

## Guidance for Use and Interpretation of the BioFire Pneumonia Panel

### Background

The BioFire Pneumonia PCR Panel is a multiplexed real-time PCR panel for molecular detection of bacterial and viral causes of pneumonia in lower respiratory tract specimens. **Culture will always be performed in parallel for detection of off-panel microorganisms and for susceptibility testing of bacterial isolates.**

- The Epic order is (LABID 10012): “Pneumonia PCR with aerobic culture and Gram stain”.
- Testing will be performed 24/7, with an 8-hour turnaround time following laboratory receipt. Testing will only be performed on specimens of adequate quality following Gram stain assessment.
- The panel includes viruses and atypical bacteria currently included in the respiratory pathogen panel as well as “typical” bacteria and some markers of antimicrobial resistance. The BioFire Pneumonia panel detects seasonal coronaviruses, but not SARS-CoV-2. **If SARS-CoV-2 is considered, testing must be ordered separately.** A comprehensive list of targets is found in Table 1.
- Results for bacterial targets will be reported with the same report as the corresponding culture. Results for the other targets will appear in a separate report.

### Clinical Considerations for Interpretation of Results:

- For shared targets, the correlation between the BioFire pneumonia panel (from lower respiratory samples) and the respiratory pathogen panel (from upper respiratory samples) is very high. In general, it is not necessary to send both tests.
- When compared to culture, the BioFire pneumonia panel has higher sensitivity for bacterial targets. The bacterial targets will be reported in semi-quantitative bins (i.e.  $10^4$ ,  $10^5$ ,  $10^6$  and  $\geq 10^7$  copies/mL). Bin numbers may correlate to quantitative cultures and may be higher than what would be detected on quantitative culture.
- The panel has excellent negative predictive value for on-panel targets. Negative results should be used to narrow or discontinue broad spectrum therapy, i.e. discontinuing vancomycin if MRSA is not identified.
- Some results may be difficult to interpret. The clinical significance of bacterial targets identified by PCR but not culture is unclear. This may represent colonization and may not require treatment. In validation studies, the panel was also more likely than culture to identify multiple targets.

### Scenarios when the BioFire Pneumonia Panel is likely to be helpful:

- Severe pneumonia for which patients are on broad spectrum antimicrobials (vancomycin, cefepime)
  - Collect either sputum, if the patient has a productive cough, or tracheal aspirate from a newly intubated patient
- Bronchoalveolar lavage specimens for bronchoscopies performed for the diagnosis of infection

For questions regarding when to send the panel or interpretation of results, please discuss with Antimicrobial Stewardship or consult Pediatric Infectious Diseases.

Table 1. BioFire Pneumonia Panel Targets	
Viruses:	Adenovirus Coronavirus Human Metapneumovirus Human Rhinovirus/Enterovirus Influenza A Influenza B Parainfluenza virus Respiratory Syncytial virus
Bacteria (Semi-Quantitative):	<i>Acinetobacter calcoaceticus-baumannii complex</i> <i>Enterobacter cloacae complex</i> <i>Escherichia coli</i> <i>Haemophilus influenzae</i> <i>Klebsiella (Enterobacter) aerogenes</i> <i>Klebsiella oxytoca</i> <i>Klebsiella pneumoniae group</i> <i>Moraxella catarrhalis</i> <i>Proteus spp.</i> <i>Pseudomonas aeruginosa</i> <i>Serratia marcescens</i> <i>Staphylococcus aureus</i> <i>Streptococcus agalactiae</i> <i>Streptococcus pneumoniae</i> <i>Streptococcus pyogenes</i>
Atypical Bacteria (Qualitative):	<i>Chlamydia pneumoniae</i> <i>Mycoplasma pneumoniae</i> <i>Legionella pneumophila</i>
Antimicrobial Resistance Genes	Methicillin resistance ( <i>S. aureus</i> ): mecA/C and MREJ Carbapenemases (Enterobacterales): KPC NDM Oxa-48-like VIM IMP Extended-spectrum beta lactamase (Enterobacterales): CTX-M