OUTBREAK OF COMMUNITY-ASSOCIATED METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* SKIN INFECTIONS AMONG ATHLETES

BACKGROUND

On September 12, 2002, ACDC was notified of three hospitalizations for cellulitis occurring within a 30-day period among players of the same sports team. On August 15, 2002, the first team member (Player #1) was hospitalized for cellulitis resulting from infection of stitches for a non-sports-related accident that occurred 6 days earlier. Wound culture in this case grew methicillin-sensitive *Staphylococcus aureus* (MSSA). On September 10, 2002, another player (Player #2) was hospitalized for superinfection of a cleat wound of the right anterior tibia sustained a week earlier. One day later, a third player (Player #3) was hospitalized for necrotizing fasciitis of the right elbow, which eventually required two surgical debridements and a skin graft. This wound was originally and erroneously believed to be due to a bug bite. The latter two cases had methicillin-resistant *S. aureus* (MRSA) confirmed on wound culture.

METHODS

On September 17, 2002, investigators from ACDC met with the team, conducted a site inspection and made preliminary recommendations—this included the use of chlorhexidine soap in locker room showers. A survey identified players with potential skin infections. Recommendations for treatment, prevention, and surveillance of suspicious skin conditions were provided. In addition ACDC completed chart reviews and interviews of the hospitalized cases. A week later, a site inspection and second player survey using the same instrument was repeated. In a letter to the head trainer and sports team physicians, results and recommendations from our investigation were summarized (available on page 40). Ongoing surveillance included a weekly patient log sent to ACDC until the end of the team's season. Laboratory investigation included pulsed-field gel electrophoretic analysis of the two MRSA isolates from Players #2 and #3 and nasal swab bacterial culture of Player #1.

RESULTS

Site inspections revealed clean and well-maintained facilities. Soap dispensers of pHisoHex® (hexachlorophene) were installed in the locker room showers. Areas of concern included bulk containers of sports massage lubricants and analgesic balm and the lack of soap and paper towel dispensers outside of locker room toilets.

Both self-administered surveys documented good player hygiene; a proportion of players used their own soap, rather than the bactericidal soap provided in the locker room showers. Both surveys identified players who reported suspicious skin lesions or recent antibiotic use; 11 players identified from the first survey and 10 from the second. As expected, players received a high frequency of cuts and abrasions. Players covered these wounds only about half of the time. Players also reported noticing teammates with boils or insect bites. Surveillance and communication with trainers and team physicians did not identify further cases of cellulitis or hospitalizations.

The laboratory investigation found that the MRSA isolates obtained from players #2 and #3 had identical antibiograms and PFGE patterns. These did not match isolates from a previous community-associated outbreak that occurred in 1997 [1], but did match MRSA isolates from a nosocomial outbreak among infants in an intensive care unit in 2002. Nasal swab culture from Player #1 (taken 1½ months after hospitalization and full recovery) did not identify *S. aureus.*

Interviews of the hospitalized players did not identify any epidemiologic links between players. All of these players played similar positions on the team but did not admit to any activities that would place them at higher risk than other players. These players also did not note any associations with hospitals, jail in-

mates, or other sick contacts. Players #2 and #3 were initially treated with oral cephalexin, prior to hospitalization.

Recommendations to control and prevent the spread of community-associated methicillin-resistant *Staphylococcus aureus* (MRSA) skin infections among athletes

Environmental control:

1. Continue to maintain excellent hygiene of facilities using appropriate disinfectant solutions according to manufacturer instructions.
2. Ensure that uniforms are washed in hot water at temperatures at or above 160° F and that dryers operate at 190° F or higher.

Player hygiene:

1. The use of pHisoHex® (hexachlorophene) is appropriate since no new hospitalizations for cellulitis have occurred. Other outbreaks of MRSA have been controlled with the use of chlorhexidine, which is what is typically recommended. If new cases arise, you may consider switching shower and hand dispenser soap to a chlorhexidine-based soap.
2. Immediately install dispensers of antibacterial soap (i.e., hexachlorophene or chlorhexidine) at the sinks outside toilet stalls in the locker room. Paper towel dispensers, trash receptacles, and appropriate maintenance are also necessary to ensure proper hygiene in this location.
3. Continue using antibacterial soap (i.e., hexachlorophene or chlorhexidine) in the locker room showers, as you are presently doing.
4. Continue providing antibacterial soap at all locations for at least four weeks after installation of hand soap dispensers to reduce or eliminate possible carriage of MRSA among players. Players should not use their own soap during this period, unless the player reports a significant skin reaction to the school soap.
5. Players should be educated on first aid management of wounds, which includes immediate washing of wounds with soap and warm water. All boils, abrasions, cuts and insect bites should be covered until completely healed. Players who do not cover their wounds should be prohibited from practice or play.

Surveillance:

1. Surveillance for skin lesions, as described below, should extend to players from all teams that share use of gym equipment, training and rehabilitation facilities, showers and locker rooms.
2. At least weekly, remind players to report skin changes that suggest underlying infection (such as redness, warmth, swelling, tenderness, or drainage), especially when associated with cuts, boils, insect bites, or sites of skin irritation.
3. Team physicians should maintain a daily log of patients evaluated for skin lesions at the team clinic. This log should include a detailed description of the lesions, the microbiologic cultures taken, the results of the cultures, as well as the treatment regimen and outcome. This should be maintained until the end of the season and sent weekly to ACDC.
4. MRSA suspected skin lesions should be cultured to assess the presence of MRSA. Results and isolates should be forwarded to the county DHS.

Treatment:

1. Physicians that care for players should not prescribe antibiotics unless there is an indication of acute infection. Adequate drainage of pustular lesions should be the primary treatment. Minocycline or trimethoprim/sulfamethoxazole should be considered as first-line antibiotics for skin infections when necessary, due to possible pre-existing antibiotic resistance to cephalosporins and fluoroquinolones.

CONCLUSIONS

Limitations: Interpretation of the findings in this investigation are subject to several limitations. Asymptomatic carriage of MRSA and the limited number of identified MRSA cases in this investigation might have prevented identification of the source of the outbreak and risk factors for infection [2]. Obtaining information was complicated, which could have prevented full disclosure of information by players and the physicians contacted. In addition, investigation into exposures and implementation of control measures took place simultaneously; thus, it is difficult to assess whether this outbreak resolved by the natural course of disease or by any specific intervention.

This investigation of hospitalized cases of MRSA cellulitis among players of the same sports team resulted in two isolates indistinguishable by PFGE from a nosocomial NICU outbreak in Spring 2002. However, the source of MRSA in this outbreak was never identified. Since these players participate in a con-

tact sport resulting in frequent cuts and abrasions, they might represent a population at higher risk for skin infections. The lack of soap dispensers in locker room bathrooms and use of topical sports treatments from bulk containers are environmental factors that may have played a role in this outbreak. Recent evidence suggests that some community-associated MRSA exhibit increased virulence [1,3–5]. Similar outbreaks of MRSA among athletes have resulted in significant morbidity [6–9]. Prompt investigation, enhanced surveillance, and the implementation of control measures may have prevented widespread infection among other players in this sports team.

REFERENCES

1. Gross-Schulman S, Dassey D, Mascola L, Anaya C. Community-acquired methicillin-resistant Staphylococcus aureus. JAMA 1998; 280(5):421-2.
2. Bloch KC, Gerberding JL. Sample size could limit the power of case-control studies for determining risk factors for community-acquired methicillin-resistant Staphylococcus aureus. Clin Infect Dis 1996; 23(4):851-2.
3. Baba T, Takeuchi F, Kuroda M, et al. Genome and virulence determinants of high virulence community-acquired MRSA. Lancet 2002; 359(9320):1819-27.
4. Dufour P, Gillet Y, Bes M, et al. Community-acquired methicillin-resistant Staphylococcus aureus infections in France: emergence of a single clone that produces Panton-Valentine leukocidin. Clin Infect Dis 2002; 35(7):819-24.
5. Hiramatsu K, Okuma K, Ma XX, Yamamoto M, Hori S, Kapi M. New trends in Staphylococcus aureus infections: glycopeptide resistance in hospital and methicillin resistance in the community. Curr Opin Infect Dis 2002; 15(4):407-13.
6. Bartlett PC, Martin RJ, Cahill BR. Furunculosis in a high school football team. Am J Sports Med 1982; 10(6):371-4.
7. Lindenmayer JM, Schoenfeld S, O'Grady R, Carney JK. Methicillin-resistant Staphylococcus aureus in a high school wrestling team and the surrounding community. Arch Intern Med 1998; 158(8):895-9.
8. Sosin DM, Gunn RA, Ford WL, Skaggs JW. An outbreak of furunculosis among high school athletes. Am J Sports Med 1989; 17(6):828-32.
9. Stacey AR, Endersby KE, Chan PC, Marples RR. An outbreak of methicillin resistant Staphylococcus aureus infection in a rugby football team. Br J Sports Med 1998; 32(2):153-4.