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Authors
Reynolds, Courtney
Kim, Diane
Kaplan, Sherrie H
et al.

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Are nursing homes less likely to admit methicillin-resistant *Staphylococcus aureus* carriers?

Courtney Reynolds, PhD[a,b,*], **Diane Kim, BS**[a,b], **Sherrie H. Kaplan, PhD**[b], **Dana B. Mukamel, PhD**[b], **Eric Cui, BS**[a,b], **Cameron Lee, BA**[a,b], and **Susan S. Huang, MD, MPH**[a,b]

[a]Division of Infectious Diseases, University of California Irvine School of Medicine, Irvine, CA

[b]Health Policy Research Institute, University of California Irvine School of Medicine, Irvine, CA

Abstract

We surveyed administrators at 13 nursing homes in Orange County, CA, on their likelihood to admit methicillin-resistant *Staphylococcus aureus* (MRSA) carriers and assessed applicant characteristics associated with rejection. In multivariate models, denial of admission was associated with MRSA carriage (odds ratio, 2.7; $P = .02$) and receiving lower ratings for overall suitability for admission (odds ratio, 5.9; $P < .001$). Larger studies are needed to determine whether decolonization may remove barriers to accessing postdischarge care for MRSA carriers.

Keywords

MRSA; Postdischarge care; Long-term care; Hospital discharge

Rising methicillin-resistant *Staphylococcus aureus* (MRSA) prevalence and legislation for mandatory hospital screening have resulted in the identification of greater numbers of hospitalized MRSA carriers.[1,2] It is unknown whether MRSA carriage impacts the ability to obtain nursing home admission after hospital discharge. MRSA carriers may experience higher rejection rates because of the shortage of single or MRSA-only rooms, concerns about later infection or transmission, or the need to use contact precautions.[3–5] Once accepted, MRSA carriers may experience delays in placement if residents are moved to create single or cohort rooms. One Canadian study found MRSA carriers experienced delays in receiving postdischarge care, However, this study included many types of postdischarge care and did not provide systematic reasons for delays.[6] We sought to understand whether MRSA carriage affects the likelihood or timeliness of admission to nursing homes, controlling for factors such as insurance and care burden.

[*]Address correspondence to Courtney Reynolds, PhD, 100 Theory Drive, Suite 110, Irvine, CA 92617. courtner@uci.edu (C. Reynolds).

Conflicts of interest: None to report.

METHODS

Among 72 nursing homes in Orange County, CA, we recruited a convenience sample of 13. At each facility, the administrator overseeing admissions completed surveys on 60 prospective applicants for admission to their facility: 30 consecutive applicants with MRSA and 30 consecutive applicants without MRSA (or other multidrug-resistant organisms). Because of variations in admission volume, administrators were given up to 12 months to complete surveys. The Institutional Review Board at the University of California Irvine approved this study.

Through the surveys, administrators rated applicants based on fixed criteria: insurance, expected duration of stay, care burden, mental status, personality, behavioral issues, requirement for ventilation, prior experiences at that facility, and an overall rating. These criteria were selected following consultation with nursing home administrators regarding the most common reasons for acceptance or rejection. We directed administrators to use a 5-point scale for all criteria. For accepted applicants, administrators quantified delays in placement and indicated whether any delays resulted from MRSA carriage. For rejected MRSA carriers, administrators documented reasons for denial and whether MRSA carriage contributed.

We conducted bivariate and multivariate analyses using generalized estimating equations models clustered by facility to assess applicant characteristics associated with rejection, excluding applicants rejected because of lack of beds. Variables from bivariate testing were entered at $P < .1$. Model variables were retained at $\alpha \leq .05$.

RESULTS

We collected 577 surveys from 13 facilities: 246 on MRSA carriers and 331 on noncarriers. We excluded 8 MRSA carriers and 25 noncarriers who elected to enter a different facility although beds were available. Applicant characteristics are provided in Table 1. Carriers and noncarriers were similar according to average age, insurance type, and expected duration of coverage. Similar numbers of carriers and noncarriers had Medicare insurance (31% vs 29%, respectively; χ^2 test, $P = .7$) versus Medicaid insurance (27% vs 24%, respectively; χ^2 test, $P = .4$). Administrators gave MRSA carriers an average overall rating of 3.5 (from 1 to 5, with 5 best) versus 3.4 for noncarriers (*t* test, $P = .1$). Ratings were not significantly different for activities of daily living (ADL) care burden, mental status, expected duration of stay, or previous experiences at that facility. MRSA carriers were given lower ratings for expected non-ADL care burden, personality, behavioral issues, and ventilator status.

Across facilities, the median rejection rate was 26% (range, 0%–66%; 153 total applicants rejected). After excluding applicants rejected for lack of available beds (51 applicants), the most common reasons for rejection were MRSA carriage and need for a higher level of care (Table 2). The median rejection rate for MRSA carriers was 33% (range, 0–71) and 25% (range, 0–64) for noncarriers; after excluding applicants rejected because of no beds being available, these rates became 28% and 18%, respectively. Among MRSA carriers denied admission, MRSA was cited as a reason for rejection in 52% (32 of 61) of cases and the sole

reason in 30% (18 of 61) of cases. For MRSA carriers who were denied admission because of MRSA, the need for single or cohort rooms was cited as a reason in 80% (32 of 40) of cases. Nursing homes reported similar delays in placement for accepted applicants: approximately 8.5 hours overall for MRSA carriers and 6.5 hours for non-MRSA carriers (*t* test, $P = .7$).

In multivariate models, denial of admission was associated with MRSA carriage (OR, 2.7 [95% confidence interval: 1.1–6.5] for carriers, $P = .02$) and with lower overall suitability ratings (OR, 5.9 [95% confidence interval: 3.4–9.6], $P < .001$, with a 6-fold increase in odds of denial per 1-point decrease in suitability rating).

DISCUSSION

A growing number of patients needing postdischarge care are MRSA carriers because of rising MRSA prevalence and mandatory screening. We found that MRSA carriage was associated with denial of nursing home admission. However, administrators rated MRSA carriers equally suitable for admission versus noncarriers. Whereas MRSA carriers were given lower ratings for select admission criteria such as personality or non-ADL care burden, only MRSA carriage and overall rating were predictors of rejection. Notably, there was no difference in type of insurance or expected duration of coverage between carriers and noncarriers. The most common reason for rejecting MRSA carriers was the lack of single or cohort rooms.

Delays in placement were similar, and short, for both applicant groups. One reason may be that our study relied on postacceptance delays measured by nursing home administrators, rather than recording delays related to the patient's placement on the list for postdischarge transfer, including time spent applying to multiple facilities.

This study has several limitations. The ratings for each nursing home applicant were intentionally based on subjective assessments and may not be consistently applied across all participating nursing homes. Certainly, nursing home administrators may not use formal ratings to evaluate applicants. However, the characteristics in our rating scales were developed in collaboration with nursing homes and reflect their priorities in making admission decisions. Selection bias may have limited our ability to detect the effect of insurance on admission because patients with inadequate coverage may have been identified during their hospitalization and discouraged from applying to nursing homes.

MRSA prevalence continues to rise in hospitals, raising the important question of how MRSA carriage impacts patients after discharge. We found that rejection rates for MRSA carriers were consistently higher compared with noncarriers, although the groups were rated as equally suitable for admission overall. As a result, MRSA carriers may experience delays or be ultimately unable to obtain nursing home care. Further research is needed to determine whether decolonizing MRSA carriers at hospital discharge or upon nursing home admission prevents disruptions in care or delays in transfer resulting from MRSA carriage.

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Table 1

Characteristics of applicants for nursing home admission

Characteristic	Mean (standard deviation)		*P* value
	MRSA carriers (n = 238)	Noncarriers (n = 306)	
Age, y	72 (16)	75 (14)	.4
Insurance type, % (n)			.3
Medicare	31 (74)	29 (90)	
Medicaid	27 (63)	24 (72)	
Private	14 (33)	19 (58)	
Other	25 (60)	27 (83)	
Missing	3 (6)	0.9 (3)	
Insurance coverage throughout stay	92 (218)	91 (278)	.6
5-Point rating of characteristics*			
Overall match*	3.4 (1.2)	3.5 (1.3)	.1
Prior resident	2.4 (2.0)	2.8 (2.0)	.06
Expected duration of stay	3.5 (1.1)	3.7 (1.2)	.2
ADL care†	3.0 (1.1)	3.1 (1.4)	.6
Non-ADL care	2.9 (1.3)	2.7 (1.7)	.02
Mental status	3.2 (1.2)	3.4 (1.3)	.1
Personality	3.0 (1.4)	3.4 (1.3)	<.01
Behavioral issues‡	2.6 (1.6)	3.1 (1.5)	<.01
Ventilator status	1.0 (1.8)	0.6 (1.3)	<.01

*All ratings were based on a 5-point scale, where 5 was the best possible rating.

†Activities of daily living (ADL), including bathing, eating, dressing, toileting, and transferring.

‡Such as substance dependence.

Table 2

Reported reasons for denying admission to nursing home applicants

Reason for admission decision	% (n) MRSA carriers denied (n = 61 denied of 219)*	% (n) Noncarriers denied (n = 49 denied of 274)
MRSA carrier	15 (32)	NA
Higher level of care needed	6 (14)	6 (16)
Behavioral issues†	4 (8)	5 (13)
Multiple MDROs	3 (7)	NA
Single room requested (but not available)	2 (5)	<1 (2)
Insufficient insurance	1 (3)	1 (4)

MDRO, multidrug-resistant organisms; *NA*, not applicable.

NOTE. Administrators were able to select multiple reasons for denying admission per applicant.

*Results after excluding 51 applicants (19 carriers, 32 noncarriers) rejected because of no available beds.

†Behavioral issues included substance abuse, aggression, and other unspecified behaviors.