

Factsheet 6 of 6: Superbugs

Subject: Superbugs

For: patients, relatives and healthcare workers

What is a superbug?

It is bacteria (bug) that is resistant to many of the commonly used antibiotics. Infections caused by superbugs are harder to treat and tend to make you quite sick.

What is MRSA?

The letters SA stand for *Staphylococcus aureus*; this is a very common bacteria. On any given day about 1 in 3 people have SA in their nose and or on their skin and it causes them no harm. When SA gets under the skin it can cause boils, wound infections and can infect the blood, heart valves and bones. Back in 1944 SA was easily killed by the first penicillin. A few years later the first penicillin did not work so well and in the early sixties there was a new type of penicillin for SA called methicillin. A few years after that SA that was not killed by methicillin became common. MRSA is *Staphylococcus aureus* that is resistant to (not killed by) methicillin.

We do not see as many serious infections with MRSA in Ireland and in many other countries as we did a few years ago but MRSA is still as serious problem and very common in hospitals and nursing homes. MRSA spreads easily in hospitals and nursing homes unless great care is taken to control it. Most people who get MRSA do not get sick as a result but some patients get very serious MRSA infection. Although methicillin does not work against MRSA there are a number of other antibiotics that do work although some of the alternatives may be more difficult to use and more expensive.

The steps needed to stop spread of MRSA in a hospital are very similar to the steps needed to stop spread of CPE.

What is VRE?

The E stands for Enterococcus which is a type of gut bug that everyone has in their gut. Enterococcus is harmless in the gut but can get into the blood of vulnerable people and cause serious infection. Some Enterococcus are naturally resistant to a lot of ordinary antibiotics. An antibiotic called vancomycin is very important for treating Enterococcus infection. VRE is Enterococcus that is not killed by vancomycin (resistant to vancomycin). VRE = Vancomycin Resistant Enterococcus.

Twenty years ago VRE was very rare in Ireland but now VRE is very common in many hospitals and nursing homes in Ireland (and across the world). VRE is easily spread from person to person; most people who get VRE do not get sick as a result but some patients get a very serious infection. Although vancomycin does not work against VRE there are a number of other antibiotics that do work.

The steps needed to stop spread of VRE in a hospital are very similar to the steps needed to stop spread of CPE.

What is ESBL?

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Developed by the HSE HCAI/AMR Implementation Team

This is difficult term to explain but briefly the term is used to describe some common but bugs that are not killed by some of the antibiotics such as cefotaxime that we started to use a lot in the 1980s.

There is a big group of very important antibiotics for which the technical name is “beta-lactams”. This big group of antibiotics includes common antibiotic like ampicillin. Some bacteria make something called an enzyme that breaks down some of these beta-lactam antibiotics and stops them from working. An enzyme that breaks down a beta-lactam is called a “beta-lactamase”. The BL in ESBL stands for beta-lactamase.

When we first learned about BLs the ones we found were good at breaking down older antibiotics like ampicillin but were not much good at breaking down a lot of the newer antibiotics in this group (for example antibiotics like cefotaxime). So these early BLs were only able to break down a small number or a narrow range of beta-lactams. In the 1980s we started to find but bugs that were making new enzymes that were able to break down a much wider range of the beta-lactams including the new antibiotics like cefotaxime.

Scientists called the older enzymes “narrow spectrum beta-lactamases” and they called the newer ones that could break down the newer drugs like cefotaxime “extended spectrum beta-lactamases. ESBL then stands for Extended Spectrum Beta-Lactamase. When we talk about ESBLs we mean certain types of common gut bug (called *Enterobacteriaceae*) that have picked up the ability to make ESBL enzymes and as a result are resistant to cefotaxime and similar antibiotics.

Because ESBLs are normal gut bugs they are harmless in the gut but can get into the blood of vulnerable people and cause serious infection. ESBLs were rare in Ireland twenty years ago but are now very common in many hospitals, nursing homes, animals, rivers and streams in Ireland and more generally in the world. ESBLs are is easily spread from person to person.

Most people who get ESBLs do not get sick as a result but some patients get very serious infection. Although cefotaxime does not work against most ESBLs there are a number of other antibiotics that do work. One of the key drugs we have relied on for ESBLs resistant to a lot of other antibiotics was meropenem and as we have used more meropenem to treat infection with ESBLs this has encouraged the spread of CPEs that are resistant to meropenem.

The steps needed to stop spread of ESBL in a hospital are very similar to the steps needed to stop spread of CPE.

What do we need to do to control superbugs?

There are two key things we need to do:

- 1. Use less antibiotics**
- 2. Get better at stopping bugs that are antibiotic resistant from spreading from person to person and between people, animals and the environment.**

Doing these two things well all the time means big changes in the way we use antibiotics in medicine, animal health and changes in how we care for the environment. We have to get a lot better about cleaning up after ourselves in hospitals, farms and in the general environment.

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1. How do we use fewer antibiotics? No one wants to stop using antibiotics. When antibiotics are really needed they prevent suffering and death from infection in people and in animals. However, we have got into a bad habit of using antibiotics for many infections where they do no good at all. This might well cause you harmful side effects such as diarrhoea, thrush and skin rash. We need to change this. Sometimes we also use antibiotics for longer than we need to or we use the wrong antibiotic or we use too much antibiotic. We need to change all of this. Although the EU has banned the use of antibiotics as animal growth promoters we still use a lot of antibiotics in animal food production. There are good examples from other countries of how to rear healthy animals with a lot less antibiotics that we use now.
2. How do we stop the bugs spreading? One of the important things about cleaning up after ourselves is that these bugs are so small that you can fit millions of them on head of a pin. Even something that looks clean – a table top, a book, your hands - may not be clean enough to be free of bugs. This is especially important in healthcare settings like hospitals and nursing homes and in particular for health care workers' hands.
3. Hands that look clean can carry millions of bugs. A nurse or a doctor may have to clean their hands up to 10 times an hour to stop bugs spreading if they are treating many patients. Performing hand hygiene by the approved method almost all the time protects the nurses and doctors as well as protecting the patients and residents. However even one minute of forgetfulness can put all the care that you and others have taken with that patient at risk. Performing hand hygiene properly all the time is not easy and no place in the world does this perfectly. In Ireland we certainly are doing better than we were 10 years ago but we need to do better still.

For more information on antimicrobial resistance and healthcare acquired infection or to view CPE guidance check www.hse.ie/hcai