You have heard about how MRSA can wreak havoc on an athletic team. Here's how to help prevent an outbreak—and also how to deal with one.

Are You Protected?

BY GREG SCHOLAND

As Jon Cochran, a senior guard on the Stanford University football team, climbed into bed the night after a game last October, he felt the usual postgame soreness. He also noticed some tenderness in his cheek around what appeared to be a small pimple.

The next morning, he woke up to find half of his face severely swollen. On the advice of Stanford's team physician, Cochran was immediately admitted to the hospital for intravenous antibiotics, and he'd miss the next two starts before he was healthy enough to return to action.

Cochran is 6-foot-6 and weighs over 300 pounds, but he was sidelined by something smaller than a pinhead: methicillin-resistant Staphylococcus aureus, also known as MRSA. A MRSA outbreak this past season infected a handful of Stanford football players, sending a few to the hospital and causing several to miss playing time. It also gave Head Athletic Trainer for Football Charlie Miller, ATC, a hands on lesson in managing this infectious disease.

"It was amazing how quickly the infection would hit somebody," Miller says. "Our doctors would look at a tiny lesion and say, 'All right, let's keep an eye on it.' By the next day, it became something really significant. You could be doing all the right things to protect yourself and still get hit."

If MRSA isn't on your radar screen yet, it should be. It can strike anywhere, and if not properly dealt with, the effects can be devastating. Athletic trainers who have faced this microscopic menace agree that vigilance, communication, and common-sense preventive measures are the keys to keeping your athletes and your program safe.

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BACTERIAL BACKGROUND

It has been almost 10 years since MRSA first appeared in an athletic setting, and in that time, it has cropped up everywhere from elementary school gyms to NFL locker rooms. In 2003, it made national headlines when a football player at Lycoming College died of a bloodstream infection linked to MRSA bacteria. But while more and more team physicians and athletic trainers are aware of the risks, an outbreak still often catches programs by surprise.

What exactly *is* MRSA, and why is it so dangerous? For years, the antibiotic methicillin (a synthetic form of penicillin) was a standard treatment for staph infections, which were common in hospitals and nursing homes but rarely seen in the general public. Over time, some staph bacteria developed resistance to methicillin, and decades of doctors overprescribing antibiotics made the problem worse. Today, methicillin is no longer prescribed to treat infections, but the term "methicillin-resistant" is still used to describe staph strains that are immune to many common antibiotics.

Because MRSA bacteria are harder to kill, the infections must be treated more carefully than ordinary staph cases (methicillin-*susceptible* Staphylococcus aureus, or MSSA). If someone with MRSA is prescribed a standard antibiotic, like penicillin or amoxicillin, the bacteria won't be killed and the infection can spread and grow more serious. Untreated, MRSA can lead to organ damage, bloodstream infections, pneumonia, or, in extreme cases, necrotizing fasciitis (commonly known as flesh eating bacteria). However, if a diagnosis is made quickly, MRSA can be treated fairly easily by debriding and cleaning the infection site and using special antibiotics such as vancomycin and teicoplanin.

"The real key to controlling MRSA is identifying it as quickly as possible," says Jeff Hageman, MS, an epidemiologist specializing in staph infections at the Centers for Disease Control and Prevention (CDC). "The standard treatment procedures and drugs are very effective, and the severe cases are usually the result of an infection not being recognized early enough."

A MRSA infection typically begins as a skin lesion containing a pustule, so it is often mistaken for a pimple, ingrown hair, or spider bite. As it develops, it expands and can present with painful discoloration and swelling, running sores, boils, and sometimes serious tissue damage.

Various forms of Staphylococcus bacteria—and to a lesser extent MRSA—are all around us. The CDC estimates that between 25 and 30 percent of the U.S. population is "colonized" with staph, meaning the bacteria currently live on their skin, in their nasal passages, or elsewhere on their body. Only about one percent of people carry a MRSA strain. The colonized almost never find out they are inhabited with staph, and most show no symptoms.

In athletic settings, infection usually occurs when a colonized person's bacteria come into contact with a cut, scrape, or other open wound. Sports involving frequent body-to-body contact, such as football and wrestling, pose the greatest risk since any small break in the skin can become an infection site. But the danger extends to locker rooms as well—MRSA can be spread when athletes share towels, razors, or even bars of soap.

AN OUNCE OF PREVENTION

Strategies for warding off MRSA range from the basic, like using the right kind of soap in locker room showers, to the high-tech—one company offers a metal box that attaches to a wall and constantly filters the air in the room. But experts agree a major piece of the puzzle is simply practicing good hygiene and proper wound care.

"Athletes can do a lot to minimize their exposure to MRSA just by following standard cleanliness rules," says A.J. Duffy III, MS, PT, ATC, Head Athletic Trainer at Widener University and former President of the Pennsylvania Athletic Trainers' Association. "That means, for one thing, washing their hands regularly with antibacterial soap. It also means showering immediately after practice—athletes shouldn't change their clothes and head back to their dorm room to shower, though many prefer to do that."

Basic hygiene standards should apply to uniforms and equipment as well. "One thing we know is that bacteria love damp, moist environments, which means protective equipment is a potential danger area," Duffy says. "How many times do we see athletes finish practice and throw their pads in a bag or locker instead of letting them dry

out? It's a simple step, but it can make a very big difference."

Almost anything athletes touch on a daily basis—weightroom equipment, towels and washcloths, locker room benches, jerseys—can be a conduit for MRSA bacteria. Since it's impossible to clean every surface daily, it helps to identify the most frequently contacted spots in your facilities (for instance, locker room doorknobs, treatment tables, and shower areas) and single them out for more frequent cleaning.

No detail is overlooked—not even the athletes' gloves. "We also provide a spray disinfectant at every practice for anyone who wears gloves on the field," Miller says. "Bacteria can thrive on players' sweaty gloves, so as they walk into the locker room we instruct everyone to spray their gloves down."

Inside the locker room, Stanford installed liquid soap dispensers in all its showers to prevent athletes from sharing bar soap, which provides an ideal growing environment for MRSA bacteria. "Nothing our athletes use in the locker room is shared—everyone keeps their own razors, towels, nail clippers, and whatever else they need," says Miller. "We make sure the athletes are following that policy."

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Of course, even if MRSA *is* lurking around your department, the bacteria need an open wound to enter an athlete's body, so keeping skin wounds covered at all times should be a top priority. Some wound care products even have a special antimicrobial treatment that can help prevent infection.

Mike Goforth, MS, ATC, Head Athletic Trainer at Virginia Tech, says his staff's close attention to cleanliness in the athletic training room sets an example that athletes take home with them. Each treatment table in his facility is outfitted with germicidal wipes, which the athletic trainers use liberally throughout the day. "We're real sticklers with hand washing procedures," Goforth says. "All the research says keeping your hands clean is one of the most important things you can do to prevent infection, so we're extremely diligent about that."

Hand washing is also now a major focus at Stanford, where Miller brings bottles of an alcohol-based hand sanitizer out to the field for every football practice. "Each athlete does a waterless hand washing as practice ends before they head to the locker room," Miller explains. "We have keypad locks on our doors, and since athletes will be touching those when they go back inside, we want them to disinfect themselves first. During practice, they touch the ball, wipe sweat off their faces, and make contact with one another, so we want their hands to be clean."

Some programs are also looking to technology to boost their prevention efforts. Last year at Virginia Tech, Goforth's department hired a company to spray the Hokies' synthetic turf fields, wrestling mats, saunas, and other areas with a special antimicrobial coating made of spear-shaped molecules that pierce MRSA and other microbes to kill them without chemicals. Other athletic departments have turned to air purifiers that claim to remove harmful bacteria from locker rooms and other common areas, and light therapy devices that kill bacteria with therapeutic blue light. In the NFL, the Washington Redskins went high-tech with their MRSA prevention by equipping their whirlpools with a filtering system that uses ultraviolet light, while several other teams use a special sanitizing unit on all player equipment.

"There are many products out there making bold claims, and it's important to do your homework before investing in any of them," says the CDC's Hageman. "Some are backed up by research and registered with the Environmental Protection Agency to prove they'll do what they say, and others are not as responsible. For teams with very limited resources, the most important thing they can do is make sure everyone is aware of the dangers and knows how to protect themselves."

EDUCATION IS KEY

Well-informed athletes are the best line of defense against outbreaks, so the most proactive programs place heavy emphasis on MRSA-related education. The programs' message is extremely simple: When in doubt, get it checked out. But athletic trainers find this mantra needs to be repeated constantly and in creative ways.

"I've learned to not assume athletes will recognize dangers on their own," says Goforth. "We recently had an athlete with a wound on his knee who didn't tell anyone for six days—it was ulcerated by the time we treated him. Here's a college athlete with a hole in his knee, and he didn't say anything. Luckily it wasn't MRSA, but it could have been. We need to constantly reinforce the message about getting every cut, scrape, pimple, and spider bite checked out and not leaving anything to chance."

Whether it's at preseason team meetings, during physicals, or in the athletic training room, Goforth and his staff take every opportunity to talk about MRSA and keep it in the front of athletes' minds. "The more ways they're hearing about it, the better," he says. "We're even looking into purchasing a big flat-screen TV to use as a rotating message board for sports medicine topics. If we're flashing pictures of untreated MRSA cases up there and showing how bad it can get, that will grab their attention."

Indeed, while they're not for the squeamish, photos of MRSA infections can make for a very powerful warning. "We hung up a poster in the football locker room that showed some extreme cases, and it definitely had shock value—which in this case is a good thing," says Stanford's Miller. "The guys kept asking us to flip the poster around. They said, 'Look, we've got it, okay? We don't need to see these pictures every time we go in and out!' But there's no doubt it raised their awareness."

Another effective technique is to discuss playing time. At Stafford (Texas) High School, Athletic Trainer David Edell, LAT, ATC, CSCS, talks to athletes about teammates who were sidelined with MRSA. "When I say to a team, 'See this guy? He didn't practice

yesterday because he's got an infection, and he won't be playing this week,' that hits home for them more than anything else," Edell says. "When it's someone they know, a teammate who they can relate to, they're going to remember it and think to themselves, 'Could that be me?'

"Above all, athletes want to participate," Edell continues. "The thought of having their season ended by something that's preventable means more than any other warning or lecture they'll get from me, their coaches, or anyone else."

Athletes' parents, too, should be part of the education process. The message is still very simple—parents should encourage their children to practice good hygiene, cover all wounds, and report any suspicious skin problem, no matter how minor, to a sports medicine professional. But keep in mind that MRSA is something many parents will be hearing about for the first time.

"We conduct a parents' meeting at the beginning of our sports seasons, where we explain what MRSA is and talk about how they can help their children protect themselves," says Tanya Dargusch, ATR, ATC, Head Athletic Trainer at Washington Township (N.J.) High School, where two football players were infected with MRSA last fall. "It's mostly simple things like making sure uniforms get washed, or that kids wear their wrestling shoes only on the mats so they're not bringing germs and bacteria from outside into the competition area. And we always open it up to questions so parents' individual concerns can be addressed."

As an extra benefit, an up-front discussion with parents about a serious subject like MRSA helps build trust, opens lines of communication, and bolsters your credibility as a health care professional. "Parents always tell us how much they appreciate being educated and say they're glad we are so proactive about their children's safety," says Dargusch. "And if they have any concerns during the season, they know they can always come to us."

HANDLING AN OUTBREAK

Even with the best education and prevention programs in place, your athletic department can still get hit with MRSA. If it strikes, there are some concrete steps athletic trainers can take to minimize the impact and manage the risk.

First, it's important to tap into outside resources as soon as possible. When Stanford's outbreak began last fall, the athletic department called on team physicians and infectious disease specialists from the Stanford Hospital & Clinics to take the lead in developing a plan of action.

"The hospital immediately helped us decide what to do," says Miller. "Any wound that was even remotely suspicious was cultured and tested, and anyone who came up positive had their wounds treated and received antibiotics that would kill the staph bacteria."

The next step was decolonizing the infected players to prevent them from re-infecting themselves or others during and after treatment. "We had those players shower using Hibiclenz soap, which specifically targets MRSA and other bacteria on the skin," Miller explains. "And to decolonize their nasal passages, we gave them Bactroban ointment to coat the inside of their nostrils with."

As a further precaution, the MRSA positive athletes showered away from the rest of the team in a private bathroom, and their uniforms and other laundry were washed separately. According to the CDC's Hageman, normal washing with hot water and detergent will usually kill any bacteria found on clothing, but with an outbreak already under way, Stanford's athletic department left nothing to chance.

Another step was eliminating potential MRSA transmission sites, and that meant getting rid of the cloth couches in the locker rooms. "We had no reason to believe the couches were the culprit, but we decided to be safe and replace them with vinyl ones that could be cleaned more easily," says Miller. "We were just trying to isolate and eliminate anything that could possibly be contributing to the spread of bacteria."

At Washington Township High, as soon as the first case was confirmed, Dargusch worked with the school's custodians to find a cleaning product that would be effective in combating MRSA. "We went through the entire school with it, focusing on any area that athletes regularly come into contact with— door handles, lockers, locks, equipment in the weightroom. We were very thorough," she says. "Our custodial staff also cleaned and disinfected all the football helmets, shoulder pads, and anything else the athletes used."

Similar steps were taken at Stafford High when MRSA struck there last fall. "Before our maintenance staff cleaned the entire locker room, we told the football team, 'Empty out your lockers—everything goes home, and you can't bring it back unless it's clean,'" says Edell. "Our maintenance director used a cleaning agent that kills microbials, and we went through all the lockers and pads."

Edell also communicated a lot with athletes' parents. "One thing that worries me is that not all physicians follow the recommended guidelines for dealing with suspected MRSA cases, so I tell parents exactly what to request when they take their child to the doctor," he says. "If I think the wound needs to be cultured to perform a type and cross for sensitivity to microbials, which is what Texas Children's Hospital recommends for any suspicious wound, that's what I'll tell the parents. If they call me back and say, 'They stuck a Q tip in it and sent it off to the lab,' I know we're on the same page."

In the broadest sense, when responding to any MRSA outbreak, "better safe than sorry" is the best approach. "Whenever I send a kid to the doctor, I tell the parents, 'I hope I'm not wasting your time, but on the other hand, I hope I *am* wasting your time, because it's great when I find out I was wrong and it's not MRSA,'" Edell adds. "One thing I've learned from dealing with these cases is that it's always better to know for sure."

IN THE LOOP

A final piece of advice for keeping one step ahead of MRSA is to stay plugged in to all the resources around you. From maintaining open lines of communication with colleagues in your conference to developing a working relationship with your county health department, there are many ways to be sure you're in the loop.

"I talk quite often with the emergency room at our local hospital, just to

hear what kinds of things they've got coming through the door," says Gioforth. "With something like MRSA, it can be a community problem before it's an athletic department problem, so the hospital is a great source of information. Anytime something comes across their desk, they pick up the phone and call me, and vice-versa. If I hear about something from a colleague or read it in an athletic training publication, I'll automatically pick up the phone and ask what they know about it. When you've built those relationships, you're much less likely to be caught by surprise."

At Stanford, Miller's advice for not being caught by surprise is even simpler. "You should never assume that it can't happen to your program," he warns. "It's easy to say, 'We've been careful, it will hit someone else.' But the truth is, you could always be next." ■

A version of this article is also appearing in *Athletic Management*, a sister publication to *Training & Conditioning*.

RESOURCES

www.cdc.gov/mrsa
The Centers for Disease Control and Prevention offers extensive Web resources for learning about MRSA, including advice for preventing and controlling outbreaks, information for people who have been diagnosed, and downloadable educational posters.

www.nata.org
Enter "MRSA infections" into the search window for a link to an official statement on MRSA released by the National Athletic Trainers' Association in March 2005. It contains recommendations for preventing and managing MRSA outbreaks in an athletic setting.

www.ncaa.org/health-safety
Click on "Injury Prevention," then click on "Skin Infection Prevention" for information from the NCAA on MRSA. This includes the association's own sports medicine guidelines, articles on MRSA in athletic settings, and downloadable educational materials such as posters and slide presentations.

www.mrsaresources.com
This privately maintained Web site contains multiple pages of MRSA information and a section with links to a variety of MRSA resources on the Internet.

www.epa.gov/oppad001/list_g_mrsa_vre.pdf
The Environmental Protection Agency has released this list of antimicrobial products that are effective against MRSA bacteria.