Abstract
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Methicillin-resistant *Staphylococcus aureus* in Ohio Emergency Medical Personnel: A statewide cross-sectional study

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Study Objectives

- To determine the prevalence of methicillin-resistant *Staphylococcus aureus* (MRSA) carriage in Ohio Emergency Medical Services (EMS) providers.
- To identify risk factors associated with MRSA in EMS personnel.

Background

- Carriage rates of MRSA in hospital personnel (> 4%) has been shown to be higher than the general population (~2%).
- Little research has been done to describe MRSA in EMS providers and no known studies have been performed in Ohio EMS personnel.
- To the best of our knowledge, this is the first known study using survey weights to estimate a statewide prevalence of MRSA carriage in EMS providers. Previous research has shown that proper probability weighting can generalize the results from a sample to the general population.

Methods

Figure 1. Emergency Medical Services regional division for the state of Ohio. Courtesy of the Regional Physicians Advisory Board (RPAB).

Participants & Procedures

- At the time of this study in 2010, there were 1,338 agencies and 40,719 certified EMS providers in Ohio.
- A representative sample of agencies (84) from urban and rural locations within each of the 10 EMS regions were selected to participate in the study (See Figure 1).
- At the time of the study visit, 280 EMS personnel were actively recruited to participate.

Methods

Measures

- Nasal swabs were collected from each individual for MRSA detection.
- Each participant completed a survey assessing for demographics, occupational history, health, cohabitation status, and hygiene practice.

Data Analysis

- Descriptive statistics were used to illustrate the sample population; survey-weight adjustment was used to estimate the prevalence of MRSA carriage in EMS providers.
- Survey-weight adjusted logistic regression was performed to identify potential risk factors for MRSA carriers.

Results

Table 1. Percentage distribution and survey-weight adjusted estimates of select characteristics for 280 EMS personnel surveyed in 2010

Characteristic	Sampled Personnel, n=280 (%)	Survey-weight adjusted, n=44,639 (%)
Demographics		
Age (±SD), years	36.9 ± 11.0	36.1 ± 0.82
Female gender	34 (12.1)	5,308 (11.9)
Caucasian Race	278 (99.3)	44,269 (99.2)
BMI (±SD), kg/m^2	29.9 ± 5.8	30.5 ± 0.61
Rural Agency Classification	100 (35.7)	15,148 (33.9)
Advance Life Support Certification	196 (72.1)	30,828 (70.0)
EMS experience, 16+ years	102 (36.4)	16,408 (36.8)
Working at more than one agency	114 (41.8)	19,355 (43.8)
Working 40+ hours/week	238 (85.3)	37,372 (83.9)
Working at healthcare setting	32 (11.5)	6,274 (14.1)
MRSA carriers	13 (4.6)	1,965 (4.4)

Results

Table 2. Univariate survey-weight adjusted odds ratios of MRSA carriage for Ohio EMS personnel surveyed in 2010.

Risk Factor	Univariate Model	p-value
Hand washing frequency after glove use		0.0012
More frequently (usually, always)	REF	
Less frequently (never, rarely, sometimes)	10.51 (2.54 – 43.45)	
Cohabitation with staphylococcal infection		0.0470
No	REF	
Yes	9.02 (1.03 – 78.98)	
Hand washing frequency		0.0468
More frequently (≥ 8 times/day)	REF	
Less frequently (< 8 times/day)	4.20 (1.02 – 17.27)	
Open Wounds (lesions, infections, boils)		0.2329
No	REF	
Yes	3.20 (0.47 – 21.62)	
History of immunosuppression therapy		0.1567
No	REF	
Yes	7.30 (0.47 – 114.29)	

Conclusions

- The survey-weight prevalence of MRSA in Ohio EMS personnel in 2010 was 4.4% and an estimated 1,965 EMS providers were carriers of MRSA.
- Low frequency of hand washing, low frequency of hand washing after glove use, and living with someone who has experienced a recent staph infection were all independently associated with increased MRSA carriage in EMS personnel.
- Previous literature suggests that a reduction in MRSA carriage can lead to decreases in transmission and improved public health.
- Implementing methods to reinforce proper CDC hygiene guidelines may decrease MRSA found in the EMS setting.

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