

Media Release

**Embargoed: 00:01 CEST, Tuesday, 21 April 2026**

ESCMID Global 2026

## **WHO-recommended antibiotics cover only 1 in 4 neonatal sepsis infections in low- and middle-income countries**

**(Tuesday, 21 April 2026, Munich, Germany) A major multi-country study has found that WHO-recommended first-line antibiotics for neonatal sepsis are likely to be effective in only one quarter of infections in low- and middle-income countries (LMICs).<sup>1</sup> The findings, presented today at ESCMID Global 2026, highlight the growing impact of antimicrobial resistance (AMR).**

Neonatal sepsis, a life-threatening infection occurring within the first month of life, remains a leading cause of newborn mortality worldwide.<sup>2</sup> The World Health Organization (WHO) currently recommends ampicillin plus gentamicin as first-line empirical antibiotic therapy – treatment initiated before the causative organism and its antibiotic susceptibility are known.<sup>3,4</sup> However, these recommendations are largely based on data from high-income settings.

To assess how these recommendations perform in LMIC hospital settings, researchers from the University of Oxford and an international network of collaborating hospitals and research institutions conducted the BARNARDS II study across 13 tertiary neonatal units in Pakistan, Bangladesh and Nigeria between February 2024 and October 2025.

The study included 14,259 neonates treated with empirical antibiotics for suspected sepsis, with initial treatment regimens varying widely and typically comprising one to three antimicrobials. Two-drug regimens were most common, most frequently amikacin plus cefotaxime, while only 40 neonates received the WHO-recommended first-line combination of ampicillin and gentamicin.

Out of a total of 5,012 culture-confirmed cases, a subset of 2,821 had both pathogen identification from blood cultures and available antibiotic susceptibility data. High levels of AMR were observed. The WHO-recommended combination of ampicillin and gentamicin would have been active against only 25.0% of identified pathogens (including fungal).

“Most concerning were the high rates of antimicrobial resistance identified,” said lead author Dr Kathryn Thomson, University of Oxford. “The substantial AMR burden makes identifying consistently effective empirical antibiotic regimens extremely challenging. In these settings, ampicillin and gentamicin would have provided limited coverage against the locally prevalent, highly resistant pathogens.”

Dr Thomson continued, “In our cohort, the limited expected effectiveness of WHO-recommended first-line therapy makes deviation from these guidelines clinically understandable. Rather than reflecting poor adherence to guidelines, this likely represents adaptation to local resistance patterns and the challenges of applying global treatment recommendations in these environments.”

Overall, 1,039 of the 2,821 neonates (36.8%) received appropriate empirical therapy over the duration of the study, defined as initial treatment in which at least one of the antibiotics given was active against the pathogen identified by blood culture.

In contrast, inappropriate empirical therapy – observed in 1,783 of the same 2,821 neonates – was associated with a two-fold higher mortality rate (32.1% vs 17.9%) in unadjusted analyses. However, this association was not maintained after adjustment for key clinical factors, particularly gestational age.

Dr Thomson explained, “Gestational age emerged as the strongest predictor of mortality. This does not mean that antibiotic choice is unimportant – prompt and appropriate therapy remains critical in neonatal sepsis. Rather, underlying clinical vulnerability plays a major role and can influence the relationship between treatment and outcomes.”

Reflecting on the study’s implications, principal investigator of the BARNARDS study, Professor Tim Walsh, said, “Our results show that a one-size-fits-all approach to empirical antibiotic guidelines is unlikely to be effective globally. Even across the countries included in this study, we observed important differences in both the pathogens responsible for infection and their resistance profiles.”

“Improving neonatal outcomes will ultimately require use of locally informed empirical treatment strategies, enhanced diagnostics, continued AMR surveillance, antimicrobial stewardship and sustainable access to effective antibiotics, supported by long-term policy commitment and investment,” Professor Walsh concluded.

**ENDS**

**Notes to editors:**

A reference to ESCMID Global must be included in all coverage and/or articles associated with this study.

For more information or to arrange an expert interview, please contact the ESCMID Press Office at: [communication@escmid.org](mailto:communication@escmid.org)

**About the study author:**

Dr Kathryn Thomson is the scientific lead for the BARNARDS II project and a researcher specialising in neonatal sepsis and antimicrobial resistance (AMR) in low- and middle-income countries. She leads analyses within one of the largest global studies of antibiotic use and resistance in newborns, working with an international network of collaborators to examine patterns of antibiotic use, resistance and key risk factors driving AMR and poor outcomes. This work contributes to policy-relevant evidence to tackle antimicrobial resistance, strengthen antibiotic stewardship and improve access to effective treatment for vulnerable newborns.

For more information about the BARNARDS II study, please visit:  
<https://www.ineosoxford.ox.ac.uk/barnards>

### **About the European Society of Clinical Microbiology and Infectious Diseases:**

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Website: [www.escmid.org/](http://www.escmid.org/)

### **References:**

1. Thomson, K., Achi, C., Hassan, B., et al. (2026). *Appropriateness of empirical antibiotic therapy and mortality in neonatal sepsis across LMIC hospitals*. Oral presentation. *ESCMID Global 2026*.
2. Mahmoud, H. A. H., Parekh, R., & Dhandibhotla, S., et al. (2023). Insight into neonatal sepsis: An overview. *Cureus*, 15(9), e45530.
3. Obiero, C. W., Seale, A. C., & Berkley, J. A. (2015). Empiric treatment of neonatal sepsis in developing countries. *The Pediatric Infectious Disease Journal*, 34(6), 659–661.
4. Strich, J. R., Heil, E. L., & Masur, H. (2020). Considerations for empiric antimicrobial therapy in sepsis and septic shock in an era of antimicrobial resistance. *The Journal of Infectious Diseases*, 222(Suppl 2), S119–S131.