Information for healthcare workers – National pilot study of CRE in critical care units

What is CRE?

CRE stands for Carbapenem resistant Enterobacteriaceae. This term is used to describe a group of well-known bacteria, such as *E. coli* and *Klebsiella pneumoniae*, which have managed to develop resistance to powerful antibiotics belonging to the carbapenem group. These antibiotics, such as meropenem and ertapenem, have traditionally been used to treat infection in patients who are seriously ill or who are suspected to have infection due to resistant bacteria. Historically, these antibiotics have been very effective treatments. In recent years there have been increasing numbers of reports from many countries, such as Greece, Israel, Eastern USA, India and Pakistan of Enterobacteriaceae that have developed resistance to meropenem and CRE bacteria are now very common in those countries. Not only do these bacteria carry enzymes that break down the meropenem, rendering it useless. They also carry enzymes that break down many other classes of antibiotics. CRE bacteria are frequently resistant to almost all available antibiotic therapies and there have been reports that patients who develop invasive infection due to CRE bacteria are more likely to die from the infection due to a lack of effective therapy.

E. coli, *Klebsiella pneumonia*e and related organisms, belong to the family Enterobacteriaceae, which describes bacteria that commonly live in the enteric tract or bowel. These bacteria are often called colonising flora or bystanders, and do no harm to the patient. Critically ill patients are often immunocompromised or vulnerable to infection because of breaches in the normal skin barrier or insertion of invasive devices (surgical wounds, central venous catheters, endotracheal tubes etc.). Such patients are at risk of invasive infection due to colonising bacteria. If the colonising bacteria are CRE, then the usual choices of antimicrobial therapy are ineffective and it may take several days for the laboratory to be in a position to tell what antibiotics are effective. Like any bacteria, CRE could potentially be transferred between patients in the event that there is sub-optimal compliance with standard precautions, including hand hygiene and personal protective equipment use. Because this bug is so resistant and there are hardly any treatments, it is vitally important to ensure that it cannot spread between patients.

How can CRE be detected?

Because CRE is usually carried in the patient's bowel, a rectal swab can be taken and tested in the microbiology laboratory to detect asymptomatic carriage of CRE. Sometimes, the CRE may be detected in a clinical sample from the patient, such as a catheter specimen of urine or a wound swab or in serious cases, from blood cultures. Currently, our national guidelines recommend that if a person has a history of hospital admission abroad in the past year or admission to a hospital in the mid-west of Ireland in the past year, then that patient should have a rectal swab taken to rule out CRE carriage. It is very important to know if a patient is a CRE carrier as this alerts healthcare workers to the need to apply additional transmission based precautions to prevent the bacteria from spreading (patient isolation, dedicated equipment and nursing care etc.) In the event that the CRE colonised patient develops signs of sepsis, it is also helpful to know what antibiotics could be used to treat the infection.

What is the reason for this CRE study?

Before 2010, CRE had only been reported in Ireland on one occasion. Since then, CRE has been detected on several occasions and there have been some outbreaks of infection, mainly in patients admitted to critical care units. Some of the patients had a history of admission to a hospital abroad. This is a four week study in which it is anticipated that all patients in critical care units in Ireland will be screened to check if they are carrying the CRE bacteria in the bowel. This study will help us decide if we need to recommend that all patients in critical care units are routinely screened for CRE carriage and it will also ensure that all microbiology laboratories have experience in picking up these resistant bacteria.