Fact sheet 2 of 6

Subject: CPE general information and background

For:

Patients, relatives and healthcare workers

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

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CPE or CRE?

Over the years the letters “CPE” and “CRE” have both been used quite a bit and often people use them to mean more or less the same thing. However, they are not exactly the same thing and we now talk more about CPE as the main problem.

What is CPE?

CPE is the newest in a long line of what people sometimes call “superbugs”. When we talk about “superbugs’ we mean bacteria that are hard to kill with antibiotics. Of all the superbugs we have had so far CPE is the hardest to kill with antibiotics. We think the number of people who carry CPE in Ireland is still fairly small (probably hundreds of people). This means that if we take very good care of people who carry CPE over the next couple of years there is still time to stop CPE becoming very common.

What do the letters CPE stand for? Carbapenemase Producing *Enterobacteriaceae*

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? Carbapenem Resistant *Enterobacteriaceae*

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.

How did CPE appear?

In most ways a CPE is like an ordinary gut bug. The difference between an ordinary gut bug and CPE is that a CPE has picked up a gene (a piece of genetic code) that tells it how to make something (an enzyme) that destroys the carbapenem antibiotics. These pieces of genetic code have always been out there in the natural environment but until about 20 years ago we never saw this code in gut bugs that can cause infection. After hospitals started to use a lot of meropenem to treat infection we started to see ordinary gut bugs turn into CPE.

There are a few different pieces of genetic code that can turn a normal gut bug into a CPE. Each piece

of code makes a gut bug into a different type of CPE. The pieces of code spread like a virus from one bug to another. This makes controlling the CPE problem much harder to manage. The speed of spread of this piece of code for the enzyme also makes it much harder to track the spread of CPE because the code can turn up in the same hospital but in many different types of bug.

How does CPE spread?
CPE lives in the gut along with billions of other gut bugs; most gut bugs are good for you. When you go to the toilet about half of the faeces (poo) that you pass is made up of these gut bugs. The bugs are very, very small. Look at the dot on this letter i. - it would take millions of gut bugs to cover that dot. This means that even the tiniest trace of poo, even on things that look clean; hands, clothing, furniture can be enough to pass on the CPE bug to another person.

For example, maybe you touch something that looks clean – there is a CPE there that gets on the tip of your fingers. You put your hand to your mouth and you put the CPE in your mouth. Maybe someone else gets CPE on their fingers and then they give you food or medicine and they put the CPE into your mouth. The CPE then goes down into your gut and makes itself at home. CPE is even more likely to make itself at home and multiply quickly if you are already on antibiotics.
Although antibiotics are very useful when you need them one of the unwanted downsides of using any antibiotic is that it will kill off a lot of the normal “good” gut bugs. As the normal good bugs die this makes your gut a better home for antibiotic resistant bugs like CPE.

How do we stop CPE from spreading in hospitals and nursing homes?
The biggest danger for spread of CPE right now in 2018 is in hospitals and nursing homes. This is because people in hospitals and nursing homes are more likely to carry CPE. People in hospital and nursing homes are also more likely to catch CPE because a lot of them are already sick and may be taking antibiotics. Clean hands (hand hygiene) are the most important thing in stopping the spread of CPE.

In hospitals and nursing homes, hand hygiene means using alcohol gel or soap and water and carefully following all the steps needed to kill or take away bugs on all parts of the hands. Hospital staff and nursing home staff receive training on when they need to carry out hand hygiene when caring for patients (see the hand hygiene section on www.hse.ie/hcai) hyperlink to new hand hygiene pages) This not only helps to stop CPE from spreading it stops a lot of other “superbugs” as well. The other big thing is to make sure that when people pass faeces (poo) that it is not allowed to spread. If there are tiny traces of poo on the toilet seat, on the commode, on the toilet roll or on hands this can be enough to spread the bugs. So cleaning the toilet seat and other things that people might put their hands on is very important.

Some countries have done a good job of stopping CPE from spreading and others have not managed to control it so well. We may still be able to stop CPE from getting out of control in Ireland if everyone works together but it will not be easy, it will not be fast and it will not be cheap. When we put better CPE controls in place we will need to keep them for good because there is always the risk of CPE coming back into a hospital from Ireland or from anywhere in the world. The risk of picking up CPE in hospital is very high in hospitals in some parts of the world.

When did CPE become a problem?
CPEs were found in different parts of the world in the last 15 to 20 years. Some were first found in Asia some in America. No one knows for sure where they started. The first CPE that was found in Ireland in

was in 2009 and we have found more every year since 2009. In 2017 more than 400 new people carrying CPE were found.

Why not use a new antibiotic to treat CPEs?

There are very few new antibiotics that work against gut bugs. Some drug companies have managed to re-jig some old antibiotics to help a bit. Doctors and scientists are trying to find new antibiotics that work but so far no one has found any completely new antibiotic that is ready to use yet. For CPE infection we often end up using some old antibiotics that we have known about for years but we tried to avoid using them because they are difficult to use and may have side effects for patients.

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