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Thomas B. Newman, Karen M. Puopolo, Soora Wi, David Draper and Gabriel J. Escobar

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AUTHORS: Thomas B. Newman, MD, MPH,[a,b] Karen M. Puopolo, MD, PhD,[c,d,e] Soora Wi, MPH, [b] David Draper, PhD,[f] and Gabriel J. Escobar, MD[b,g]

[a]Departments of Epidemiology and Biostatistics and Pediatrics, School of Medicine, University of California, San Francisco, California; [b]Division of Research, Kaiser Permanente Medical Care Program, Oakland, California; [c]Department of Newborn Medicine and Channing Laboratory, Brigham and Women's Hospital, Boston, Massachusetts; [d]Division of Newborn Medicine, Children's Hospital Boston, Boston, Massachusetts; [e]Harvard Medical School, Boston, Massachusetts; [f]Department of Applied Mathematics and Statistics, University of California, Santa Cruz, California; and [g]Department of Pediatrics, Kaiser Permanente Medical Center, Walnut Creek, California

KEY WORDS
complete blood count, sepsis, bacteremia, neutrophils, leukocytes, sensitivity, likelihood ratios, newborn

ABBREVIATIONS
CBC—complete blood count
GBS—group B *Streptococcus*
WBC—white blood cell
ANC—absolute neutrophil count
I/T—proportion of neutrophils that are immature
KPMCP—Northern California Kaiser Permanente Medical Care Program
BWH—Brigham and Women's Hospital
LR—likelihood ratio
ROC—receiver operating characteristic

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Address correspondence to Thomas B. Newman, MD, MPH, Department of Epidemiology and Biostatistics, University of California, San Francisco, Box 0560, San Francisco, CA 94143. E-mail: newman@epi.ucsf.edu

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WHAT'S KNOWN ON THIS SUBJECT: Components of the complete blood count (CBC) provide information about the likelihood of sepsis in newborns, but previous studies have used varying definitions of abnormal and yielded inconsistent results.

WHAT THIS STUDY ADDS: White blood cell counts and absolute neutrophil counts increase the probability of sepsis only when they are low. The informativeness of the CBC increases with age and when interval likelihood ratios are used rather than a "normal" range.

abstract

BACKGROUND: A complete blood count (CBC) with white blood cell differential is commonly ordered to evaluate newborns at risk for sepsis.

OBJECTIVES: To quantify how well components of the CBC predict sepsis in the first 72 hours after birth.

METHODS: For this retrospective cross-sectional study we identified 67 623 term and late-preterm (≥34 weeks gestation) newborns from 12 northern California Kaiser hospitals and 1 Boston, Massachusetts hospital who had a CBC and blood culture within 1 hour of each other at <72 hours of age. We compared CBC results among newborns whose blood cultures were and were not positive and quantified discrimination by using receiver operating characteristic curves and likelihood ratios.

RESULTS: Blood cultures of 245 infants (3.6 of 1000 tested newborns) were positive. Mean white blood cell (WBC) counts and mean absolute neutrophil counts (ANCs) were lower, and mean proportions of immature neutrophils were higher in newborns with infection; platelet counts did not differ. Discrimination improved with age in the first few hours, especially for WBC counts and ANCs (eg, the area under the receiver operating characteristic curve for WBC counts was 0.52 at <1 hour and 0.87 at ≥4 hours). Both WBC counts and ANCs were most informative when very low (eg, the likelihood ratio for ANC < 1000 was 115 at ≥4 hours). No test was very sensitive; the lowest likelihood ratio (for WBC count ≥ 20 000 at ≥4 hours) was 0.16.

CONCLUSION: Optimal interpretation of the CBC requires using interval likelihood ratios for the newborn's age in hours. *Pediatrics* 2010; 126:903–909