

METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (MRSA)
COMMUNITY ACQUIRED vs. HEALTHCARE ASSOCIATED

Recently, there have been a number of reports about methicillin-resistant Staph aureus (MRSA) infections in schools. There are many resources available for schools that have questions about MRSA infections. Below is some general information about MRSA. There is also a fact sheet regarding MRSA on the Pennsylvania Department of Health web site (www.health.state.pa.us).

What is Staphylococcus aureus?

Staphylococcus aureus, often referred to simply as "staph," is commonly carried on the skin or in the nose of healthy people. Approximately 25% to 30% of the population is colonized (when bacteria are present, but not causing an infection) with staph bacteria in the nose or on the skin. Sometimes, staph can cause an infection. Staph is among the most common causes of skin infections in the United States. Most of these skin infections are minor (such as pimples and boils) and can be treated without antibiotics (also known as antimicrobials or antibacterials). However, in some instances staph can cause serious infections (such as surgical wound infections, bloodstream infections, and pneumonia).

What is MRSA (methicillin-resistant Staphylococcus aureus)?

Some staph bacteria are resistant to antibiotics. MRSA is a type of staph that is resistant to the antibiotic methicillin and its close cousins oxacillin, penicillin and amoxicillin. While 25% to 30% of the population is colonized with staph, only about 1% normally carries MRSA.

Who gets staph or MRSA infections?

Staph infections, including MRSA, occur most frequently among persons in hospitals and healthcare facilities (such as nursing homes and dialysis centers) who have weakened immune systems. These healthcare-associated staph infections include surgical wound infections, urinary tract infections, bloodstream infections, and pneumonia and are quite different from the MRSA infections that occur in the community setting

What is community-associated MRSA (CA-MRSA)?

Another form of MRSA can cause illness in persons outside of hospitals and healthcare facilities. This community form of MRSA occurs in persons who have not been recently (within the past year) hospitalized nor had a medical procedure (such as dialysis, surgery, catheters) and is known as CA-MRSA. This type of MRSA usually produces skin infections, such as pimples and boils.

How is MRSA transmitted in the community?

The main mode of spread of all forms of staph, including MRSA, is by the hands and skin-to-skin contact, crowded conditions, and poor hygiene. The sharing of towels, personal hygiene items like razors, athletic equipment, clothes, nonsterilized tattoo instruments, and illicit drug paraphernalia also promote the spread of S.aureus from one individual to another. Habits like body shaving are also thought to promote MRSA infection.

Although MRSA has been isolated from environmental surfaces (e.g., floors, work areas, medical equipment) and pets, these are not considered to be the most important sources for spread and there is no need to do environmental sampling in any affected facility. However, it is important to routinely clean shared items like athletic equipment.

What are the risk factors for CA-MRSA?

Although there have been documented outbreaks of CA-MRSA in numerous settings and associated with a number of activities, it is important to remember that CA-MRSA may occur in otherwise healthy persons with no traditional MRSA associated risk factors. CA-MRSA knows no age boundaries and has been documented in newborns, toddlers, teens, adults, and the elderly. A recent study (2007) concluded that there are no reliable markers to distinguish patients with CA-MRSA infection from patients with other skin infections caused by staph. With that in mind there are some factors that should raise the level of suspicion for community onset of skin infections being MRSA.

* Populations in which MRSA clusters have been documented

Athletes in contact sports
Intravenous drug and methamphetamine users
Inmates at correctional facilities
Military personnel

* Medical history

Recent hospitalization
Recurrent or recent antibiotic use
Past MRSA infections
Recurrent skin disease
Recurrent or recent skin damage

* Environmental conditions

Living in crowded or unsanitary conditions
Close contact with someone known to be infected or colonized with MRSA
Contact with a colonized pet
High incidence of MRSA in the community

What are the clinical features of CA-MRSA?

CA-MRSA most often presents as skin or soft tissue infection such as a boil or abscess. Pimples, rashes, pus-filled boils, especially when warm, painful, red or swollen, can indicate a staph skin infection. Impetigo is one example of a skin infection that can be caused by staph, including MRSA. Patients frequently recall a "spider bite". Staph infections also can cause more serious infections, such as blood stream infections or pneumonia, leading to symptoms of shortness of breath, fever, and chills.

What are the criteria for distinguishing community-associated MRSA (CA-MRSA) from healthcare-associated MRSA (HA-MRSA)?

Persons with MRSA infections that meet all of the following criteria are likely to have CA-MRSA infections:

- * Diagnosis of MRSA was made in the outpatient setting or by a culture positive for MRSA less than 48 hours after admission to the hospital.
- * No medical history of MRSA infection or colonization.
- * No medical history in the past year of:
 - o Hospitalization
 - o Admission to a nursing home, skilled nursing facility, or hospice
 - o Dialysis
 - o Surgery
- * No permanent indwelling catheters or medical devices that pass through the skin into the body.

How is a MRSA infection diagnosed?

In general, a culture should be obtained from the infection site and sent to the microbiology laboratory. If *S. aureus* is isolated, the organism should be tested to determine which antibiotics will be effective for treating the infection.

How is CA-MRSA treated?

Most MRSA infections are treated by simply administering good wound and skin care: incision and draining of boils by a health care provider, keeping the area clean and dry, washing hands after caring for the area, carefully disposing of any bandages, and allowing the body to heal.

In some instances, antibiotics are also used to treat MRSA. However, several studies have shown that MRSA skin infections generally heal just as quickly with proper care whether or not antibiotics have been used. If antibiotics are needed, it is important for the patient to use the medication as directed unless the healthcare provider says to stop. If the infection has not improved within a few days after seeing the healthcare provider, the student should contact the provider again.

How do CA-MRSA and HA-MRSA strains differ?

Recently recognized outbreaks of MRSA in community settings have been associated with strains that have some unique microbiologic and genetic properties compared with the traditional hospital-based MRSA strains. In general, CA-MRSA strains are much less resistant to common antibiotics other than methicillin than strains found in the hospital setting.

Are MRSA infections a reportable disease?

Individual cases of MRSA are not reportable in Pennsylvania, like in many other states. Cluster or outbreaks of CA-MRSA should be reported to the PADOH under the Communicable and Non-Communicable Disease Regulations.

As of today the majority of reported CA-MRSA outbreaks have been the result of skin and soft tissue infections.

Why is MRSA a problem for school healthcare professionals?

There are several reasons why school health professionals are concerned about MRSA.

- * MRSA infections are being more commonly recognized in community settings, including schools.
- * Staph (including MRSA) are spread by direct contact, especially when personal hygiene is poor. In school settings, there are many opportunities for direct contact among students, especially those on athletic teams or in residential facilities.
- * A MRSA outbreak can cause anxiety for parents, students and staff and MRSA infection can vary widely in severity.
- * Identifying a MRSA infection can be difficult because the symptoms of MRSA infection are similar to those of other skin infections. MRSA can only be diagnosed by culture and laboratory testing. The laboratory will also perform antibiotic susceptibility testing. Unfortunately, misdiagnosis or delayed diagnosis of MRSA infection can result in delayed treatment and institution of preventive measures.

* Finally, MRSA is part of a larger problem of antibiotic resistance. In the long term, *Staphylococcus aureus* may become resistant to many more antibiotics. For this reason it is important that healthcare providers diagnose MRSA early and accurately, prescribe appropriate antibiotics if needed, and direct patients to complete the full course of antibiotics as prescribed. At the same time, healthcare providers should be cautious about the unnecessary use of antibiotics, which can contribute to the problem of antibiotic resistance

What should I do if a student in my school is reported to have MRSA?

Consider taking the following steps:

- * Confirm the diagnosis. This may require contacting the doctor and family of the student to ensure that accurate medical information is available.
- * Consult with your school physician to help assess the situation and institute a plan of action.
- * Re-enforce proper hand washing practices, including appropriate supply of hand soap and access to handwashing facilities.
- * Follow routine infection control precautions. Use the normal infection control precautions with a student who has MRSA infection:
 - * Wear gloves when handling the student, or touching blood, body fluids, secretions, excretions, and any items contaminated with these fluids. Gloves should be used before touching mucous membranes

and non-intact skin. Gloves should be removed after use, and hand washing performed before touching non-contaminated items and environmental surfaces and before tending to another student.

- * Linens (e.g., from cots), and/or towels from the locker rooms, that may contain blood, secretions, or excretions should be handled in a manner to prevent skin, mucous membrane and clothing exposure.

- * Follow routine procedures for cleaning the school environment. In general, use routine procedures with a freshly prepared solution of commercially available cleaner such as detergent, disinfectant-detergent or chemical germicide, as per the manufacturer's directions.

- * School attendance. Students and staff with a suspected or confirmed MRSA infection can attend school regularly as long as the wound is covered and they are receiving proper treatment. Students and staff do not need to be isolated or sent home in the middle of the day if a suspected staph or MRSA infection is noticed. Wash the area with soap and water and cover it lightly. Those who touch the wound should wash their hands immediately. The student should be encouraged to have the wound looked at by their healthcare provider as soon as possible to confirm a MRSA infection and determine the best course of treatment. The wound should be kept lightly covered until it has dried completely.

What should I do if more than one student in my school is reported to have MRSA?

Follow the guidelines above. In addition, please contact the Pennsylvania Department of Health at 1-877-PA-HEALTH if you suspect more than one case of MRSA at your school.

Do I need to alert parents and staff if a student has a MRSA infection?

Typically, it is not necessary to inform the entire school community about a MRSA infection. When MRSA occurs within the school population, the school nurse and the school physician should determine, based on their clinical assessment, whether parents and staff should be notified. Prior to parent notification, discuss the issue with the school administration. The PADOH is available for consultation at 1-877-PA-HEALTH.

Are there special considerations for students with immune suppression or HIV?

Students with weakened immune systems may be at risk for more severe illness if they get infected with MRSA. These students should follow the same prevention measures as all others to prevent staph infections, including practicing good hygiene, covering wounds (e.g., cuts or abrasions) with clean dry bandages, avoiding sharing personal items such as towels and razors, and contacting their doctor if they think they have an infection.

How can staph/MRSA infections be prevented at school?

It is important for school healthcare professionals to coordinate infection control efforts with the athletics department, residential services, and other colleagues at the school to effectively prevent and control infections such as MRSA. Visit the CDC website for information about MRSA for your school's athletics department.

To prevent MRSA infections at the school, consider these guidelines:

- * Regular hand washing is the best way to prevent getting and spreading staph/MRSA. Encourage and practice hand hygiene.

- * Practice and encourage good skin care. Since staph infections begin when staph enters the body through a break in the skin, keeping skin healthy and intact is an important preventative measure.

- * Ensure access to sinks, soaps, and clean towels.

- * Ensure the availability of alcohol-based hand sanitizers, if soap and water are not accessible.

- * Educate school personnel (i.e., coaches, athletic trainers, etc.) about the importance of personal hygiene for students.

- * Encourage daily showers with soap and water.

- * Discourage sharing of personal items such as towels, razors, and toothbrushes.

- * Regularly clean sinks, showers, and toilets by saturating with disinfectant.

- * Disinfect athletic equipment between users.

- * Launder sheets, towels, sports uniforms, and underclothing with hot water and detergent, and dry on the hottest setting.

- * Wear gloves when handling dirty laundry.

- * Wear gloves when caring for another person's wounds, and protect clothing from touching wounds or bandages.

- * Encourage those infected to always keep draining lesions covered with dressings.

- * Dispose of dressings containing pus and blood carefully.

- * Disinfect contaminated portable equipment such as stethoscopes, blood-pressure cuffs, equipment handles, tourniquets, pagers, and cell phones.

What information on MRSA is available for students and parents / guardians?

For more information about MRSA, visit:

- * Pennsylvania Department of Health www.health.state.pa.us

- * Centers for Disease Control and Prevention. CA-MRSA Information for Providers http://www.cdc.gov/ncidod/dhqp/ar_mrsa_ca.html