Category 4: Written or electronic notification within 1 month of diagnosing by private and public health laboratories.

CARBAPENEM–RESISTANT ENTEROBACTERALES (PREVIOUSLY ENTEROBACTERIACEAE)

<table>
<tr><th>Disease epidemiology</th><th>Who must notify</th><th>What to notify</th><th>Confirmed case definition</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr>
<td>Carbapenem-resistant Enterobacterales (CRE) and/or carbapenem-producing Enterobacterales (CPE) are a group of Gram-negative bacteria that are resistant to the carbapenem class of antibiotics. CRE or CPE can produce enzymes that are able to break down carbapenems and survive if patients are treated with these antibiotics. Carbepenems are considered the last line of treatment against Gram-negative bacteria and they are categorized as reserve group of antibiotics by the World Health Organization. In patients with organism resistant to carbapenems alternative treatment is substandard and is difficult. People who are at risk of infections are usually those who are receiving health care in any setting (e.g., hospitals and long-term care facilities, dialysis centres, etc.) and received antibiotic therapy previously. CRE can cause many types of infections including bloodstream infections, urinary tract infections, surgical site infections, pneumonia and meningitis. People often get colonised first from coming into contact with contaminated medical devices, healthcare workers hands and/or equipment, and get infected following breaks in their skin or other tissue.</td>
<td>Laboratory making the diagnosis</td>
<td>Laboratories are to send monthly line lists of all patients with clinical specimens where a CRE was isolated. Only include isolates when resistance was determined using confirmatory methods, including Etest, broth microdilutions test, or PCR (OXA-48 & variants, NDM, KPC, IMP, VIM, GES, etc. detected).
Resistance should be based on interpretation of minimum inhibitory concentrations according to EUCAST or CLSI guidelines.

2021 guidelines for Enterobacterales*
<table>
<tr><td>Antibiotic</td><td colspan="2">Resistance criteria (MICs in µg/mL)</td></tr>
<tr><td></td><td>CLSI</td><td>EUCAST</td></tr>
<tr><td>Ertapenem</td><td>≥2</td><td>>0.5</td></tr>
<tr><td>Meropenem</td><td>≥4</td><td>>8*</td></tr>
<tr><td>Meropenem (CSF)</td><td>-</td><td>>2</td></tr>
<tr><td>Imipenem</td><td>≥4</td><td>>4</td></tr>
<tr><td>Doripenem</td><td>≥4</td><td>>2</td></tr>
</table>
*These guidelines are subject to change annually and therefore reporting should always be in line with the most recent recommendations.

In addition, laboratories are requested to report the total number of patients for which a microbiological culture test was done. If a patient has multiple cultures from the same specimen, they should be counted once. Similarly, if a patient has cultures done for multiple specimen type, they should be counted once.</td>
<td>A patient with an Enterobacterales that is resistant to either of the carbapenem (ertapenem, imipenem, meropenem or doripenem) cultured from any clinical specimen. Each CRE pathogen isolated from the same patient will be counted as a distinct case. A 30-day period will be used to deduplicate patients with more than one of the same CRE isolated.</td>
</tr>
</table>

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GLYCOPEPTIDE-RESISTANAT ENTEROCOCCI

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<tr><th>Disease epidemiology</th><th>Who must notify</th><th>What to notify</th><th>Confirmed case definition</th></tr>
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<td>Glycopeptide-resistance Enterococci (GRE) are Gram-positive bacteria that have developed the ability to survive in the presence of the glycopeptide antibiotics (such as vancomycin), normally used to treat people who are infected with Gram-positive bacteria. Enterococci are present in the human intestines and in the female genital tract without causing harm. They are also found in the environment, including in healthcare settings. GRE typically affect people who are ill (particularly those who have weakened immune systems) and admitted to hospitals, and those receiving treatment that may be weakening their immune system.</td>
<td>Laboratory making the diagnosis</td>
<td>Laboratories are to send monthly line lists of all patients with clinical specimens where a GRE was isolated. Only include isolates when resistance was determined using a confirmatory methods, including Etest, broth microdilutions test, or PCR (vanA, vanB, vanC1/vanC2, etc. detected). Resistance should be based on interpretation of minimum inhibitory concentrations according to EUCAST or CLSI guidelines

2021 guidelines for Enterococci*
<table>
<tr><td>Antibiotic</td><td colspan="2">Resistance criteria (MICs in µg/mL)</td></tr>
<tr><td></td><td>CLSI</td><td>EUCAST</td></tr>
<tr><td>Vancomycin</td><td>≥32</td><td>>4</td></tr>
<tr><td>Teicoplanin</td><td>≥32</td><td>>2</td></tr>
</table>
* These guidelines are subject to change annually and therefore reporting should always be in line with the most recent recommendations.

In addition, laboratories are requested to report the total number of patients for which a microbiological culture test was done. If a patient has multiple cultures from the same specimen, they should be counted once. Similarly, if a patient has cultures done for multiple specimen type, they should be counted once.</td>
<td>A patient with an Enterococci that is resistant to vancomycin (±teicoplanin) cultured from any clinical specimen. When multiple Enterococcus species are isolated from the same patient, each will be counted as a distinct case. A 30-day period will be used to deduplicate patients with more than one of the same Enterococci pathogen isolated.</td>
</tr>
</table>

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GLYCOPEPTIDE-RESISTANT STAPHYLOCOCCUS AUEUS

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<tr><th>Disease epidemiology</th><th>Who must notify</th><th>What to notify</th><th>Confirmed case definition</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr>
<td>Staphylococcus aureus is a common Gram-positive bacterium that causes healthcare-associated infections. Patients with Staphylococcus aureus infections that are resistant to first line antibiotic treatment (methicillin) are mainly treated with glycopeptides, another class of antibiotics. Although uncommon, resistance to glycopeptides can occur in patients who have prolonged stays in hospital stays and prolonged treatment with glycopeptides. Vancomycin resistance is uncommon is seldom through the pathogen acquiring the vanA gene. A few cases of vancomycin resistant Staphylococcus aureus infection have been reported globally.</td>
<td>Laboratory making the diagnosis</td>
<td>Laboratories are to send monthly line lists of all patients with clinical specimens where a glycopeptide-resistant Staphylococcus aureus was isolated. Only include isolates when resistance was determined using confirmatory methods, including Etest, broth microdilutions test, or PCR (vanA, vanB, vanC1/vanC2, etc. detected). Resistance should be based on interpretation of minimum inhibitory concentrations according to EUCAST or CLSI guidelines

2021 guidelines for Staphylococcus aureus*
<table>
<tr><td>Antibiotic</td><td colspan="2">Resistance criteria (MICs in µg/mL)</td></tr>
<tr><td></td><td>CLSI</td><td>EUCAST</td></tr>
<tr><td>Vancomycin</td><td>≥16</td><td>>2</td></tr>
<tr><td>Teicoplanin</td><td>≥32</td><td>>2</td></tr>
</table>
*These guidelines are subject to change annually and therefore reporting should always be in line with the most recent recommendations.

In addition, laboratories are requested to report the total number of patients for which a microbiological culture test was done. If a patient has multiple cultures from the same specimen, they should be counted once. Similarly, if a patient has cultures done for multiple specimen type, they should be counted once.</td>
<td>A patient with Staphylococcus aureus that is resistant to vancomycin (±teicoplanin) cultured from any clinical specimen.
A 30-day period will be used to deduplicate patients with multiple subsequent pathogens isolated.</td>
</tr>
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COLISTIN-RESISTANT PSEUDOMONAS AERUGINOSA

<table>
<tr><th>Disease epidemiology</th><th>Who must notify</th><th>What to notify</th><th>Confirmed case definition</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr>
<td>Pseudomonas aeruginosa is a Gram-negative bacterium found everywhere in the environment and usually causes infections in people who are sick and are hospitalised. This bacterium can cause many types of infections, including bloodstream infections, surgical site infections and others. This bacterium can easily develop resistance to many classes antibiotics such as carbapenems, aminoglycosides and fluoroquinolones. When resistance to many antibiotic classes occurs at the same time, the bacteria is said to be multi-drug resistant or MDR. People who are infected with MDR Pseudomonas aeruginosa are often treated with colistin, but this bacterium is now developing resistance to colistin and patients in hospitals are increasingly infected with colistin-resistant Pseudomonas aeruginosa.</td>
<td>Laboratory making the diagnosis</td>
<td>Laboratories are to send monthly line lists of all patients with clinical specimens where a colistin-resistant Pseudomonas aeruginosa was isolated.
Only include isolates when resistance was determined using confirmatory methods; broth microdilutions test or PCR (mcr1, mcr2, mcr3, etc., detected).
Resistance should be based on interpretation of minimum inhibitory concentrations according to EUCAST or CLSI guidelines.

2021 guidelines for Pseudomonas aeruginosa *
<table>
<tr><td>Antibiotic</td><td colspan="2">Resistance criteria (MICs in µg/mL)</td></tr>
<tr><td></td><td>CLSI</td><td>EUCAST</td></tr>
<tr><td>Colistin</td><td>≥4</td><td>>2</td></tr>
</table>
* These guidelines are subject to change annually and therefore reporting should always be in line with the most recent recommendations.

In addition, laboratories are requested to report the total number of patients for which a microbiological culture test was done. If a patient has multiple cultures from the same specimen, they should be counted once. Similarly, if a patient has cultures done for multiple specimen type, they should be counted once.</td>
<td>A patient with Pseudomonas aeruginosa that is resistant to colistin cultured from any specimen type.
A 30-day period will be used to deduplicate patients with multiple subsequent pathogens isolated.</td>
</tr>
</table>

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COLISTIN-RESISTANT ACINETOBACTER BAUMANII

<table>
<tr><th>Disease epidemiology</th><th>Who must notify</th><th>What to notify</th><th>Confirmed case definition</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Acinetobacter baumannii is a Gram-negative bacterium that cause infections in hospitalised patients. It can cause serious infections such as pneumonia, sepsis, urinary tract infection and wound infections. Patients who are in intensive care units or those who have undergone surgery or those who have received antibiotic treatment have a higher risk of developing infections with this bacterium. Acinetobacter baumannii has developed antibiotic-resistance to many antibiotic classes, including carbapenems. Colistin is the antibiotic that is usually used for patients who have infections with multi-drug resistant Acinetobacter baumannii. Unfortunately, increased use of colistin has led to Acinetobacter baumannii developing resistance to it. Up to 40% of patients with colistin-resistant Acinetobacter baumannii infections may die.</td><td>Laboratory making the diagnosis</td><td>Laboratories are to send monthly line lists of all patients with clinical specimens where a colistin-resistant Acinetobacter baumannii was isolated. Only isolates when resistance was determined using confirmatory methods; broth microdilutions test or PCR (mcr1, mcr2, mcr3, etc., detected).
Resistance should be based on interpretation of minimum inhibitory concentrations according to EUCAST or CLSI guidelines.

2021 guidelines for Acinetobacter baumannii *<table><tr><td>Antibiotic</td><td colspan="2">Resistance criteria (MICs in µg/mL)</td></tr><tr><td></td><td>CLSI</td><td>EUCAST</td></tr><tr><td>Colistin</td><td>≥4</td><td>>2</td></tr></table>* These guidelines are subject to change annually and therefore reporting should always be in line with the most recent recommendations.</td><td>A patient with Acinetobacter baumannii that is resistant to colistin cultured from any specimen type
A 30-day period will be used to deduplicate patients with multiple subsequent pathogens isolated.</td></tr>
</table>

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CLOSTRIDIOIDE (CLOSTRIDIUM) DIFFICILE

Disease epidemiology	Who must notify	What to notify	Confirmed case definition
Clostridioide (previously *Clostridium*) *difficile* is a Gram-positive bacterium that produces toxins that can cause disease in humans. This bacterium is the commonest cause of healthcare-associated infections globally and commonly affects patients who are receiving antibiotics for other infections. *Clostridioide difficile* lives in the gut and can cause mild to severe diarrhoea in patients who receive antibiotics. All antibiotic classes have been shown to cause infections with *Clostridioide difficile*. Patients with *Clostridioide difficile* infections can shed spores of this bacterium which can spread to other patients resulting in outbreaks in hospitals. The spores can be difficult to remove from the environment making outbreaks difficult to control. Some patients may develop severe infections such as toxic megacolon and die from this infection.	Laboratory making the diagnosis	Laboratories are to send monthly line lists of all patients with stool specimens were a toxin-producing *Clostridioide difficile* was isolated. Only toxin-producing *Clostridioide difficile* confirmed with one of the following tests should be sent: GDH antigen and toxin test OR Real-time PCR test for toxigenic *Clostridioide difficile* In addition, laboratories are to send the total number of stool tests for *Clostridioide difficile* (positive and negative). Only one test per patient should be counted in a 30-day period.	Patient with a stool specimen positive for toxigenic *Clostridioide difficile*. Only one positive test per patient in a 30-day period will be reported.