

# MRSA INFORMATION SHEET

MRSA (sometimes referred to as a 'superbug') stands for methicillin-resistant *Staphylococcus aureus*. It is one of the bacteria which tends to be acquired in hospitals so attracts attention as a reflection of hospital performance.

New regimes practised by all levels of hospital staff are helping reduce the rate of infection in hospital, as are specific hygiene practices by patients, their visitors and preventative treatment in the non-hospital environment. The use of antibiotics generally increases the risk of acquiring new resistant bacteria. The sensible use of antibiotics is an important part of the control of MRSA and other resistant bacteria.

## WHAT IS *Staphylococcus aureus*?

*Staphylococcus aureus* is a type of bacterium or "bug" that lives harmlessly in the lining of the inside of the nose of about a third of healthy people. It can sometimes be found in armpits, groin and hair but it does not survive very well on healthy washed skin. It can cause infection once it enters the body through a cut or graze. In fact, it is the most common cause of local skin infections, boils and abscesses. If it gets into the blood, it can cause blood poisoning (sepsis) and then go on to cause abscesses internally and even on heart valves. One of the commonest deep-seated infections occurs in bones. However, all these problems are very, very rare compared with the number of people who carry the bacterium without any symptoms.

### Antibiotic resistance

There are many strains of *Staphylococcus aureus* and the organism is easily able to change its genetic make-up. The DNA of the bug can mutate so its offspring become resistant to an antibiotic. Bugs can also exchange bits of DNA which often makes them resistant to several antibiotics. 'Natural (or "Artificial") Selection' occurs when antibiotics are used because the bugs without the mutations get killed, and only the mutants survive.

In the 1950's, resistance to penicillin became a problem especially in hospitals. In the 1960's, a strain of *Staphylococcus aureus* underwent natural selection and became resistant to penicillin and tetracycline. This caused many serious infections in hospitals. Methicillin was introduced then and this antibiotic and its derivatives like flucloxacillin, proved very effective in treating penicillin-resistant strains. Resistance was occasionally seen very soon after introducing these antibiotics but there has been a dramatic increase in MRSA in UK hospitals since 1994. This increase is caused by a few strains which seem to be able to spread

very easily.

MRSA strains are resistant to a variety of the antibiotics that are commonly used to treat infection with *Staphylococcus aureus* such as flucloxacillin. MRSA strains are always resistant to the penicillins and the cephalosporin antibiotics but luckily they are never resistant to all antibiotics.

## What does *Staphylococcus aureus* do?

***Staphylococcus aureus* does not normally infect healthy people despite the fact that many are carrying the bacterium.**

Infection arises mainly after cuts and abrasions and after surgery. Some people contract skin infections (boils) and it is possible this happens when they are tired and run down, ill, or poorly nourished. Sometimes suffering from boils runs in the family because virulent bugs can be passed from one person to another very easily by sharing flannels and towels or even razors! In hospital, any injury to the skin may become infected.

In addition to the obvious cuts of surgery in hospital, plastic tubes placed in the body to drain fluids or plastic tubes placed into veins and arteries all cause small holes through the skin where infection may begin.

It is quite normal to acquire new bugs when we go into a new environment, be it an hotel, someone else's home or hospital. In fact, we have a fairly stable bug flora in our bodies but this does change gradually through our lives depending on what we are exposed to. Big changes in our bacterial flora can happen when we take antibiotics.

In hospital, patients may easily acquire a new strain of "spreadable" *Staphylococcus aureus* from the other patients, staff and visitors. People in hospital are particularly vulnerable as the bacterium can be spread from person to person quite easily. In the community, the movement of *Staphylococcus aureus* from person to person is much slower because we are generally in direct contact with relatively few people. So we tend to see new successful strains of *Staphylococcus aureus* spreading in the community about 10 years after they have begun to circulate in hospital.

However, in addition to the problem we see in hospitals, at the moment there is an epidemic of a very special virulent strain of community-acquired MRSA which tends to spread between people who do contact sports and use gyms and who have not been in contact with hospitals. The pattern of resistance to antibiotics is different from the strains which currently spread in UK hospitals. This bug causes very nasty skin infections and is a major problem in the USA though a few cases have already been seen in the UK. UK gyms are advised to

encourage good hygiene practices in their customers.

## Symptoms

*Staphylococcus aureus* is quite common: around 30% of people carry the bacterium in their nose (this is often referred to as being 'colonised' with *Staphylococcus aureus*). This is not a risk to healthy people and the majority of people colonised with *Staphylococcus aureus* do not have any symptoms and aren't aware they are carrying the germ.

For people who do become infected with MRSA, symptoms can include the following:

- boils and abscesses in any part of the body. These are quite uncommon these days which may mean that the population is healthier than it has been in the past.
- impetigo: an infectious skin disease usually around the mouth which used to be common in nurseries and junior schools and to spread like wild-fire but is uncommon now. (This is the disease where gentian violet used to be put on the skin and cause big purple splodges!)
- septic wounds: this is the bad outcome of surgery which we are trying very hard to eradicate. Overall, wound infection rates are less than 5% and hospital staff do everything they can to reduce this risk.
- Infection of bones and joints: commoner in children
- blood poisoning or sepsis: the bacteria gets into the blood stream.
- heart-valve infections: this is a complication of bacteria in the blood and where there is some sort of abnormality of the valve.
- food poisoning: some strains of *Staphylococcus aureus* produces toxins which can cause vomiting. The foodstuff is contaminated by the organism from a chef and then grows in the food until there is a lot of toxin present. Nowadays, this is a rare form of food poisoning.
- toxic shock syndrome: this arises when a small focus of infection is caused by a strain of *Staphylococcus aureus* possessing a special toxin which spreads around the body causing a severe generalised illness. This is also very rare.

## What is the effect of *Staphylococcus aureus* infection after surgery?

Wound infections usually do not appear until 10-14 days after surgery and this is particularly disappointing as recovery seems to be going well. The area of the wound will become more painful, red and hot and there may be some swelling. Eventually an abscess forms within the wound and this may discharge pus which is the normal healing response to infection. However, If your wound becomes

infected like this, it will take longer to heal and you may need to take antibiotics to help the healing process. If the infection is resistant like MRSA we may nurse you in a side room to reduce the risk of your bacterium spreading to others.

## Treatment

Treatment depends on two main factors:

- The pattern of antibiotic resistance in the particular strain of *Staphylococcus aureus*.
- Whether you have an infection or are simply colonised with the bacteria.

### ***For treatment of an infection***

An infected wound may need cleaning by surgery. Although this sounds drastic, it is very important to drain pus to encourage healing as wounds which have been properly cleaned heal more quickly.

If the strain of *Staphylococcus aureus* is not resistant to methicillin, then flucloxacillin or another common antibiotic drug can be given if the doctor thinks it is necessary. These are mostly available in tablet form but for ill patients they may be given by injection.

If the infection is caused by MRSA (that is, resistant to many common antibiotics, including flucloxacillin, and usually ciprofloxacin and erythromycin), other types of antibiotics can be used. Laboratory tests on a sample of the bacteria will tell the doctor which antibiotics will work on a particular strain. Most strains of MRSA can be treated with antibiotics such as vancomycin or teicoplanin, which are given by infusion into a vein. Very few strains are resistant to vancomycin but even if they are, other drugs such as linezolid or rifampicin with trimethoprim are available.

### ***Treatment before surgery for prevention of infection (prophylaxis)***

People who are just 'colonised' with the bacterium have MRSA present in the nose and sometimes in the groin and armpits, but the bacteria have not yet caused any harm. If you are colonised, then it may be worth reducing the number of bacteria in these parts of the body especially just before a surgical operation.

Sometimes in the home environment, a programme of topical medication is offered for a maximum of 5 days, up to the time of surgery. A special antibiotic called mupirocin is usually applied to the inside of the nose to remove the bacteria. Skin and hair is washed with special antiseptic soap, and antiseptic dusting talc is used after bathing. You should change your sheets, towels and

flannels every couple of days. There is a recommended prescription at the end of this leaflet.

Sometimes a specialist may recommend trying to reduce colonisation in individuals and families who have skin infections and/or recurrent boils.

## Prevention

### Hygiene

MRSA is usually passed on by human contact, often from the skin of the hands. Therefore, in hospitals, hands should always be thoroughly washed and disposable gloves worn when changing dressings to prevent the germ spreading to other people. Open wounds and dressings are likely to be very heavily contaminated by *Staphylococcus aureus*.

Hospital staff who come into contact with patients need to maintain a very high standard of personal hygiene and they should take extra care when treating patients known to be infected with MRSA. Before examining a patient, hospital staff should make sure they have washed their hands or cleaned them with a special alcohol rub or gel. Alcohol hand gel dispensers are placed by patients' beds and at the entrance to clinical areas for use by staff and visitors. Rub the gel thoroughly into your hands until they are warm and dry.

If you are concerned about hygiene, don't be afraid to ask the doctor or nurse treating you if you notice that they have not cleaned their hands. When in hospital, you can reduce your risk of infection by keeping up the same standards of hygiene as you use at home. Sensible precautions include:

- Keeping your hands and body clean. Take soap, a flannel and moist hand-wipes with you, as well as your own razor and toothbrush.
  - Always wash your hands after using the toilet or commode (many hospitals now routinely offer a hand-wipe).
  - Always wash your hands or clean them with alcohol gel or a hand-wipe immediately before and after eating a meal.
  - Make sure your bed area is regularly cleaned
  - Report any unclean toilet or bathroom facilities to staff.
  - Make sure all your visitors use alcohol gel before contact with you. Discourage them from bringing in food and if they bring in items for you such as i-pods clean them with an alcohol wipe before you use them.
- 
- If you are not in hospital, it is still very important to take basic hygiene precautions. Do not share towels and flannels. Keep wounds covered as instructed by your nurse. All the family members should wash their hands

frequently and thoroughly.

For the skin infections and boils at home, really diligent precautions and actions are needed to get rid of the *Staphylococcus aureus* from families.

### Preventing the effects of antibiotics

As explained above, taking an antibiotic will kill many bacteria in your body and leave it open to be colonised by resistant ones. Some people think that taking live “acidophilus” tablets or yoghurt can help these symptoms. Unfortunately, these preparations do not have much effect. Time alone without antibiotics allows your body to recolonise with normal sensitive bacteria.

---

A simple “de-colonisation” procedure

### Prescription

Mupirocin nasal ointment 2% 15g

Chlorhexidine gluconate 4% (Hibiscrub or equivalent) 500 mL

Chlorhexidine hairwash, one bottle

Chlorhexidine Antiseptic Dusting powder (*Chlorhexidine acetate 1% or equivalent*) 15g

CHLORHEXIDINE GLUCONATE 4% (eg “HIBISCRUB”)	Wash the body once or twice a day. It is best to apply this neat onto the wet body and then shower it off. Do not add it to bath water because it will be too dilute
CHORHEXIDINE Hair wash	Shampoo hair on Days 1, 3 and 5
CHLORHEXIDINE ACETATE DUSTING POWDER 1%	Dust armpits, groins and skin folds after washing and drying
MUPIROCIN NASAL OINTMENT 2%	Apply to inside of each nostril with a clean finger three times a day

There are alternative preparations to chlorhexidine. “Selsun” or other selenium containing shampoos for dandruff can be used if preferred.

This should be done for a maximum of 5 days. If you are having surgery, do this for up to 5 days before the operation. The clothes, bedclothes and night clothes should be changed a couple of times during this.

We hope you have found this information helpful. If you are going into hospital for surgery or if you feel you and/or your family may be colonised with the bacteria and you need further information, please don't hesitate to ask a medical practitioner for advice. April 2008