

# **Malaysia Antimicrobial Resistance** (MyAMR) Conference 2024

Unite Against Antimicrobial Resistance (AMR): Fight Resistance with Evidence

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# Utilization of Rapid Molecular Diagnostic Pneumonia Panel in Critical Care Units: Single Centre Experience in Malaysia

Jordy Wong Der Yuan<sup>1</sup>, Liu Man Wei<sup>1</sup>, Fong Si Wei<sup>2</sup>, Shymala Kumarasamy<sup>1</sup>, Lily Zainuddin<sup>1</sup>, Anusha Shunmugarajoo<sup>1</sup> Pantai Hospital Kuala Lumpur<sup>1</sup>, Pantai Integrated Labs<sup>2</sup>

## Background

It is often complex to determine the etiology of lower respiratory tract infections (LRTIs), leading to delay in appropriate antimicrobial administration<sup>1</sup>. Culture-based methods are laborious with poor sensitivity and long turnaround time for finalizing complex cultures and susceptibility profiles<sup>2</sup>. Therefore, molecular methods become an attractive alternative to conventional culture methods to detect bacterial pathogens by providing more sensitive results rapidly to assist in making earlier clinical decisions<sup>3</sup>. In this study, the results of rapid molecular diagnostic pneumonia panel in patients with LRTI in critical care units were evaluated.

Results

Out of the respiratory samples (N=62) collected,

### **Traditional testing methods**

Traditional methods of pathogen identification can be time consuming and lack sensitivity.



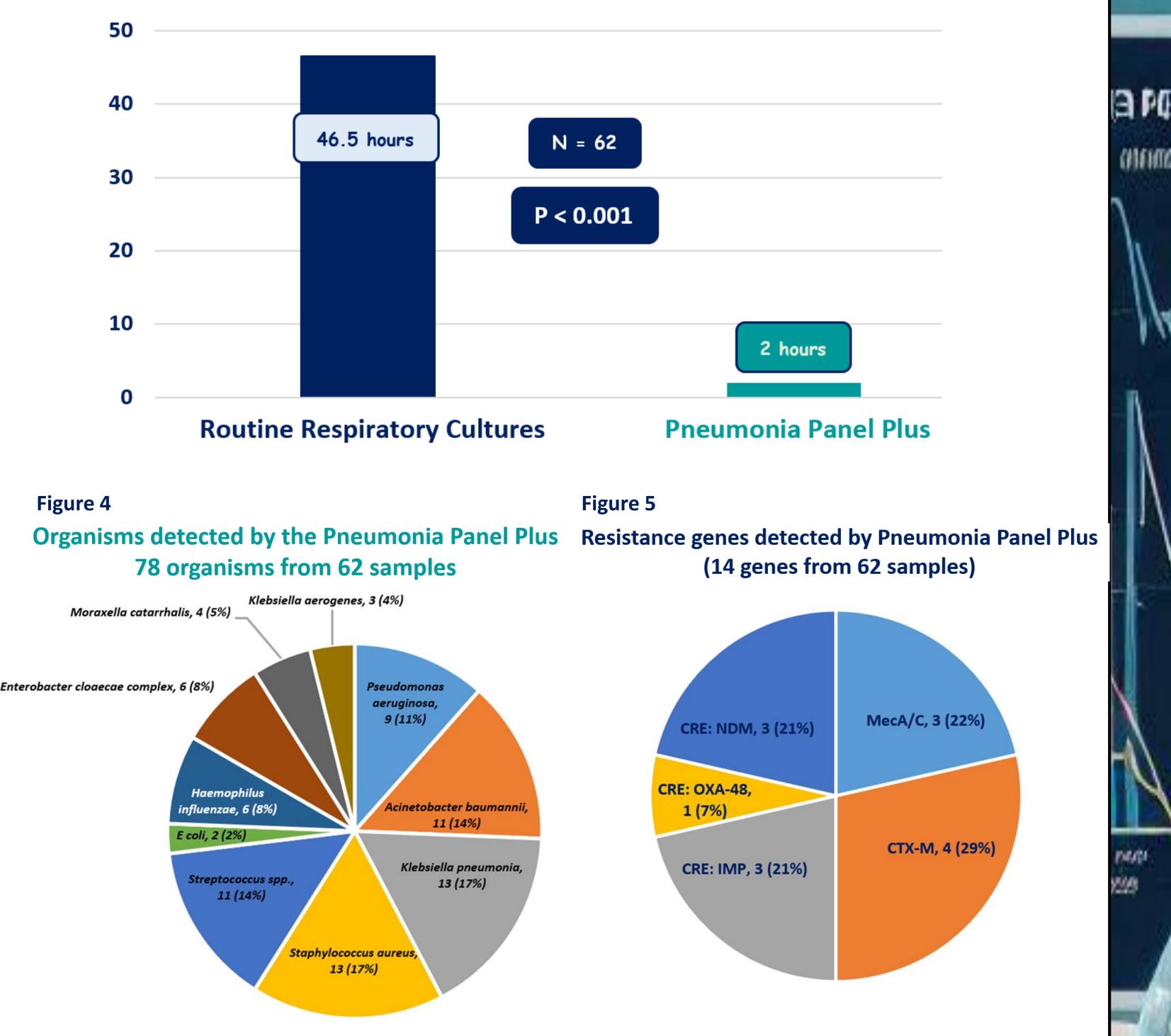
### Fast. Easy. Comprehensive.

Syndromic testing provides a streamlined workflow and fast, comprehensive results.



Semi-quantitative results to help distinguish pathogens of interest from

Figure 3 Mean Turnaround Time reduction from 46.5 hours to 2 hours using Pneumonia Panel Plus



#### included swab

or BAL-like sample

retrieved using the

#### normal flora

Figure 1 shows the flows of respiratory sample(s) subjected to traditional testing methods and Pneumonia panel plus.

single report

### Method

This observational cohort study involved identical cohort comparison between routine respiratory sample culture (standard practice) and pneumonia panel plus test (Rapid Molecular testing) from 2022 to 2024.

#### **BioFire® FilmArray®** 1 6 Pneumonia Panel plus

BACTERIA Semi-Quantitative Bacteria Acinetobacter calcoaceticusbaumannii complex Enterobacter cloacae complex Escherichia coli Haemophilus influenzae Klebsiella aerogenes Klebsiella oxytoca Klebsiella pneumoniae group Moraxella catarrhalis Proteus spp. Pseudomonas aeruginosa Serratia marcescens Staphylococcus aureus Streptococcus agalactiae Streptococcus pneumoniae Streptococcus pyogenes

**ATYPICAL BACTERIA Qualitative Bacteria** Chlamydia pneumoniae Legionella pneumophila Mycoplasma pneumoniae

#### VIRUSES Adenovirus Coronavirus Human Metapneumovirus Human Rhinovirus/Enterovirus Influenza A Middle East Respiratory Syndrome Coronavirus (MERS-CoV) \* Influenza B Parainfluenza Virus **Respiratory Syncytial Virus**

ANTIMICROBIAL **RESISTANCE GENES** Carbapenemases KPC NDM OXA-48-like VIM

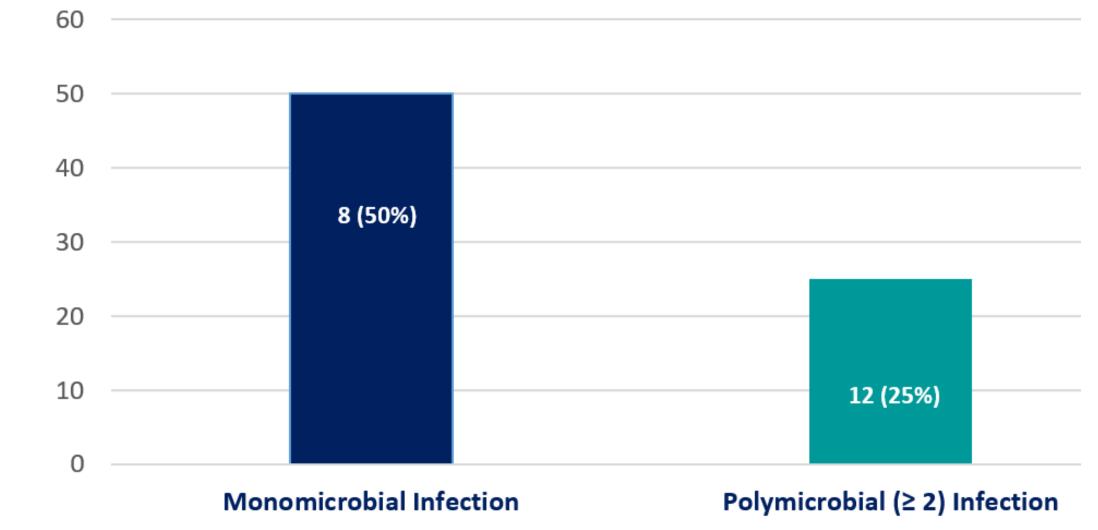
ESBL

CTX-M Methicillin Resistance mecA/C and MREJ (MRSA)

Figure 2 shows the panel of organisms and resistance genes that can be detected by BioFire® FilmArray® Pneumonia Panel Plus.

Klebsiella spp. (21%) and Staph. aureus (17%) were the most common pathogens detected by the panel. This testing also captured 14 resistance genes, including CTX-M (N=4), MecA/C (N=3), CRE-NDM (N=3), CRE-IMP (N=3) and CRE-OXA-48 (N=1).

#### Figure 6 Percentage of Concordance between Pneumonia panel plus with Routine Respiratory Cultures (%)



Pneumonia panel plus increased the number of positive samples with semi-quantitative

## Conclusion

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Pneumonia panel plus test was associated with significant reduced turnaround time than routine cultures method, with additional benefit of rapidly detecting resistance genes from the organism. Pneumonia panel plus test increased the number of positive samples with typical bacteria, but the semi-quantitative reporting algorithm does not describe the correlation between the different bin values and colonization versus infection.

### References

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reporting manner (ranging from 10<sup>4</sup> to 10' copies/mL). Organisms with low bacterial burden ( $\leq 10^{\circ}$  copies/mL) were unlikely to grow in actual cultures.

Limitation: Pneumonia Panel Plus is unable to detect Burkholderia cenocepacia, Stenotrophomonas maltophilia, PJP and yeast infection.

DOWINI

Contact: Jordy Wong Der Yuan **Senior Clinical Pharmacist** Pantai Hospital Kuala Lumpur Jordy.wong@pantai.com.my

Contacts

Fong Si Wei Assistant Manager (Microbiology) Pantai Premier Pathology Siwei.fong@premierintegratedlabs.com.my PANTAI HOSPITAL **Kuala Lumpur** 

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