LABUPDATE no. 33

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AMPATH LABORATORIES

THE BIOFIRE® FILMARRAY® PNEUMONIA PANEL PLUS

Severe community-acquired pneumonia (CAP), hospital-acquired pneumonia (HAP) and ventilator-acquired pneumonia (VAP) continue to result in high morbidity and mortality. The timely identification of the causative pathogen or pathogens may aid in antimicrobial stewardship and infection control efforts, as well as improving patient outcomes by directing antibiotic therapy. Molecular testing is a useful adjunct to culture for the rapid detection of causative pathogens.

The Biofire® FilmArray® Pneumonia Panel Plus (Biomérieux) is an FDA-cleared, CE-marked multiplexed nucleic acid amplification test for the simultaneous detection of multiple respiratory viral and bacterial pathogens in sputum-like (sputum and endotracheal aspirate) and bronchoalveolar lavage specimens (Table 1). The results are rapidly available, with a run time of approximately one hour from loading onto the instrument. The utility of the panel may be most relevant to intensive care unit admissions (especially cases admitted for extracorporeal membrane oxygenation), where pathogens such as *Streptococcus pneumoniae*, *Legionella pneumophila*, Gram-negative bacilli, *Staphylococcus aureus* and Influenza are to be considered. In addition, resistance markers are detected relevant to *Staphylococcus aureus* (MRSA) and Gram-negative bacilli (ESBL and carbapenemase genes). The Enterobacterales, non-lactose fermenters and Gram-positive bacteria are semi-quantified in the following bins: 10^4, 10^5,10^6, and $\geq 10^7$ copies/ml.

The overall performance of the panel has been determined with sensitivity and specificity for sputum-like specimens (96.3% and 97.2%) and bronchoalveolar lavage specimens (96.2% and 98.3%). The results will assist clinicians in directing empirical antibiotic choices. It is important to submit additional specimens for culture. Further adjustment to the antibiotic choice will be based on the antimicrobial susceptibility pattern determined for the bacteria isolated.

TABLE 1: PATHOGENS AND RESISTANCE MARKERS DETECTED BY THE BIOFIRE® FILMARRAY® PNEUMONIA PANEL

Bacteria detected semi-quantitatively	Resistance markers	Atypical bacteria	Viruses
Enterobacterales: • *Enterobacter cloacae complex* • *Escherichia coli* • *Klebsiella pneumoniae* • *Klebsiella oxytoca* • *Klebsiella aerogenes* • *Proteus spp* • *Serratia marcescens* **Non-lactose fermenters:** • *Acinetobacter calcoaceticus-baumannii complex* • *Pseudomonas aeruginosa* **Gram positives:** • *Staphylococcus aureus* • *Streptococcus agalactiae* • *Streptococcus pneumoniae* • *Streptococcus pyogenes* **Other Gram negatives:** • *Haemophilus influenzae* • *Moraxella cattarhalis*	• CTX-M • OXA 48-like • NDM • VIM • KPC • IMP • mecA/C	• *Chlamydophila pneumoniae* • *Legionella pneumophila* • *Mycoplasma pneumoniae*	• Adenovirus • Coronavirus • Human metapneumovirus • Human rhinovirus/ enterovirus • Parainfluenza virus • Influenza A • Influenza B • Respiratory syncytial virus • Middle East Respiratory Syndrome Coronavirus (MERS-CoV) **Please note:** The panel does not currently include SARS-CoV-2

TABLE 2: TEST DETAILS

Specimen types	Sputum, tracheal aspirate and broncheoalveolar lavage
Mnemonic	**PNEUMOPCR**
Turnaround time	6 hours (from being received in the laboratory)

Contact your Ampath representative should you require information on the cost and medical aid reimbursement criteria for this panel.

PLEASE NOTE

- As this is a particularly sensitive assay, careful consideration of the results generated should be employed, especially in the context of previous admissions and antibiotic use. Certain bacteria may simply represent colonisation.
- The assay cannot determine viability and a positive result may reflect remnant DNA and non-viable organisms.
- Only resistance markers incorporated into the panel will be detected. Culture remains the gold standard methodology for susceptibility testing.
- Other pathogens not covered by the panel may still need to be considered in the appropriate patient, such as mycobacterial disease, cytomegalovirus, *Pneumocystis jirovecii* and *Aspergillus* species. In addition, *Stenotrophomonas maltophilia*, *Burkholderia cepacia* complex and other members of the Enterobacterales that are less commonly associated with HAP and VAP are not detected by the panel.
- Furthermore, the semi-quantification of the bacterial pathogens may be overcalled by this panel. It may also not necessarily correlate with the culture result.
- Results should be discussed with your microbiologist, especially in cases where multiple bacteria are detected.