Fact sheet 3 of 6

Subject: CPE information for healthcare workers

For:

Healthcare workers

Seirbhís Sláinte Níos Fearr á Forbairt | Building a Better Health Service

What can be done to prevent healthcare associated infection?
It is really difficult to completely stop bugs from spreading in hospitals and clinics and to prevent all healthcare associated infection. There is no country in the world that has a perfect system for doing this but some countries manage better than we do. It is possible to do better than we do now but it is not easy and it will not be fast. We will need to invest a lot and to change a lot about how we organise health care and how we behave. This is slow and demanding work that needs very strong leadership over a long period to time.

The following are some things that can reduce healthcare associated infection:

1. Make sure that people spend as little time as possible in hospitals, nursing homes and other residential healthcare facilities.

2. Help patients and residents to be less vulnerable to infection by:
    a. keeping people mobile
    b. helping people maintain a good diet and take plenty of fluids
    c. giving vaccines like flu and pneumococcal vaccine to reduce illness
    d. avoiding antibiotics that are not needed (they do more harm than good if you don't need them)
    e. keeping people free of tubes and needles (urinary catheters, intravenous drips) as much as possible

3. Make it harder for bugs that cause disease to spread from one person to another. Stopping bugs from spreading in a hospital or clinic is very hard to do. The most important idea here is **"Standard Precautions".** You cannot tell by looking at someone if they have an AMR bug. No system of lab testing for AMR bugs is perfect. This means we have to think that any patient we see might carry an AMR bug and so **standard precautions** means the basic care we take with **EVERY** patient to prevent spread of bugs between patients and between patients and staff. The most important part of standard precautions is hand hygiene. We know that hand hygiene works very well most of the time. Every time you perform hand hygiene you are protecting patients and protecting yourself. But it is really hard to remember to perform hand hygiene 100% right all of the time. Just one mistake – forgetting to perform hand hygiene when you rush from one patient to help another patient can put weeks of good work at risk. "Standard Precautions" also includes using personal protective equipment (PPE) when needed (clean gloves, plastic aprons and eye protection) and cough etiquette (cover up when coughing or sneezing). Gloves are always **as well as not instead of** performing hand hygiene so you must change gloves and perform hand hygiene between tasks.

4. Patients/residents and their visitors can also help to prevent spread of infection by washing hands or using alcohol based hand rub especially after visiting the toilet. Disposable hand wipes may be helpful for some patients. Remember alcohol hand rub is only suitable for

hands that look clean. If there is any dirt on the hands or under the fingernails, then cleaning with soap and water is needed.

Why are there so many different terms CPE, CRE, NDM, OXA
Most of the time the different terms do not matter for most people but the differences can be important for specialists who are dealing with the spread of CPE. This is a short explanation of the differences.

What do the letters CPE stand for?
E stands for Enterobacteriaceae. *Enterobacteriaceae* means a larger family of bugs that live in the gut. You may have heard of one of these bugs called *E. coli*. *E. coli* is one of this family of gut bugs but there are many others.

C stands for Carbapenemase. The carbapenems are a very important group of antibiotics. The best known example in Ireland is an antibiotic called meropenem. A carbapenemase is an enzyme (a type of protein) that destroys meropenem and other antibiotics like meropenem.

P stands for Producer.

So CPE is a gut bug that produces a protein/enzyme that destroys meropenem.

What do the letters CRE stand for?
E stands for *Enterobacteriaceae*. *Enterobacteriaceae* means a large family of bugs that live in the gut. You may have heard of one of these bugs called *E. coli*. *E. coli* is one of this family of gut bugs but there are many others.

C stands for Carbapenem. The carbapenems are a very important group of antibiotics. The best known example in Ireland is an antibiotic called meropenem. Until a few years ago meropenem killed pretty much all gut bacteria. We can say that gut bacteria are normally sensitive to meropenem.

R stands for Resistant. In the last few years there are more and more gut bugs that are **not** killed by meropenem – we say these are resistant to meropenem and to other members of this carbapenem family of antibiotics. So a CRE Carbapenem Resistant *Enterobacteriaceae* is a gut bug that is not killed by meropenem.

CRE stands for Carbapenem Resistant *Enterobacteriaceae*.

When a lab finds a Carbapenem Resistant *Enterobacteriaceae* (a CRE) in a patient sample the next question to ask in is what is it about the bug that makes it resistant to meropenem. There are a few different things that can make a bug resistant to meropenem. So the CRE bugs can be divided into different groups. One group of CRE is called CPE (Carbapenemase Producing *Enterobacteriaceae*). This CPE group is the group of CRE that we are most worried about because it is these CPE that are spreading rapidly all over the world.

You might also find the following leaflets helpful. There is a patient information leaflet available at this link https://www.hpsc.ie/publications/informationleafletsforthegeneralpublic/File,12779,en.pdf

Why does it matter if CPE can destroy meropenem?
Over the past 30 years or more gut bugs (*Enterobacteriaceae*) have become harder and harder to kill with antibiotics. This means that we have less choice when it comes to antibiotics to treat infection caused by these bugs. Until about 10 years ago one safe antibiotic we could nearly always

count on for people with very bad infection with these gut bugs was meropenem. CPE means that we can't count on meropenem anymore and so sometimes we have no safe, easy to use antibiotic to treat infection caused by CPE.

What is OXA, KPC and NDM?
This is another piece of the puzzle. CPE is a gut bug that makes a protein/enzyme that destroys meropenem. But all CPE are not the same. There are a few different enzymes. The three enzymes that destroy meropenem and that are most common in Ireland in 2017 are called (1) OXA, (2) KPC and (3) NDM. The difference between different CPEs can be important to a team trying to stop CPE from spreading. Suppose there are two patients in a ward called James and Peter. If James and Peter both carry CPE but James has the OXA type of CPE and Peter has the KPC type of CPE then we know that they have different kinds of CPE and the bug did not spread from James to Peter or from Peter to James.

If James and Peter both have a KPC type of CPE then we have to wonder if the bug spread from one of them to the other of if they both got it from someone else. Knowing how the bug is spreading can be important in making plans to stop spread.

What extra steps are needed to prevent spread go CPE bugs from patients who are known to carry CPE?
Remember **standard precautions** apply to all patients all the time and will reduce the risk of spread of CPE. You must expect that there will be patients in your care who have undetected CPE (or other superbugs) so do not let your guard down because you do not know someone has CPE or because they have had a laboratory test and CPE was not detected. CPE is spread by contact so standard precautions go a long way to reduce the risk of spread of CPE. Additional "**contact precautions**" should be applied with patients with known CPE colonisation or infection. Check your hospital policy for details but the additional measures will in so far as possible include single en-suite room with the door closed, signage on the door and use of long sleeve gowns for close contact.

Why not test staff to see if they are CPE carriers?
In relation to protecting patient or residents it is not necessary to know if staff are carrying CPE in their gut. All staff members at all times have to be careful about hygiene, especially about carrying out good hand hygiene after going to the toilet. Good hand hygiene deals with the risk of spreading gut bugs from a staff member. If a staff member did carry CPE there might be a greater risk of spread from the staff member to patients and other staff if they have diarrhoea. However, all health care workers with diarrhoea should stay away from care of patients/resident until at least 2 days after the diarrhoea has stopped. The basic staff rules about hand hygiene and staying out of work with diarrhoea are the ways we manage any risk to patients/residents from CPE or any other bugs that might be carried in the gut of the healthcare worker. There is no good reason or evidence to show that testing health care workers would make patients any safer.

Should health care workers know if they are carrying CPE?
Carrying CPE in the gut does not make a health care worker sick. There is no treatment for clearing it but it may go away on its own. So if a health care worker finds out that they are carrying CPE they may worry about it but there is nothing to do about it. Provided they follow standard good practice in the clinical area there is no reason to believe that they are putting patients at risk.

In relation to their own health we do not have any information that says health care workers who look after people who carry CPE are more likely to get sick with CPE than anyone else. Even for health care workers with health problems like diabetes or high blood pressure we have no reason to believe that they are more like to get sick with CPE because of their work. We do not have any information that says the family members of health care workers are more likely to carry CPE or to get sick with CPE.

We can never rule out a risk of infection to a health care worker. Health care workers have contact with sick people. Some of those sick people have infections that can make a health care worker sick than CPE (influenza, tuberculosis, salmonella and so on). The risk of infection at work is are small (probably a lot smaller than driving to work) for most health care workers especially if they following **standard precautions** at work – most especially carrying out hand hygiene properly when needed during the day and before going home from work. Remember standard precautions is about protecting healthcare workers as well as protecting patients.

Do we need to do anything special with the body of a person colonised with CPE after they die?

No; good routine practice should prevent the spread of bacteria from the dead body. With the dead as with the living carrying out hand hygiene by the proper method is the most important safeguard against spread of infection.

I want to know the technical details about antibiotic resistance?

Technically antibiotic resistance is assessed by growing a bug in the lab in a tube that has no antibiotic (the control tube) and in a set of tubes with gradually higher concentrations of antibiotic. We look to see how much antibiotic is needed to stop the bug from growing. If a small amount of antibiotic stops the bug growing it is sensitive and if the bug grows in a high concentration of antibiotic, it is resistant.

We divide antibiotic resistance into two categories. Intrinsic resistance and acquired resistance. Intrinsic resistance means that on the day the antibiotic was discovered it did not work for this particular type of bacteria. An example is the original penicillin (benzylpenicillin) never worked against the bug that most commonly causes cystitis (called *E. coli*). So the day it was discovered the first penicillin was not much use for treating cystitis caused by *E. coli*.

Acquired resistance means that on the day the antibiotic was discovered it worked for this particular type of bacteria but it does not work anymore. An example is the original penicillin (benzylpenicillin) was like magic for treating the bug that is the commonest cause of boils and wound infections (*Staphylococcus aureus*). In 1944 almost all *Staphylococcus aureus* were killed by tiny concentrations of benzylpenicillin today it is completely useless for 9 out of 10 *Staphylococcus aureus* that we find on people. This is acquired antibiotic resistance and most of the time that people talk about antibiotic resistance as a big problem it is this acquired antibiotic resistance that we are talking about – antibiotics that used to work but do not work anymore.

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