Evaluation of NG Carba5 and Biomerieux Carba NP kits for carbapenemase detection.

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Introduction

Carbapenem-resistant *Enterobacteriaceae* (CPE) are strains of bacteria that are resistant to an antibiotic class (carbapenem) used to treat severe infections. CPE are also resistant to most other commonly used antibiotics and in some cases to all available antibiotics.
CPE are a major public health concern, identified by the World Health Organization as one of the 10 greatest threats to global health. Rapid confirmation and reporting of CPE as well as the specific type of gene can directly affect infection control and treatment.

Objective:

The objective of this study was to assess the performance of the NG Carba5 lateral flow assay and the Biomerieux Carba NP for the rapid detection of carbapenemase genes.

Figure 1: Carba5 kit

Material/methods

60 known (PCR confirmed) reference isolates of CPE were subcultured from a -70 degree freezer. These isolates were then subcultured 3 times onto blood agar and then 100 ul of 0.5 McFarland suspensions were added to eswab containers and run on the WASP/ WASPlab™ using Colorex™ Supercarba (CHROMagar™). Cultures were used for the Carba NP and Carba5 tests. If negative, they were also tested from SBA.

Figure 2: CarbaNP kit

Results

60 out of 60 of the reference strains tested positive with the Carba5 kit as compared to 57 out of 60 with the Carba NP kit where 3 OXA strains tested negative.

	CarbaNP+	Carba5+
OXA/NDM	8	8
OXA	11+/3-	14
NDM	8	8
KPC	16	16
IMP	4	4
VIM	10	10

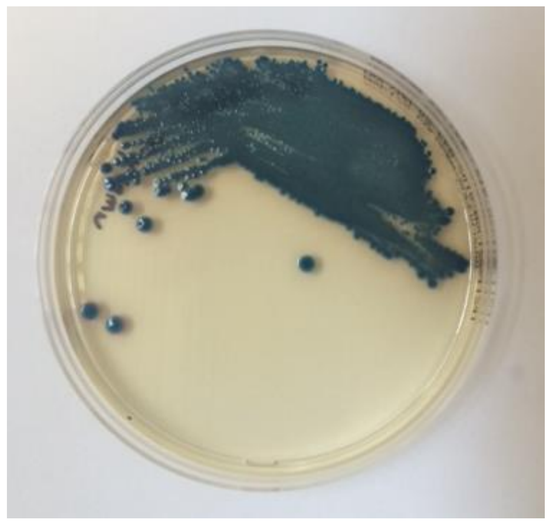

Figure 3: Colorex Supercarba agar

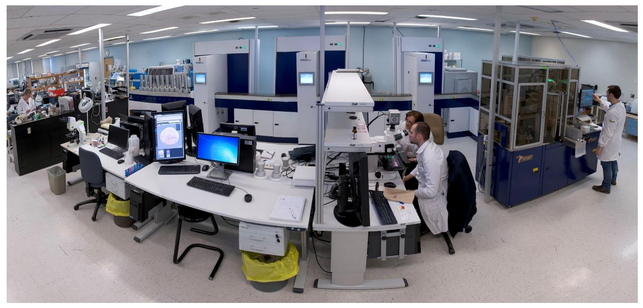

Figure 4: WASPLab

Conclusion

Antimicrobial drug resistance is a massive challenge for today's healthcare system. Rapid detection of CPE is essential in the fight against this resistance and its spread. Surveillance testing for CPE requires a sensitive method to detect low amounts of organism, low levels of resistance and be timely and cost effective. Both kits tested in this study showed very good sensitivity. Results showed the Carba5 kit had a greater sensitivity (100%) than the Carba NP kit (95%) for detecting carbapenemase genes with the Carba NP missing 3 OXA strains. The Carba NP assay gives you a positive or negative result for CPE. Results can be read after 30 minutes to 2 hours. There is some degree of subjectivity in interpreting the colorimetric results. The Carba5 is a rapid lateral flow assay that accurately detects a wide range of clinically relevant carbapenemases: NDM, KPC, OXA-48, IMP and VIM. Detection is within 15 minutes. It can also be used to detect carbapenemases in *Pseudomonas aeruginosa*. Carba5 also provides the genotype which helps guide therapy and infection control containment. It is preferred over Carba NP due to better sensitivity (detection of OXA),ability to distinguish genotype and ease of interpretation.

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