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Research Article

Antibiotic Administration Timing among Children with Sepsis Presenting to the Emergency Department in Saudi Arabia

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Received: October 16, 2026; **Published:** October 28, 2026

Abstract

Background: Timely antimicrobial therapy is central to pediatric sepsis care. Associations between treatment timing and outcomes vary with illness severity, recognition processes, and the definition of time zero.

Objective: To describe antibiotic administration timing after documented sepsis recognition among children with sepsis, using the 330-minute threshold available in the cohort summary.

Methods: This retrospective descriptive cohort study included 377 children presenting to the emergency department of South Al-Qunfudhah Hospital, Saudi Arabia, from 21 May 2021 through 1 September 2026. The aggregate data classified first antibiotic administration as <330 or ≥330 minutes after documented sepsis recognition. Counts, percentages, and Wilson 95% confidence intervals (CIs) were calculated. Clinical outcomes and patient-level covariates were unavailable.

Results: Antibiotics were administered before 330 minutes in 370 children (98.14%; 95% CI, 96.22%-99.10%) and at or after 330 minutes in 7 children (1.86%; 95% CI, 0.90%-3.78%).

Conclusion: Antibiotic administration at or after 330 minutes was uncommon. These descriptive findings do not establish associations with clinical outcomes, and the threshold should not be interpreted as a recommended treatment target.

Keywords: *Pediatric Sepsis; Antibiotic Timing; Emergency Department; Saudi Arabia; Retrospective Cohort; Antimicrobial Therapy*

Abbreviations

CI: Confidence Interval; Cis: Confidence Intervals; N: Total Cohort Size; n: Subgroup Size; REC: Research Ethics Committee

Introduction

Pediatric sepsis remains an important cause of morbidity, intensive-care use, and mortality. Contemporary consensus criteria define pediatric sepsis for research using suspected infection plus organ dysfunction measured with the Phoenix Sepsis Score, while emphasizing that research classification should not be conflated with early bedside screening or the clinical moment of sepsis recognition [1,2].

Timely antimicrobial therapy is a core component of sepsis management. The 2026 Surviving Sepsis Campaign pediatric guidelines recommend rapid initiation of antimicrobials, with the exact urgency depending on the clinical syndrome and shock status. However, the certainty of evidence surrounding specific timing targets remains limited, and observational studies have reported heterogeneous findings [3].

Previous pediatric studies have found associations between longer delays and worse outcomes, particularly in septic shock, whereas other studies have illustrated how illness severity and confounding by indication can complicate interpretation of very early treatment [4-8]. A large multicenter study published in 2024 examined the timing-mortality relationship and identified a 330-minute threshold measured from emergency department arrival [4].

A Saudi retrospective cohort reported an association between antibiotic administration later than 3 hours and higher mortality among children with septic shock, underscoring the relevance of local evidence [6]. The present study describes antibiotic administration timing in 377 children at a Saudi emergency department, using the available aggregate data.

Materials and Methods

Study design and setting

This retrospective descriptive cohort study used routinely collected clinical data from children with sepsis who presented to the emergency department of South Al-Qunfudhah Hospital, Saudi Arabia. The study period was from 21 May 2021 through 1 September 2026, and the analytic cohort comprised 377 eligible children.

Participants

The source protocol defined eligibility as children aged 29 days to younger than 18 years with suspected or confirmed infection who met the prespecified pediatric sepsis research definition during the emergency department encounter. The present report is restricted to the 377 children included in the verified cohort summary.

Exposure and timing variable

The timing variable was defined as the interval from documented sepsis recognition to administration of the first empiric systemic antibacterial agent. The available cohort summary categorized this interval as <330 minutes or ≥330 minutes. Because patient-level timing values were unavailable, continuous exposure-response modeling and alternative timing categories could not be evaluated. The 330-minute threshold was treated only as a study-specific analytic boundary, not as a clinical treatment target.

Outcome data

The planned outcomes included sepsis-attributable mortality and other clinical endpoints. Mortality status, outcome counts by timing category, and patient-level covariates were unavailable in the analytic summary; clinical-outcome associations could therefore not be evaluated.

Statistical analysis

Counts and percentages were calculated from the cohort totals (370 + 7 = 377). Wilson 95% CIs were calculated for binomial proportions. Given that only seven patients were in the ≥330-minute category, any outcome comparison based on this dichotomy would be statistically unstable without adequate event counts and appropriate patient-level adjustment.

Ethics

The study was approved by the South Al-Qunfudhah Hospital Research Ethics Committee (approval number: REC-2025-079; approval date: February 2025). The requirement for informed consent was waived by the committee.

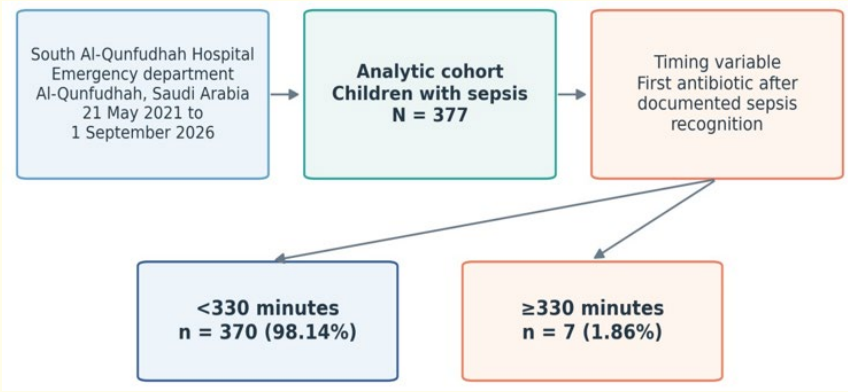

Figure 1: *Study overview and antibiotic-timing categories (N = 377). Timing was measured from documented sepsis recognition to first antibiotic administration. Screening and exclusion counts were unavailable.*

Results

Cohort antibiotic-timing distribution

Of 377 children, 370 (98.14%; 95% CI, 96.22%-99.10%) received antibiotics before 330 minutes and 7 (1.86%; 95% CI, 0.90%-3.78%) received antibiotics at or after 330 minutes. Table 1 and figure 2 summarize this distribution.

Antibiotic timing	Count	Percentage	95% CI
<330 minutes	370	98.14%	96.22%-99.10%
≥330 minutes	7	1.86%	0.90%-3.78%
Total	377	100.00%	—

Table 1: *Time from documented sepsis recognition to first antibiotic administration (N = 377).*

Note: Percentages use the total cohort as the denominator. CI, Wilson 95% confidence interval.

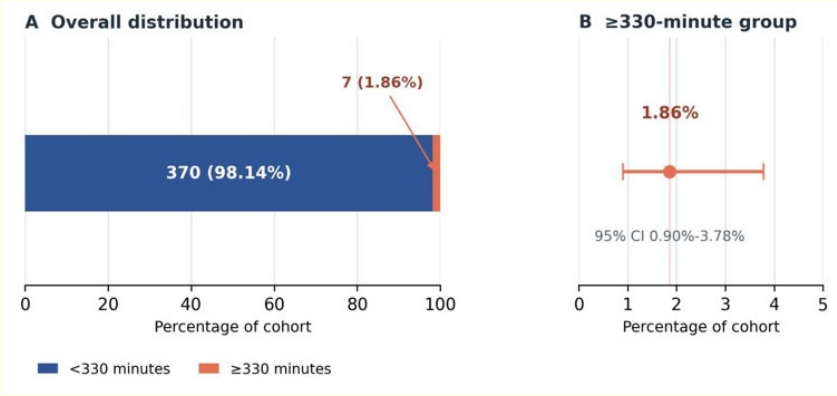

Figure 2: *Antibiotic administration timing after documented sepsis recognition (N = 377). Panel A shows both timing categories; panel B shows the ≥330-minute proportion with its Wilson 95% confidence interval (CI).*

Outcome associations

Clinical-outcome associations could not be assessed because outcome events and patient-level covariates were unavailable.

Discussion

In this cohort, 98.14% of children received antibiotics before 330 minutes after documented sepsis recognition. Administration at or beyond this threshold was uncommon, occurring in seven children.

This result should not be interpreted as evidence that treatment within 330 minutes is clinically adequate. Current pediatric sepsis guidance supports substantially earlier antimicrobial treatment when sepsis or septic shock is recognized, and published pediatric studies have commonly evaluated delays on the scale of 1 to 3 hours [3,5-8]. The 330-minute threshold in the present dataset is therefore a descriptive data boundary rather than a recommended target.

The broader literature indicates that the association between antibiotic timing and outcomes is complex. Sankar., *et al*. reported higher mortality among children treated more than 1 hour after recognition, while Weiss., *et al*. and a Saudi cohort by Alsadoon., *et al*. found increased mortality with delays beyond approximately 3 hours in selected populations [5-7]. Conversely, Creedon., *et al*. reported worse outcomes among children who received antibiotics within 1 hour, a finding compatible with confounding by indication because the sickest children may be recognized and treated earliest [8]. Lane., *et al*. identified a 330-minute threshold measured from emergency-department arrival [4]. This differs from the recognition-based interval used here and limits direct comparison.

Assessment of associations with mortality would require patient-level timing and outcome data, baseline severity, shock status, relevant comorbidities, and a prespecified approach to confounding and missing data. The small ≥330-minute group (n = 7) would constrain comparisons, particularly if outcome events were infrequent.

The analysis presents a transparent description of the available aggregate data. Its main limitations are the single-center setting, the dichotomous timing measure, and the absence of patient-level clinical characteristics and outcomes. These limitations restrict clinical interpretation and generalizability.

Conclusion

Among 377 children with sepsis at South Al-Qunfudhah Hospital, 98.14% received antibiotics before 330 minutes after documented sepsis recognition. These findings describe treatment timing but do not establish associations with clinical outcomes or validate 330 minutes as a clinical target.

Ethics Approval and Consent to Participate

The study was approved by the South Al-Qunfudhah Hospital Research Ethics Committee (approval number: REC-2025-079; approval date: February 2025). The requirement for informed consent was waived by the committee.

Consent for Publication

Not applicable.

Author Contributions

Abdallah Alganmy: Conceptualization, Methodology, Investigation, Data curation, and Writing - review and editing. Mohammed Alkhairi: Supervision, Project administration, Formal analysis, and Writing - original draft.

Data Availability

The aggregate antibiotic-timing data analyzed in this study are reported in Table 1. Availability of underlying clinical records is subject to institutional authorization and applicable ethics and data-protection requirements.

Funding Support

No external funding was received for this study.

Conflict of Interest

The authors declare that they have no competing interests.

Bibliography

1. Schlapbach LJ., *et al.* "International consensus criteria for pediatric sepsis and septic shock". *Journal of the American Medical Association* 331.8 (2024): 665-674.
2. Sanchez-Pinto LN., *et al.* "Development and validation of the phoenix criteria for pediatric sepsis and septic shock". *Journal of the American Medical Association* 331.8 (2024): 675-686.
3. Weiss SL., *et al.* "Surviving sepsis campaign international guidelines for the management of sepsis and septic shock in children 2026". *Intensive Care Medicine* 52.5 (2026): 937-983.
4. Lane RD., *et al.* "Delays to antibiotics in the emergency department and risk of mortality in children with sepsis". *JAMA Network Open* 7.6 (2024): e2413955.
5. Sankar J., *et al.* "Delayed administration of antibiotics beyond the first hour of recognition is associated with increased mortality rates in children with sepsis/severe sepsis and septic shock". *The Journal of Pediatrics* 233 (2021): 183-190.e3.
6. Alsadoon A., *et al.* "Association of antibiotics administration timing with mortality in children with sepsis in a tertiary care hospital of a developing country". *Frontiers in Pediatrics* 8 (2020): 566.
7. Weiss SL., *et al.* "Delayed antimicrobial therapy increases mortality and organ dysfunction duration in pediatric sepsis". *Critical Care Medicine* 42.11 (2014): 2409-2417.
8. Creedon JK., *et al.* "Timing of antibiotic administration in pediatric sepsis". *Pediatric Emergency Care* 36.10 (2020): 464-467.

Volume 15 Issue 11 November 2026
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