**Staphylococcus aureus** are bacteria commonly found on the skin and in the nose of people. Some strains of staphylococci are resistant to all penicillins and cephalosporins and are known as MRSA. Community associated strains are generally unrelated to hospital MRSA.

**Methicillin resistant Staphylococcus aureus (MRSA) in the community**

**Information for clinicians**

What is methicillin resistant *Staphylococcus aureus*?
About one-third of healthy people carry *Staphylococcus aureus* on their skin or in the anterior nares of the nose. Some strains of ‘staph’ are resistant to β-lactam antibiotics (penicillins and cephalosporins); these are known as methicillin resistant *Staphylococcus aureus* (MRSA). In general they are resistant to multiple other antibiotics as well. There are some strains of MRSA referred to as non-multiresistant MRSA (nmMRSA) which tend to arise and spread in community settings.

nmMRSA strains are often quite different to the MRSA strains associated with hospitals and can cause disease in otherwise healthy people. nmMRSA usually manifests as skin infections such as pimples and boils, impetigo or cellulitis, but can cause more serious infections including osteomyelitis, bacteraemia and pneumonia.

As it is not possible to distinguish between nmMRSA infection and infection due to methicillin-susceptible *S. aureus* on clinical grounds, it is advisable to submit specimens (e.g. swabs or aspirates of pus) for culture and susceptibility testing. This applies to any suspected staphylococcal infection of a severity to require systemic antibiotic treatment.

Who is at risk in the community?
Anyone can acquire nmMRSA infections, but many cases have been found in certain populations including Pacific Islanders and Indigenous communities. Athletes and contact sports participants (e.g. footballers), military personnel, men who have sex with men, intravenous drug users, and inmates of correctional facilities may also be at increased risk.

Transmission occurs predominately by person to person spread but may also occur by indirect contact with contaminated surfaces or items. Little is known about risk factors for transmission in community settings, except that common factors observed from outbreak investigations were crowding, frequent skin to skin contact, compromised skin, contaminated surfaces and shared items, and lack of cleanliness. nmMRSA transmission in hospital settings has also been demonstrated (also refer Management of Patients in a Healthcare Setting).

When should specimens be collected?
nmMRSA should be considered in the differential diagnosis of serious or recurrent skin and soft tissue infections such as skin abscesses and boils. Collect a specimen for culture and antimicrobial susceptibility from patients with boils, wounds, or other sites of infection that warrant antibiotic therapy particularly severe local infections or when in connection with a cluster or outbreak of infection. If patients have evidence of systemic sepsis, blood cultures should also be submitted. It is not necessary to collect nasal cultures in patients with suspected nmMRSA infection.

How are skin infections treated?
Incision and drainage remains the primary treatment for boils and abscesses. Patients should be told of the importance of keeping wounds clean and covered following incision. Empiric antibiotic therapy may also be used according to the severity and progression of infection, presence of systemic illness, patient co-morbidities, inability to drain abscess, or lack of response to initial treatment with incision and drainage alone. nmMRSA is often resistant to commonly used antibiotics and treatment should be guided by the antibiotic sensitivity pattern on the microbiology result and the attached algorithm.

What about recurrent cases and their contacts?
Some people can have repeated skin infections, and members of the same household can be affected due to contact with skin or contaminated objects or surfaces. Routinely ask patients with staph infections about other cases of skin and soft tissue infections in household members or other close contacts. It is important to counsel the patient (and provide them with a fact sheet [http://www.health.qld.gov.au/chrisp/resources/nmMRSA_public.pdf](http://www.health.qld.gov.au/chrisp/resources/nmMRSA_public.pdf)) about prevention measures and good hygiene practices. Referral for specialist advice from an Infectious Diseases Physician or Clinical Microbiologist should be considered for recurrent cases.
What advice should I give patients?

1. Wash hands thoroughly with soap and running water for 10-15 seconds, and dry them with a clean towel or disposable paper towels:
   • Before and after touching/dressing an infected area
   • After going to the toilet
   • After blowing their nose or coughing into their hands
   • Before handling and eating food
   • After handling soiled clothing or linen
   • After handling animals including domestic pets and livestock

2. Showering or bathing daily using soap that contains an antiseptic such as 1% Triclosan is recommended for personal hygiene. Hair should be washed regularly.

3. Cover boils or other skin infections with a waterproof dressing.

4. Don’t share clothes, towels, bed linen, nail scissors/cutters, tweezers, razors, toothbrushes or make-up applicators.

5. Wash towels, clothes, bed sheets in a washing machine with the regular household laundry. Soiled items can be soaked in a powdered oxygen-based product such as a nappy soaker, before washing. No special washing temperature is required. Dry clothing and linen in direct sunlight if possible, or in a dryer using the hottest cycle the clothing will tolerate.

6. Cutlery and dishes should be washed as normal with other household utensils using detergent and hot water, or a dishwasher.

7. The household environment should be regularly cleaned with a standard household detergent.

8. Discard contaminated waste including used dressings, into a general waste bin (not recyclable) as soon as possible to avoid exposure to other individuals.

9. Instruct patients to return if they develop signs and symptoms of systemic illness, have worsening local symptoms, or if no improvement is seen in 48 to 72 hours.

Management of Patients in a Healthcare Setting

Infection Control Measures in Healthcare Settings

nmMRSA can be transmitted in the healthcare setting. Transmission occurs from patient to patient mainly by healthcare workers’ hands that become contaminated from patient contact or contact with soiled items. In addition to Standard Precautions, Contact Precautions should be used for all patients with any strain of MRSA. Where possible, patients with nmMRSA should be managed separately to patients with mMRSA. Standard Precautions, with a particular emphasis on hand hygiene, should be used for patients with skin or soft tissue infections compatible with a diagnosis of a staphylococcal infection until susceptibilities are known. Information on the use of Standard and Contact Precautions is available from the Queensland Health Infection Control Guidelines which are accessible at [http://www.health.qld.gov.au/chrisp/ic_guidelines/contents.asp](http://www.health.qld.gov.au/chrisp/ic_guidelines/contents.asp)

Infection Control Measures in General Practice

nmMRSA like mMRSA, is most frequently transmitted from person to person by direct physical contact with an infected person. Since MRSA is located on the hands and skin and is found in infected wounds and body fluids, they are important factors in how MRSA infections are spread. MRSA may also be spread indirectly by contaminated items and surfaces, although transmission occurs less often by this means. Important strategies to prevent transmission of MRSA are hand hygiene, use of personal protective equipment (gloves and plastic aprons) for direct contact with wounds or during procedures e.g. wound drainage, containing wound drainage and infected body fluids, and cleaning contaminated items and environmental surfaces.

References:

Adapted from the:
1. New South Wales Health Communicable Diseases Fact Sheet: Staphylococcus aureus in the Community-Information for Clinicians (December 2008)
2. Government of Western Australia, Department of Health Public Health Fact Sheet: Information for General Practitioners, Management of community-associated MRSA (CA-MRSA) (January 2011)

Key Points

**mMRSA** (multiresistant MRSA or sometimes referred to as healthcare-associated MRSA) are strains that have adapted to spread and cause infections in the healthcare setting. The major hospital-associated strain in Australia is resistant to all penicillins, cephalosporins and methicillin (oxacillin), plus three or more of the non-beta-lactam antibiotics (erythromycin, cotrimoxazole, gentamicin, rifampicin, fusidic acid, ciprofloxacin, tetracycline).

- mMRSA first appeared in the 1960s and has typically been linked to persons with healthcare associated risk factors such as hospitalisation or nursing home care, chronic dialysis, antibiotic treatment, or exposure to invasive devices or procedures.

**nmMRSA** (non-multiresistant MRSA or sometimes referred to as community-associated MRSA) are strains that have arisen in the community and cause similar types of infection to other strains of *S. aureus* found in the community. They are usually resistant to all penicillins, cephalosporins and methicillin (oxacillin), plus up to two of the non-beta-lactam antibiotics (erythromycin, cotrimoxazole, gentamicin, rifampicin, fusidic acid, ciprofloxacin, tetracycline).

- nmMRSA infections usually occur in a person who does not have any prior history of a healthcare exposure such as hospitalisation, surgery, permanent intravenous lines or other indwelling devices, or haemodialysis.
- nmMRSA strains of *S. aureus* are different from mMRSA strains.
- The most frequent infections caused by nmMRSA are skin and soft tissue infections that typically present as boils, abscesses, or cellulitis.
Management of Individuals with Skin & Soft Tissue Infections

**Mild skin & soft tissue infections**
- Infected scratches
- Insect bites
- Furuncles
- Small abscesses <2cm
- Boils
  
  Patient NOT systemically unwell

**Moderate/recurrent skin & soft tissue infections**
- Cellulitis
- Moderate abscesses 2-3 cm
- Multiple documented recurrences of infection
  
  Minimal or no systemic symptoms

**Severe infections**
- Extensive cellulitis
- Large >4cm or multiple >3 abscesses
- Osteomyelitis/septic arthritis
- Necrotising pneumonia
- Necrotising fasciitis
  
  Patient septic or unwell

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**Determine if other cases exist among contacts**

- Drain abscesses & cover draining wounds
- Provide wound care & hygiene advice
- NO antibiotics required (unless co-morbidities or unable to drain abscess)
- Maintain close follow-up

**History/risk factors associated with MRSA**
(nmMRSA may be seen outside these risk groups)

- History of MRSA infection/colonisation
- History within the past 12 months of: hospitalisation, surgery, long term care residence, indwelling catheter or other medical device, dialysis, renal failure, diabetes or other co-morbidities
- Close contact with someone known to be infected or colonised with MRSA including household contacts
- Injection drug use
- Inmates of correctional facilities
- Men who have sex with men
- Member of a contact sports team
- Indigenous Queenslander or Pacific Islander

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**Patient education**
- Provide information regarding hygiene & importance of ensuring wounds are completely covered
- Reinforce frequent hand washing & importance of not sharing personal items such as towels, razors or tooth brushes.
- Advise to return if systemic symptoms develop, or no improvement in 48 hours.

**Antibiotic therapy**
- The decision to use antibiotics is dependent on severity of illness or co-morbidities and should be guided by the current guidelines.
- Antibiotic therapy should be adjusted when results of culture and susceptibility are available.
- Monitor response to therapy and review if no improvement or symptoms worsen within 48 hours.

**Recurrent cases**
- Referral for specialist advice from an Infectious Diseases Physician or Clinical Microbiologist should be considered for recurrent cases.

**Adults:**
Empiric therapy for nmMRSA could comprise:
- Oral clindamycin (not recommended if the isolate is erythromycin resistant)
- OR
  Oral cotrimoxazole (not recommended if Group A Streptococcus suspected such as in cellulitis)

**Children:**
- Oral cotrimoxazole suspension (40mg trimethoprim, 200mg sulfamethoxazole)

Refer Therapeutic Guidelines – Antibiotic for recommended doses. Antibiotic choice may need to be altered on receipt of antibiotic susceptibility results

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Dicloxacillin
Flucloxacillin
Cephalexin
(Standard doses as per Therapeutic Guidelines - Antibiotic)