**Introduction**

As a result of increased resistance amongst the Enterobacteriaceae, the use of carbapenem antibiotics has grown and in recent times the emergence and spread of carbapenem-resistant Enterobacteriaceae (CRE) has become a major concern for patient safety and public health\(^2\). The need for an accurate, easy-to-use screening method to help identify colonized patients more quickly is of great importance. Early detection of CRE will allow faster implementation of appropriate strategies to limit the spread of CRE. The Thermo Scientific™ Sensititre™ system is a microbroth dilution method that provides results reporting will be significantly reduced thus saving time, money and possibly reducing morbidity and mortality in the laboratory. If direct susceptibility testing can be performed from a primary isolation plate, the time to results reporting will be significantly reduced thus saving time, money and possibly reducing morbidity and mortality in the laboratory.

**Methods**

Forty eight CRE including 30 Enterobacteriaceae (CRE), 10 Staphylococcus (SA) and 8 Enterococcus faecalis were tested. The CRE were inoculated onto Columbia Blood Agar (CBA, Sigma-Aldrich, USA) and CRE Agar (Thermo Scientific™) using the Sensititre™ system. Each plate contains antimicrobial agents at appropriate dilutions. The GN4F plate format contains four carbapenem antibiotics (doripenem, ertapenem, imipenem and meropenem) that allow confirmation of CRE status (see Figure 2 for plate layout). For each CRE isolate, the difference between the susceptibility results (for doripenem, ertapenem, imipenem and meropenem) of colonies from the Brilliance CRE Agar plate and of colonies from the CBA plate was evaluated.

**Results**

The susceptibility results for an isolate read using the Sensititre Vizion or Sensititre ARIS, are in essential agreement when the MIC on the Sensititre GN4F panel inoculated directly from growth on Brilliance CRE Agar broth dilution compared with the MIC result on the Sensititre GN4F panel inoculated from growth on CBA. The essential agreement was calculated only for isolates where the MIC result for both Brilliance CRE Agar and CBA were on-scale. The results are in categorical agreement when the category, (susceptible or intermediate/resistant) as determined by CLSI or EUCAST breakpoints is the same for an isolate where the inoculum has been prepared from colonies grown on Brilliance CRE Agar and CBA.

**Conclusion**

- The MIC of doripenem, ertapenem, imipenem and meropenem for CRE colonies grown on Brilliance CRE Agar can be determined directly from the agar plate using the Sensititre GN4F plate format.
- A high level of essential and categorical agreements were obtained between the results from Brilliance CRE Agar and CBA (See Table 2). This suggests the MIC results were unaffected by inoculation directly from Brilliance CRE Agar compared to the non-selective CBA.

**References**


**TABLE 1. The comparative essential & categorical agreement between the results from Brilliance CRE Agar and CBA**

<table>
<thead>
<tr>
<th>Antimicrobial agent</th>
<th>Read source</th>
<th>% Essential agreement (No. of isolates with on-scale MIC results)</th>
<th>% Categorical agreement (CLSI/EUCAST)</th>
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</thead>
<tbody>
<tr>
<td>Doripenem ARIS</td>
<td>100.0 (n=21)</td>
<td>97.0/97.9</td>
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</tr>
<tr>
<td>Ertapenem ARIS</td>
<td>100.0 (n=21)</td>
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<tr>
<td>Imipenem ARIS</td>
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</tr>
<tr>
<td>Meropenem ARIS</td>
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**TABLE 2. Quality control strains and expected ranges for each of the carbapenems tested.**

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<th>Antimicrobial agent</th>
<th>ATCC® number</th>
<th>Organism ID</th>
<th>CLSI MIC range (µg/ml)</th>
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<tr>
<td>Doripenem</td>
<td>29212</td>
<td>Enterococcus faecalis</td>
<td>1-4</td>
</tr>
<tr>
<td>Ertapenem</td>
<td>29213</td>
<td>Pseudomonas aeruginosa</td>
<td>2-6</td>
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