

Athletic Trainers and MRSA Infections: *What's the Score?*

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*** Editor's Note:** *This is a special report prepared by the Centers for Disease Control & Prevention in conjunction with the College/University Athletic Trainers' Committee. The two entities have been working to gauge the profession's knowledge of and practices concerning MRSA – reported as one of the most challenging issues related to the care of athletes.*

S *Staphylococcus aureus* (also referred to as “staph”) are bacteria, and in the United States, staph bacteria are one of the most common causes of skin infections. These skin infections usually manifest as purulent lesions (think pimples, boils and abscesses) and are frequently misidentified as spider bites.

Methicillin-resistant *Staphylococcus aureus* – MRSA – is a specific strain of staph bacteria that is resistant to the beta-lactam class of antibiotics (e.g., penicillin, cephalosporins and cephalixin) most commonly used to treat staph infections. While MRSA most frequently infects persons with weakened immune systems who are in hospitals or other health care facilities, in the last decade MRSA has emerged as a cause of infections in otherwise healthy persons outside of health care settings, including athletes.

MRSA is transmitted primarily by direct skin-to-skin contact through open skin lesions such as abrasions, hair follicles or microabrasions that can result from body shaving. The area of infection is usually red, swollen, painful and may have drainage. MRSA infection can lead to more serious conditions like bloodstream infections and pneumonia; the symptoms frequently associated with these more serious infections include fever, chills and shortness of breath.

Several factors have been associated with the spread of MRSA skin infections; those are emphasized in the “Five C Framework” (Figure 1). Athletic settings are optimal environments for the spread of MRSA due to the occurrence of these five important risk factors: **crowding**, frequent skin-to-skin **contact**, **compromised** skin (i.e., cuts or abrasions), **contaminated** items and surfaces, and lack of **cleanliness**. Additional factors currently under evaluation are antimicrobial use and colonization (the presence of bacteria on a person's body without symptoms of disease).

Figure 1. The “Five C Framework” indicating primary risk factors for MRSA skin infections.

THE 5 Cs
Crowding
Frequent skin-to-skin Contact
Compromised skin (i.e., cuts or abrasions)
Contaminated items and surfaces
Lack of Cleanliness

Athletes, specifically those involved in contact sports, may be at higher risk for MRSA skin infections because they have frequent skin-to-skin contact and often sustain skin abrasions or cuts. Outbreaks have been reported among several athletic groups (fencers, football players and wrestlers) and at all levels of competition, including an outbreak among members of professional football teams.^{i,ii}

Given the challenges of treating infections caused by MRSA and the potential severity of these infections, it is important for athletic trainers and other health care providers to be aware of the pivotal role they play in evaluating and preventing the spread of this bacteria.

To assess the knowledge, practices and perceptions of certified athletic trainers regarding MRSA, a Web-based survey was conducted via the NATA site in October 2006. Questions pertained to the demographics of the respondents, reported practices, the number and type of patients/athletes commonly treated, and their perceptions regarding MRSA. Data from 364 respondents were used in the analysis, which included only one respondent per institution/site.

who responded?

Most respondents were male (58.9%) and most had practiced a median of 9.0 years (range: 0-35) in high school (40.8%), college/university (32.3%), or multiple (i.e., two or more of the

following: high school, college/university, professional, clinical or “other” (17.0%) athletic settings. Almost 40% of respondents had at least one credential in addition to their athletic training certification. The additional credentials most frequently reported were Certified Strength and Conditioning Specialist or “other” (i.e., teaching certification, athletic training license or advanced degree). More than one-third of the respondents (37.7%) were from the South as compared to 28.8% from the Midwest, 18.7% from the West, 14.1% from the Northeast, and 0.6% from “other” (e.g., Puerto Rico).

overall skin infections

The median number of patients/athletes reportedly treated per week was 50.0 (range: 0-1000), and nearly all (92.0%) respondents indicated they had treated at least one patient/athlete for a skin infection caused by any organism.

Of male patients/athletes reportedly treated for any skin infection, most were participants in football (72.6%), wrestling (52.5%) or basketball (25.8%), while the female patients/athletes most commonly participated in basketball (34.3%), soccer (34.3%) or volleyball (32.0%).

mrsa infections

The survey showed almost all respondents (98.6%) are aware of MRSA. About one-half of them (53.3%) have treated at least one patient/athlete for an MRSA skin infection. In the 12 months preceding the survey, respondents reported treating a median of 3.0 (range: 1-50) patients/athletes for MRSA skin infections. The most affected areas were:

- Lower leg (38.1%)
- Forearm (31.5%)
- Knee (29.3%)

Male patients/athletes (87.3%) were significantly more likely than female patients/athletes (35.9%) to be reportedly treated for MRSA skin infections. MRSA skin infections were most commonly reported in male athletes participating in football (76.0%), wrestling (22.8%) or basketball (12.7%).

reported practices

Athletic trainers were asked a series of questions regarding their reported

practices both on and off the field.

— hand hygiene

Only 17.6% of respondents reported they always wash their hands *before* seeing each patient/athlete and only 38.9% reported they always wash their hands *after* seeing each patient/athlete (Figure 2). Fewer reported using an alcohol-based hand sanitizer (11.1% and 24.4%, respectively).

However, 31.8% reported always using an alcohol-based hand sanitizer *between* caring for each patient/athlete, while only 12.0% reported always washing their hands with soap and water.

Almost 60% of respondents reported that they put on a new pair of gloves before seeing each patient/athlete.

— treat or refer?

In day-to-day practice, respondents indicated they usually refer patients/athletes to other health care personnel for suspected infection, spread of infection (i.e., to other body sites) or discharge (i.e., from a wound).

When asked whether they personally perform care measures or refer patients/athletes to other health care providers when there is a suspected MRSA skin infection:

- 94.1% indicated they personally apply a bandage
- 80.0% personally clean the infection

site with an antiseptic agent (e.g., Hibiclens or betadine)

- 55.3% personally apply a warm compress (Table 1).

In addition, 91.8% refer the patient/athlete to other health care providers to obtain a *wound/abscess* culture and 86.5% refer the patient/athlete for an incision and drainage procedure to be performed.

While 95.3% reportedly refer the patient/athlete for a *systemic* antibiotic prescription, only 72.9% reportedly refer the patient/athlete for a *topical* antibiotic prescription.

— guidance & education

For patients/athletes with MRSA skin infections, respondents indicated they most commonly recommend the patient/athlete practice these measures:

- Good general hygiene practices (i.e., frequent bathing) (95.8%)
- Good hand hygiene (95.2%)
- Cover the wound with bandages (94.1%)
- Watch for signs of worsening (89.3%)

Although NATA released an official statement and set of recommendations regarding MRSA, only 48.8% of respondents reported they were aware of this. Moreover, only 26.5% of respondents indicated the organization or setting at



Table 1. Reported treatment measures among certified athletic trainers for suspected MRSA skin infections.

Treatment Measure	Perform Personally (% of respondents)	Refer to Other Health care Provider (% of respondents)
Applying a bandage	94.1%	2.9%
Applying a warm compress	55.3%	10.6%
Cleaning the infection site with an antiseptic agent	80.0%	15.9%
Obtaining a <i>nasal</i> culture	2.4%	81.8%
Obtaining a <i>wound/abscess</i> culture	4.1%	91.8%
Performing Incision and Drainage (I&D)	7.7%	86.5%
Prescribing a <i>systemic</i> antibiotic	1.8%	95.3%
Prescribing a <i>topical</i> antibiotic	22.9%	72.9%

Table 2. Reported perceptions of MRSA among certified athletic trainers.

Reported Perceptions	Agree	Neutral	Disagree	Don't Know or N/A
MRSA is a problem nationally.	89.0%	5.8%	3.1%	2.1%
MRSA is a problem in my practice setting.	37.9%	24.5%	35.8%	1.8%
I am concerned my patients/athletes are at risk for getting an MRSA infection.	77.4%	14.1%	7.7%	0.9%
My patients/athletes are aware of MRSA.	55.4%	12.8%	29.4%	2.5%
My patients/athletes think MRSA is a problem nationally.	17.4%	24.8%	40.1%	17.7%
My patients/athletes think MRSA is a problem in their team/organization.	15.9%	19.0%	56.9%	8.3%
My patients/athletes are concerned they are at risk for getting an MRSA infection.	29.7%	18.4%	45.9%	6.1%

which they practice most of the time has an official statement, policy or set of recommendations pertaining to MRSA.

reported perceptions

Most of the respondents reported believing that **poor overall hygiene** (91.1%), **contaminated athletic equipment** (87.8%), **sharing personal items** (84.7%), and **non-intact skin** (83.2%) are the primary risk factors for acquiring MRSA.

Overall, more than 75% of respondents agreed they are concerned their patients/athletes are at risk for getting an MRSA infection and that MRSA is more of a problem nationally than in their practice setting. When asked about the perceptions of their *patients/athletes*, respondents indicated their patients/athletes viewed MRSA as more of a prob-

lem nationally than on their team/organization (Table 2).

Most respondents (96.0%) indicated athletic trainers are responsible for educating patients/athletes about MRSA in their practice setting. Less than one-half (42.5%) of respondents reported that a patient/athlete had asked them for information about MRSA. Patients/athletes who did inquire about it most frequently asked for information about what MRSA is (78.0%), how MRSA is spread (52.8%), and what causes MRSA (52.0%).

conclusion

The overall scorecard for athletic trainers regarding MRSA shows the profession is in the lead.

However, hand hygiene practices should be improved. **Athletic trainers need to wash their hands with soap and water or use an alcohol-based**

hand sanitizer before and after every patient contact.

The reported recommendations made by athletic trainers for patients/ athletes with MRSA skin infections –including good overall hygiene, good hand hygiene, and covering the wound – are consistent with the “Five C Framework” and have been important in controlling MRSA during outbreaks. The practices reportedly used for suspected MRSA infections, such as cleaning and covering the wound, are also consistent with recommended practices for preventing transmission of MRSA skin infections. In addition, athletic trainers successfully identified risk factors for acquiring MRSA infections, such as poor overall hygiene and non-intact skin.

Athletic trainers and other health care providers must be aware of the signs and symptoms of MRSA as well as the seriousness of the infections that it can cause, since athletes are a known risk group for acquiring these infections. All health care providers should know the recommended measures they can take to prevent and control MRSA infections, including performing basic hand hygiene and other infection control precautions for all contact with athletes for whom they provide care.

Recognizing risk factors such as those addressed in the “Five C Framework” and the NATA recommendations should be emphasized to both athletes and athletic trainers. Taking these measures will help reduce the impact of MRSA so athletic trainers stay ahead of the game and everyone wins in preventing MRSA skin infections.

more information

If you have questions about this survey, contact Kristin Rainisch at aof4@cdc.gov.

Please report all MRSA outbreaks to your local health department. For more information, visit www.cdc.gov/mrsa. ■■

ⁱ “Methicillin-resistant *Staphylococcus aureus* infections among competitive sports participants – Colorado, Indiana, Pennsylvania, and Los Angeles County, 2000 – 2003.” *MMWR* 22 Aug 2005;52(33): 793-795.

ⁱⁱ Kazakova SV, Hageman JC, Matava M, et al., “A clone of methicillin-resistant *Staphylococcus aureus* among professional football players.” *The New England Journal of Medicine* 2005; 352:468-475.

Official Statement from the National Athletic Trainers' Association

on Community-Acquired MRSA Infections (CA-MRSA)

In an effort to educate the public about the potential risks of the emergence of community-acquired methicillin-resistant staphylococcus infection (CA-MRSA), the National Athletic Trainers' Association recommends that health care personnel and physically active participants take appropriate precautions with suspicious lesions and talk with a physician.

According to the Centers for Disease Control and Prevention, approximately 25% to 30% of the population is colonized in the nose with *Staphylococcus aureus*, often referred to as "staph," and approximately 1% of the population is colonized with MRSA1.

Cases have developed from person-to-person contact, shared towels, soaps, improperly treated whirlpools, and equipment (mats, pads, surfaces, etc). Staph or CA-MRSA infections usually manifest as skin infections such as pimples, pustules and boils, which present as red, swollen, painful or have pus or other drainage. Without proper referral and care, more serious infections may cause pneumonia, bloodstream infections or surgical wound infections.

Maintaining good hygiene and avoiding contact with drainage from skin lesions are the best methods for prevention.

Proper prevention and management recommendations may include, but are not limited to:

- Keep hands clean by washing thoroughly with soap and warm water or using an alcohol-based hand sanitizer routinely.
- Encourage immediate showering following activity.
- Avoid whirlpools or common tubs while open wounds, scrapes or scratches are present.
- Avoid sharing towels, razors and daily athletic gear.
- Properly wash athletic gear and towels after each use.
- Maintain clean facilities and equipment.
- Inform or refer to appropriate health care personnel for all active skin lesions and lesions that do not respond to initial therapy.
- Administer or seek proper first aid.
- Encourage health care personnel to seek bacterial cultures to establish a diagnosis.
- Care and cover skin lesions appropriately before participation.

1 CA-MRSA Information for the Public. Centers for Disease Control and Prevention. Available online at www.cdc.gov/ncidod/hip/aresist/ca_mrsa_public.htm

**National Athletic Trainers' Association
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