NATIONAL INSTITUTE FOR COMMUNICABLE DISEASES
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NICD CENTRE FOR HEALTHCARE-ASSOCIATED INFECTIONS, AMR AND MYCOSES
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Carbapenem-resistant bacteria
Frequently Asked Questions

1. What are carbapenem-resistant bacteria?

Carbapenem–resistant bacteria are resistant to carbapenem antibiotics. These Gram-negative bacteria are usually from the genera known as *Klebsiella, Enterobacter, Escherichia*, but other genera also become resistant to carbapenems. Bacteria are highly adaptive organisms. Carbapenem antibiotics are broad-spectrum beta-lactam-type antibiotics that are especially effective against Gram-negative bacteria. Carbapenem antibiotics were introduced in the early 1980s and were seen as the last line of defence against Gram-negative bacteria that had become resistant to multiple other antibiotics. Examples of carbapenem antibiotics include imipenem, meropenem, ertapenem and doripenem. Over time, Gram-negative bacteria developed resistance to carbapenem antibiotics. They have gained the ability to either break down carbapenems with an enzyme ("carbapenemases"), or to prevent the antibiotic from entering its cell or to transport it out of the cell. In this way, carbapenem antibiotics can no longer kill these bacteria. The problem is that now, infections with these Gram-negative bacteria are essentially untreatable.

2. What types of infections do carbapenem-resistant bacteria cause?

Organisms that are resistant to carbapenems can cause a variety of infections. Most commonly, they cause bladder infections, intra-abdominal infections, bacteraemia (when the bacterium infects the blood), pneumonia, and skin and soft tissue (including surgical site) infections. Most of these infections are healthcare-associated but certain organisms may be introduced in community and cause infections in susceptible populations. Persons in nursing homes who have frequent admissions to hospital are at high risk.

3. Where do infections caused by carbapenem-resistant bacteria occur?

Bacteria resistant to carbapenems occur throughout the world in healthcare settings, but seem to be more common in middle-income countries where access to antibiotics is common but usage of antibiotics is unrestricted. Infections caused by carbapenem-resistant bacteria occur across South Africa and their prevalence is increasing.

4. Who can get infections caused by carbapenem-resistant bacteria?

Healthy persons are usually not at risk for these infections. Persons who are at risk for infections with carbapenem-resistant organisms are those who have severe illness, surgical patients, long-term hospital-stay patients, persons undergoing organ or stem cell

transplantation, persons in intensive care and those who are on mechanical ventilation. Although less common, persons can also be infected from the community.

5. How do infections caused by carbapenem-resistant bacteria spread?

Carbapenem–resistant bacteria can be spread from person-to-person through being touched by someone carrying the organisms on their hands, or when medical instruments (such as ventilators or urine catheters) or medications contaminated with the organisms are used. Sometimes bacteria may transfer their genes that code for resistance to other bacteria. Sometimes resistant organisms can be newly created when antibiotics are overused.

6. What are the signs and symptoms of infections caused by carbapenem-resistant bacteria?

Clinical symptoms of infections caused by carbapenem-resistant bacteria are identical to symptoms caused by bacteria that are not resistant to carbapenem antibiotics, and depend on the site of infection.

7. What are the complications of infections caused by carbapenem-resistant bacteria?

Persons with these infections are usually already weakened from other underlying conditions, so untreatable infections may lead to death in some cases.

8. How are infections caused by carbapenem-resistant bacteria diagnosed?

It is important to diagnose these infections early so that the best possible treatment can be given, and so that healthcare workers can observing strict infection prevention and control measures and prevent these infections from spreading to other persons.

9. How are infections caused by carbapenem-resistant bacteria treated?

A limited range of antibiotics can be used to treat infections caused by carbapenem-resistant bacteria. These include colistin, tigecycline and aminoglycosides. Unfortunately these antibiotics are often not very potent (strong) and sometimes they have side effects. In most cases combination treatment is recommended.

10. How can infections caused by carbapenem-resistant bacteria be prevented?

Careful use of antibiotics in hospital facilities is essential, so that resistance to antibiotics does not develop, and so that the hospital environment does not ‘select’ for resistant organisms. Infection prevention and control practices, including good hand hygiene, should be encouraged for all healthcare workers and patients. Hospitals should set up systems to monitor the occurrence of healthcare-associated infections, including those caused by carbapenem-resistant bacteria.

11. Where can I find more information?

For clinical or medical enquiries, call the NICD Hotline Tel: +27 82 883 9920 (for use by healthcare professionals only) or the Centre for Healthcare-Associated Infections, Antimicrobial Resistance and Mycoses, National Institute for Communicable Diseases (NICD) Tel: +27 11 386 6278