Review of surveillance methods for the detection of CPO* including 8 culture media, reagents for confirmation and PCR.

*CPO: Carbapenemase producing organisms

KEY POINTS :

- **chromID CARBA is the preferred culture-based screening method in this review.**

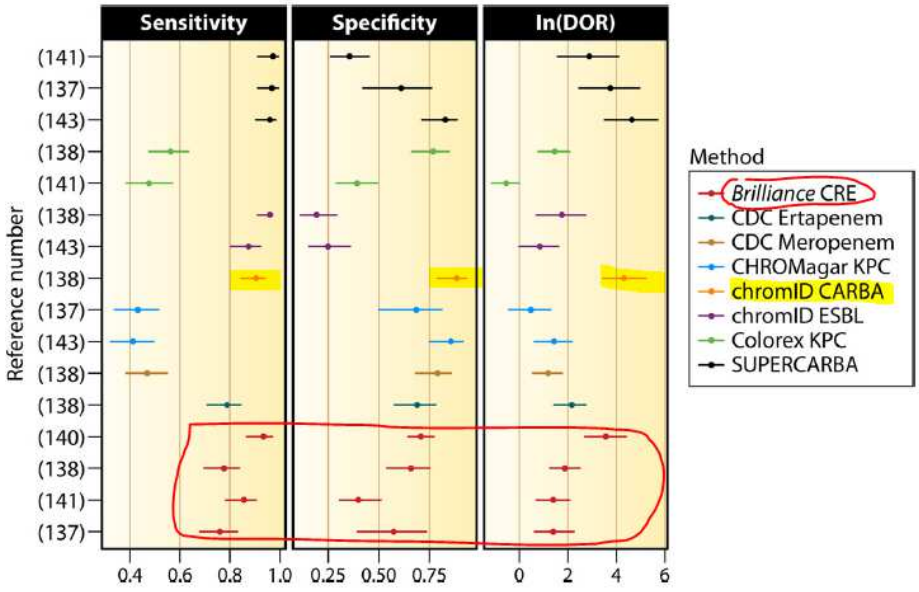
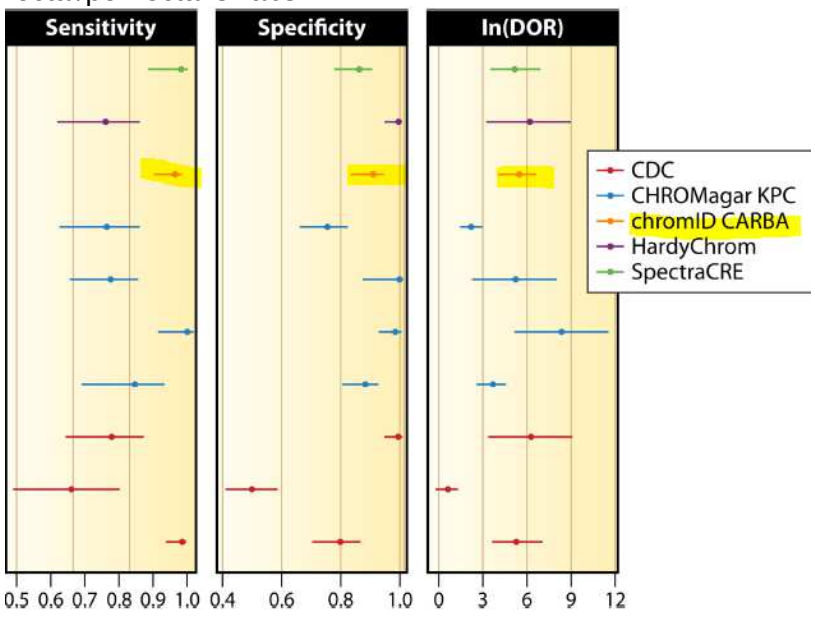
Title and source:	**Intestinal Carriage of Carbapenemase-Producing Organisms: Current Status of Surveillance Methods** **Viau R / Bonomo R.A.** et al. Clinical Microbiology Reviews 2016;29:1-27
Objective of the review:	Compare the clinical performance, advantages and disadvantages of methods available for the detection of intestinal carriage of CPOs.
Culture Tests:	Evaluation of 8 techniques designed to target KPC: CHROMagar KPC, HardyChrom , **chromID CARBA** , chromID ESBL, Colorex KPC, RambaChrom KPC, Spectra CRE , Brilliance CRE One targeted OXA-48: **chromID OXA-48**

*N.B.: This **synopsis** sheet is mainly limited to the **chromogenic culture media** performance and clinical utility analysis.*
*However, this state-of-the art review also gives **clear definitions and recommendations**, and reviews all the **surveillance methods**:*

- *Definition of the context of surveillance*
- *Definition of carbapenemases*
- *Definition of carbapenem resistance*
- *Classification of 8 culture media for CPO screening*

*After a short review of **carbapenemase classification and the mechanisms** of carbapenem resistance- **carbapenemases and impermeability**-, the authors highlight the **importance of screening** for intestinal carriage for the effective control of infections due to CPOs. Sites that have implemented **a "bundle approach"** to control the spread of CPOs, including **screening of carriers**, succeed in decreasing carriage rates.*

*In this review, **CPO refers** to all Enterobacteriaceae and non-Enterobacteriaceae carrying carbapenemase-encoding plasmids, even when their carbapenem (imipenem, meropenem, doripenem or ertapenem) MIC does not reach the resistance breakpoint.*

Results: **On strains:**	Results are based on literature analysis. To place the analysis in a clinical perspective, a statistical analysis was performed based on sensitivities, specificities and diagnostic odds ratios (DORs). Per-observation estimates of sensitivity, specificity, and DOR for screening methods used on pure cultures included in statistical analyses *The higher the DOR, the higher the performance* 
Results: **On clinical samples**	Per-observation estimates of sensitivity, specificity, and DOR for screening of rectal/perirectal swabs 
	Due to its limited scope, **chromID OXA-48** was not included in the statistical analysis, but performed exceptionally well with class D enzymes.

Screening options	There is a higher cost of missing a colonized patient. Ideally, screening should be universal, but most institutions are unlikely to have sufficient resources for screening and isolating all patients. Proposed criteria for screening patients, according to areas.

Area	Patients for screening
Areas where the disease is not endemic	Patients with multiple hospital admissions ICU patients Patients who have received medical care in areas of endemicity over the last 12 months Patients who reside in health care settings Patients with history of CPO infections or colonization Patients with prior prolonged hospital stays Patients coming from areas of endemicity Patients who are or who are expected to become incontinent or unable to take care of their personal hygiene
Areas where the disease is endemic	Everyone (as resources for testing, isolation, and cohorting allow), with particular emphasis on critically ill patients, patients who are unable to take care of their excreta, and patients with an expected prolonged hospital stay

Conclusion	**…"Screening** for intestinal carriage of CPOs is of significant importance for the development of infection control strategies". "**Culture-based** screening methods have the advantage that they involve technologies that are readily available in clinical microbiology laboratories". "**Agar-based** procedures always require **confirmatory testing** to detect the type of *bla* gene present after a potentially resistant isolate is detected. Clinical microbiology laboratories may choose an agar-based screen with follow-up molecular testing or a molecular method with reflex to culture if further investigation of the isolate is desired".
Quote from the authors:	**Culture-based screening techniques: "Based on our analysis, we favor the use of chromID Carba. However, if the hospital is located in a geographic area with a high incidence of OXA-48, the clinical microbiology laboratory should strongly consider the use of Supercarba or the addition of an OXA-48-specific medium such as chromID OXA-48 medium. A biplate containing chromID Carba and chromID OXA-48 is available - chromID CARBA SMART"**

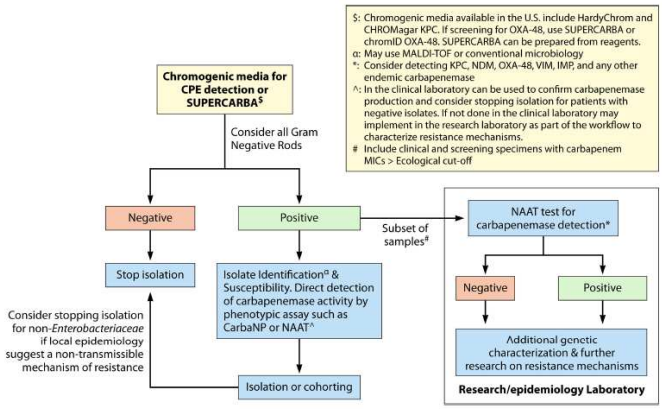


FIG 6 Screening by conventional microbiology.

*N.B.: this publication also highlights the good performance of **RAPIDEC CARBA NP** (called Carba NP test bioMérieux): "the Carba NP test is one of the recommended tests for confirmation of carbapenemase production in pure isolates by the CLSI and EUCAST". "The Carba NP test can be performed in most microbiology laboratories, with no additional equipment.*

Note: This bioMérieux summary is intended to be an informative and educational in-house support for bioMérieux staff. It is not intended to be exhaustive. The full publication can be consulted in the document mentioned under "Title and source" above.