EP0230
ePoster Session
Getting better and faster: resistance detection

Retrospective evaluation of the performance of the chromID CARBA-SMART Bi-plate to detect carbapenemase-producing organisms (CPO)

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Background: Optimum methods for detecting CPO from surveillance specimens have yet to be determined. Ideally, sensitivities of screening methods should be 100%, while accompanying specificities should be as high as possible to minimize confirmatory rule-out work. This retrospective study evaluated performance of bioMérieux's chromID CARBA-SMART, a chromogenic bi-plate where CARBA agar selects for all CPO and the OXA agar is designed to select for OXA48-type CPO only.

Material/methods: 259 species-diverse clinical isolates, highly-characterized by PCR/sequencing, were blinded to prevent bias. They including 221 CPO (108 class A: 99 KPC, 4 SME, 3 NMC/IMI, 2 GES; 80 class B: 73 NDM, 6 VIM, 1 IMP7; 26 class D; OXA48; OXA181, OXA232, OXA244; 7 class B+D: NDM+OXA181, NDM+OXA232) and 38 non-CPO with mixed mechanisms (derepressed-*ampC*, ESBL, *ompC/ompF* or *ompK35/ompK36* mutants, 1 *cphA*,1 OXA252). Standard saline 0.5-MacFarland equivalent suspensions, prepared using colonies growing closest to ertapenem discs placed on MacConkey agar sub-cultures for selective pressure, were transferred to emptied Copan eSwab tubes for automated inoculation (10µL/side) to CARBA-SMART by the WASP system. After overnight (~4pm-~10am) incubation at 37°C, quantity, colour and size of colonies were documented independently by 5 readers. Consensus data were analyzed for sensitivity (Sn) and specificity (Sp) for 1) all CPO on CARBA-agar, 2) class D CPO on OXA-agar, and 3) overall CPO detection of both agars combined. 95% confidence intervals (CI) were calculated using www.graphpad.com.

Results: Only 1 NDM+ *P. mirabilis* and 1 OXA48+ *E. coli* were not detected by either agar on CARBA-SMART resulting in an overall Sn (95% CI) of 99.1% (96.6-99.97). The CARBA-agar grew all but 6/221 CPO [1 NDM+ *Proteus mirabilis* and 5 OXA48-type *Escherichia coli* (2 OXA181, 3 OXA48)] resulting in a CPO detection Sn (95%CI) was 97.3% (94.1-98.9), and Sn by class was: A (100%; 95.9-100), B (98.8%; 92->99.99), and D including B+D (84.9%; 68.6-93.8). The OXA-agar grew all but 1/33 class D (1 OXA48 *E. coli* that also failed on CARBA) and also grew 1 class A (SME+ *Serratia marcescens*) and 2 class B (1 NDM+ *Acinetobacter baumannii*, 1 VIM+ *Pseudomonas putida*) CPO; corresponding Sn (95% CI) was 97% (83.4->99.99) for class D only and as expected it was low for

any CPO [15.8% (11.6-21.3)]. Of the 38 non-CPO, 12 grew on CARBA and 1 on OXA agars, resulting in Sp (95%CI) of 68.4% (52.5-81) and 98.2% (95.4-99.5), respectively.

Conclusions: This evaluation of the CARBA-SMART chromogenic bi-plate found the OXA agar to complement the chromID CARBA agar as 4/5 OXA48-type CPO that were not detected on CARBA grew on OXA, thus improving overall CPO detection (Sn) from 97.3% to 99.1%. These data support prospective evaluation.