



## Atypical Pneumonia DNA Panel, Qualitative Real-Time PCR

Test code: 17610X

### Clinical Use

- Differential diagnosis of atypical pneumonia (ie, pneumonia caused by the atypical respiratory pathogens *Chlamydia pneumoniae*, *Legionella pneumophila*, or *Mycoplasma pneumoniae*)
- Determine appropriate antibiotic therapy and duration of that treatment

### Clinical Background

Atypical pneumonia is a vague term used historically to describe community-acquired pneumonia (CAP) that was initially thought to be unique in clinical and radiographic presentation. Subsequent studies revealed that the syndrome is diverse, and diagnosis cannot always be made on clinical grounds or from chest x-ray.<sup>1</sup> The primary causes of atypical pneumonia are infections with *C pneumoniae*, *L pneumophila*, and *M pneumoniae*, which together account for 10% to 40% of CAP cases.<sup>2</sup>

Because mortality is reduced when antimicrobial therapy is administered within 4 or 8 hours of presentation,<sup>3,4</sup> antibiotics are typically selected empirically. Guidelines for empiric therapy have been developed for outpatients as well as for inpatients on a medical ward or in an intensive care unit (ICU).<sup>1,5</sup> However, identification of the causative agent is important for selection of pathogen-specific antimicrobial therapy and to ensure adequate treatment duration. Pathogen-specific therapy reduces ineffective treatment, fosters the use of narrow-spectrum antibiotics, and minimizes adverse drug reactions. In addition, the atypical pathogens require a longer course of treatment.<sup>1,5</sup>

Identification of these atypical pathogens has been based on direct antigen detection, serology, or culture. Culture, however, is often compromised when performed after initiation of antibiotic therapy and requires at least 3 days to complete. Serology requires paired acute and convalescent samples, usually collected 2 weeks apart, to diagnose current infection. Thus, the time required for these tests makes them useful only retrospectively. The *Legionella* urinary antigen test or respiratory sample culture has been recommended for patients hospitalized in the ICU with enigmatic pneumonia as well as during a *Legionella* epidemic or when  $\beta$ -lactam antibiotic therapy has been ineffective.<sup>5</sup> The antigen test detects *L pneumophila* serogroup 1, which accounts for 80% of

legionellosis cases, but does not detect all 64 subgroups that are detected by culture and DNA testing.<sup>2</sup>

Real-time polymerase chain reaction (PCR) technology used to detect the DNA of these organisms does not require the organism to be viable, is not affected by previously administered antibiotic therapy, and does not require paired acute and convalescent samples.<sup>6</sup> PCR methods for these atypical pathogens are at least as sensitive as culture and, in most studies, more sensitive.<sup>6</sup> In many cases, the organisms may be detected by PCR prior to detection by immunological methods.

### Individuals Suitable for Testing

Patients presenting with symptoms of pneumonia who

- Are suspected of having atypical pneumonia
- Are not responding to antibiotic therapy

### Specimen Requirements

Submit bronchial alveolar lavage (BAL), bronchial wash, or sputum in a sterile container.

Lower respiratory specimens are preferred for detecting *Legionella* species.

Ship refrigerated.

### Method

- Real-time PCR-based tests using specific target primers and probes to amplify and detect the DNA of each organism
- Analytical sensitivity: varies with specimen type and organism; contact Quest Diagnostics Nichols Institute (1-800-NICHOLS) for more information.
- Analytical specificity: no known cross-reactivity with other organisms or with human DNA
- CPT codes\*: 87486, 87541, 87798, 87581

### Reference Range

<i>C pneumoniae</i> DNA:	Not detected
<i>Legionella</i> species DNA:	Not detected
<i>L pneumophila</i> DNA:	Not detected
<i>M pneumoniae</i> DNA:	Not detected

## Interpretive Information

A positive result is consistent with infection by the organism detected. Diagnosis of pneumonia, however, should rely on clinical and chest radiographic findings.

A negative test result is consistent with the absence of infection but may also be due to DNA concentrations below the detection limit of the assay. When there is epidemiologic evidence of legionellosis, treatment of symptomatic patients is recommended even when *Legionella* test results are negative.<sup>5</sup>

## References

1. Niederman MS, Mandell LA, Anzueto A, et al. Guidelines for the management of adults with community-acquired pneumonia. *Am J Respir Crit Care Med.* 2001;163:1730-1754.
2. Bartlett JG. Diagnostic test for etiological agents of community-acquired pneumonia. *Infect Dis Clin N Am.* 2004;18:809-827.
3. Houck PM, Bratzler DW, Nsa W, et al. Timing of antibiotic administration and outcomes for Medicare patients hospitalized with community-acquired pneumonia. *Arch Intern Med.* 2004;164:637-644.
4. Meehan TP, Fine MJ, Krumholz HM, et al. Quality of care, process, and outcomes in elderly patients with pneumonia. *JAMA.* 1997;278:2080-2084.
5. Mandell LA, Bartlett JG, Dowell SF, et al. Update of practice guidelines for the management of community-acquired pneumonia in immunocompetent adults. *Clin Infect Dis.* 2003;37:1405-1433.
6. Murdoch DR. Nucleic acid amplification tests for the diagnosis of pneumonia. *Clin Infect Dis.* 2003;36:1162-1170.

\*The CPT codes provided are based on AMA guidelines and are for informational purposes only. CPT coding is the sole responsibility of the billing party. Please direct any questions regarding coding to the payor being billed.

These tests were developed and their performance characteristics determined by Quest Diagnostics Nichols Institute. They have not been cleared or approved by the U.S. Food and Drug Administration. The FDA has determined that such clearance or approval is not necessary. Performance characteristics refer to the analytical performance of the tests.

Polymerase chain reaction (PCR) is performed pursuant to a license agreement with Roche Molecular Systems, Inc.

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