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Turnaround time for pathogen identification and antimicrobial susceptibility testing of bronchoalveolar lavage specimens in U.S. acute care hospitals

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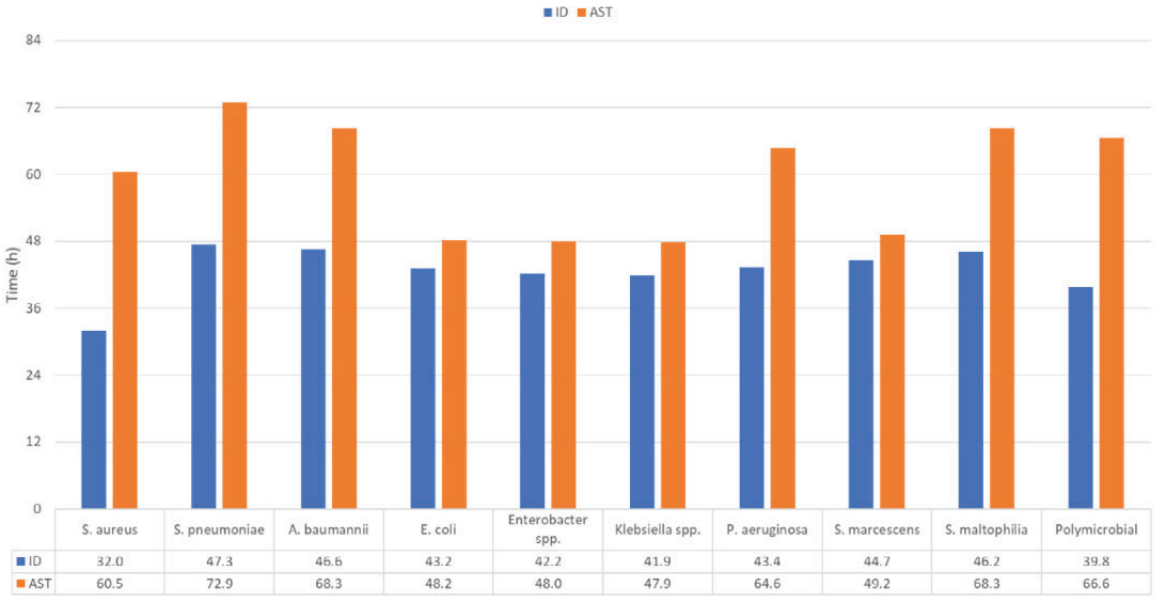
Background: Identification of respiratory pathogens and antimicrobial susceptibility testing (AST) results are fundamental to the diagnosis and management of patients hospitalized with pneumonia. Here, we examine the turnaround time (TAT) for reporting of results of the most prevalent bacterial pathogens among bronchoalveolar lavage (BAL) from patients hospitalized with suspected or confirmed pneumonia.

Materials/methods: Using the Premier Healthcare Database, a comprehensive database of U.S. hospitals, BAL samples from in-patient encounters with microbiology culture data were identified. BALs were excluded if they were from patients age < 18 years old, diagnosis of cystic fibrosis, time to organism identification > 7 days, and > 3 pathogens. Time from collection to reporting of gram stain, first organism identification (ID), and first organism AST were summarized descriptively.

Results: From June 2015 through May 2018, a total of 43,129 BALs met all study criteria, of which 28.6% were no growth, 43% were normal respiratory flora (including yeast), and 0.7% molds. Bacterial pathogens were recovered from 11,956 (27.7%) BALs. *S. aureus* and *P. aeruginosa* were recovered in 3,391 (7.9%) and 2,184 (5.1%) of all BALs, respectively and were the most common bacterial pathogens, followed by *Haemophilus* spp. (2.6%), *Klebsiella* spp. (2.1%), *S. pneumoniae* (1.8%), *E. coli* (1.6%), and *Enterobacter* spp. (1.3%). Median (interquartile range) TAT from specimen collection for bacterial pathogens were 10.6 (4.1-20.4), 41.0 (22.6-52.9), and 63.8 (46.5-72.4) hours for Gram stain, ID, and AST respectively. Median TAT for major respiratory pathogens is shown in Figure 1, ranging from 32.0 (*S. aureus*) to 47.3 (*S. pneumoniae*) hours for ID and from 47.9 (*Klebsiella* spp.) to 72.9 (*S. pneumoniae*) hours for AST. ID for BALs with bacterial pathogens was reported during the day shift (7:00 A.M. to 2:59 P.M.) for 75% of samples and 16% during the evening (3:00 P.M. to 10:59 P.M.). Similarly, AST was reported during the day shift for 74% of samples and 6% during the evening.

Conclusions: The average BAL TAT from specimen collection to ID and AST were approximately 40 and 65 hours, respectively. Most ID/AST results are reported during the day shift. BALs represent an area of interest for improved TAT.

Figure 1. Average turnaround time for first ID and AST of major respiratory pathogens



	S. aureus	S. pneumoniae	A. baumannii	E. coli	Enterobacter spp.	Klebsiella spp.	P. aeruginosa	S. marcescens	S. maltophilia	Polymicrobial
ID	32.0	47.3	46.6	43.2	42.2	41.9	43.4	44.7	46.2	39.8
AST	60.5	72.9	68.3	48.2	48.0	47.9	64.6	49.2	68.3	66.6

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