

Pharmacist-Interpreted PCR Diagnostics to Enhance Antimicrobial Stewardship and Therapeutic Decision-Making in Lower Respiratory Tract Infections

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Background

Lower respiratory tract infections are a leading cause of hospitalization and antibiotic use, contributing to antimicrobial resistance and healthcare burden. Unlike conventional microbiological cultures that are often slow and less sensitive, PCR-based diagnostics enable rapid and highly sensitive detection of pathogens and resistance genes. When implemented within a pharmacist-led molecular diagnostics laboratory where results are interpreted collaboratively within a multidisciplinary team, these methods enable prompt, targeted antimicrobial optimization and improved clinical outcomes.

Aim

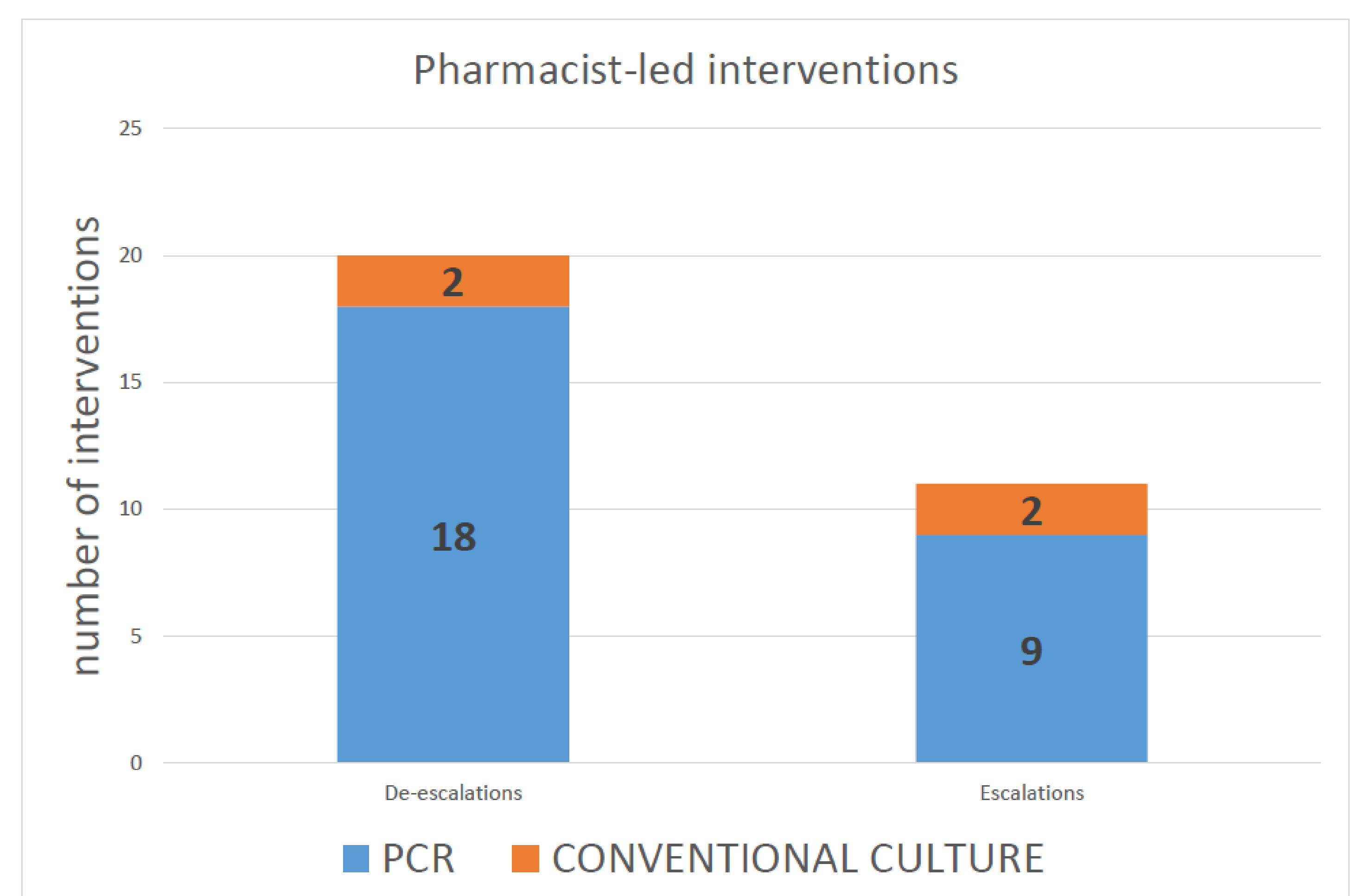
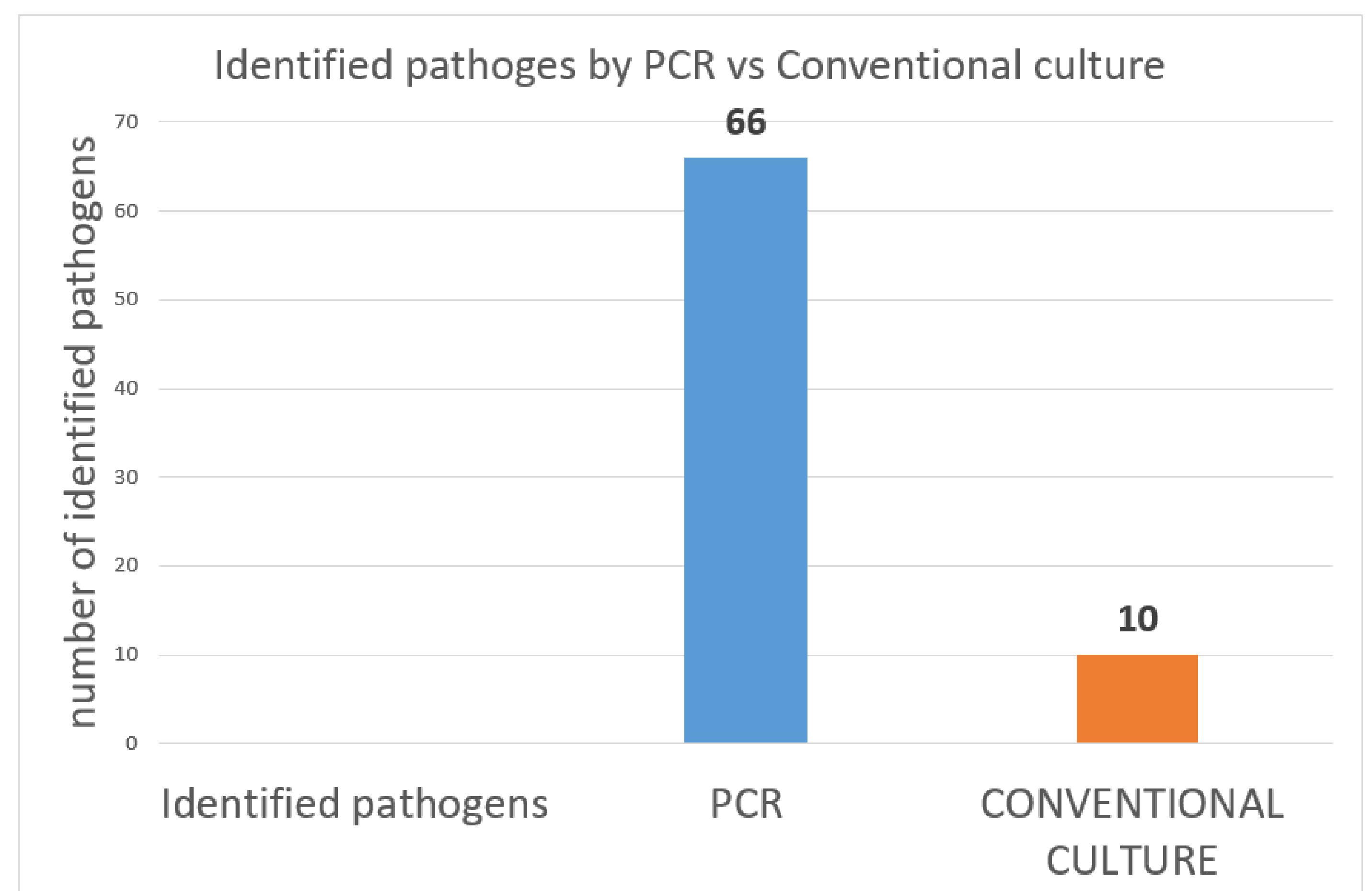
To assess the value of pharmacist-interpreted PCR compared with conventional culture in optimizing antibiotic therapy and improving laboratory outcomes in patients with lower respiratory tract infections.

Materials and Methods

A retrospective observational study was conducted at the University Clinic of Pulmonology and Allergology, Skopje, North Macedonia, including 74 hospitalized adults (>18 years) with clinical signs of lower respiratory tract infection. Respiratory samples (sputum, bronchoalveolar lavage, and blood cultures) were analyzed using both the BioFire® FilmArray® Pneumonia Panel Plus and conventional microbiological culture. Patient data—including infection biomarkers (C-reactive protein [CRP] and leukocytes) and length of hospital stay (LOS)—were extracted from electronic medical records.



Results



Patients' median biomarker levels	At admission	On discharge day
Leukocytes (x10 ⁹ /L)	12.43	11.45
CRP (mg/L)	37.7	3

The median LOS was 11 days (6–25). Patients positive for Human Rhinovirus, especially those with viral–bacterial co-infections, showed the strongest correlation with longer LOS ($p < 0.001$).

Conclusion

Pharmacist-led PCR molecular diagnostics and result interpretation facilitate timely, evidence-based optimization of antimicrobial therapy in patients with lower respiratory tract infections, strengthen antimicrobial stewardship efforts, enhance multidisciplinary teamwork, and lead to improvements in clinical outcomes.