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Methicillin-Resistant *Staphylococcus aureus* (MRSA)  
Infections Among Patients of a Large Anchorage  
Primary-Care Practice, 1996-2000

**Background:** Methicillin-resistant *Staphylococcus aureus* (MRSA) skin infections have been previously documented among populations in rural Alaska.<sup>1,2</sup> In April 2000, the Section of Epidemiology sought to characterize the epidemiology and prevalence of MRSA skin infections among patients of a large Anchorage primary-care practice.

**Investigation Objectives:**

1. To document the prevalence and epidemiology of culture-confirmed skin infections seen at the practice during 1996-2000.
2. To determine if a particular ethnic or racial group of these patients, specifically persons of Samoan or Pacific Islander origin, appeared to be disproportionately affected and if so, to suggest possible changes in management recommendations for this group.
3. Pending investigation results, to suggest aspects of MRSA epidemiology that warrant further study.

**Methods:** Approximately 1000 patients diagnosed with skin infections from January 1996 through April 2000 were identified through the practice's computerized billing records system. Basic demographics, information about skin infection-related visits and bacterial skin cultures, in addition to any predisposing characteristics for developing MRSA, e.g., presence of diabetes, were recorded during chart reviews. This study was based upon a convenience sample of 20% of the approximately 1,000 patients.

**Results and Discussion:** Of the 204 patient charts reviewed, 12 or 6% of patients were of Samoan or Pacific Islander origin (S/PI). For persons identified as not being of Samoan or Pacific Islander origin, 30% of lesions were cultured compared to S/PI persons for which 50% of lesions were cultured. The proportion of persons cultured was not significantly different between non-S/PI and S/PI persons ( $X^2$  p-value = 0.27). For non-S/PI persons, 60% of cultures yielded *S. aureus*, not significantly different compared to 83% for S/PI persons ( $X^2$  p-value = 0.48).

Nine or 23% of all *S. aureus* culture isolates demonstrated resistance to methicillin. Among non-S/PI patients, 15% of isolates were methicillin-resistant compared to 80% among S/PI persons. This difference was statistically significant (Table 1, RR 5.41, 95% Confidence Interval 2.2, 13.7, p-value < 0.007).

**Limitations:** Because this was a retrospective investigation, details regarding patient visits were not uniform. For example, some patients regularly visited the practice for follow-up appointments. If a skin infection was not healing, the health-care provider would have been aware. However, several patients visited the practice only once which could have meant that their infection resolved or that they sought follow-up care elsewhere. The difference seen in the prevalence of MRSA among S/PI persons may also be explained by differences in culturing practices. For example, if non-S/PI patients were cultured at the

first sign of an abscess or skin infection, the infection might be uncomplicated and quickly resolved by a first-line antibiotic. However, if S/PI patients were only cultured after a skin infection failed to respond to first-line antibiotics, cultures would be more likely to yield drug-resistant isolates. There was insufficient evidence to determine if this scenario was likely. Additionally, the number of MRSA isolates, as well as the number of persons of S/PI origin, were small, and therefore the apparent association may be spurious.

**Conclusions:** The findings from this chart review were consistent with previous literature documenting a higher prevalence of community-acquired MRSA among persons from Australia and the South Pacific.<sup>3</sup> However, as with those studies, we cannot determine whether this association was confounded by other risk factors that may play a role in increasing the likelihood of developing an MRSA infection.

**Recommendations:**

1. The chart review suggested that among persons who presented to the practice and had documented *S. aureus* skin infections, patients of Samoan or PI origin had a statistically higher proportion of MRSA infections compared to those patients of non-S/PI origin. It would therefore be prudent to reduce the threshold of clinical suspicion for obtaining a routine skin culture among these patients, and to use the results to guide subsequent antibiotic therapy.
2. Future MRSA isolates should be further characterized by pulse-field gel electrophoresis (PFGE) to compare with other community-acquired isolates of MRSA among the general population as well as among persons of S/PI origin in Anchorage, in Alaska, and in the United States. For example, is there a dominant strain of MRSA seen among S/PI persons in Alaska, and is it the same as the community-acquired MRSA seen among other Alaska populations? Or is the S/PI strain in Alaska more similar to isolates seen in other S/PI communities around the nation? Current research has been directed toward determining the evolution of the genetic patterns of resistance among *S. aureus* isolates. Molecular information from Alaska strains could be helpful for these larger national studies.

**References:**

1. "An Outbreak of Boils Associated with Steambathing, 1996." *Epidemiology Bulletin* No.27, July 17, 1997.
2. Baggett HC, Hennessy T, Leman R, Hamlin C, Bruden D, Reasonover A, Martinez P, Butler J. 2001 "Outbreak of Community-Acquired Methicillin-resistant *Staphylococcus aureus* (MRSA) Skin Infections Among Alaska Natives - Southwestern Alaska, 2000. Epidemic Intelligence Service Conference, Atlanta, GA, April 23-27, 2001.
3. Gorak EJ, Yamada SM, Brown JD. 1999. "Community-acquired methicillin-resistant *Staphylococcus aureus* in hospitalized adults and children without known risk factors." *Clin Inf Dis* 29:797-800.

**Table 1. Relative Risk of MRSA Infection by Race/Ethnicity**

Race/Ethnicity	Number of <i>S. aureus</i> isolates that were MRSA +	Number of isolates <i>S. aureus</i> that were MRSA -	Total	Relative Risk (95% Confidence Interval)
Samoan/Pacific Islanders	4	1	5	
Other	5	29	34	5.4 (2.2, 13.7) p < 0.007*
Total	9	30	39	

\*2-tailed Fisher's Exact test

(Reported by Louisa Castrodale, D.V.M., M.P.H., Section of Epidemiology; and Brad Gessner, M.D. Thanks to medical records personnel for pulling and re-filing patient charts.)