

Dress Code

Worker hygiene is very important in preventing infectious diseases in LTC facilities. Staff's clothing, fingernails, and jewelry can serve as vehicles for disease transmission. In one reported HuNoV outbreak, worker clothes contaminated after taking care of a child sick with AGE were the likely source of infection for hospital staff and patients.²² Staff wearing clean and neat clothing, wearing proper jewelry, and following proper fingernail grooming could help prevent cross-contamination among residents and staff.

Laundry

Soiled laundry should be separated from unsoiled laundry throughout the laundry process including storing, transporting, and washing. The CDC recommends handling soiled laundry with minimum agitation because infectious particles can become aerosolized and disperse into surrounding areas.⁵ It is recommended to use hot water for washing (160°F (71°C) for a minimum of 25 minutes) and 50-150 ppm chlorine bleach as a sanitizer during the bleach cycle to effectively destroy enteric viruses.²³ However, most did not include proper temperature and sanitizing agents for washing. Without proper handling and washing procedures for contaminated laundry, HuNoV could be transmitted to laundry staff exacerbating an outbreak.

Readability of Hand Hygiene and Bodily Fluid Clean-up Procedures

The Federal Plain Language Guidelines suggest using present tense, active verbs, pronouns that speak directly to readers, and examples, lists, tables, and illustrations to make documents easier to read. Using present tense, active verbs makes procedures more direct and clarifies who is responsible for an activity. Examples can help readers understand what is

written, and lists and tables break text up into chunks possibly making learning easier.⁶ If procedures are easier to understand, we believe they are more likely to be put into practice.

The higher a Flesch Reading Ease score is the easier a document is to read with scores between 51-59 are considered “fairly difficult” to read.²⁴ Inversely, the higher the Flesch-Kincaid grade level the more difficult it is.²⁵ Based on our findings, hand hygiene and bodily fluid clean-up procedures in LTC facilities in SC are not easy to read and understand. Even though procedures may contain proper information, they may not help to prevent HuNoV transmission if they are not easy to read by the employees expected to follow them.

LIMITATIONS

We analyzed a convenience sample of procedures collected from 26 LTC facilities in SC, so our findings cannot be generalized to all SC LTC facilities. However, in order to get the largest proportion of facility participation, we called all registered LTC facilities in SC. We sent a list of requested procedures to be collected to each facility before their site visit in an attempt to make it easier to collect procedures the day of the site visit. However, most facilities had not gathered requested procedures before the visit and spent an extended amount of time trying to locate the procedures. We also could not forcibly collect their procedures, so we had to be satisfied with what each facility provided. Nevertheless, we feel confident about our accurate coding of the collected procedures to provide an insight into prevention and control procedures against HuNoV in LTC facilities in SC.

CONCLUSIONS

As 60% of HuNoV outbreaks in the U.S. occur in LTC facilities,² the best way to prevent and control outbreaks in these setting is having institutional procedures that contain clear information aligned with CDC recommendations.^{4, 5} Inconsistencies with CDC recommendations

were identified in hand hygiene, outbreak management, and general cleaning and sanitation procedures. Length of handwashing mentioned varied greatly across procedures from different facilities, and even within procedures from the same facility. Also, few required handwashing after events that could potentially contaminate hands with bodily fluids, such as after changing bed pans or resident briefs and after contact with inanimate surfaces of resident surroundings. Most LTC facilities lacked separate procedures for HuNoV outbreak management. However, even in the facilities that had separate procedures on outbreak management, most focused on environmental cleaning and disinfection and only briefly mentioned handling of residents, staff, and visitors. Only 9 facilities had procedures for both sanitizing and disinfecting of environmental surfaces. However, many did not include the proper pathogen removal step (disinfection) for high-touch surfaces. Without procedures for preventing and controlling HuNoV in LTC facilities, outbreaks could continue to occur which could have large economic implications as well as an impact of the livelihood and well-being of facility residents.

This study shows hand hygiene and bodily fluid clean-up procedures were not easy to read based on Federal Plain Language Guidelines and Microsoft Word's Readability statistics. Improvements are required to enhance readability of hand hygiene and bodily fluid clean-up procedures in LTC facilities in SC. Procedures that are easy to understand and well aligned with CDC recommendations could prevent future HuNoV outbreaks and help provide better quality care for older adults living in LTC facilities.

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