

A simple guide to MRSA

This guide explains what MRSA is, how it developed and ways in which it can cause infection.

What is MRSA?

MRSA stands for methicillin resistant *Staphylococcus aureus*. It is a highly contagious strain of the *Staphylococcus aureus* family of bacteria, which cause a number of infections, some of which are serious. The reason that MRSA is such a problem for hospitals and care homes – and why it has become known as a superbug – is that it is resistant to common antibiotics.

MRSA – background and a short history

The *Staphylococcus aureus* family of bacteria, to which MRSA belongs, is a very common cause of bacterial infections such as boils, carbuncles, infected wounds, deep abscesses and bloodstream infection (or bacteraemia).

It was first identified in the 1880s when doctors realised it was the most common cause of infected surgical wounds and could cause serious or sometimes fatal disease. When penicillin was introduced in the 1940s, it helped tackle these infections, but after a while some strains of the bacteria began to become resistant to the antibiotic and by 1959, about 90-95% of *S.aureus* strains isolated from patients with clinical infections were resistant to penicillin.

Methicillin (and, later, cloxacillin and flucloxacillin) was therefore developed, from penicillin, to treat these new strains with some success. Although the first case of MRSA was reported in England within a year of the launch of methicillin, MRSA was relatively uncommon through the 1960s and 1970s, and only a few more cases appeared in the 1980s.

In the mid -1990s, however, 'epidemic' strains of MRSA became established in hospitals throughout the UK. These strains are easily transmissible (passing between and colonising both patients and hospital staff easily) and have the capacity to cause serious disease. When we talk about MRSA, usually these strains are being referred to.

What does MRSA cause in patients?

There is no specific 'MRSA disease', as there is with tuberculosis or typhoid. Instead, MRSA can infect a range of tissues and body systems, depending on how it entered the body. As a result, patients may have general and ambiguous

symptoms that are common to many different infections caused by other bacteria – including other strains of *S.aureus* bacteria. These can range from potentially fatal infections such as septicaemia to asymptomatic colonisation, where the patient is carrying the MRSA bacteria but has no symptoms.

The list below shows some of the ways MRSA affects patients and how it can be identified.

Wound infections

S.aureus is the commonest cause of wound infection – either after accidental injury or surgery. The obvious signs are that the wound is red and inflamed, has yellow pus seeping from and may easily break open or fail to heal. A wound abscess could develop.

Superficial ulcers

MRSA can infect pressure ulcers, varicose ulcers and diabetic ulcers (all of which are caused by poor blood supply and superficial skin damage) if the skin breaks. The ulcer is then harder to heal.

Intravenous line infections

MRSA may infect the entry site of an intravenous line, causing local inflammation with pus from which the MRSA can enter the blood stream to cause a bacteraemia (blood stream infection).

Deep abscesses

If MRSA (or any *S.aureus*) spreads from a local site into the bloodstream, it can lodge at various sites in the body (e.g. lungs, kidneys, bones, liver, spleen) and cause deep abscesses. Patients are likely to be in considerable pain and may have high fever, a high white cell count in the blood and signs of inflammation near the infection. The patient will be unwell and may have rigors (shivers) and low blood pressure (shock).

If untreated over a period, the body will enter a catabolic state where tissues begin to break down, the patient loses weight and vital organs will fail. This is usually linked with an associated septicaemia.

Bacteraemia / septicaemia

MRSA can enter the normally sterile bloodstream either from a local site of infection (wound, ulcer, and abscess) or via an intravenous catheter (placed there for the patient's medical care).

Bacteraemia is when MRSA is in the blood – and it can lead to septicaemia, the clinical term for a severe illness caused by the bacteria in the blood stream. This is the kind of MRSA infection that has the highest death rate.

The symptoms are not specific to MRSA and can be the same for other bacteria that cause septicaemia. Typically, symptoms can include high fever, raised white cell count, rigors (shaking), disturbance of blood clotting with a tendency to bleed and failure of vital organs.

Lung infections

MRSA can cause lung infections when bacteria enter the lungs via a tube in the trachea. This rarely occurs outside of Intensive Care Units, where the patient is on a ventilator with a tube in the trachea, bypassing the defences of the nose and throat. When MRSA gains entry to the lungs via the tube, it can cause pneumonia, which may be fatal.

How do patients become infected?

S.aureus is just one of a family of staphylococcal bacteria. Their normal home is on human skin and nose, and some of them – such as *S.epidermidis* – are seen as part of the normal ‘commensal flora’ of the human body. About 30% of the general population are colonised by *S.aureus* – in other words, they have it on their skin and/or nose– and are known as carriers. In about one tenth of these carriers (3% of the population overall), the *S. aureus* is MRSA

MRSA infection occurs when the bacteria enter the body through a wound or when they enter the bloodstream. A carrier can be a source of infection for themselves (e.g. they can infect themselves if they have a wound), but they can also infect others when the bacteria are passed on either on someone’s hands (normally a healthcare worker’s) or on infected equipment such as catheters.

Carriage sites are most commonly the nose and the skin, especially in folds such as axilla (armpit) or groin.

What can we do to prevent infection?

- To reduce the likelihood of spreading infection, you should always wash your hands or use an antibacterial hand rub after you have had any physical contact with a patient – whether the patient has a wound or not. Remember that healthcare workers can be carriers of the bacteria even if they are not infected themselves.

- You should also encourage patients to wash their hands after using the toilet and before and after eating.
- If you suspect infection, there is a simple test that involves taking a swab or other sample from the suspected site of infection and sending it for laboratory analysis. Also check their antibiotics to make sure their treatment is appropriate for MRSA.
- If a patient is infected, always use gloves when treating them and consider moving them away from other patients to help prevent the bacteria spreading.
- In high-risk situations (e.g. patients for major surgery like a hip replacement or heart surgery) if pre-screening shows MRSA carriage, decontamination with skin and nose treatment is recommended before they are operated on.

Visit www.clean-safe-care.nhs.uk for further copies of this Simple Guide.