

Beaumont Health

Beaumont Health Scholarly Works and Archives

Conference Presentation Abstracts

Infectious Diseases

5-1-2022

Clinical Pathways Leading to Antibiotic Initiation in Patients with Suspected Infection and Their Association with Delays and Mortality

X Han

C Lopez-Espina

P A. Verhoef

A Spicer

A Bhargava

See next page for additional authors

Follow this and additional works at: https://scholarlyworks.beaumont.org/infectious_diseases_confabstract



Part of the [Infectious Disease Commons](#), and the [Internal Medicine Commons](#)

Authors

X Han, C Lopez-Espina, P A. Verhoef, A Spicer, A Bhargava, L Schmalz, Matthew Sims, Alexandra Halalau, Nicholas Maddens, and Aimee Espinosa

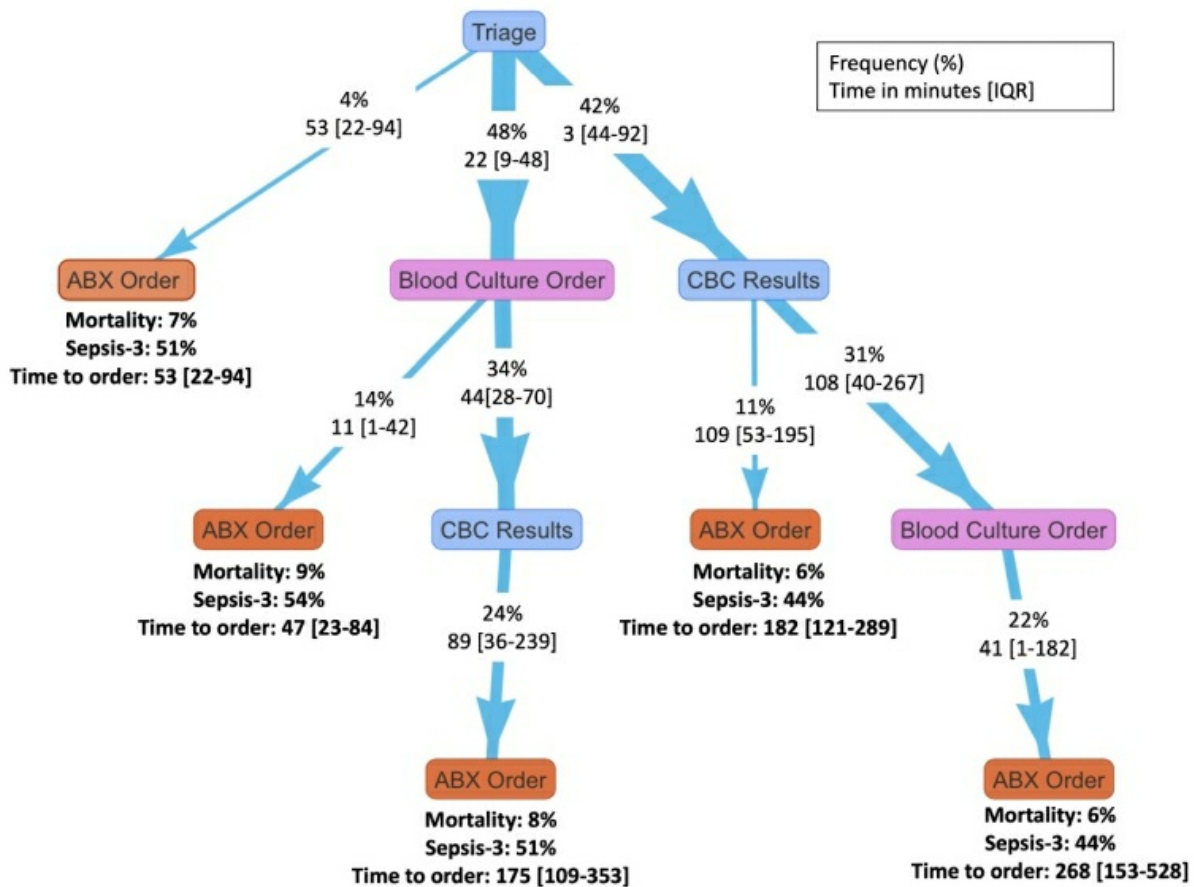
Clinical Pathways Leading to Antibiotic Initiation in Patients with Suspected Infection and Their Association with Delays and Mortality

X. Han¹, C. Lopez-Espina², P. A. Verhoef³, A. Spicer⁴, A. Bhargava², L. Schmalz², M. Sims⁵, A. V. Palagiri⁶, K. V. Iyer⁷, M. J. Crisp⁷, A. Halalau⁵, N. Maddens⁵, F. Gosai⁸, A. Syed⁸, S. Azad⁹, A. Espinosa⁵, B. Reddy Jr.², M. M. Churpek⁴; ¹Medicine, Tufts Medical Center, Boston, MA, United States, ²Prenosis, Inc., Chicago, IL, United States, ³Kaiser Permanente Hawaii, Honolulu, HI, United States, ⁴Medicine, University of Wisconsin-Madison, Madison, WI, United States, ⁵Medicine, Beaumont Health System, Royal Oak, MI, United States, ⁶Medicine, Mercy Hospital, St. Louis, MO, United States, ⁷Medicine, Mercy Hospital, Jefferson, MO, United States, ⁸Medicine, OSF Saint Francis Medical Center, Peoria, IL, United States, ⁹Emergency Medicine, Mercy Hospital, Jefferson, MO, United States.

Corresponding author's email: xhan1@tuftsmedicalcenter.org

Rationale: Delayed antibiotic therapy is associated with increased mortality in patients hospitalized with infection. The decision to initiate therapy in patients with suspected infection is influenced by a variety of information, such as vital signs, and laboratory results. Identifying different patterns of events that lead to initiation is necessary to discover factors that could serve as targets for interventions to expedite this process. We aimed to identify the most common sequences of events that precede antibiotic ordering and to quantify the time intervals between each event that contribute to antibiotic delays. **Methods:** This was a retrospective study of adult patients hospitalized at 4 community hospitals from 2017 to 2021 with blood cultures ordered within 24 hours of triage. Vital signs, laboratory results, medications, and demographics were collected from the electronic health record at each site. Key events related to clinical decision making – triage time, blood culture order, first complete blood count (CBC) result, and first antibiotic order – were arranged in chronological order for each patient. The most common sequences that occurred in at least 5% of patients were identified, and the time interval between each event was calculated. In-hospital mortality and frequency of sepsis, defined using Sepsis-3, were compared across pathways. **Results:** A total of 7502 patients were included in the five most common event pathways (94% of eligible patients). As shown in the Figure, the most frequent first event after triage was blood culture order (48%; n=3954), followed by CBC results (42%; n=3127), and first antibiotic order (4%; n=421). Median time to antibiotic order was shortest in the blood culture order path (47 minutes [IQR: 23-84],) and longest in the CBC followed by blood culture path (268 minutes [IQR: 153-528]). The longest delays occurred after CBC results (median [IQR], minutes): 109 [35-195] to antibiotic order and 108 [40-267] to blood culture order in the CBC first pathway, and 89 [36-239] to antibiotic order in the blood culture first pathway. Sepsis prevalence and unadjusted mortality were lowest in the CBC first pathways (44% and 6%), and highest in the blood culture followed by antibiotic order pathway (54% and 9%). **Conclusions:** Antibiotic initiation for patients with suspected infection on admission followed five major pathways with considerable variation in time to antibiotic orders. The greatest delays occurred following CBC results. These results highlight opportunities for process improvement to ensure more timely initiation of antibiotics.

Figure 1: The five most common event pathways leading to initial antibiotic order (ABX Order) in patients admitted with suspicion of infection. Frequency of occurrence and time intervals (minutes) are shown between each event. In-hospital mortality, development of sepsis per Sepsis-3 criteria, and cumulative time to first antibiotic order (minutes) are shown for each pathway.



This abstract is funded by: NIGMS R01 GM123193

Am J Respir Crit Care Med 2022;205:A2373
Internet address: www.atsjournals.org

Online Abstracts Issue