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Guidance for Clinicians

BioFire FilmArray® Pneumonia PCR Panel

Purpose

This guidance outlines the appropriate use, interpretation, and antimicrobial stewardship considerations for the BioFire FilmArray® Pneumonia PCR Panel. The assay is intended to support, **not replace**, clinical assessment, microbiology culture results, radiology findings, and stewardship review.

Restrictions

- Per manufacturer clearance the assay is validated for induced or expectorated sputum, endotracheal aspirate, and bronchoalveolar lavage (BAL)/mini-BAL. Pleural fluid and nasopharyngeal specimens are not validated and will be rejected.
- Testing should not be repeated within 7 days of previous result.

Appropriate Clinical Indications

1. Severe community-acquired pneumonia requiring ICU admission
2. Hospital-acquired pneumonia (HAP)
3. Ventilator-associated pneumonia (VAP)
4. Immunocompromised patients with suspected pneumonia
5. Rapidly progressive pneumonia
6. Failure of empiric antimicrobial therapy

Key Principles of Interpretation

Detection of an organism by PCR does not necessarily indicate active infection. The assay may detect colonization, residual non-viable organisms, or airway flora. Results must always be interpreted in conjunction with clinical findings, radiology, inflammatory markers, BAL microscopy/culture, and prior microbiology history.

Semi-Quantitative Interpretation

Semi-quantitative bin values apply only to the 15 typical bacterial targets. The atypical bacteria (Chlamydia pneumoniae, Legionella pneumophila, Mycoplasma pneumoniae) and all viral targets are reported qualitatively (detected / not detected) only.

1. **10^4 copies/mL:** Low burden; may represent colonization or early infection.
2. **10^5 copies/mL:** Intermediate significance; interpret clinically.
3. **10^6–10^7 copies/mL:** More supportive of active infection when clinically compatible.

Low-level detection alone should not trigger automatic antimicrobial escalation.

Colonization Versus Infection

Organisms such as *Pseudomonas aeruginosa, Staphylococcus aureus, Klebsiella pneumoniae* group, *Enterobacter cloacae* complex, *Acinetobacter calcoaceticus-baumannii* complex, and *Haemophilus influenzae* may represent colonization, especially in ventilated or chronically ill patients. Interpret cautiously when bacterial burden is low or clinical/radiologic evidence is weak.

Key Interpretation Caveats for Resistance Markers

Read before using the pathogen table below:

- Resistance genes are reported by the panel but are **not** linked to a specific organism. In polymicrobial samples a detected marker cannot be definitively attributed to any one pathogen; correlate with culture and susceptibility testing.
- *mecA/C / MREJ* should be interpreted as MRSA only when *S. aureus* is also detected. A positive marker without *S. aureus* may reflect methicillin-resistant coagulase-negative staphylococci.
- AmpC is not a panel-detected gene; it is inferred from organism identity.

Pathogen-Specific Guidance

Pathogen	Resistance Gene(s)	Interpretation	Treatment Recommendation
Staphylococcus aureus	mecA/C / MREJ positive	MRSA	Initiate vancomycin
Staphylococcus aureus	mecA/C / MREJ negative	MSSA	Initiate cefazolin or flucloxacillin
Staphylococcus aureus **NOT detected**	—	—	Discontinue anti-MRSA therapy
Streptococcus agalactiae *Streptococcus pyogenes*	—	—	Penicillin G, ampicillin, or cefazolin
Streptococcus pneumoniae — concern for CNS infection	—	—	Ceftriaxone and vancomycin
Streptococcus pneumoniae — no concern for CNS infection	—	—	Penicillin G, ampicillin +/- azithromycin
Haemophilus influenzae *Moraxella catarrhalis*	—	—	Amoxicillin-clavulanate or ceftriaxone
Chlamydia pneumoniae *Mycoplasma pneumoniae*	—	—	Azithromycin or doxycycline
Legionella pneumophila	—	—	Azithromycin or fluoroquinolones
Influenza A *Influenza B*	—	—	Oseltamivir; evaluate for bacterial co-infection and stop antibiotics if negative
Other viruses (adenovirus, coronavirus, human metapneumovirus, parainfluenza, RSV, rhinovirus/enterovirus)	—	—	Supportive care; evaluate for bacterial co-infection and stop antibiotics if negative
Pseudomonas aeruginosa	—	Common colonizer in ventilated patients. Treat only when clinically significant.	Initiate antipseudomonal beta-lactam (piperacillin-tazobactam, cefepime, meropenem) guided by prior susceptibilities and local antibiogram

Pathogen	Resistance Gene(s)	Interpretation	Treatment Recommendation
Enterobacterales	CTX-M	Suggests ESBL production	Initiate ertapenem or meropenem if clinical/radiologic evidence supports active infection
Enterobacterales	KPC, NDM, OXA-48-like, VIM, IMP	Suggests carbapenemase production	ID consultation recommended. Refer to antimicrobial use guidelines for therapy recommendations.
Enterobacter cloacae complex *Klebsiella aerogenes* †	—	Organisms with inducible AmpC. Not a panel-detected gene; inferred from organism identity. Avoid 3rd-generation cephalosporins.	Cefepime
Acinetobacter calcoaceticus-baumannii complex	—	Frequently colonizes airways. Treat only if strong clinical evidence supports infection.	Initiate ampicillin-sulbactam if clinical/radiologic evidence supports active infection

† *Citrobacter freundii* is not a target on this panel and has been removed from this row; it is retained here in the footnote only as a related AmpC-producing organism for context.

Negative Result Interpretation

A negative panel does not exclude pneumonia. Causes include off-panel pathogens, low organism burden, fungal infection, mycobacterial infection, or prior antimicrobial therapy.

Relationship to Conventional Culture

The BioFire FilmArray® Pneumonia Panel complements but does not replace conventional culture. Culture remains essential for antimicrobial susceptibility testing, off-panel pathogen detection, and epidemiologic surveillance.

Antimicrobial Stewardship Recommendations

1. Do not treat every detected organism.
2. Avoid escalation solely because multiple organisms are detected.
3. Review broad-spectrum therapy daily.
4. De-escalate therapy when cultures are negative or findings suggest colonization.
5. Viral-only detections should prompt reassessment of antibiotic need.

Suggested Clinical Interpretation Framework

1. Is there convincing evidence of pneumonia?

2. Does the detected organism explain the syndrome?
3. Is the bacterial burden supportive of infection?
4. Could the organism represent colonization?
5. Are resistance markers present?
6. Do Gram stain and cultures support the PCR findings?
7. Can therapy be narrowed or stopped safely?

References

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