RISK FACTORS & ADVERSE OUTCOMES IN BACTEREMIC INFANTS & CHILDREN

National Multi-Center Study 2017-2022

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INTRODUCTION & OBJECTIVE

Bacteremia in young children remains a significant cause of morbidity and mortality despite declining incidence with conjugate vaccines. Standard risk assessment tools lack nationwide validation, and limited multicenter data exist on predictors of **adverse outcomes**.

Objective: Identify risk factors for adverse outcomes in bacteremic infants and children across two age cohorts, and develop risk-stratification models for PED settings.

METHODS & SAMPLE

803 BACTEREMIC EPISODES

13 PEDIATRIC EDS NATIONWIDE

5 yrs STUDY PERIOD 2017-2022

COHORT A: **184** INFANTS <91 DAYS

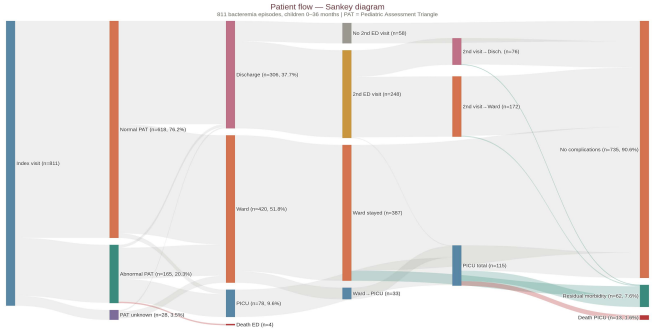
COHORT B: **619** CHILDREN 3–36 MO

Design: Retrospective multicenter cohort. **Outcome:** ICU, ventilation, inotropes, major complications, or death. **Analysis:** Multivariable logistic regression, AUC-ROC.

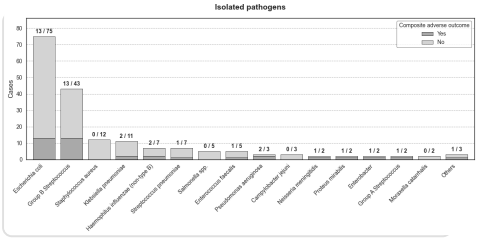
COHORT CHARACTERISTICS

Characteristic	Infants <91d (n=184)	Children 3-36mo (n=619)
Age, median (IQR)	22 days (14–48)	13 mo (8–18)
Male sex	107 (58.2%)	335 (54.1%)
Term gestation	163 (88.6%)	583 (94.1%)
Pre-existing conditions	20 (10.9%)	104 (16.8%)
PAT Normal	**138 (75.0%)**	**478 (77.2%)**
PAT Abnormal	**36 (19.6%)**	**125 (20.2%)**
Max temp °C, median	38.3 [37.7–38.8]	38.8 [38.0–39.5]
CRP mg/dL, median	4.5 [0.8–11.5]	7.2 [2.1–17.8]
WBC ×10³/L, median	11.9 [7.8–17.4]	16.7 [11.4–23.0]
PCV-13 vaccinated	18 (9.8%) ≥1 dose	335 (54.1%) ≥3 doses

PATIENT FLOW — COMBINED COHORTS (N=811)

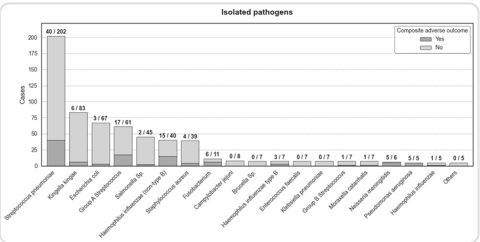


PATHOGEN DISTRIBUTION



Infants

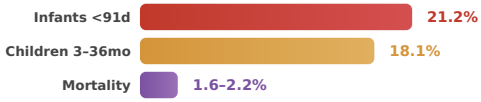
E. coli (40.7%), GBS (23.4%)



Toddlers

S. pneumoniae (32.6%)

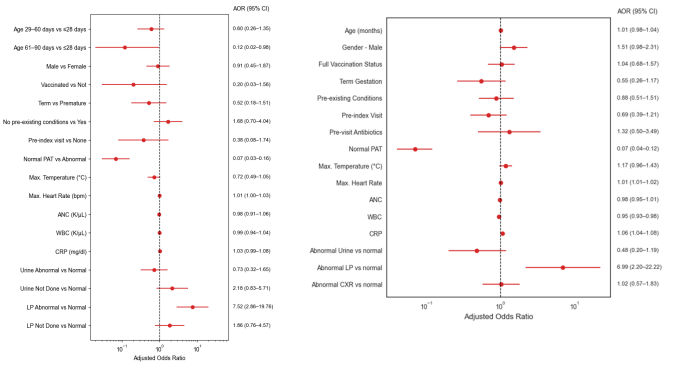
ADVERSE OUTCOME RATES



OUTCOMES SUMMARY

Outcome	Infants <91d (n=184)	Children 3-36mo (n=619)
Composite adverse	**39 (21.2%)**	**109 (18.1%)**
PICU admission	35 (19.0%)	80 (12.9%)
Mechanical ventilation	6 (3.2%)	17 (2.7%)
Vasopressor support	4 (2.2%)	14 (2.2%)
Major complications	10 (5.4%)	52 (8.4%)
Death	4 (2.2%)	10 (1.6%)
Hospital LOS (median)	8 days [5–11]	6 days [4–10]
PICU LOS (median)	3 days [2–8.5]	4 days [2–6]

FOREST PLOTS — MULTIVARIABLE ANALYSIS



Infants 0-90 days *Children 3–36mo*

OR 0.07–0.09

Normal PAT = strongest bedside predictor — reduces adverse outcome odds >90%

MULTIVARIABLE MODEL PARAMETERS

Parameter	Infants OR (95% CI)	Children OR (95% CI)
Normal PAT	**0.07 (0.02–0.18)**	**0.09 (0.05–0.14)**
CRP (per mg/dL)	1.06 (1.00–1.11)	1.05 (1.03–1.08)
LP pathologic vs normal	7.96 (2.37–26.7)	—
Urinary source	—	0.35 (0.12–0.96)

AUC 0.89 (Infants) | AUC 0.84 (Children)

CONCLUSIONS & POLICY IMPLICATIONS

1. **PAT-Based Triage:** A normal Pediatric Assessment Triangle reduced odds of adverse outcome by >90% in both cohorts — integrate into structured risk-stratification protocols.
2. **Active Recall Systems:** ~15% of infants and ~45% of older children were safely discharged and recalled without clinical deterioration — risk-based protocols can reduce unnecessary hospitalizations.
3. **Vaccine Surveillance:** S. pneumoniae remains the most common pathogen (32.6%) in children 3–36 months despite routine PCV vaccination — ongoing monitoring is essential.
4. **Risk Models:** Model AUCs of 0.89 (infants) and 0.84 (children) support implementation of predictive risk-stratification tools in PED settings nationwide.

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