

Methicillin-resistant Staphylococcus aureus (MRSA)



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INTRODUCTION — Staphylococcus aureus (Staph aureus or "Staph") is a bacterium that is carried on the skin of about 30 percent of healthy individuals. In this setting, the bacteria usually cause no symptoms. However, when the skin is damaged, even with a minor injury such as a scratch, Staph can cause a wide range of problems, from a mild skin infection to a severe, life-threatening illness, especially in young children, older adults, and people with a weakened immune system.

HISTORY — in the past, Staph infections were treated with antibiotics derived from penicillin, such as methicillin. Staph that can be treated with these drugs is called methicillin-susceptible Staphylococcus aureus, or MSSA. Unfortunately some strains of staph have become resistant to methicillin and other similar antibiotics. **These strains are known as MRSA, which** cannot be cured with traditional penicillin-related drugs. Instead, MRSA must be treated with alternate antibiotics.

Early cases of MRSA occurred only in people who were hospitalized or lived in a nursing home. However, in the 1990s the first cases of MRSA were seen in people who were not hospitalized. MRSA is now found in up to 70 percent of people in the community who are diagnosed with a Staph infection. Today, infection with MRSA can develop in a person who is currently or was recently in the hospital (called hospital-associated or healthcare-associated MRSA) or a person in the community (called community-associated MRSA).

TRANSMISSION — a person can be "colonized" with MRSA, meaning that he or she carries the bacteria on the skin or in the nose but has no signs or symptoms of the illness. The number of people who are colonized with MRSA varies widely in different populations and in different geographic regions; estimates vary from 0.2 to 7.2 percent in hospitalized patients and from one to two percent of people in the community. Colonization can develop in a variety of ways:

- By touching the skin of another individual who is colonized with MRSA.
- Via the tiny droplets that are exhaled during breathing, coughing,



or sneezing.

- By touching a contaminated surface (such as a counter top, door handle, or phone).

Individuals (including patients, healthcare workers and household contacts) who are colonized with hospital-associated strains of MRSA can be identified with a nasal swab. Nasal swabs are less reliable in identifying people who are colonized with community-associated strains of MRSA.

Active infection with MRSA can develop when a person is colonized and the bacteria enter an opening (eg, a cut, scrape, or wound) in the skin.

RISK FACTORS — anyone can become infected with MRSA, although certain people are at a higher risk.

Hospital care — most cases of MRSA develop in hospitalized patients. Risk factors for becoming infected with hospital associated MRSA including the following:

- Having a surgical wound and/or intravenous (IV) line
- Being hospitalized for a prolonged period of time
- Recent use of antibiotics
- Having a weakened immune system due to a medical condition or its treatment
- Being in close proximity to other ill patients.

In hospitals and other long-term healthcare facilities, MRSA can be spread from one patient to another on the hands of health care workers. Hands or gloves may become contaminated with MRSA when healthcare workers touch a patient's skin, wounds, wound dressings, or devices such as IV tubing. Washing the hands before and after touching the patient and changing gloves between patients decreases the risk of spreading MRSA.

Hemodialysis — People who need hemodialysis for kidney failure have a substantially higher risk of becoming infected with MRSA compared to other patients. In one study, 4 percent of hemodialysis patients became infected with MRSA; only about 0.04 percent of people in the general population become infected with MRSA.



Community associated MRSA — A few additional risk factors have been identified for people outside of hospital, including the following:

- Skin trauma (eg, "turf burns", cuts or sores)
- Athletes, particularly those who play lineman or linebacker positions in football
- Being overweight or obese
- Cosmetic body shaving
- Physical contact with a person who has a draining cut or sore or is a carrier of MRSA
- Sharing personal items or equipment that is not cleaned or laundered between users

Community-associated MRSA infections may occur more commonly in certain populations, such as daycare centers, prisons, in the military, or in athletes who play on a team. However, many people who live in the community and develop MRSA infections have no risk factors.

SIGNS AND SYMPTOMS — Patients infected with community-associated MRSA (CA-MRSA) usually have signs of a skin infection. Such skin infections often appear spontaneously and may be mistaken for a spider bite. The skin may have a single raised red lump that is tender, a cluster of "pimples", or a large tender lump that drains pus (called a carbuncle). The area may enlarge and become progressively more tender, red, and swollen. The center of the raised area may ooze pus.

It is also possible to develop infection in other areas of the body if the bacteria enter the bloodstream through an opening in the skin. Infection can then develop on a heart valve, in a bone, joint, or the lungs, or on devices (such as intravenous catheters, pacemakers or replacement joints). In these situations, there may be symptoms of fever and fatigue, as well as symptoms at the site of infection.

DIAGNOSIS — Patients with skin infections can be tested for MRSA with a culture. Results of the test are usually available in 48 to 72 hours.

People with infections of the lung, bone, joint, or other internal areas usually require blood tests as well as imaging



studies (eg, x-ray, CT scan, echocardiogram).

TREATMENT — If MRSA is suspected, an antibiotic that can eliminate MRSA is started immediately. The antibiotic dose or type may be changed when the results of the laboratory culture are available.

At home — Treatment of MRSA at home usually includes a seven to 10 day course of an antibiotic (by mouth).

It is very important to carefully follow the instructions for taking the antibiotic, including taking it on time and finishing the entire course of treatment, even if the infection improves after a few days. Stopping the treatment early or skipping a dose could allow the bacteria to become more resistant, which could allow the infection to spread and require longer treatment.

If the oral antibiotic is not effective or if the infection is causing serious illness, it may be necessary to treat the person in the hospital.

In addition to antibiotics, the healthcare provider may drain the infected area by inserting a needle and withdrawing fluid or making a small incision in the skin. This is done to reduce the amount of infected material (pus), which will help the tissue to heal. A person should NEVER try to drain a boil or pimple on their own because this could worsen the infection.

In the hospital — Hospitalized people with MRSA infections are usually treated with an intravenous medication. The intravenous antibiotic is usually continued until the person is improving.

In many cases, the person will be given antibiotics after discharge from the hospital, either by mouth or by IV. This may be needed for a short period of time or for as long as six to eight weeks. Intravenous antibiotics can be given at home, by a visiting nurse, or in a rehabilitation facility.

MRSA infections can be very serious and even fatal.

PREVENTION — a number of prevention strategies are recommended to avoid becoming infected with MRSA.



Prevention in the hospital — in the hospital, MRSA is commonly spread to patients from the hands of healthcare workers. To minimize this risk, patients and family members can help to ensure that anyone who comes in contact with the patient washes their hands or uses waterless hand sanitizers before touching the patient. Patients with active infection should also wash their hands frequently, especially before eating and after using the bathroom.

Hospitalized patients who are colonized or infected with MRSA should have "contact precautions". This means that anyone who enters the patient's room, even family and friends must wash their hands and wear gloves and a clean gown.

Prevention in the community — the best way to prevent and control MRSA in the community is not clear. The Center for Disease Control and Prevention has made the following recommendations:

- Keep hands clean by washing thoroughly with soap and water. Hands should be wet with water and plain soap, and rubbed together for 15 to 30 seconds. Special attention should be paid to the fingernails, between the fingers, and the wrists. Hands should be rinsed thoroughly, and dried with a single use towel (eg, paper towels).
- Waterless hand sanitizers are a good alternative for disinfecting hands if a sink is not available. Hand sanitizers should be rubbed over the entire surface of hands, fingers, and wrists until dry, and may be used several times. Hand sanitizers are available as a liquid or wipe in small, portable sizes that are easy to carry in a pocket or handbag. When a sink is available, visibly soiled hands should be washed with soap and water.
- Keep cuts and scrapes clean, dry, and covered with a bandage until healed.
- Avoid touching other people's wounds or bandages.
- Avoid sharing personal items such as towels, washcloths, razors, clothing, or uniforms. Other items that should not be shared include brushes, combs, and makeup.
- Students who participate in team sports should shower after



every athletic activity using soap and clean towels.

- People who use exercise machines at sports clubs or schools should be sure to wipe down the equipment, including the hand grips, with a waterless hand sanitizer's solution after using it.

Current guidelines do not recommend that family members of a person with CA-MRSA infection be treated with antibiotics. Careful preventive measures, including washing hands, keeping wounds covered, washing bed sheets and towels, and avoiding shared personal items is recommended in these situations.

Basic infection prevention measures — there are a number of other measures that may help to prevent the spread of infections, including infection with MRSA.

- Use a tissue to cover the mouth when sneezing or coughing. Used tissues should be disposed of promptly. Sneezing/coughing into the sleeve of one's clothing (at the inner elbow) is another means of containing sprays of saliva and secretions and has the advantage of not contaminating the hands.
- Use of disinfectant (antimicrobial cleaning agent) on surfaces (eg, counters, door knobs, phones, computer keyboards) can help to reduce or eliminate bacteria.

Should I be tested for MRSA? — It is frightening to think about becoming ill with a serious infection, such as MRSA. Many people wonder if they should be tested for MRSA, even if they have no signs, symptoms, or risk factors. Experts do not recommend widespread testing for MRSA because of the small risk of becoming infected; currently only about four out of 10,000 people living in the community develop the infection per year.

WHERE TO GET MORE INFORMATION — your healthcare provider is the best source of information for questions and concerns related to your medical problem. Because no two patients are exactly alike and recommendations can vary from one person to another, it is important to seek guidance from a provider who is familiar with your individual situation.



REFERENCES:

US National Library of Medicine

www.nlm.nih.gov/medlineplus/healthtopics.html

National Institute of Allergy and Infectious Diseases

www.niaid.nih.gov/

Centers for Disease Control and Prevention (CDC)

www.cdc.gov/

UpToDate

www.uptodate.com

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