healthcare network was of borderline significance and should be further explored in the NH setting.

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Evaluation of Care Interactions Between Healthcare Personnel and Residents in Nursing Homes Across the United States

Nai-Chung Chang, University of Utah, VA Salt Lake City Health Care System; Karim Khader, University of Utah, VA Salt Lake City Health Care System; Molly Leecaster, VA Salt Lake City Health Care System, University of Utah School of Medicine; Lindsay Visnovsky, University of Utah, VA Salt Lake City Health Care System; Scott Fridkin, Emory Healthcare and Emory University; Morgan Katz, Johns Hopkins University; Philip Polgreen, University of Iowa; Mary-Claire Roghmann, University of Maryland School of Medicine VA Salt Lake City Health Care System; Candace Haroldsen, VA Salt Lake City Health Care System, University of Utah School of Medicine; Diane Mulvey, VA Salt Lake City Health Care System, University of Utah School of Medicine; Kristina Stratford, VA Salt Lake City Health Care System, University of Utah School of Medicine; Lauren Dempsey, Emory University; William Dube, Emory University School of Medicine; Ghinwa Dumyati, University of Rochester; Linda Frank, California Emerging Infections Program; Deborah Godine, California Emerging Infections Program; Siyeh Gretzinger, Emory University; Trupti Hatwar, New York Emerging Infections Program and University of Rochester Medical Center; Marion Kainer, Tennessee Emerging Infections Program; Joseph Kellogg, Emory University; Sarah Kuchman, New York-Rochester Emerging Infections Program, University of Rochester Medical Center; Laura LaLonde, Oregon Health

Figure 1: Distribution of interactions by unit type and HCP role

HCP Role	Long-Term N (%) Facility IQR	Mixed N (%) Facility IQR	Short Stay/Rehab N (%) Facility IQR	Ventilator/Skilled Nursing N (%) Facility IQR	HCP Interviewed per Unit* Mean (IQR)	Interactions per HCP* Mean (IQR)
CNA	1882 (60.1%) 52.0 - 70.1%	345 (55.2%) 41.7 - 57.8%	1061 (50.3%) 40.8 - 55.8%	429 (42.7%) 27.5 - 39.7%	4.5 (3 - 5)	15.5 (9 - 20)
Nurse	856 (27.4%) 26 - 33.8%	250 (40.0%) 37.8 - 47.8%	786 (37.3%) 29.8 - 47.6%	480 (47.8%) 34.4 - 50.8%	2.9 (2 - 3)	16.5 (9 - 22)
PT/OT	33 (1.1%) 1.2 - 3.9%	30 (4.8%) 9.6 - 11.3%	129 (6.1%) 3.4 - 10.7%	31 (3.1%) 4.0 - 8.6%	2.1 (1 - 3)	4.2 (2 - 6)
Other**	358 (11.4%) 1.5% - 40.7%	-	132 (6.3%) 5.1 - 15.4%	55 (5.5%) 13.9 - 22.9%	3 (1 - 5)	10.1 (4 - 15)
Physician	-	-	1 (0.05%) 0.3 - 0.3%	2 (0.2%) 16.8 - 16.8%	1 (1 - 1)	1.5 (1 - 2)
RT	-	-	-	182 (15.3%) 9.2 - 2.1%	2.3 (1 - 3)	13 (4 - 20)
PA/NP	-	-	-	8 (0.8%) 3.3 - 3.3%	1 (1 - 1)	4 (4 - 4)

*Number of HCPs and interactions are from entire shifts

**Other HCP roles included: speech pathologist; restorative nurse aides with PT/OT and CNA care; medication aides; nursing or CNA students

Figure 2: Clustered linear regression of average number of unique tasks types per interaction

	Estimate	Std. Error	p
Baseline			
CNA in Long-term care unit	2.06	0.09	<0.0001
Unit Type			
Mixed	0.12	0.13	0.3472
Short Stay/Rehab	0.00	0.09	0.9600
Ventilator/Skilled Nursing	0.42	0.22	0.0495
HCP Role			
Nurse	-0.74	0.10	<0.0001
Other*	-0.53	0.13	<0.0001
PA/NP	-1.48	0.22	<0.0001
Physician	-1.34	0.25	<0.0001
PT/OT	-0.61	0.20	0.0018
RT	-1.13	0.24	<0.0001

*Other HCP roles included: speech pathologist; restorative nurse aides with PT/OT and CNA responsibilities; medication aides; nursing or CNA students

Fig. 1.

Authority, Portland, OR; Giancarlo Licitra, Emory University; Ruth Lynfield, Minnesota Emerging Infections Program; J.P. Mahoehney, Minnesota Emerging Infections Program; Joelle Nadle, California Emerging Infections Program; Sandra A. Peña, Tennessee Emerging Infections Program; Sujan Reddy, Centers for Disease Control and Prevention; Nicola Thompson, Centers for Disease Control and Prevention; Rebecca Tsay, New York-Rochester Emerging Infections Program; Lucy Wilson, Maryland Emerging Infections Program; Alexia Zhang, Oregon Health Authority; Matthew Samore, VA Salt Lake City Health Care System, University of Utah School of Medicine

Background: Certain nursing home (NH) resident care tasks have a higher risk for multidrug-resistant organisms (MDRO) transfer to healthcare personnel (HCP), which can result in transmission to residents if HCPs fail to perform recommended infection prevention practices. However, data on HCP-resident interactions are limited and do not account for intrafacility practice variation. Understanding differences in interactions, by HCP role and unit, is important for informing MDRO prevention strategies in NHs.
Methods: In 2019, we conducted serial intercept interviews; each HCP was interviewed 6–7 times for the duration of a unit's dayshift at 20 NHs in 7 states. The next day, staff on a second unit within the

Table 3: Proportion of interactions* where at least one care task performed was high-risk for HCP contamination, stratified by unit type and HCP Role.

Risk Level	All Types			Long-Term			Mixed			Short Stay/Rehab			Ventilator/Skilled Nursing		
	N	%	Facility IQR	N	%	Facility IQR	N	%	Facility IQR	N	%	Facility IQR	N	%	Facility IQR
High	3213	45.6%	39.7-53.9%	1380	44.1%	39.9-54.9%	264	42.2%	41.9-42.7%	840	39.8%	35.3-43.7%	729	61.4%	51.6-73.1%
CNA	2288	32.5%	55.5%-73.9%	1142	36.5%	52.3%-73.8%	209	33.4%	62.3%-70.5%	613	29.1%	53.1%-66.0%	324	27.3%	69.7%-87.3%
Nurse	496	7.0%	11.7%-21.4%	99	3.2%	7.7%-16.3%	48	7.7%	13.1%-22.5%	156	7.4%	14.8%-22.5%	193	16.3%	10.5%-60.8%
Other	191	2.7%	28.8%-47.5%	131	4.2%	30.2%-100.0%	-	-	-	36	1.7%	22.3%-68.8%	24	2.0%	31.8%-47.9%
PA/NP	1	0.0%	-	-	-	-	-	-	-	-	-	-	1	0.1%	-
PT/OT	67	1.0%	17.4%-44.7%	8	0.3%	24.4%-45.8%	7	1.1%	17.6%-42.2%	35	1.7%	13.8%-45.2%	17	1.4%	44.4%-70.8%
RT	170	2.4%	86.5%-95.8%	-	-	-	-	-	-	-	-	-	170	14.3%	86.5%-95.8%
Low	3837	54.4%	46.1-60.3%	1749	55.9%	45.1-60.1%	361	57.8%	57.3-58.1%	1269	60.2%	56.3-64.7%	458	38.6%	26.9%
CNA	1429	20.3%	26.1%-44.5%	740	23.6%	26.2%-47.7%	136	21.8%	29.5%-37.7%	448	21.2%	34.0%-46.9%	105	8.8%	12.7%-30.3%
Nurse	1876	26.6%	79.0%-88.6%	757	24.2%	84.6%-92.3%	202	32.3%	77.5%-86.9%	630	29.9%	77.5%-85.2%	287	24.2%	39.2%-89.5%
Other	354	5.0%	55.0%-74.2%	227	7.3%	45.0%-74.7%	-	-	-	96	4.6%	92.9%-100.0%	31	2.6%	52.1%-68.2%
PA/NP	7	0.1%	81.2%-93.8%	-	-	-	-	-	-	-	-	-	7	0.6%	81.3%-93.8%
Physicians	3	0.0%	-	-	-	-	-	-	-	1	0.1%	-	2	0.2%	-
PT/OT	152	2.2%	61.0%-93.2%	25	0.8%	75.0%-100.0%	23	3.7%	57.8%-82.4%	94	4.5%	62.1%-92.7%	14	1.2%	29.2%-55.6%
RT	12	0.2%	5.6%-16.4%	-	-	-	-	-	-	-	-	-	12	1.0%	5.6%-16.4%

Note: A "high risk" interaction was a HCP-resident interaction where ≥1 task that posed higher-risk for HCP contamination care activity was performed, a "low risk" interaction did not include any high-risk care tasks during the interaction. Higher risk care tasks included: dressing resident, hygiene, wound care, ventilator/tracheotomy care, device care, stool cleanup, and linen change.
*Includes interaction in common areas or outside patient rooms

Table 4: Distribution of resident care tasks, stratified by unit type

Task Type*	Long-term			Mixed			Short Stay/Rehab			Ventilator/Skilled Nursing			Total
	N	%	Facility IQR	N	%	Facility IQR	N	%	Facility IQR	N	%	Facility IQR	
Tasks with Higher Risk of HCP Contamination	3223	**57.6%**	- -	586	**50.7%**	- -	2282	**47.8%**	- -	1297	**55.9%**	- -	7388 53.4%
Dressing Resident	654	**11.7%**	54.6-69.5%	121	**10.5%**	46.9-75.8%	436	**9.1%**	33.2-45.4%	159	**6.8%**	38.0-58.3%	1370 9.9%
Hygiene	676	**12.1%**	51.2-61.1%	144	**12.5%**	41.9-78.1%	485	**10.2%**	39.4-48.2%	238	**10.2%**	46.3-70.1%	1543 11.1%
Transfers	916	**16.4%**	54.3-69.5%	146	**12.6%**	36.6-70.2%	602	**12.6%**	33.1-46.2%	232	**10.0%**	34.5-63.4%	1896 13.7%
Wound Care	52	**0.9%**	22.1-60.1%	31	**2.7%**	84.5-100.0%	102	**2.1%**	39.9-79.0%	42	**1.8%**	34.0-75.0%	227 1.6%
Ventilator/Tracheotomy Care	11	**0.2%**	0.0-75.0%	-	-	0.0-0.0%	3	**0.1%**	22.8-100.0%	289	**12.4%**	93.3-100.0%	303 2.2%
Device Care	73	**1.3%**	29.6-73.9%	17	**1.5%**	73.1-100.0%	72	**1.5%**	26.1-68.5%	46	**2.0%**	51.9-100.0%	208 1.5%
Stool Cleanup	426	**7.6%**	48.3-67.3%	77	**6.7%**	36.4-68.6%	289	**6.1%**	32.7-46.6%	159	**6.8%**	57.1-65.0%	951 6.9%
Linen Change	415	**7.4%**	45.3-67.9%	50	**4.3%**	40.1-70.8%	293	**6.1%**	32.1-52.8%	132	**5.7%**	56.0-60.8%	890 6.4%
Tasks With Lower Risk of HCP Contamination	2370	**42.4%**	- -	570	**49.3%**	- -	2490	**52.2%**	- -	1025	**44.1%**	- -	6455 46.6%
Medication Administration	759	**13.6%**	43.9-54.7%	167	**14.4%**	57.2-83.9%	721	**15.1%**	47.8-59.7%	337	**14.5%**	46.5-59.7%	1984 14.3%
Physical/Occupational Therapy	61	**1.1%**	2.1-92.9%	35	**3.0%**	53.6-83.9%	159	**3.3%**	33.6-98.9%	26	**1.1%**	0.0-39.3%	281 2.0%
Glucometer Check	80	**1.4%**	20.8-59.7%	28	**2.4%**	51.2-76.2%	103	**2.2%**	45.0-75.0%	44	**1.9%**	44.4-91.7%	255 1.8%
Vitals Check	156	**2.8%**	11.5-41.0%	98	**8.5%**	56.4-81.4%	393	**8.2%**	65.4-88.5%	136	**5.9%**	44.4-92.6%	783 5.7%
Nutrition/Feeding	741	**13.2%**	43.2-74.2%	91	**7.9%**	71.2-92.9%	519	**10.9%**	34.4-54.9%	150	**6.5%**	28.8-77.0%	1501 10.8%
Other	573	**10.2%**	38.4-57.8%	151	**13.1%**	34.1-69.7%	595	**12.5%**	51.7-61.7%	332	**14.3%**	51.5-66.4%	1651 11.9%
Total	5593			1156			4772			2322			13843

*Multiple task types may occur per interaction
IQR = Interquartile Range

Fig. 2.

facility were interviewed during the dayshift. HCP on 38 units were interviewed to identify healthcare personnel (HCP)–resident care patterns. All unit staff were eligible for interviews, including certified nursing assistants (CNAs), nurses, physical or occupational therapists, physicians, midlevel practitioners, and respiratory therapists. HCP were asked to list which residents they had cared for (within resident rooms or common areas) since the prior interview. Respondents selected from 14 care tasks. We classified units into 1 of 4 types: long-term, mixed, short stay or rehabilitation, or ventilator or skilled nursing. Interactions were classified based on the risk of HCP contamination after task performance. We compared proportions of interactions associated with each HCP role and performed clustered linear regression to determine the effect of unit type and HCP role on the number of unique task types performed per interaction. **Results:** Intercept-interviews described 7,050 interactions and 13,843 care tasks. Except in ventilator or skilled nursing units, CNAs have the greatest proportion of care interactions (interfacility range, 50%–60%) (Fig. 1). In ventilator and skilled nursing units, interactions are evenly shared between CNAs and nurses (43% and 47%, respectively). On average, CNAs in ventilator and skilled nursing units perform the most unique task types (2.5 task types per interaction, Fig. 2) compared to other unit types ($P < .05$). Compared to CNAs, most other HCP types had significantly fewer task types (0.6–1.4 task types per interaction, $P < .001$). Across all facilities, 45.6% of interactions included tasks that were higher-risk for HCP contamination (eg, transferring, wound and device care, Fig. 3). **Conclusions:** Focusing infection prevention education efforts on CNAs may be most efficient for preventing MDRO transmission within NH because CNAs have the most HCP–resident interactions and complete more tasks per visit. Studies of HCP-resident interactions are critical to improving understanding of transmission mechanisms as well as target MDRO prevention interventions.

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Feasible Surgical Site Infection Surveillance in Resource-Limited Settings: A Pilot in Sierra Leone

Matthew Westercamp, Centers for Disease Control and Prevention; Aqueelah Barrie, World Health Organization, Freetown, Sierra Leone; Christiana Conteh, Sierra Leone Ministry of Health and Sanitation; Danica Gomes, Centers for Disease Control and Prevention; Hassan Benya, US Centers for Disease Control and Prevention; Jamine Weiss, US Centers for Diseases Control and Prevention; Anna Maruta, World Health Organization—Sierra Leone; Rachel Smith, Centers for Disease Control and Prevention

Background: Surgical site infections (SSIs) are among the most common healthcare-associated infections (HAIs) in low- and middle-income countries (LMICs). SSI surveillance can be challenging and resource-intensive to implement in LMICs. To support feasible LMIC SSI surveillance, we piloted a multisite SSI surveillance protocol using simplified case definitions and methodology in Sierra Leone. **Methods:** A standardized evaluation tool was used to assess SSI surveillance knowledge, capacity, and attitudes at 5 proposed facilities. We used simplified case definitions restricted to objective, observable criteria (eg, wound purulence or intentional reopening) without considering the depth of infection. Surveillance was limited to post-cesarean delivery patients to control variability of patient-level infection risk and to decrease data collection requirements. Phone-based patient interviews at 30-days facilitated postdischarge case finding. Surveillance activities utilized existing clinical staff without monetary incentives. The Ministry of Health provided training and support for data management and analysis. **Results:** Three facilities were selected for initial implementation. At all facilities, administration and surgical staff described most, or all, infections as "preventable" and all considered SSIs an "important problem" at their facility. However, capacity assessments revealed limited staff availability to support surveillance activities, limited experience in systematic data collection, nonstandardized patient records as the basis for data collection, lack of unique and consistent patient identifiers to link patient encounters, and no quality-assured microbiology services. To limit system demands and to maximize usefulness, our surveillance data collection elements were built into a newly developed clinical surgical safety checklist that was designed to support surgeons' clinical decision making. Following implementation and 2 months of SSI surveillance activities, 77% (392 of 509) of post-cesarean delivery patients had a checklist completed within the surveillance system. Only 145 of 392 patients (37%) under surveillance were contacted for final 30-day phone interview. Combined SSI rate for the initial 2-months of data collection in Sierra Leone was 8% (32 of 392) with 31% (10 of 32) identified through postdischarge case finding. **Discussion:** The surveillance strategy piloted in Sierra Leone represents a departure from established HAI strategies in the use of simplified case definitions and implementation methods that prioritize current feasibility in a resource-limited setting. However, our pilot implementation results suggest that even these simplified SSI surveillance methods may lack sustainability without additional resources, especially in postdischarge case finding. However, even limited phone-based patient interviews identified a substantial number of infections in this population. Although it was not addressed in this pilot study, feasible laboratory capacity building to support HAI surveillance efforts and promote appropriate treatment should be explored.

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Group Electronic Monitoring of Hand Hygiene on Inpatient Units: A Multicenter Cluster Randomized Quality Improvement Study

Jerome Leis, University of Toronto; Jeff Powis, Michael Garron Hospital, Toronto, Ontario, Canada; Allison McGeer, Mount Sinai Hospital; Daniel Ricciuto, Lakeridge Health, Oshawa, Ontario, Toronto; Tanya Agnihotri, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada; Natalie Coyle, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada; Victoria Williams, Sunnybrook Health Sciences Centre; Christine Moore, Sinai Health System, Toronto, Ontario, Canada; Natasha Salt, Sunnybrook Health Sciences Center; Louis Wong, Sinai Health System; Liz McCreight, Sinai Health System, Toronto, Ontario, Canada; Sajeetha Sivaramakrishna, Michael Garron Hospital, Toronto, Ontario, Canada; Shara Junaid, St Michael's Hospital; Xingshan Cao, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada; Matthew Muller, Unity Health, Toronto, Ontario, Canada