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Use of Clinical Criteria for Prediction of Invasive Bacterial Infection in Febrile Infants: Evaluation of the PROS Criteria

Lyubina Yankova

Mark Neuman

Marie Wang

Adrienne G. DePorre
Children's Mercy Hospital

Sanyukta Desai

See next page for additional authors

Creators
Lyubina Yankova, Mark Neuman, Marie Wang, Adrienne G. DePorre, Sanyukta Desai, Laura Sartori, Richard Marble, Lise Nigrovic, Rianna Leazer, Christopher Pruitt, Christopher Woll, Sahar Rooholamini, Frances Balamuth, and Paul Aronson

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Yankova LC, Neuman MI, Wang ME, DePorre AG, Desai S, Sartori LF, Marble RD, Nigrovic LE, Leazer RC, Pruitt CM, Woll C, Rooholamini SN, Balamuth F, Aronson PL; for the Febrile Young Infant Research Collaborative

PAS 2021 VIRTUAL

Presenter Name: Lyubina Yankova

Institution: Yale School of Medicine

Email: Lyubina.Yankova@yale.edu

Mentor: Paul Aronson

Disclosure

Lyubina Yankova
Has documented no financial relationships to disclose or Conflicts of Interest (COIs) to resolve.

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Unapproved or Off Label

Lyubina Yankova has documented this presentation ***will not*** involve discussion of unapproved or off-label, experimental or investigational use.

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Background

- Should a primary care doctor obtain lab testing or refer a febrile infant to the ED?
- 2004 AAP Pediatric Research in Office Settings (PROS) network study
  - 3 clinical criteria:
    - Age <25 days
    - Maximum temperature ≥38.6℃
    - Ill-appearance
  - Sensitivity 93.6% for invasive bacterial infection (IBI)
    - Need for external validation

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Objective

To evaluate the sensitivity of the PROS criteria for IBI in febrile infants ≤60 days old

Methods

Study Design:

- Secondary analysis of retrospective cohort study
- Setting: 11 EDs between 7/1/2011 – 6/30/2016

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Methods

Study population:

- Identified by query of each site's microbiology laboratory or EHR system

Inclusion Criteria	Exclusion Criteria
- Age ≤60 days - Temp of ≥38℃ at home or ED triage - Blood or cerebrospinal fluid (CSF) pathogen	- Clinically apparent source of infection

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Methods

Study Definitions:

- Ill-appearing: toxic, limp, unresponsive, gray, cyanotic, apneic, weak cry, poorly perfused, grunting, listless, lethargic, or irritable

- IBI: pathogen identified in blood and/or CSF AND treated as bacteremia or bacterial meningitis

- Bacterial Meningitis:
  - Pathogen in CSF culture
  - CSF pleocytosis with bacteremia if pretreated

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Methods

Outcome Measure:

- Sensitivity of PROS criteria
  - Age <25 days
  - Maximum temperature ≥38.6℃
  - Ill-appearance

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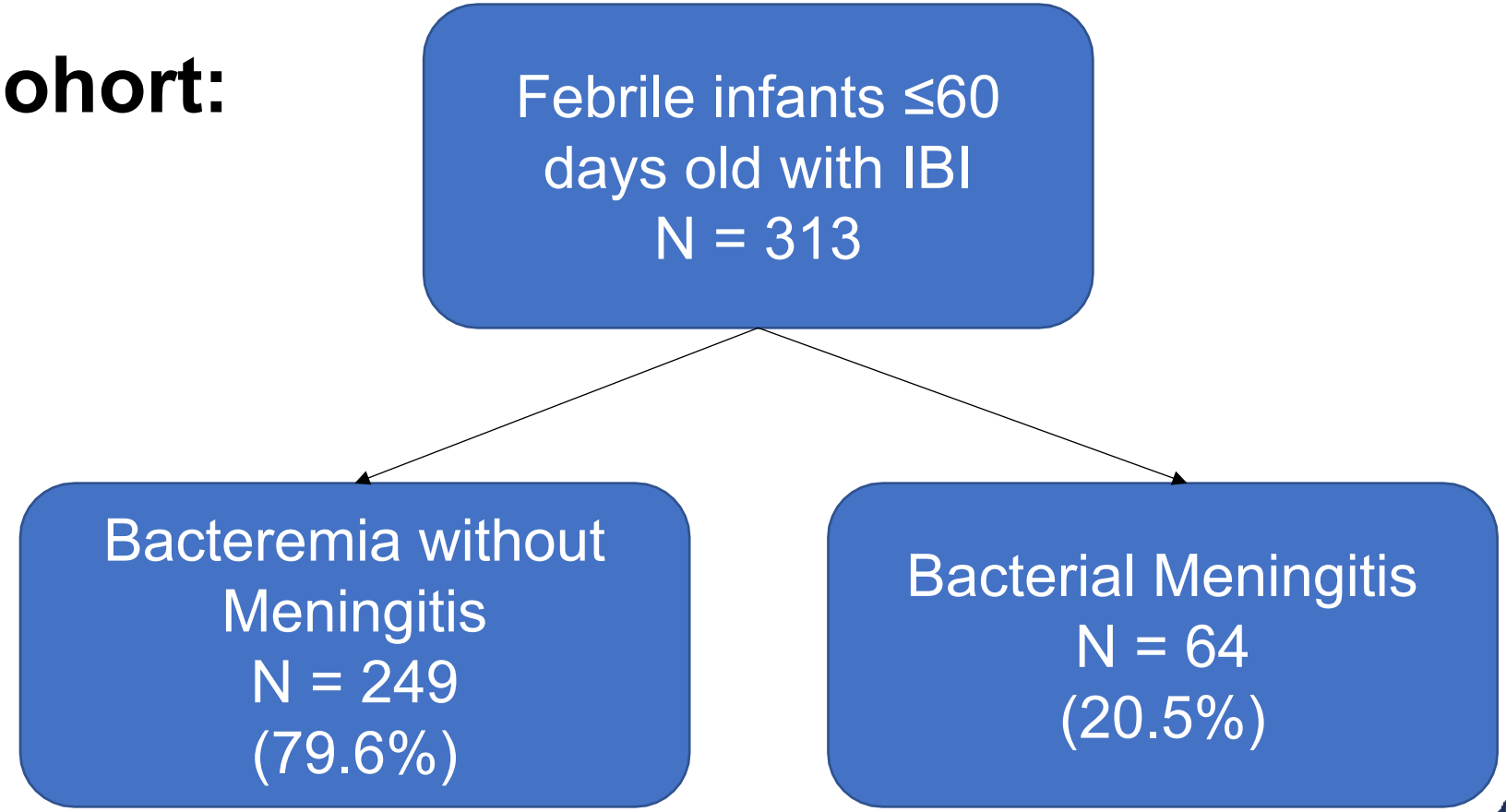
Results

Study Cohort:



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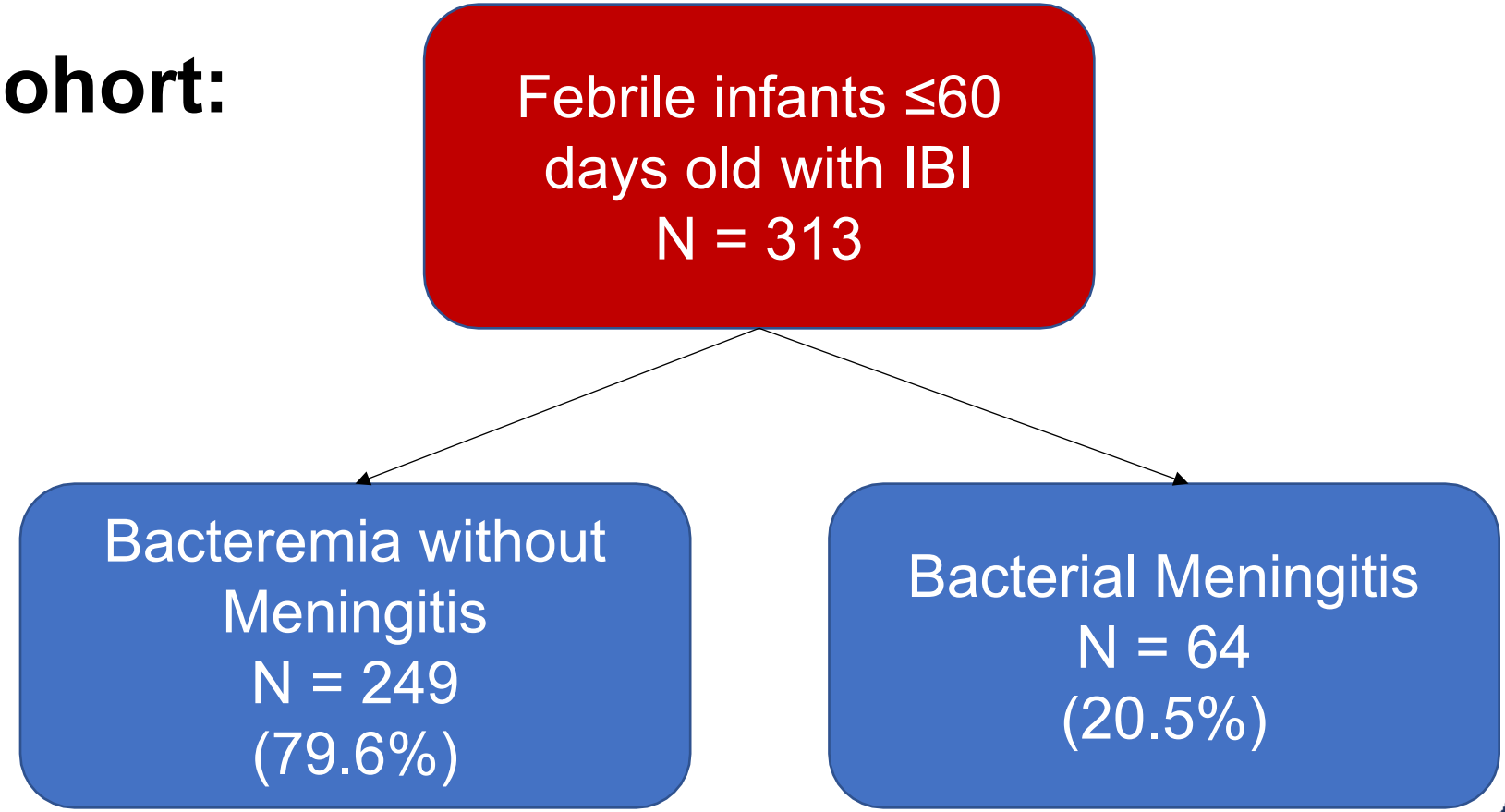

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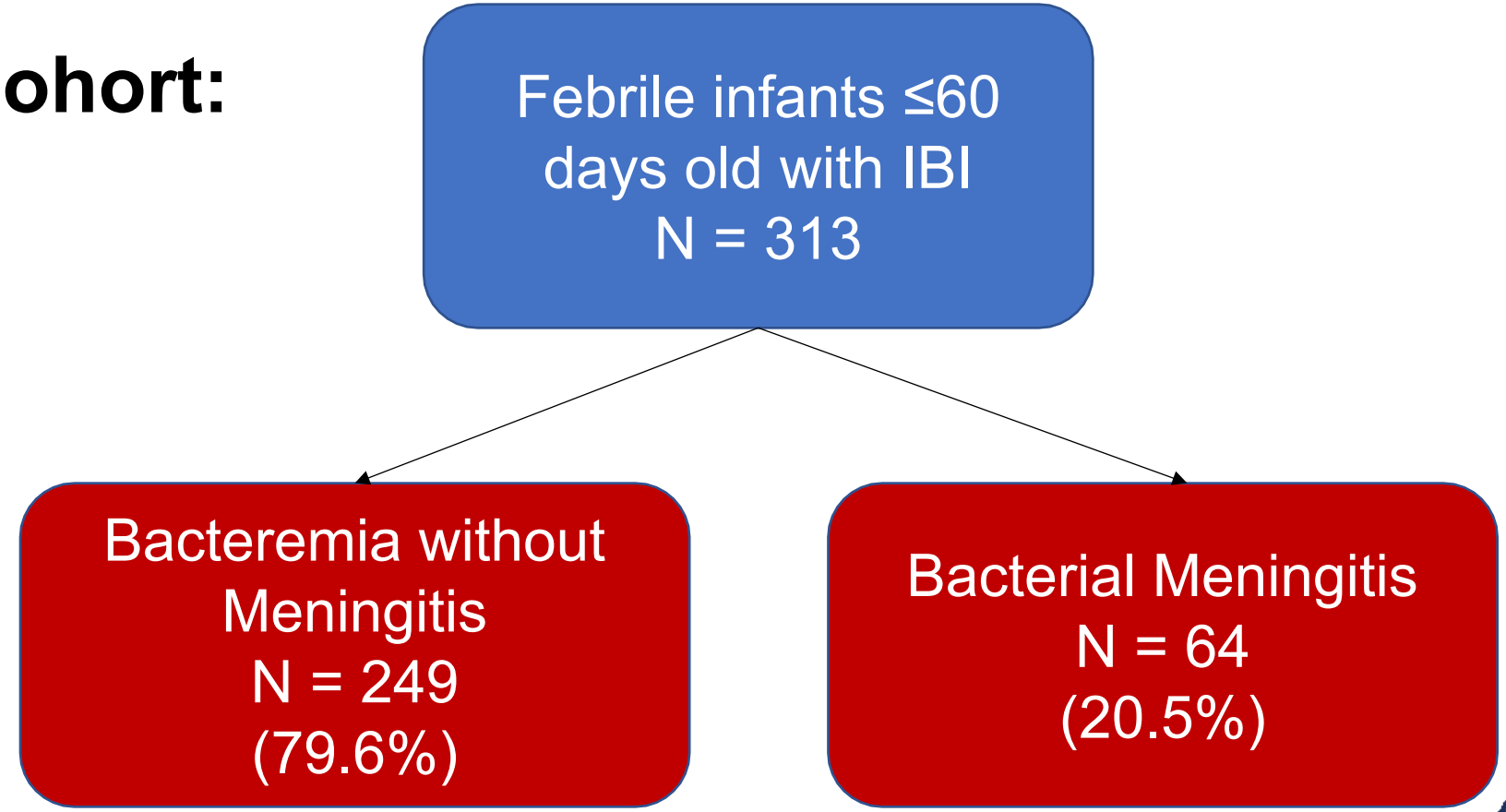

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Results

Study Cohort:

- Age Group:
  - <25 days: 130 (41.5%)
  - 25-60 days: 183 (58.5%)

- Clinical Appearance
  - Ill-appearing: 87 (27.8%)
  - Non-ill-appearing: 226 (72.2%)

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	IBI Overall	Bacteremia Without Meningitis	Bacterial Meningitis
Sensitivity (95% CI)	87.9% (83.7-91.3)	87.1% (82.3-91.0)	90.6% (80.7-96.5)

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Results

Missed IBI:

- 38 infants with IBI (12.1%) misclassified as low-risk
- 6 of these infants had bacterial meningitis

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Results

Age, d	Maximum temperature (℃)	Ill-Appearing Y/N	Peripheral WBC (cells/μL)	CSF WBC (cells/μL)	Blood culture	CSF culture
25	38.4	N	9,670	91	K. pneumoniae	No growth*
25	38.0	N	4,600	820	S. gallolyticus	S. gallolyticus
26	38.3	N	11,450	Not performed	No growth	E. coli
36	38.2	N	5,630	3	GBS	GBS
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*CSF culture obtained >11 hours after antimicrobial administration; treated as bacterial meningitis

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Limitations

- Outpatient criteria applied to ED cohort
- Retrospective determination of “ill-appearance”
- Cannot calculate specificity or predictive values

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Conclusions

- Sensitivity of PROS criteria for identifying febrile infants at low-risk for IBI was lower in our study (87.9%) than in original study (93.6%)
- Caution in applying PROS criteria

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Future Directions

- Derive and validate clinical criteria for use when laboratory testing unavailable
- Evaluate outcomes of infants managed without laboratory tests

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Acknowledgements

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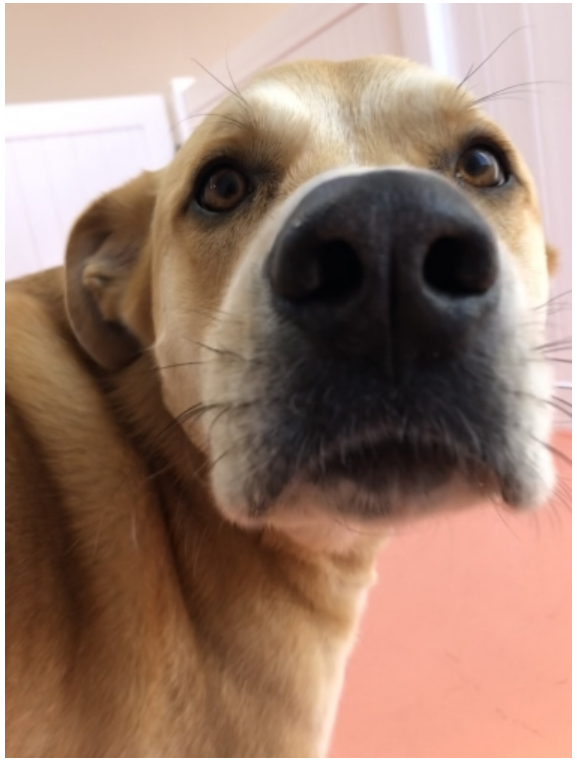
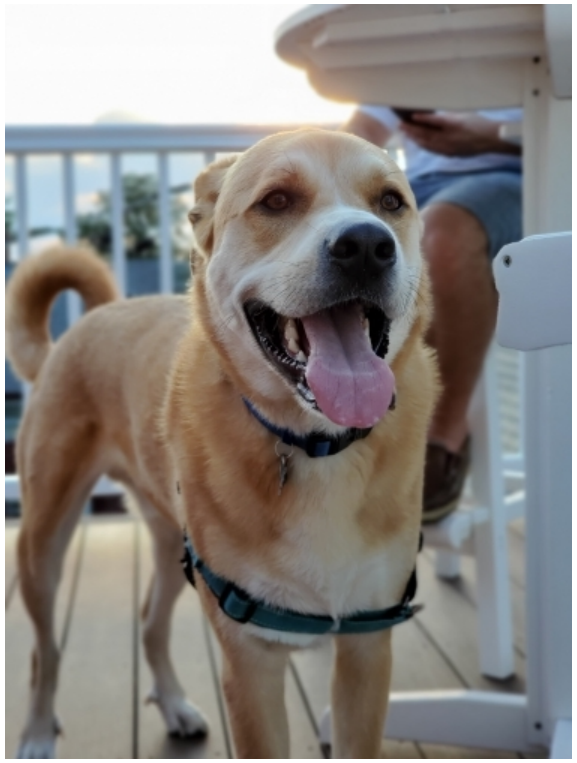
Questions?

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