

DOWNLOAD PDF METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (MRSA)

Chapter 1 : MRSA - Preventing Methicillin-Resistant Staph Infections

Methicillin-resistant Staphylococcus aureus (MRSA) is a bacteria that is resistant to many antibiotics. Staph and MRSA can cause a variety of problems ranging from are skin infections and sepsis to pneumonia to bloodstream infections.

School children sharing sports and other equipment College students living in dormitories [6] People staying or working in a health care facility for an extended period of time [5] [6] People who spend time in coastal waters where MRSA is present, such as some beaches in Florida and the west coast of the United States [12] [13] People who spend time in confined spaces with other people, including occupants of homeless shelters, prison inmates, and military recruits in basic training [14] [15] Veterinarians, livestock handlers, and pet owners [16] People that ingest unpasteurized milk [17] People who are immunocompromised and also colonized [18]: This is because some providers may inconsistently neglect to perform hand-washing between examinations. In the news media, hundreds of reports of MRSA outbreaks in prisons appeared between and For example, in February , the Tulsa County jail in Oklahoma started treating an average of 12 S. In response to these and many other reports on MRSA infections among incarcerated and recently incarcerated persons, the Federal Bureau of Prisons has released guidelines for the management and control of the infections, although few studies provide an evidence base for these guidelines. During a recent study in Fort Benning Georgia, a variety of military recruits both healthy and those suffering from soft tissue infections were tested for MRSA as well as other pathogens. In October , a high-school football player was temporarily paralyzed from MRSA-infected turf burns. His infection returned in January and required three surgeries to remove infected tissue, as well as three weeks of hospital stay. Tynes and Nicks apparently did not contract the infection from each other, but it is unknown if Banks contracted it from either individual. Parents should be especially cautious of children who participate in activities where sports equipment is shared, such as football helmets and uniforms. The MRSA resistance to oxacillin being tested, the top s. Normally, the bacterium must be cultured from blood, urine, sputum , or other body-fluid samples, and in sufficient quantities to perform confirmatory tests early-on. PBP2a is a variant penicillin-binding protein that imparts the ability of S. It does not form spores and it is non- motile. It forms grape-like clusters or chains. Specialized culture media have been developed to better differentiate between MSSA and MRSA and in some cases, it will identify specific strains that are resistant to different antibiotics. These resistant strains may or may not possess the mecA gene. One strain is only partially susceptible to vancomycin and is called vancomycin-intermediate S. GISA is a strain of resistant S. Resistance to antibiotics in S. Examples include plasmids, transposable genetic elements, and genomic islands , which are transferred between bacteria through horizontal gene transfer. Carriage of large plasmids, such as SCCmecI-III, is costly to the bacteria, resulting in compensatory decrease in virulence expression. After acquisition of mecA, the gene must be integrated and localized in the S. MecI is usually bound to the mecA promoter and functions as a repressor. Beta-lactam antibiotics permanently inactivate PBP enzymes , which are essential for bacterial life, by permanently binding to their active sites. Acquisition of SCCmec in methicillin-sensitive S. Other common strains include ST5: USA strain results in skin infections, necrotizing fasciitis and toxic shock syndrome, whereas the ST1: USA strain results in necrotizing pneumonia and pulmonary sepsis. In a remote region of Alaska, unlike most of the continental U. Rapid culture and sensitivity testing and molecular testing identifies carriers and reduces infection rates. Combined with extra sanitary measures for those in contact with infected people, swab screening people admitted to hospitals has been found to be effective in minimizing the spread of MRSA in hospitals in the United States , Denmark , Finland , and the Netherlands. To prevent the spread of MRSA the recommendations are to wash hands using soap and water or an alcohol-based sanitizer. In addition, surface and equipment sanitizing conforms to the Environmental Protection Agency EPA -registered disinfectants. Reducing use of antibiotic classes that promote MRSA colonisation, especially fluoroquinolones, is recommended in current guidelines. In the "search and destroy" strategy that was employed by all UK hospitals until the mids, all hospitalized people

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with MRSA were immediately isolated, and all staff were screened for MRSA and were prevented from working until they had completed a course of eradication therapy that was proven to work. Loss of control occurs because colonised people are discharged back into the community and then readmitted; when the number of colonised people in the community reaches a certain threshold, the "search and destroy" strategy is overwhelmed. An important part of the success of the Dutch strategy may have been to attempt eradication of carriage upon discharge from hospital. A secondary covering of clothing is preferred. In the United Kingdom, the Workplace Health, Safety and Welfare Regulations [79] requires businesses to provide toilets for their employees, along with washing facilities including soap or other suitable means of cleaning. Guidance on how many toilets to provide and what sort of washing facilities should be provided alongside them is given in the Workplace Health, Safety and Welfare Approved Code of Practice and Guidance L24, available from Health and Safety Executive Books. But there is no legal obligation on local authorities in the United Kingdom to provide public toilets , and although in the House of Commons Communities and Local Government Committee called for a duty on local authorities to develop a public toilet strategy [80] this was rejected by the Government.

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Chapter 2 : MRSA: MedlinePlus

Methicillin-resistant Staphylococcus aureus (MRSA) is a bacterium that causes infections in different parts of the body. It's tougher to treat than most strains of staphylococcus aureus -- or.

Areas that have increased body hair, such as the armpits or back of the neck, are more likely to be infected. Areas that have been cut, scratched, or rubbed are also vulnerable to infection because your biggest barrier to germs — your skin — has been damaged. The infection usually causes a swollen, painful bump to form on the skin. The bump may resemble a spider bite or pimple. It often has a yellow or white center and a central head. Sometimes an infected area is surrounded by an area of redness and warmth, known as cellulitis. Pus and other fluids may drain from the affected area. Some people also experience a fever. Risk factors vary depending on the type of MRSA infection. Samples will also be taken from the site of infection. The types of samples obtained to help diagnose MRSA include the following:

- Wound cultures Wound samples are obtained with a sterile cotton swab and placed in a container.
- Sputum cultures Sputum is the substance that comes up from the respiratory tract during coughing. A sputum culture analyzes the sputum for the presence of bacteria, cell fragments, blood, or pus. People who can cough can usually provide a sputum sample easily. Those who are unable to cough or who are on ventilators may need to undergo a respiratory lavage or bronchoscopy to obtain a sputum sample. Respiratory lavage and bronchoscopy involve the use of a bronchoscope, which is a thin tube with a camera attached. Under controlled conditions, the doctor inserts the bronchoscope through the mouth and into your lungs. The bronchoscope allows the doctor to see the lungs clearly and to collect a sputum sample for testing.
- To do this, urine is collected in a sterile cup during urination. The cup is then given to the doctor, who sends it to a lab for analysis. Sometimes, urine must be collected directly from the bladder. To do this, the healthcare provider inserts a sterile tube called a catheter into the bladder. Urine then drains from the bladder into a sterile container.
- Blood cultures A blood culture requires taking a blood draw and placing the blood on a dish in a laboratory. If bacteria grow on the dish, doctors can more easily identify what bacteria type is causing infection. Results from blood cultures typically take about 48 hours. A positive test result can indicate the blood infection sepsis. Bacteria can enter the blood from infections located in other parts of your body, such as the lungs, bones, and urinary tract. These infections usually require antibiotics through an IV, sometimes for long periods of time depending on the severity of your infection. If you have a large enough skin infection, your doctor may decide to perform an incision and drainage. Incision and drainage are typically performed in an office setting under local anesthesia. Your doctor will use a scalpel to cut open the area of infection and drain it completely. You may not need antibiotics if this is performed.

How can MRSA be prevented? Wash your hands on a regular basis. This is the first line of defense against spreading MRSA. Scrub your hands for at least 15 seconds before drying them with a towel. Use another towel to turn off the faucet. Carry hand sanitizer that contains 60 percent alcohol. Keep your wounds covered at all times. Covering wounds can prevent pus or other fluids containing staph bacteria from contaminating surfaces that other people may touch. This includes towels, sheets, razors, and athletic equipment. If you have cuts or broken skin, wash bed linens and towels in hot water with extra bleach and dry everything at high heat in the dryer. You should also wash your gym and athletic clothes after each use. Isolation prevents the spread of this type of MRSA infection. Hospital personnel caring for people with MRSA should follow strict handwashing procedures. To further reduce their risk for MRSA, hospital staff and visitors should wear protective garments and gloves to prevent contact with contaminated surfaces. Linens and contaminated surfaces should always be properly disinfected. While many people have some MRSA bacteria living on their skin, excess exposure can lead to serious and potentially life-threatening infections. Symptoms and treatments can vary based on the type of MRSA infection a person has. Practicing excellent infection prevention techniques, such as washing hands regularly, refraining from sharing personal items, and keeping wounds covered, clean, and dry can help prevent its spread. Healthline and our partners may receive a portion of

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Chapter 3 : What is methicillin-resistant Staphylococcus aureus (MRSA)? | MRSA - Sharecare

During the past four decades, methicillin-resistant Staphylococcus aureus, or MRSA, has evolved from a controllable nuisance into a serious public health www.nxgvision.com is largely a hospital-acquired infection, in fact, one of the most common.

The infection is resistant to the antibiotic methicillin. It is also resistant to other common antibiotics, such as amoxicillin, oxacillin, and penicillin. This makes MRSA infection hard to treat. Two main types of MRSA have been identified. At first, they may resemble a spider bite. These bumps can be red, swollen, and painful and may have pus. They may feel warm to the touch. You may also have a fever. Cuts, scrapes, and hairy areas of the body are common places for these bumps to appear. Bumps from MRSA skin infections can quickly turn into abscesses. These are deep, infected wounds filled with pus. The bacteria may stay in the skin. They can also spread deep in the body. This could cause possibly life-threatening infections such as pneumonia. If they are not treated properly, MRSA infections can cause sepsis. This is a life-threatening reaction to severe infection in the body. If you or a family member experiences MRSA symptoms, it is important to call your family doctor right away. This is especially important if the symptoms include fever. Do not pick at the area or try to treat it yourself. Be sure to cover the area with a bandage and wash your hands thoroughly. The MRSA infection is spread through contact with an infected person. This could be skin-to-skin contact or from personal items that have touched the infected skin. To kill all of the bacteria, hands must be washed thoroughly using soap and water or an alcohol-based hand sanitizer. People in hospitals, health care facilities, and nursing homes who have weak immune systems are at risk of more serious complications if they get HA-MRSA. Some chemotherapy drugs and medicines taken after an organ transplant can weaken the immune system. So can having the human immunodeficiency virus HIV. Compromised skin, such as skin with cuts or scrapes. Contaminated items and surfaces. Daycare centers, dormitories, jails, locker rooms, military barracks, prisons, and schools are common locations for the 5 Cs. MRSA outbreaks have also occurred among members of sports teams. This is because skin-to-skin contact as well as minor cuts and scrapes occur frequently. How is MRSA diagnosed? Several tests can show if you have MRSA. Your doctor may take a sample from your wound or nasal passages. He or she may also take a sample of urine or blood to send to the laboratory. Results of this type of test called a culture should be ready in about 24 to 48 hours. It can take about 48 hours for the bacteria to grow. A newer rapid blood test provides results more quickly, in about 2 hours. Can MRSA be prevented or avoided? Good hygiene is the best defense against MRSA and other bacterial infections. Wash your hands often, using soap and water or an alcohol-based hand sanitizer. If you have any cuts or scrapes, keep them clean and covered with a bandage until they heal. The dressing will need to be changed regularly. Your doctor may also prescribe an ointment to apply to the area. Often, this is all that is needed to treat the infection. Schedule a follow-up visit to make sure the site is healing well. Change the dressing as advised. Wear disposable gloves to prevent spreading the infection. Throw away bandages and tape with the regular trash. If heavily soiled, first place inside a separate bag. Use a hot dryer rather than air drying. Clean surfaces with household cleaners. For more serious cases, your doctor may prescribe antibiotics that work effectively against MRSA. Some strains of MRSA respond to antibiotics. Contact your doctor if you do not improve after a few days or if the infection gets worse. You may need to be hospitalized if: Questions to ask your doctor I work at a hospital. My husband has MRSA. What can I do to protect myself and my family from getting it? How should I care for my wound that was just drained? Should I get rid of my bed linens? Is there any special way I should get rid of my bandages and wound dressings? Should I have my child tested for it?

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Chapter 4 : Methicillin-resistant Staphylococcus aureus - Wikipedia

Methicillin-resistant Staphylococcus aureus (MRSA) (/ ɛ̃ m ɛ̃ ɛ̃ r ɛ̃ s ẽ a / or / ɛ̃ m ɛ̃ œ̃ ɛ̃ r s ɛ̃ TM /) refers to a group of gram-positive bacteria that are genetically distinct from other strains of *Staphylococcus aureus*.

Description Gram-stained *Staphylococcus aureus*. **Pathogenesis** **Transmission** Since *S.* Because the bacterium is nonmotile, *S. MRSA* is typically spread from human-to-human by the hands. This bacterium is most commonly transmitted horizontally rather than vertically [4]. **Infectious dose, incubation, and colonization** *S.* In most cases, *S.* When ingested, the infectious dose of *S.* The infectious dose and incubation period for other types of *S.* Roughly 24 drug users and 16 nonusers were infected. **Virulence factors** Virulence factors of *S.* **Pathogenesis of Methicillin-Resistant Staphylococcus aureus Infection.** These surface proteins typically promote attachment to laminin and fibronectin. Most strains also express a clumping factor, coagulase, that promotes attachment to blood clots and traumatized tissue. Fibronectin and fibrinogen-binding proteins are also produced by *S.* Adhesins that bind to collagen are significant in infections that cause osteomyelitis. Once the bacteria have adhered, they can secrete a biofilm that make them difficult to eradicate [8]. **Invasion** Invasins help to promote bacterial spread within the tissues of the body. Alpha toxin is the most characterized and potent membrane-damaging toxin secreted by *S.* It is originally expressed as a monomer that binds to the surface of susceptible cells before becoming oligamerized into a heptameric ring that causes a pore in the membrane of the attacked cell, which causes the contents of the cell to leak out. Platelets and monocytes are especially susceptible to this toxin. It is not often expressed in human isolated strains of the bacteria [8]. This correlation suggests that the toxin is a large component of necrotizing skin infections. Leukocidin forms a hetero-oligameric transmembrane pore made from four LukF and four LukS subunits. This toxin is hemolytic, but not as hemolytic as alpha toxin. FAME may be important for virulence in abscesses, where it could prolong bacterial survival by modifying anti-bacterial lipids in the cell [8]. **Avoidance** To avoid the immune system, *S.* Strains of the bacteria isolated from infections have been found to produce this capsule in high amounts. This capsule helps the bacteria evade phagocytosis in the absence of complement. Protein A is an Fc receptor on the surface of the pathogen that specifically binds IgG antibody in the wrong orientation. This incorrect orientation of the antibody disrupts opsonization and phagocytosis of the bacteria, allowing it to evade the immune system. Leukocidin also helps in avoidance of the immune system, as acts specifically on phagocytic cells called polymorphonuclear leukocytes [8]. **Toxins** Mechanism of superantigen toxins of *S.* A few are listed above, such as invasion toxins. **Resistance** Through many generations, *Staphylococcus aureus* has developed a wide variety of antibiotic resistance. The most commonly known resistance is that of methicillin like antimicrobials. This gene is carried on a mobile Staphylococcal cassette chromosome SCC. The SCC carries a variety of genes that lend themselves to antibiotic resistance and are usually transmitted both vertically and horizontally across *S.* Instead of producing normal PBP-2, the enzyme responsible for catalyzing peptidoglycan cross-linking, the bacteria begin to produce PBP-2A. Therefore, PBP-2A is not inhibited by the antibiotic [5]. **Staphylococcal Cassette Chromosome mecA.** **Community-Associated Methicillin-Resistant Staphylococcus aureus: A Review** [6] **Clinical features** Sites of *S.* The most well known Staph infection is that of the skin, but many other diseases are also caused by Staph infections as well. **Diagnosis** of the infection depends on where the bacteria has caused infection. **Bacteremia** Bacteremia, also known as "blood poisoning" can occur when bacteria enter into the blood stream and begin to colonize. In some cases, bacteremia is self-limiting and asymptomatic but in other cases is known to lead to septic shock, which is fatal. Bacteremia may be characterized by one of more of the following symptoms: Bacteremia is diagnosed by culturing blood for bacteria. The blood might also reveal elevated white blood cell levels. **Endocarditis** is not characterized by a single symptom, but can be detected by many symptoms such as a mild fever, chills, weakness, cough, trouble breathing, headaches, aching joints, and loss of appetite. It also causes heart murmurs and regurgitation in the heart valves. This disease usually affects people between the ages of A

risk that accompanies endocarditis is the formation of emboli. This occurs when bacteria break off from the site of colonization in clumps and become lodged in blood vessels. This can lead to organ failure as nutrients are blocked from accessing certain areas of the blood stream. Diagnosis of this is usually done by taking a sample of blood from the patient to test it for bacteria. Another way to diagnose Endocarditis is echocardiography, which uses ultrasound waves to make an image of the heart. This allows doctors to check for abnormalities like bacterial vegetation [10].

Soft tissue infections Staph infections lead to several different kinds of soft tissue infections. Impetigo, abscesses, Necrotizing Fasciitis, erysipelas, and cellulitis are all examples of soft tissue infections caused by *S.* Each of these infections are caused by a bacterial invasion of the skin, usually through an open wound. Once invasion has occurred, the staph bacteria colonize the area and produce mild to severe infections. These skin infections can be very contagious and spread quickly to other parts of the body through contact. These infections also spread easily to others as the bacteria are often transferred by the hands to other surfaces. The symptoms of these skin infections vary from type to type, but nearly all of them are characterized by a lesion or bump in the skin that contains pus. The bump then develops a scab like crust that may become itchy. Skin infections can also be characterized by redness, warmth, pain, and swelling typical signs of inflammation. Though typically not severe, even simple infections can cause major problems in the bones and blood stream if left untreated. Severe infections such as necrotizing fasciitis are fatal if not treated. Diagnosis of these diseases are done by an observation of symptoms and sometimes laboratory tests [7] [10].

Pneumonia is the most common fatal infection contracted by those in the hospital. Symptoms of this infection include fever, cough, chest pain, shortness of breath, and increased respirations. Chills accompanying fevers are especially suspicious. Many patients with Pneumonia will also cough up sputum produced by the alveoli. Pneumonia is diagnosed through symptoms and a chest examination. Cultures of sputum and x-ray examinations may also be used to detect infection [10].

Osteomyelitis Infections of the bones and joints are called Osteomyelitis and are most often caused by bacteria, specifically *S.* Symptoms of osteomyelitis are pain in the affected bone, tenderness, fever, and chills. If the infection is caused by the spread of the bacteria from an area of soft tissue infection, the only symptom of note may be slow healing of the wounded area. To diagnose this staph infection, blood samples are collected to check white blood cell levels and then cultured to allow for the growth of bacteria. Bone inflammation is then tested using radioactive elements that show up in X-rays. An MRI may also be used. If a pocket of pus is available, samples are taken and cultured to detect the infectious bacteria [10].

Meningitis The meninges is the thin, membranous covering of the brain and spinal chord. Infection of this membrane is called meningitis and can be caused by bacteria, including *S.* Meningitis caused by bacteria is typically the most serious and hard to treat. In many cases, meningitis can be fatal. Common symptoms of bacterial meningitis are fever, headache, vomiting, sensitivity to light, irritability, severe fatigue, stiff neck, and a reddish purple rash on the skin. Seizures, confusion, and an eventual coma are all possibilities if the infection remains untreated. The most reliable way to diagnose meningitis is a lumbar tap, where a sample of spinal fluid is taken from the lower spinal chord. The fluid is then examined under a microscope for signs of bacteria [10].

When produced in large quantities, this toxin can enter the blood stream and cause high fever, vomiting, diarrhea, headache, rash, sore throat, and body aches. A drop in blood pressure, kidney failure, and skin peeling on hands and feet may also accompany the later stages of TSS. While menstruating women are most commonly the victims of TSS, the disease can affect anyone of any age, race, and sex, especially those whose immune systems are weakened at any time. TSS can be fatal if not diagnosed. A variety of blood tests and physical examinations are used to diagnose this infection [10]

Morbidity and Mortality MRSA has been on the decline for many years as health care professionals become more adept at preventing and treating the infections. Statistics for MRSA infections can be difficult to acquire, as they can often go undetected or clear up on their own [6] [2].

Treatment Depending on the severity of the infection, Staph infections, even those caused by MRSA, can be treated outpatient with antibiotics.

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Chapter 5 : MRSA infection - Symptoms and causes - Mayo Clinic

MRSA stands for methicillin-resistant Staphylococcus aureus. MRSA is a "staph" germ (bacteria) that does not get better with the type of antibiotics that usually cure staph infections. MRSA is a "staph" germ (bacteria) that does not get better with the type of antibiotics that usually cure staph infections.

Scanning electron micrograph image depicting numerous clumps of methicillin-resistant Staphylococcus aureus bacteria; Magnified x. Most of these individuals are colonized by the staph bacteria, meaning that the bacteria are present but are not causing disease. Some people become infected with staph bacteria indicating that the bacteria are present and cause disease. Although staph bacteria do not usually cause infection, they can bring about disease if they penetrate through a break in the skin or through mucous membranes. Staph bacteria are one of the most common causes of skin infections and sometimes produce relatively minor skin infections such as pimples and boils. However, they can cause more serious illnesses such as surgical wound infections, bloodstream infections, bone infections, and pneumonia. In the past few decades, a more dangerous form of staph has emerged. This form is known as methicillin-resistant Staphylococcus aureus and is usually referred to by the acronym MRSA. This group of antibiotics includes methicillin, and the more commonly prescribed penicillin, amoxicillin, and oxacillin among others. MRSA is categorized by the setting in which it is acquired. Strains of staph were identified in patients in hospital and healthcare facilities that were resistant to methicillin resistance to penicillin had occurred even earlier. The incidence of this infection has been increasing over time, with patients who have had surgery, medical devices implanted, or weakened immune systems being particularly at risk. CA-MRSA occurs outside of hospital settings and usually manifests itself as a skin infection in an otherwise healthy individual. CA-MRSA tends to occur under conditions where people are in prolonged physical proximity, such as in childcare and long-term care facilities, and in soldiers, prisoners, athletes involved in skin-to-skin contact sports such as wrestling, and in individuals sharing personal items such as towels. Photograph depicting a cutaneous abscess caused by methicillin-resistant Staphylococcus aureus bacteria. The first sign of infection is commonly described as resembling a spider bite – a spot on the skin that is red, swollen, and painful. The site may produce pus. Highly publicized accounts of the deaths of at least three students from CA-MRSA in late prompted concern among students, parents, and school officials. The best defense against MRSA is to maintain good hygiene, including frequent and thorough hand washing, and to avoid the sharing of personal care items. Scientists are working towards understanding the differences between these strains and determining why certain people become infected and seriously ill. Thirty years ago, MRSA accounted for 2 percent of staph infections. By , 64 percent of staph infections were caused by MRSA. The majority of MRSA cases, 85 percent, were associated with healthcare facilities, while approximately 14 percent occurred in individuals with no known exposure to healthcare. The staph bacterium continues to evolve and is beginning to show resistance to additional antibiotics. In the first staph strains were found that are resistant to vancomycin, an antibiotic that is one of the few available treatments used as a last resort against MRSA. Although vancomycin-resistant staph strains are currently still quite rare, it is feared that these strains will become more widespread over time and further reduce the limited number of antibiotics that are effective against MRSA. The rising problem of resistance of staph bacteria to methicillin and other antibiotics is part of a larger issue that greatly concerns healthcare professionals. The emergence of antimicrobial-resistant organisms is making it more difficult to treat a variety of infectious diseases. Drug resistance occurs because microbes, such as staph bacteria, need to reproduce to ensure their survival. When this ability is threatened, as when they are exposed to antibiotics, microbes adapt and evolve to overcome the block to their reproduction. This can occur naturally, and microbes become genetically altered in ways which allow them to survive in the presence of antimicrobial drugs. However, drug resistance adaptations can be accelerated by human actions, particularly by the overuse and inappropriate use of antibiotics. The escalating use of antimicrobials in humans, animals, and agriculture is increasing the problem of drug resistance. The

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consequences of antimicrobial resistance pose a significant concern to scientists and medical professionals. Infection with drug-resistant organisms can lead to increased and longer hospital stays, more complicated treatment, more deaths, and higher healthcare costs. The Research Surveillance of drug-resistant strains of MRSA As strains of staph continue to adapt and change over time, it is critical for healthcare workers to track these changes. They need to know which strains are present within a community at any point in time, to which antibiotics the strains are resistant, and the severity of disease caused by the circulating strains. By analyzing strains isolated from these patients, the scientists have found that CA-MRSA accounts for an increasing percentage and number of infections. This information can help doctors select the optimal antibiotic treatment for infected patients. Genetics changes in MRSA Scientists would further like to understand the genetic changes in MRSA that allow the bacterium to cause serious illness in otherwise healthy individuals. They chose the USA strain, one of two strains that cause the majority of CA-MRSA cases, because it has emerged as the predominant strain causing skin infections, as well as more serious infections, in both pediatric and adult patients in many states. Another reason for the interest in the USA strain is that it appears to be more virulent than other strains. They then compared the DNA sequences. They also compared the DNA sequence of these strains with the previously published staph genomes of isolates obtained elsewhere. This suggests that the increased virulence of the USA strain is due to subtle genetic changes within its genome. One intriguing finding of their study is that the bacterium has picked up a plasmid that contains a gene that confers resistance to bacitracin, an antibiotic commonly found in over-the-counter skin ointments. With the genetic information describing USA in hand, the scientists can now zoom in on the regions that differ from other strains to pinpoint genes that may account for the ability of USA to cause serious illness in some people. They include penicillin and its derivatives, such as methicillin and amoxicillin. Timothy Palzkill , professor of Pharmacology and Chemical Biology and Molecular Virology and Microbiology, and his research team have been studying mechanisms of resistance to methicillin and other beta-lactam antibiotics. Palzkill and coworkers conducted a study in which they found that the protein BLIP-II was able to weakly bind and inhibit PBP2a, making it susceptible to beta-lactam antibiotics.

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Chapter 6 : Methicillin-resistant Staphylococcus aureus (MRSA) - www.nxgvision.com

Overview. Methicillin-resistant Staphylococcus aureus (MRSA) infection is caused by a type of staph bacteria that's become resistant to many of the antibiotics used to treat ordinary staph infections.

A cotton swab is used to collect a sample from an open skin rash or skin sore. Or, a sample of blood , urine , sputum , or pus from an abscess may be collected. The sample is sent to a lab to test for staph and MRSA. If MRSA is found, it will be tested to see which antibiotic should be used to treat the infection. Treatment Draining the infection may be the only treatment needed for a skin MRSA infection that has not spread. A provider should do this procedure. **DO NOT** try to pop open or drain the infection yourself. Keep any sore or wound covered with a clean bandage. Severe MRSA infections are becoming harder to treat. Your lab test results will tell the doctor which antibiotic will treat your infection. Your doctor will follow guidelines about which antibiotics to use, and will look at your personal health history. MRSA infections are harder to treat if they occur in: The lungs or blood People who are already ill or who have a weak immune system You may need to keep taking antibiotics for a long time, even after you leave the hospital. Be sure to follow instructions on how to care for your infection at home. Pneumonia and bloodstream infections due to MRSA are linked with high death rates. When to Contact a Medical Professional Call your provider if you have a wound that seems to get worse instead of healing. Prevention Follow these steps to avoid a staph infection and to prevent an infection from spreading: Keep your hands clean by washing them thoroughly with soap and water. Or, use an alcohol-based hand sanitizer. Wash your hands as soon as possible after leaving a healthcare facility. Keep cuts and scrapes clean and covered with bandages until they heal. **DO NOT** share personal items such as towels, clothing, or cosmetics. Simple steps for athletes include: Cover wounds with a clean bandage. Wash your hands well before and after playing sports. Shower right after exercising. **DO NOT** share soap, razors, or towels. If you share sports equipment, clean it first with antiseptic solution or wipes. Place clothing or a towel between your skin and the equipment. **DO NOT** use a common whirlpool or sauna if another person with an open sore used it. Always use clothing or a towel as a barrier. **DO NOT** share splints, bandages, or braces. Check that shared shower facilities are clean. If they are not clean, shower at home. If you have surgery planned, tell your provider if: Updated May 16, Accessed November 10, Que YA, Moreillon P. Staphylococcus aureus including staphylococcal toxic shock syndrome.

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Chapter 7 : Methicillin-resistant Staphylococcus aureus (MRSA): MedlinePlus Medical Encyclopedia

Methicillin-resistant Staphylococcus aureus (commonly known as MRSA) is a bacterial (staph) infection. "Staph" is the common name for the Staphylococcus aureus bacteria. The infection is resistant to the antibiotic methicillin. It is also resistant to other common antibiotics, such as.

HA-MRSA infections typically are associated with invasive procedures or devices, such as surgeries, intravenous tubing or artificial joints. Another type of MRSA infection has occurred in the wider community among healthy people. At-risk populations include groups such as high school wrestlers, child care workers and people who live in crowded conditions. Symptoms Staph infection Staph infection Methicillin-resistant Staphylococcus aureus MRSA infections start out as small red bumps that can quickly turn into deep, painful abscesses. Staph skin infections, including MRSA, generally start as swollen, painful red bumps that might resemble pimples or spider bites. The affected area might be: Warm to the touch Full of pus or other drainage Accompanied by a fever 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. When to see a doctor Keep an eye on minor skin problems such as pimples, insect bites, cuts and scrapes especially in children. If wounds appear infected or are accompanied by a fever, see your doctor. Request an Appointment at Mayo Clinic Causes Different varieties of Staphylococcus aureus bacteria, commonly called "staph," exist. Staph bacteria are normally found on the skin or in the nose of about one-third of the population. The bacteria are generally harmless unless they enter the body through a cut or other wound, and even then they usually cause only minor skin problems in healthy people. According to the Centers for Disease Control and Prevention, around 2 percent of the population chronically carries the type of staph bacteria known as MRSA. Antibiotic resistance MRSA is the result of decades of often unnecessary antibiotic use. Bacteria live on an evolutionary fast track, so germs that survive treatment with one antibiotic soon learn to resist others. Risk factors Because hospital and community strains of MRSA generally occur in different settings, the risk factors for the two strains differ. MRSA remains a concern in hospitals, where it can attack those most vulnerable such as older adults and people with weakened immune systems. Having an invasive medical device. Medical tubing such as intravenous lines or urinary catheters can provide a pathway for MRSA to travel into your body. Residing in a long-term care facility. MRSA is prevalent in nursing homes. MRSA can spread easily through cuts and abrasions and skin-to-skin contact. Living in crowded or unsanitary conditions. Outbreaks of MRSA have occurred in military training camps, child care centers and jails. Men having sex with men. Homosexual men have a higher risk of developing MRSA infections. People who inject drugs are an estimated Complications MRSA infections can resist the effects of many common antibiotics, so they are more difficult to treat. This can allow the infections to spread and sometimes become life-threatening. MRSA infections may affect your:

Chapter 8 : General Information | MRSA | CDC

Staphylococcus aureus, often referred to as "staph", is a common type of bacterium that is found in about 25 to 30 percent of healthy people, primarily on the skin or in the nose. Most of these individuals are colonized by the staph bacteria, meaning that the bacteria are present but are not causing disease.

Chapter 9 : MRSA: Treatment, causes, and symptoms

Objective. Methicillin-resistant Staphylococcus aureus (MRSA) is associated with difficult-to-treat infections and high levels of morbidity. Manual practitioners work in environments where MRSA is a common acquired infection.