



SAF•T•GRAM

“A gram of safety is worth a pound of cure!”

Methicillin-resistant *Staphylococcus aureus* (MRSA)

This article was graciously provided by Dr. John J. Iandolo, Chair of the Department of Microbiology and Immunology. His research has included studying protein synthesis and transport in the bacterium Staphylococcus aureus to better understand how S. aureus infections are caused, so that prevention and treatment methods may be improved.

Methicillin-resistant *Staphylococcus aureus* (MRSA) infection is caused by the bacterium *Staphylococcus aureus* - often called "staph." In the early 1960s, a strain of staph emerged in hospitals that was resistant to the broad-spectrum antibiotics commonly used to treat it. These methicillin-resistant *Staphylococcus aureus* (MRSA), were the first germs to outwit all but the most powerful drugs. MRSA infection can be fatal.

Staph bacteria are normally found on the skin or in the nose of about one-third of the population. If you have staph on your skin or in your nose but aren't sick, you are said to be "colonized" but not infected with MRSA. Healthy people can be colonized with MRSA and have no ill effects for reasons that are still unknown, however, they can pass the germ to others.

Staph bacteria are generally harmless unless they enter the body through a cut or other wound, and even then they often cause only minor skin problems in healthy people. But in older adults and people who are ill or have weakened immune systems, ordinary staph infections can cause serious infections.

In the 1990s, a type of MRSA began showing up in the wider community. Today, that form of staph, known as community-associated MRSA, or CA-MRSA, is responsible for many serious skin and soft tissue infections and for a serious form of pneumonia.

Vancomycin is one of the few antibiotics still effective against hospital strains of MRSA infection, although the drug is no longer effective in every case. Several drugs continue to work against CA-MRSA, but CA-MRSA is a rapidly evolving bacterium, and it may be a matter of time before it, too, becomes resistant to most antibiotics.

Signs and Symptoms

Staph infections, including MRSA, generally start as small red bumps that resemble pimples, boils or spider bites. These can quickly turn into deep, painful abscesses that require surgical draining. Sometimes the bacteria remain confined to the skin. But they can also burrow deep into the body, causing potentially life-threatening infections in bones, joints, surgical wounds, the bloodstream, heart valves and lungs.

Causes

Leading causes of antibiotic resistance include:

•**Unnecessary antibiotic use in humans.** Like other superbugs, MRSA is the result of decades of excessive and unnecessary antibiotic use. For years, antibiotics have been prescribed for colds, flu and other viral infections that don't respond to these drugs, as well as for simple bacterial infections that normally clear on their own.

•**Antibiotics in food and water.** Prescription drugs aren't the only source of antibiotics. In the United States, antibiotics can be found in animal feeds especially for beef cattle, pigs and chickens. The same antibiotics then find their way into municipal water systems when the runoff from feedlots contaminates streams and groundwater. However, antibiotics given in the proper doses to sick animals don't appear to produce resistant bacteria.

•**Germ mutation and exchange of genes.** Even when antibiotics are used appropriately, they contribute to the rise of drug-resistant bacteria because they don't destroy every germ they target. Bacteria evolve rapidly, so germs that survive treatment with one antibiotic soon learn to resist others. And because bacteria mutate much more quickly than new drugs can be produced, some germs end up resistant to just about everything. To make things even worse, staph are even able to transfer antibiotic resistance to one another. That's why only a handful of drugs are now effective against most forms of staph.

(continued on page 2)

Inside this issue:

E-Waste Update	3
Halloween Safety and Health Tips	4
Flu Season is Coming!	5
"Canned-Air" Hazards	6

MRSA , cont.

Because hospital and community strains of MRSA generally occur in different settings, the risk factors for the two strains differ.

Risk Factors for Hospital-acquired (HA) MRSA

•**Current or recent hospitalization.** MRSA remains a concern in hospitals, where it can attack those most vulnerable — older adults and people with weakened immune systems, burns, surgical wounds or serious underlying health problems.

- About 85% of all invasive MRSA infections were associated with healthcare, and of those, about two-thirds occurred outside of the hospital, while about one third occurred during hospitalization.

- About 14% of all the infections occurred in persons without obvious exposures to healthcare.

- Although the rates of disease varied between the geographically diverse sites participating in the surveillance, overall rates of disease were consistently highest among older persons (age >65), Blacks, and males.

- Worldwide, an estimated 2 billion people carry some form of *S. aureus*; of these, up to 53 million (2.7% of carriers) are thought to carry MRSA.

- In the United States, 95 million carry *S. aureus* in their noses; of these, 2.5 million (2.6% of carriers) carry MRSA.

•**Residing in a long-term care facility.** MRSA is far more prevalent in these facilities than it is in hospitals. Carriers of MRSA have the ability to spread it, even if they're not sick themselves.

•**Invasive devices.** People who are on dialysis, are catheterized, or have feeding tubes or other invasive devices are at higher risk.

•**Recent antibiotic use.** Treatment with fluoroquinolones (ciprofloxacin, ofloxacin or levofloxacin) or cephalosporin antibiotics can increase the risk of HA-MRSA. It is not quite clear why this occurs, but may be related to increased production of colonizing factors and higher innate resistance of MRSA.

Main Risk Factors for Community-acquired (CA) MRSA

•**Young age.** CA-MRSA can be particularly dangerous in children. Often entering the body through a cut or scrape, MRSA can quickly cause a wide spread infection. Children may be susceptible because their immune systems aren't fully developed or they don't yet have antibodies to common germs. Children and young adults are also much more likely to develop dangerous forms of pneumonia than older people are.

•**Participating in contact sports.** CA-MRSA can be a danger in both amateur and professional sports teams. The bacteria spread easily through cuts and abrasions and skin-to-skin contact.

•**Sharing towels or athletic equipment.** Although few outbreaks have been reported in public gyms, CA-MRSA has spread among athletes sharing razors, towels, uniforms or equipment.

•**Having a weakened immune system.** People with weakened immune systems, such as those undergoing immunosuppressive therapy and including those living with HIV/AIDS, are more likely to have severe CA-MRSA infections.

•**Living in crowded or unsanitary conditions.** Outbreaks of CA-MRSA have occurred in military training camps and in American and European prisons.

•**Association with health care workers.** People who are in close contact with health care workers are at increased risk of serious staph infections.

“Children may be susceptible because their immune systems aren't fully developed or they don't yet have antibodies to common germs.”

When to Seek Medical Advice

Keep an eye on minor skin problems - pimples, insect bites, cuts and scrapes - especially in children. If wounds become infected, see your doctor. Ask to have any skin infection tested for MRSA before starting antibiotic therapy. Drugs that treat ordinary staph aren't effective against MRSA, and their use could lead to serious illness and more resistant bacteria.

Screening and Diagnosis

Doctors diagnose MRSA by checking a tissue sample or nasal secretions for signs of drug-resistant bacteria. The sample is sent to a lab to determine the organism's susceptibility to antibiotics. But because it takes about 48 hours for the bacteria to grow, newer tests that can detect staph DNA in a matter of hours are now becoming more widely available.

In the hospital, you may be tested for MRSA if you show signs of infection or if you are transferred into a hospital from another healthcare setting where MRSA is known to be present. You may also be tested if you have had a previous history of MRSA.

Treatment

Both hospital and community associated strains of MRSA still respond to certain treatments. In hospitals and care facilities, doctors generally rely on the antibiotic vancomycin to treat resistant germs. CA-MRSA may be treated with vancomycin or other antibiotics that have proved effective against particular strains. Although vancomycin saves lives, “staph” are growing resistant to it as well; some hospitals are already seeing outbreaks of vancomycin-resistant MRSA. To help reduce that threat, doctors are using cocktails of powerful antibiotics and may choose to drain an abscess caused by MRSA rather than treat the infection with drugs.

Prevention

Hospitals are fighting back against MRSA infection by using surveillance systems that track bacterial outbreaks and by investing in products such as antibiotic-coated catheters and gloves that release disinfectants.

Still, the best way to prevent the spread of germs is for health care workers to wash their hands frequently, to properly disinfect hospital surfaces and to take other precautions such as wearing a mask when working with people with weakened immune systems.

In the hospital, people who are infected or colonized with MRSA are placed in isolation to prevent the spread of MRSA to other patients and healthcare workers. Visitors and healthcare workers caring for isolated patients may be required to wear protective garments and must follow strict handwashing procedures.

How can you protect yourself, family members or friends from hospital-acquired infections?

- Ask all hospital staff to wash their hands before touching you - every time.
- Wash your own hands frequently.
- Ask to be bathed with disposable cloths treated with a disinfectant rather than with soap and water.
- Make sure that intravenous tubes and catheters are inserted and removed under sterile conditions; some hospitals have dramatically reduced MRSA blood infections simply by sterilizing patients' skin before using catheters.

“Still, the best way to prevent the spread of germs is for health care workers to wash their hands frequently...”

Preventing CA-MRSA

Protecting yourself from CA-MRSA - which might be just about anywhere - may seem daunting, but these common-sense precautions can help reduce your risk:

- Keep personal items personal.** Avoid sharing personal items such as towels, sheets, razors, clothing and athletic equipment. MRSA spreads on contaminated objects as well as through direct contact.
- Keep wounds covered.** Keep cuts and abrasions clean and covered with sterile, dry bandages until they heal. The pus from infected sores often contains MRSA, and keeping wounds covered will help keep the bacteria from spreading.
- Sanitize linens.** If you have a cut or sore, wash towels and bed linens in hot water with added bleach and dry them in a hot dryer. Wash gym and athletic clothes after each wearing.
- Wash your hands.** In or out of the hospital, careful hand washing remains your best defense against germs. Scrub hands briskly for at least 15 seconds, then dry them with a disposable towel and use another towel to turn off the faucet. Carry a small bottle of hand sanitizer containing at least 62 percent alcohol for times when you don't have access to soap and water.

E-Waste Update - OUHSC Project GreenSafe

Source: <http://it.ouhsc.edu/services/service-desk/greensafe.asp>

Information Technology on the OUHSC campus is now providing a service for environmentally responsible and data-secure disposal of computing assets. The **GreenSafe** program is a centralized HSC campus service to securely erase data from used computing assets according to [university policy](#) and dispose of used technology in an environmentally friendly manner.



The **GreenSafe** program is the designated procedure for OKC-based organizations of the OU Health Sciences Center to comply with the existing [OUHSC Electronic Data Disposal policy and standard](#).

The **GreenSafe** program includes the pick-up, tracking, data cleaning and proper disposal of computing assets, including desktop & laptop computers, monitors, printers and computer accessories (keyboard, mice, speaker, etc.). This program, through a number of vendor partners coordinated under Dell Asset Recovery Services, provides for either the re-use/recycling of usable computers and accessories or environmentally sensitive disposal (including disposition of EPA-regulated hazardous material) of unusable equipment.

When your department no longer needs or wants computers or accessories, be sure to use this environmentally friendly system for disposal.



Halloween Health and Safety Tips

Source: <http://www.cdc.gov/family/halloween/>

For many people, autumn events like Halloween and Harvest Day are fun times to dress up in costumes, go trick-or-treating, attend parties, and eat yummy treats. These events are also opportunities to provide nutritious snacks, get physical activity, and focus on safety. Below are tips to help make the festivities fun and safe for trick-or-treaters and party guests.

Going trick-or-treating?

- S** Swords, knives, and similar costume accessories should be short, soft, and flexible.
- A** Avoid trick-or-treating alone. Walk in groups or with a trusted adult.
- F** Fasten reflective tape to costumes and bags to help drivers see you.
- E** Examine all treats before eating them for choking hazards and tampering. Limit the amount of treats you eat.
- H** Hold a flashlight while trick-or-treating to help you see and others see you.
- A** Always test make-up in a small area first and remove it before bedtime to prevent skin and eye irritation.
- L** Look both ways before crossing the street. Use established crosswalks wherever possible.
- L** Lower your risk for serious eye injury by not wearing decorative contact lenses.
- O** Only walk on sidewalks or on the far edge of the road facing traffic to stay safe.
- W** Wear well-fitting masks, costumes, and shoes to avoid blocked vision, trips, and falls.
- E** Eat only commercially-wrapped treats. Avoid eating homemade treats unless you know the chef well.
- E** Entering homes for treats should be avoided unless accompanied by a trusted adult.
- N** Never walk near lit candles or luminaries. Be sure to wear flame-resistant costumes.

Expecting trick-or-treaters or party guests?

- Provide healthier treats for trick-or-treaters, such as individual packs of raisins, trail mix, or pretzels. For party guests, offer a variety of fruits, vegetables, and cheeses.
- Use party games and trick-or-treat time as an opportunity for kids to get their daily dose of 60 minutes of physical activity.
- Be sure walking areas and stairs are well-lit and free of obstacles that could result in falls.
- Keep candle-lit jack-o'-lanterns and luminaries away from doorsteps, walkways, landings, and curtains. Place them on sturdy tables, keep them out of the reach of pets and small children, and never leave them unattended.
- Remind drivers to watch out for trick-or-treaters and to drive safely.

Follow these tips to help make the festivities fun and safe for everyone!



Flu Season is Coming!

Sources: <http://www.cdc.gov/flu/about/qa/flushot.htm>
<http://www.cdc.gov/flu/about/disease/index.htm>

Influenza (the flu) is a contagious respiratory illness caused by influenza viruses. It can cause mild to severe illness, and at times can lead to death. Every year in the United States, on average 5% to 20% of the population gets the flu; more than 200,000 people are hospitalized from flu complications, and; about 36,000 people die from flu. Some people, such as older people, young children, and people with certain health conditions, are at high risk for serious flu complications.

The CDC says “Take 3 Steps To Fight The Flu”:

1 Take Time to Get a Flu Shot

In general, anyone who wants to reduce their chances of getting the flu can get vaccinated. However, certain people should get vaccinated each year. They are either people who are at high risk of having serious flu complications or people who live with or care for those at high risk for serious complications.

People who should get vaccinated each year are:

- all persons who want to reduce the risk of becoming ill with influenza or of transmitting influenza to others
- all children aged 6 months to 18 years old
- all persons aged 50 years and older
- children and adolescents (aged 6 months to 18 years) receiving long-term aspirin therapy
- women who will be pregnant during the influenza season
- adults and children who have chronic pulmonary (including asthma), cardiovascular (except hypertension), renal, hepatic, hematological or metabolic disorders (including diabetes mellitus)
- adults and children who are immunosuppressed
- residents of nursing homes and other chronic-care facilities
- health-care personnel
- healthy household contacts (including children) and caregivers of children aged less than 5 years and adults aged 50 years and older
- healthy household contacts (including children) and caregivers of persons with medical conditions that put them at higher risk for severe complications from influenza

Talk with a doctor before getting a flu shot if you:

- have ever had a severe allergic reaction to eggs or to a previous flu shot **or**
- have a history of Guillain-Barré syndrome (GBS).

If you are sick with a fever when you go to get your flu shot, you should talk to your doctor or nurse about getting your shot at a later date. However, you can get a flu shot at the same time you have a respiratory illness without fever or if you have another mild illness.

Can the flu shot give me the flu? No, the flu shot cannot cause flu illness. The three influenza viruses contained in the flu vaccine are each inactivated (killed), which means they cannot cause infection.

2 Take Everyday Preventive Actions

- Cover your nose and mouth with a tissue when you cough or sneeze. Throw the tissue in the trash after you use it.
- Wash your hands often with soap and water, especially after you cough or sneeze. Alcohol-based hand cleaners are also effective.
- Try to avoid close contact with sick people.
- If you get the flu, CDC recommends that you stay home from work or school and limit contact with others to keep from infecting them.
- Avoid touching your eyes, nose or mouth. Germs spread this way.

3 Take Flu Antiviral Drugs if your Doctor Recommends Them

Where to Get Flu Shots!

At OUHSC, Employee Health Service is currently offering the flu vaccine at no charge to OUHSC employees. Contact Employee Health at 405-271-3100 for times and locations.

In Tulsa, flu shots are available at Employee/Student Health (918-619-4565) from 8:30 - 11:30 am on Tuesdays (no appointments necessary). Other days are available by appointment. Flu shots for students, College of Medicine, IT and Operations employees will be provided free. For other departments, there is a \$13 charge.

In Norman, Goddard Health Center will provide the flu vaccine free to students on October 21-22, 2008. Employees can stop by any time between 9am - 4pm (the cost will be filed with the employee's health insurance plan).

"Canned-Air" Hazards

Adapted from <http://www.ini.wa.gov/Safety/Basics/HazAlerts/CannedAir0608.asp>



Products commonly used in offices and other businesses to remove dust from computers and other electronic equipment area are often called "canned air". The name is misleading, and users may not follow safe use practices because they mistakenly assume these products contain harmless, pressurized air. On the contrary, "canned air" products usually contain a gas that is compressed into a liquid. A variety of gases are used in these products and some are highly flammable. One example of a commonly-used, highly-flammable gas is difluoroethane.

The Washington State Dept. of Labor and Industries has reported that an employee working in a bowling alley suffered burns to her face due to a flash fire while cleaning a paper shredder using a canned-air product. The employee tilted the can, which released its contents as a liquid onto the shredder. As the liquid became a gas, it suddenly created a zone of highly concentrated, flammable gas that was easily ignited.

The hazard risks posed by a particular canned-air product depend on what's in the can and how the product is used. The only sure way to know what's really in the can is to check the product label or the Material Safety Data Sheet (MSDS) for the product.

- ✓ **Flammable Ingredients** - Safe use of these products requires the user to keep the can in an upright position during spraying. This upright position allows only the gas layer above the liquid to be released from the nozzle. Unsafe use occurs when the can is tilted, allowing the liquefied gas to be released from the nozzle and saturate the air and any surfaces it contacts.

If the immediate use area is enclosed or poorly ventilated, the gas is more likely to become concentrated, creating a flammable atmosphere. Ignition sources such as electrical switches, flames, and sparks inside the immediate use area can easily ignite the concentrated gas.

- ✓ **Frostbite** - When any canned-air product is used you can feel the can become colder. This effect is caused by gas expansion, and the liquid inside is even colder. If expelled, the liquid can quickly and deeply chill skin, fingers, and any other part of the body it contacts. Exposure to a steady stream of this liquid can cause serious frostbite with physical injury such as deep cracking and damage to muscles, nerves, and blood vessels. Even mild frostbite can cause an intense burning pain as skin thaws. To prevent frostbite, most canned-air products carry a warning not to tilt or shake the can.
- ✓ **Asphyxiation and Toxicity** - Used properly, the chance of inhaling sufficient quantities of canned air to cause a serious breathing problem is unlikely to occur. In the worst case, high concentrations of gas generated in enclosed, non-ventilated areas can displace ambient air and cause oxygen deficiency or possibly asphyxiation. Toxicity varies depending on the gas used and the intensity and duration of exposure. For example, nervous system problems have been associated with sustained exposure to high concentrations of some products but not others. Physical symptoms caused by inhaling canned-air products are most likely due to intentional abuse rather than misuse.

The EHSO recommends reading the label on any chemical product prior to using it. If you have any questions, or need an MSDS, contact the EHSO.



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