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Multidrug-Resistant Organisms on Patients' Hands: A Missed Opportunity

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Multidrug-resistant organisms (MDROs) are increasingly prevalent in post-acute care (PAC) facilities.^{1,2} Increased contact between health care workers, the environment, and patients in PAC facilities can increase the risk of MDRO cross-transmission^{3,4} because PAC patients may need assistance with activities of daily living and are encouraged to be mobile outside of their room for rehabilitation, dining, and other recreational activities. Much more than other anatomic sites, patients' hands are more likely to come in contact with environmental surfaces, health care workers' hands, and other patients in PAC facilities. Our objective was to evaluate baseline, new acquisition, and duration of MDRO hand carriage among patients newly admitted to PAC facilities from acute care hospitals.

Methods

This prospective observational cohort study in 6 PAC facilities in metropolitan Detroit and Southeast Michigan was approved by the institutional review board of the University of Michigan. After obtaining written informed consent, the dominant hands of newly admitted

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Author Contributions: Dr Mody had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: Cao, Lansing, Mody.

Acquisition, analysis, or interpretation of data: All authors.

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PAC patients were sampled. We swabbed the palm, fingers, and around nails of patients' hands. Samples were collected at baseline (day of enrollment), day 14, and monthly for up to 180 days or until discharge from the facility. Methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant *Enterococcus* (VRE), and resistant gram-negative bacilli (RGNB) were identified using standard microbiological methods. Gram-negative bacilli resistant to either ceftazidime, ciprofloxacin, or imipenem were defined as RGNB.

Results

Of 826 consecutive eligible PAC patients approached for the study, 357 (43.2%) agreed to participate and were followed for 806 visits (mean, 2.3 visits; range, 1–8 visits). Most participants were female (54.9%), with a mean age of 75.8 years.

Nearly one-quarter (86 of 357 [24.1%]) had at least 1 MDRO on their hands on discharge from an acute care hospital and admission to the PAC facility (Table). Baseline hand carriage rates of VRE, MRSA, and RGNB were 13.7%, 10.9%, and 2.8%, respectively. During follow-up (Figure), 34.2% of patients' hands (122 of 357) were colonized with an MDRO, with 10.1% of patients (36 of 357) newly acquiring 1 or more MDROs. Specifically, 7.1% (22 of 308 at risk), 6.3% (20 of 318 at risk), and 3.1% (11 of 347 at risk) of patients newly acquired VRE, MRSA, and RGNB colonization, respectively. MRSA and VRE colonization were more likely to be persistent, with 37.3% (22 of 59) and 22.5% (16 of 71) of patients colonized at multiple visits, whereas RGNB colonization on the same patient's hand was never obtained at follow-up. Overall, 67.2% of MDRO-colonized patients (82 of 122) remained colonized at discharge.

Discussion

Our study shows that patients commonly bring MDROs on their hands on discharge from an acute care hospital and acquire more during their stay at the PAC facility. This, combined with frequent antibiotic use in PAC patients, increases the probability that MDROs introduced to a PAC facility will be transmitted to other frail patients and to health care workers—and, most important, that the MDRO will persist in the facility. Current quality measures that address infection prevention fail to adequately address patient hand hygiene. Despite concerns raised by some recent studies,^{5–7} patient hand washing is not a routine practice in hospitals to date. Owing to PAC patients' increased mobility and interaction with the environment, health care workers, and other patients, we believe that it is even more important to implement routines that enforce washing of patients' hands than in the acute care setting.¹

We did not conduct molecular typing for MDROs, and our analysis was limited to patients who were newly admitted to PAC facilities. Therefore, our estimates do not reflect the patients who were already residing in the facility, some of them long-term, and may underestimate the magnitude of hand colonization and its impact on transmission.

Our study provides critical and emerging evidence that patient hand hygiene is a greatly under appreciated strategy for MDRO reduction efforts in PAC facilities as well as acute

care hospitals. Further interventions and development of performance measures to address this issue are overdue.

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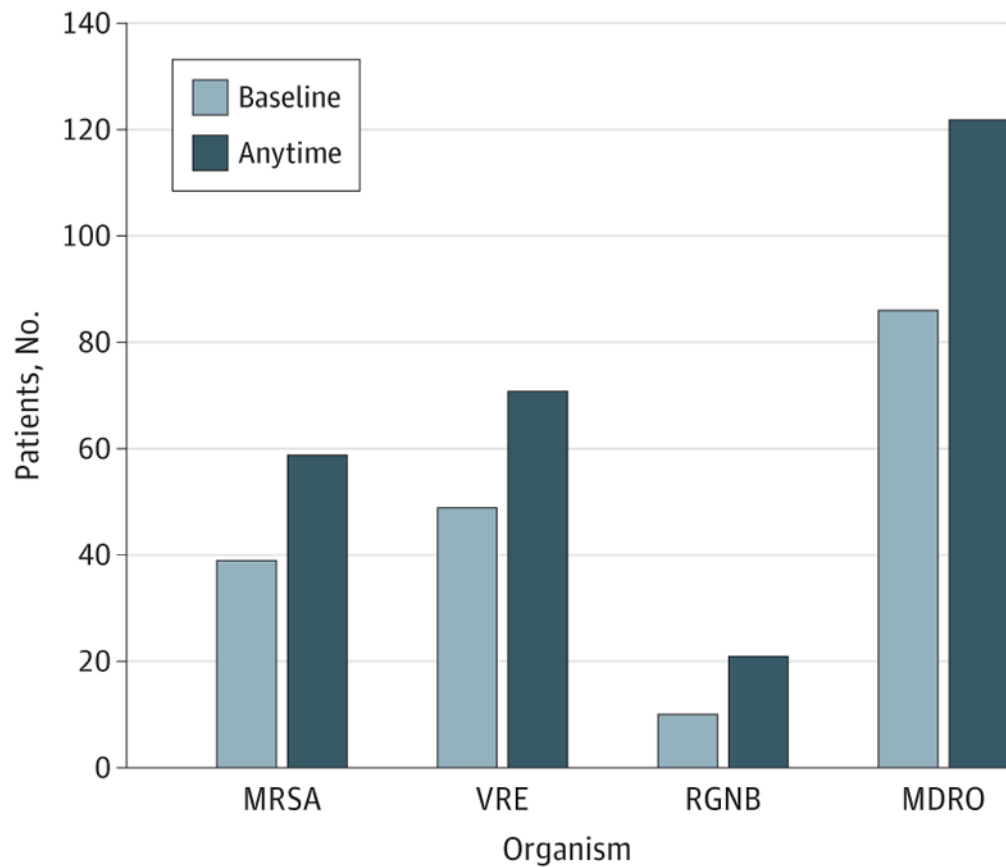


Figure. Patient Hand Carriage of Organisms at Baseline and Follow-up

MDRO indicates multidrug resistant organism; MRSA, methicillin-resistant *Staphylococcus aureus*; RGNB, resistant-gram negative bacilli; and VRE, vancomycin-resistant *Enterococcus*. During the entire follow-up period, 34.2% (122 of 357) patients were colonized by at least 1 MDRO. MRSA, VRE, and RGNB were colonized on patients hands at rates of 16.5% (59 of 357), 19.9% (71 of 357), and 5.9% (21 of 357), respectively.

Table

Baseline Patient Hand Carriage of MDROs in 6 Post–Acute Care Facilities

Facility (Patients, No.)	Organisms, No. (%)			
	MRSA	VRE	RGNB	Any MDRO ^a
1 (81)	8 (9.9)	7 (8.6)	2 (2.5)	16 (19.8)
2 (47)	6 (12.8)	6 (12.8)	1 (2.1)	12 (25.5)
3 (85)	9 (10.6)	9 (10.6)	2 (2.4)	19 (22.4)
4 (81)	8 (9.9)	16 (19.8)	2 (2.5)	21 (25.9)
5 (26)	3 (11.5)	5 (19.2)	3 (11.5)	8 (30.8)
6 (37)	5 (13.5)	6 (16.2)	0	10 (27.0)
Total (357)	39(10.9)	49 (13.7)	10 (2.8)	86 (24.1)

Abbreviations: MDRO, multidrug resistant organism; MRSA, methicillin-resistant *Staphylococcus aureus*; RGNB, resistant-gram negative bacilli; VRE, vancomycin-resistant *Enterococcus*.

^aAt least 1 MDRO.

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