



Myths and Facts:

MRSA

By Ronale Tucker Rhodes, MS

While the incidence of the more deadly form of MRSA is declining, more needs to be understood about this infection so more cases can be prevented and those that occur can be properly diagnosed and successfully treated.

After a MRSA outbreak among Tampa Bay Buccaneers' players in October called into question whether the team would play the Philadelphia Eagles in the league's sixth scheduled game, a health specialist was called in to meet with the team, supervise the inspection of the facilities and conduct medical examinations. Just one day before the game, the specialist decided not to advise against the teams playing. With annual NFL revenues of \$25 billion, this high-stakes decision to allow a third party to control the fate of a game shows how serious a risk MRSA, a sometimes-deadly infection, poses.

MRSA (methicillin-resistant *Staphylococcus aureus*) is a bacterium that causes infections in different parts of the body. *Staphylococcus aureus*, also known as staph, is one of the most common bacteria in the world that exists in the environment and in people's bodies.¹ The bacteria are commonly found on the skin and the noses of 25 percent to 30 percent of healthy people. Most of the time, this garden-variety staph does no harm, but when it does cause infection, it is easily treated with antibiotics. In the past few decades, the more dangerous form of staph, MRSA, has emerged. This form is referred to as a "superbug" because it is resistant to an entire class of antibiotics called beta-lactams, which includes methicillin and the more commonly prescribed penicillin, amoxicillin and oxacillin, among others, that are commonly used to treat bacterial infections. As such, MRSA is a serious infection, and the threat of contracting it causes fear in many. But, the fear about MRSA can be minimized by debunking the myths that create confusion about this sometimes deadly infection.

Separating Myth from Fact

MYTH: The incidence of MRSA infection is rare.

FACT: Thirty years ago, MRSA accounted for 2 percent of staph infections. However, by 2003, 64 percent of staph infections were caused by MRSA. According to the Centers for Disease Control and Prevention (CDC), more than 94,000 people in the U.S. developed life-threatening infections caused by MRSA in 2005.² It is believed that MRSA developed due to overuse of antibiotics, especially in cases where the course of antibiotics was not finished, allowing the remaining bacteria to become familiar with the drug and develop resistance to it.³

MYTH: MRSA can be contracted only in hospitals.

FACT: MRSA first appeared in the 1960s in hospitals in the U.S.⁴ In 2005, 85 percent of MRSA cases were associated with healthcare facilities. However, there were also another 14 percent that occurred in individuals with no known exposure to healthcare.² Today, approximately 60 percent of MRSA cases occur in U.S. hospitals. But, a growing number of MRSA outbreaks are occurring in diverse types of people who are constantly in close contact such as team players of contact sports, dormitory residents, inmates and armed-services personnel.⁵

MYTH: There is only one type of MRSA infection.

FACT: MRSA infections that occur in hospitals are referred to as hospital-associated MRSA (HA-MRSA), whereas those that occur in people who have not been hospitalized or who haven't had a medical procedure in the past year and are otherwise healthy are called community-associated MRSA (CA-MRSA) infections. Risk factors for an HA-MRSA infection include current or recent hospitalization, living in a nursing home or long-term antibiotic use. Risk factors for a CA-MRSA infection include having an underdeveloped or weakened immune system, playing contact sports, association with

healthcare workers (family, friends, etc.) or living in crowded or unsanitary conditions.⁶

The number of CA-MRSA infections in the U.S. began increasing in the 1990s. Today, they comprise about 20 percent of all MRSA infections. CA-MRSA infections differ from HA-MRSA strains. CA-MRSA typically affects younger people (children under age 2 are especially susceptible), while HA-MRSA infections are more often found in older persons.⁴ In a study of Minnesotans published in the *Journal of the American Medical Association*, the average age of people with MRSA in a hospital or healthcare facility is 68. But, the average age of a person with CA-MRSA is only 23.⁷

*Today, approximately
60 percent of MRSA cases
occur in U.S. hospitals.*

In general, most CA-MRSA infections are mild skin and soft tissue infections, while most HA-MRSA infections are more serious and invasive (bloodstream infections, surgical site infections and pneumonia). CA-MRSA strains are also more susceptible to antibiotics than HA-MRSA strains, so there are more choices for treatment of CA-MRSA infections. However, CA-MRSA strains spread more rapidly in the community than do HA-MRSA strains because HA-MRSA is confined mostly to healthcare settings. CA-MRSA strains also appear to be more virulent than susceptible *Staphylococcus aureus* strains, whereas HA-MRSA strains are usually less so. In addition, there is increased mortality from HA-MRSA, usually due to delays in effective treatment and because the antibiotics available to treat HA-MRSA are less effective than those used to treat antibiotic-sensitive strains.

Although only about 1 percent of the U.S. population carries CA-MRSA, it is now the leading cause of pus-producing skin and soft tissue infections among adults.⁴

MYTH: MRSA can be treated with antibiotics.

FACT: MRSA is most commonly resistant to antibiotics used to treat conventional staph infections, including beta-lactams (penicillins and cephalosporins), fluoroquinolones (e.g., levofloxacin) and macrolides (e.g., erythromycin and azithromycin). However, it can be treated with "last-resort" antibiotics such as clindamycin, vancomycin, linezolid and daptomycin (the last two of which are novel drugs approved to treat drug-resistant *Staphylococcus aureus* infections).¹ While these are all viable treatment options, they have their pros and cons. They are powerful drugs that have many side effects that

can be severe and long-lasting. They also can weaken the immune system and increase chances of recurring infections.⁸

MYTH: MRSA infections are not serious.

FACT: While MRSA often first presents with mild symptoms that are easier to treat, MRSA can worsen and spread quickly, causing severe, long-lasting challenges that don't respond to standard treatments.⁸ Symptoms that need immediate medical attention, especially when associated with skin infections, include fever, chills, low blood pressure, joint pains, severe headaches, shortness of breath and rash over most of the body. Occasionally, the infection can spread to almost any other organ in the body. MRSA that spreads to internal organs can cause complications such as endocarditis, necrotizing fasciitis, osteomyelitis and sepsis, which can be life-threatening.⁹

MYTH: MRSA is not contagious.

FACT: MRSA is highly contagious, and anyone can get it. MRSA is spread very similarly to the way a cold is spread such as by touching someone or something that has staph bacteria on it and then touching the eyes, nose or any scrape or abrasion on the skin.

MRSA is highly contagious, and anyone can get it.

While controversial, there are two studies that indicate MRSA can be spread through the air. A June 2001 study published in *JAMA Otolaryngology Head and Neck Surgery* showed that MRSA could be acquired by medical staff and patients through the air in hospitals. The study was conducted in a hospital ward and found MRSA recirculating in the air, among the patients and on inanimate objects in the area, especially when there was movement in the patients' rooms. This study identified both colonized carriers and infected people as sources of risk.⁸ A new study conducted by researchers at the University of Leeds in the United Kingdom used a biological aerosol chamber to replicate conditions in hospital rooms with one and two beds. Tiny aerosol droplets containing *Staphylococcus aureus* were released from a heated mannequin simulating the heat emitted by a human body. Petri dishes, placed where other patients' beds, bedside tables, chairs and washbasins might be located, were then checked to see where the bacteria landed and grew. It was determined that the bacteria were detected up to 11 feet away from the source inside the chamber.¹⁰

MYTH: A MRSA infection is easily identified by its symptoms.

FACT: Most early-stage MRSA infections appear as skin infections. The types of skin infections include cellulitis, an infection of the skin or the fat and tissues that lie immediately

beneath the skin, usually starting as red bumps in the skin with some areas resembling a bruise; boils, pus-filled infections of hair follicles; abscesses, collections of pus in or under the skin; sty, an infection of an oil gland of the eyelid; carbuncles, infections larger than an abscess, usually with several openings to the skin; impetigo, a skin infection with pus-filled blisters; and rash, with the skin appearing reddish or having red-colored areas.⁹ However, these types of skin infections can often be mistaken for either spider bites or skin changes that occur with Lyme disease.¹²

MYTH: If MRSA is suspected, testing is unnecessary.

FACT: Testing is always necessary because MRSA can be mistaken for other skin changes, which can result in the infection being treated with other agents such as dapsone (used for spider bites) that can cause a progression of the MRSA infection and even other complications.¹² In fact, it's common for doctors to prescribe a general broad spectrum antibiotic for anything that looks like a bacterial infection, and these often have no effect on MRSA and can actually make the condition worse.⁸ To test for MRSA, a skin sample, a sample of pus from a wound, or blood, urine or biopsy material is sent to a lab and cultured for *Staphylococcus aureus*. If it tests positive, the bacteria are then exposed to different antibiotics, including methicillin. If the bacteria grow well in methicillin, the infection is diagnosed as MRSA. In 2008, a rapid blood test called the StaphSR assay that can detect the presence of MRSA genetic material in a blood sample in as little as two hours was approved by the U.S. Food and Drug Administration.¹²

MYTH: MRSA infections occur only in humans.

FACT: Although rare, MRSA can be transferred between humans and pets. The first incidence of MRSA in a pet was recorded in 2007. Since then, it has been documented in dogs, cats and horses, but it is believed it may be found in other animals in the future. Animal care and treatments are similar to those in humans.¹¹

MYTH: MRSA is a growing threat.

FACT: A CDC study published in 2010 showed that the life-threatening HA-MRSA infections in healthcare settings are declining. Those that began in hospitals declined 28 percent from 2005 to 2008. Decreases in infection rates were more pronounced for patients with bloodstream infections. And, the study showed a 17 percent drop in invasive MRSA infections that were diagnosed before hospital admissions (community onset) in people with recent exposures to healthcare settings. The CDC study complements data from the National Healthcare Safety Network that found rates of MRSA bloodstream infections occurring in hospital patients fell nearly 50 percent from 1997 to 2007.¹³

On the other hand, CA-MRSA is now common and is a growing threat. Some have suggested that there is an epidemic of CA-MRSA in the U.S., and results of a 2012 meta-analysis of published studies revealed a dramatic increase in infections

over the past two decades, with CA-MRSA strains now endemic at unprecedented levels in many U.S. regions.¹⁴

MYTH: MRSA can't be prevented.

FACT: MRSA can't always be prevented, but there are many ways to reduce the chances of contracting MRSA. The best way to avoid MRSA infection is to avoid making direct contact with skin, clothing and any items that have come in contact with either MRSA patients or MRSA carriers. Of course, infected individuals and carriers aren't immediately identifiable. Therefore, the next best way to foil infection is to treat and cover any skin breaks or wounds and to use excellent hygiene practices. These include hand-washing with soap after personal contact or toilet use, washing clothes that potentially come in contact with MRSA patients or carriers, and using disposable items when treating MRSA patients.¹¹ In fact, a study recently published in the *New England Journal of Medicine* found that "germ-killing soaps and ointments" used in ICUs reduced cases of MRSA by 40 percent.⁶

MYTH: MRSA can't be cured.

FACT: MRSA can be successfully treated and, in many cases, infections do not reoccur. While MRSA is resistant to some antibiotics, there are other kinds of antibiotics that still work to treat it. Bactrim and vancomycin are often the first drugs used. Other options are clindamycin, minocycline, Tygacil, Cubicin, Zyvox and Synercid, some of which are only available intravenously. Unfortunately, there is emerging antibiotic resistance observed with some of these medications.¹⁵ A study published in the *Journal of the American Medical Association* found that there is an increased risk of recurrent infection among recently hospitalized patients with healthcare-associated CA-MRSA infections. These patients had a 64 percent risk of infection at three months or less following discharge. There were also reports of a high risk of infection in discharged patients either infected or colonized with MRSA.¹⁶

In addition to antibiotics, healthcare providers may drain the infected area by inserting a needle or making a small cut in the skin to reduce the amount of infected material (pus), which will help the tissue to heal.¹⁷

There are some people who experience recurring infections of MRSA. However, data are sparse, and the rate in mild cases is thought to be very low. Some investigators report that patients may be carriers for up to 30 months, so it is possible for a carrier to have a contagious period for this length of time.¹⁸

MYTH: You can't die from MRSA.

FACT: MRSA can be deadly. In 2005, a study published in the *Journal of the American Medical Association* found there were 94,360 cases of MRSA infection reported in the U.S. that were responsible for an estimated 18,650 deaths. Now, with the decline in HA-MRSA, CDC reports there are an estimated 10,800 deaths in the U.S. each year that are caused by staph, 5,500 of which are linked to MRSA.⁶

Dispelling the Myths Now

MRSA remains a major cause of healthcare-associated and, more recently, community-associated infections. While there has been a decline in HA-MRSA infections in the U.S., MRSA is still a very serious infection that can result in death. But, with early detection and testing, MRSA can be successfully treated. And, with good hygiene, MRSA can be prevented in many cases. Unfortunately, strains of staph continue to adapt and change over time, but researchers are tracking these changes to help identify the optimal treatments for patients. ❖

RONALE TUCKER RHODES, MS, is the editor of *BioSupply Trends Quarterly magazine*.

References

1. MRSA: A Deadly Pathogen with Fewer and Fewer Treatment Options. The PEW Charitable Trusts, April 3, 2012. Accessed at www.pewhealth.org/reports-analysis/issue-briefs/mrsa-a-deadly-pathogen-with-fewer-and-fewer-treatment-options-85899380134.
2. Methicillin-Resistant Staphylococcus Aureus (MRSA). Baylor College of Medicine Department of Molecular Virology and Microbiology. Accessed at www.bcm.edu/departments/molecular-virology-and-microbiology/index.cfm?pmid=16508.
3. O'Domhnaill S. MRSA: Should We Be Afraid? The Life Institute, May 3, 2010. Accessed at www.thelifeinstitute.net/blog/2010/05/03/mrsa-should-we-be-afraid.
4. What Is MRSA (Methicillin Resistant Staphylococcus Aureus)? State of Wisconsin Department of Health and Family Services, Oct. 22, 2007. Accessed at www.affinityhealth.org/object/services-specialty-MRSA.html.
5. Davis CP. MRSA Infection FAQs. MedicineNet.com. Accessed at www.medicinenet.com/mrsa_quiz/faq.htm.
6. MRSA Fast Facts. CNN Library, June 28, 2013. Accessed at www.cnn.com/2013/06/28/us/mrsa-fast-facts.
7. Understanding MRSA Infection — The Basics. WebMD. Accessed at www.webmd.com/skin-problems-and-treatments/understanding-mrsa-methicillin-resistant-staphylococcus-aureus.
8. Moore M. 7 MRSA Myths. Staph Infection Resources. Accessed at www.staph-infection-resources.com/info/mrsa-myths.
9. Davis CP and Stoppler MC. What Are the Signs and Symptoms of MRSA Infection? MedicineNet.com. Accessed at www.medicinenet.com/mrsa_infection/page3.htm#what_are_the_signs_and_symptoms_of_mrsa_infection.
10. King MF, Noakes CJ, Sleigh PA, Camargo-Valero MA. Bioaerosol Deposition in Single and Two-Bed Hospital Rooms: A Numerical and Experimental Study. *Building and Environment*, 2013; 59, 436-447. Accessed at yadda.icm.edu.pl/yadda/element/bwmeta1.element.elsevier-ad41d4f1-46fd-3319-a5e7-6ae70adb1985.
11. Davis CP and Stoppler MC. How Can People Prevent MRSA Infection. MedicineNet.com. Accessed at www.medicinenet.com/mrsa_infection/page6.htm.
12. Davis CP and Stoppler MC. How Is MRSA Diagnosed? MedicineNet.com. Accessed at www.medicinenet.com/mrsa_infection/page5.htm.
13. Centers for Disease Control and Prevention. MRSA Statistics. Accessed at www.cdc.gov/mrsa/statistics.
14. Dukic VM, Lauderdale DS, Wilder J, Daum RS, David MZ. Epidemics of Community-Associated Methicillin-Resistant Staphylococcus Aureus in the United States: A Meta-Analysis. *PLoS ONE*, 8(1): e52722. Accessed at www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0052722.
15. Understanding MRSA: Diagnosis and Treatment. WebMD. Accessed at www.webmd.com/skin-problems-and-treatments/understanding-mrsa-detection-treatment.
16. Lowy FD. Methicillin-Resistant Staphylococcus Aureus: Where Is It Coming From and Where Is It Going? *JAMA Internal Medicine*, published online Sept. 16, 2013 Accessed at archinte.jamanetwork.com/article.aspx?articleid=1738714.
17. Harris A. Patient Information: Methicillin-Resistant Staphylococcus Aureus (MRSA) (Beyond the Basics). Up to Date. Accessed at www.uptodate.com/contents/methicillin-resistant-staphylococcus-aureus-mrsa-beyond-the-basics.
18. Davis CP. MRSA Infection Prognosis. eMedicineHealth. Accessed at www.emedicinehealth.com/mrsa_infection/page10_em.htm.