

IVD solutions through partnership



# **MASTDISCS<sup>®</sup>** *Combi*

## *Carba plus* Complete CPE and OXA-48 confirmation

- Detects and identifies MBL, KPC and OXA-48
- Ideal for confirmatory testing
- Simple and cost effective
- Supports antibiotic stewardship

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***Carba plus* calculator**  
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# MASTDISCS® Combi

## Carba plus

Since the dawn of the antibiotic age, bacteria have adapted by developing new resistance mechanisms to antimicrobial agents. Mast Group Ltd., remains at the forefront of the fight against these threats and is committed to providing effective laboratory solutions to aid antibiotic stewardship.

## Introduction

The emergence and spread of carbapenem resistance in carbapenemase-producing-Enterobacterales (CPE) poses a major healthcare threat. The high rate of transmissibility of genes conferring carbapenem resistance justifies the need for rapid identification in order to guide antibiotic therapy and help to prevent or control outbreak situations.

The effectiveness of carbapenem antibiotics, which are often used as a 'last resort' for critically ill patients, is increasingly threatened by the rise of carbapenemase enzymes. Of particular concern is the future of modern surgical techniques, including transplantation and high dependency unit, in which carbapenems play a major role in preventing life threatening infections.

## What are carbapenemases?

Carbapenemases are bacterial enzymes that hydrolyse most beta-lactam antibiotics (see Figure 1). They are readily transferable and have disseminated amongst all members of Enterobacterales worldwide. Carbapenem resistance can also occur in AmpC producers with porin loss, although this is not a transferable mechanism.

Figure 1 - The 'Big 5' carbapenemases

Class	Carbapenemase
<b>A</b> <i>Serine based hydrolytic mechanism</i>	<b>KPC</b>
<b>B</b> <i>Metallo – Zinc catalysed at active site</i>	<b>MBL (including VIM, IMP and NDM)</b>
<b>D</b> <i>Carbapenem-hydrolyzing class D β-lactamases</i>	<b>OXA-48-like</b>

## Benefits of Carba plus

### Confirmation of all CPEs including OXA-48

**MASTDISCS® Combi Carba plus** is a five disc system for the detection of MBL, KPC and OXA-48-like carbapenemases produced by Enterobacterales, including the reliable discrimination of KPC from AmpC-producing isolates. The addition of a temocillin disc incorporating MBL inhibitor (Disc E), rather than a temocillin only disc, improves OXA-48 identification by removing the ambiguity of MBLs being incorrectly identified as OXA-48 (see Figure 2).

### Easily integrated into laboratory workflow

**MASTDISCS® Combi Carba plus** can be used in conjunction with CAT-ID, to confirm and differentiate enzymes expressed by CPE once screened positive for carbapenemase activity. Compatible with any **MAST® DISCMaster** disc dispenser, permitting smooth integration into the laboratory workflow (see Figure 3). Additionally, **MASTDISCS® Combi**

*Carba plus* is provided as a stock product with an in-use shelf life of 4 weeks when stored in a **MAST® DISCMaster** containing charged desiccant.

### Supports antibiotic stewardship

Reliable identification helps to guide appropriate antibiotic usage, conserving carbapenems for complicated infections. This may allow selection of a targeted narrow spectrum antibiotic rather than those with broad spectrum activity, minimising the risk of selecting for, or promoting the development of resistance.

### Quality

Optimised combinations for increased sensitivity and specificity, including detection of low level VIM producers. **MASTDISCS® Combi Carba plus** combination discs are jointly manufactured and QC tested to prevent erroneous results arising from variations in content.



## Interpretation of results

**MASTDISCS® Combi Carba plus** - confirmation of MBL, KPC and OXA-48-like carbapenemases

D73A - Penem

D73B - Penem + MβL inhibitor

D73C - Penem + KPC inhibitor

D73D - Penem + AmpC inhibitor

D73E - Temocillin + MβL inhibitor

Figure 2 - Interpretation of **MASTDISCS® Combi Carba plus**

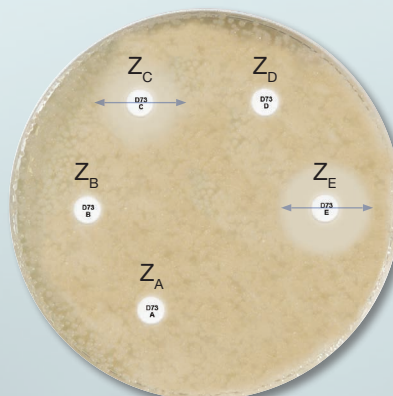
N.B. Images are shown for demonstration purposes only, actual diameters may differ in use.

### MBL



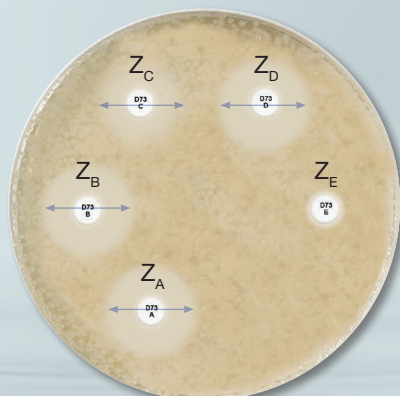
$Z_B - Z_A \geq 5\text{mm}$   
and the difference of each  
 $Z_C - Z_A$  and  $Z_D - Z_A < 5\text{mm}$

### KPC



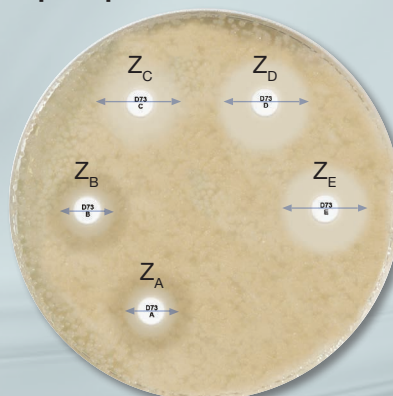
$Z_C - Z_A \geq 5\text{mm}$   
and the difference of each  
 $Z_B - Z_A$  and  $Z_D - Z_A < 5\text{mm}$

### OXA-48



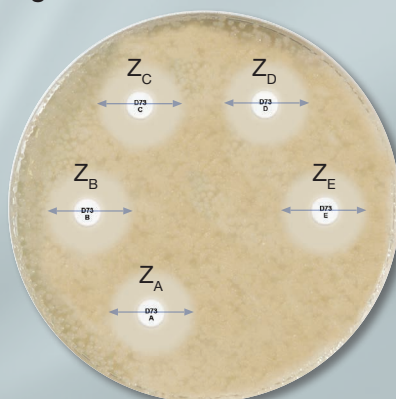
No synergy obtained on  $Z_A - Z_B$ ,  $Z_C$   
or  $Z_D$  respectively  
and  $Z_E \leq 10\text{mm}$

### AmpC + porin loss



$Z_C - Z_A \geq 5\text{mm}$  and  $Z_D - Z_A \geq 5\text{mm}$   
and the difference  
of  $Z_B - Z_A < 4\text{mm}$

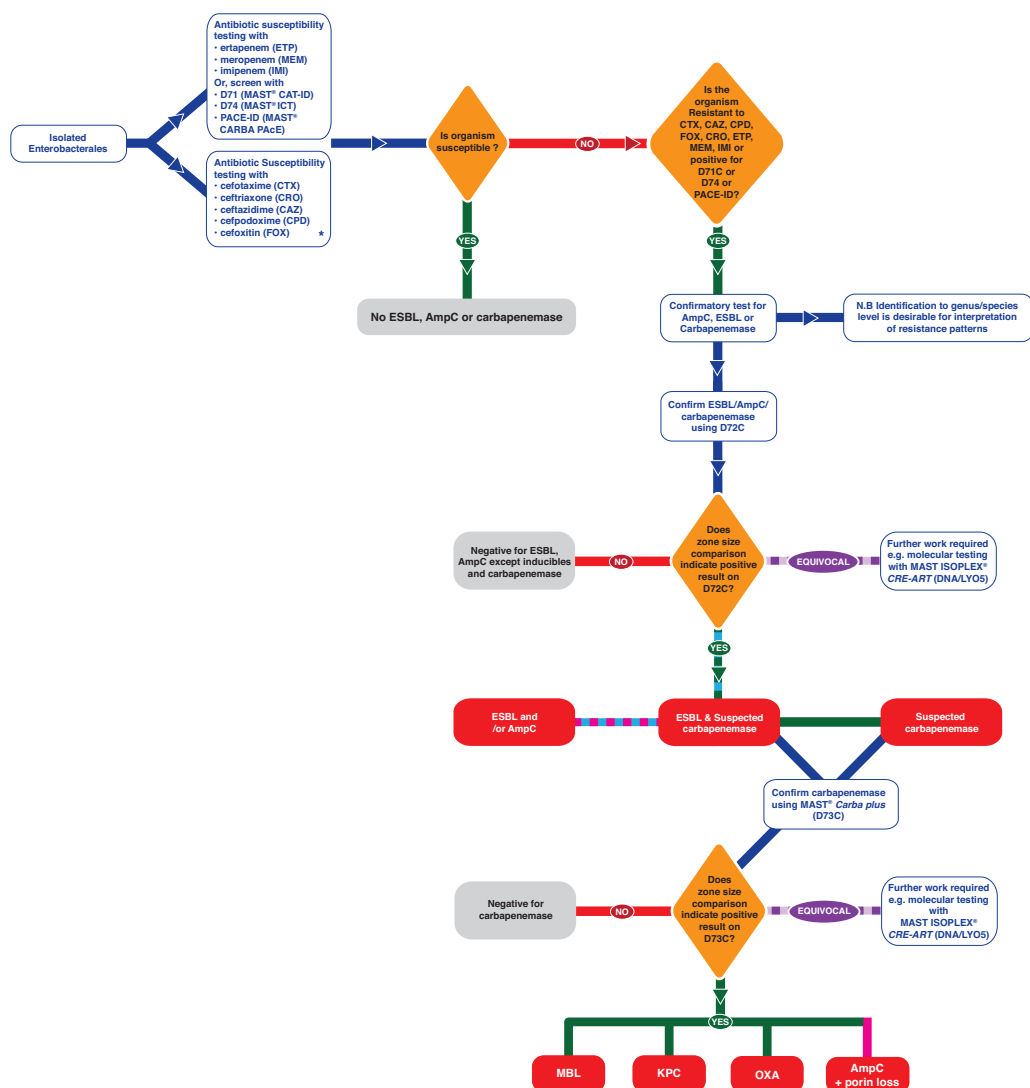
### Negative



$Z_A$ ,  $Z_B$ ,  $Z_C$  and  $Z_D$  all differ by  $\leq 2\text{mm}$   
and  $Z_E > 10\text{mm}$

# Laboratory use of MASTDISCS® Combi Carba plus

Figure 3 - Laboratory use of MASTDISCS® Combi Carba plus



## Ordering Information

Order Code	Product	Pack Size	No. Tests
D73C	MASTDISCS® Combi Carba plus	5 x 50 discs	50
D72C	MASTDISCS® Combi AmpC, ESBL & Carbapenemase Detection Set	6 x 50 discs	50
D74	MAST®ICT Indirect Carbapenemase Test	25	25
D71C	MASTDISCS® ID CAT-ID - Carbapenemase Activity Test	5 x 50 discs	250
PACE-ID	MAST® CARBA PAcE - Rapid carbapenemase detection	48	48
DNA/LYO5	MAST ISOPLEX® CRE-ART - Rapid molecular carbapenemase detection	10	10



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