

## Raj Kumar Shrestha

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Raj Kumar Shrestha, MSc, is a molecular microbiologist currently working as a Research officer at Siddhi Memorial Hospital, Bhaktapur, Nepal. His areas of interest include epidemiology and characterization of mechanisms of antimicrobial resistance in Gram-negative bacterial pathogens with a focus on the pediatric population. He has over two years of research experience and aspires to specialize in his future work on expanding the understanding of drivers of antimicrobial resistance and explorations of novel approaches for the mitigation of antimicrobial resistance in resource-limited settings.

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## Project

### **A pilot study to investigate community-associated risk factors for gut colonization with 3rd generation cephalosporin-resistant Enterobacterales in neonates after introduction into the community**

Widespread dissemination of multidrug-resistant Gram-negative bacteria, in particular Enterobacterales harboring extended-spectrum  $\beta$ -lactamases (ESBLs), is endemic in many parts of Nepal. Colonization with antimicrobial-resistant (AMR) pathogens is considered one of the risk factors for developing infectious syndromes. While the transmission dynamics and epidemiology of drug-resistant pathogens are reasonably well characterized in the context of hospital settings, community-associated risk factors for the acquisition of multidrug-resistant pathogens are not sufficiently understood. This knowledge gap is much evident in lower-middle-income countries where the burden of AMR is the most problematic.

In light of the high burden of AMR infections among young infants, this pilot study aims to establish baseline evidence to determine a) what proportion of healthy neonates (without hospitalization, no maternal rectovaginal colonization, and antimicrobial use), free of gut colonization by 3rd generation cephalosporin-resistant Enterobacterales (3-GCRE) at the time of discharge, get colonized in their gut with 3-GCRE after introduction into the community, and what are the risk factors for colonization? b) what are the proportions of new colonization events within different time points of sampling? c) what is the nature of colonization among those who get colonized (persistent colonization with the same strain or transient colonization with different strains)? d) What proportion of colonized children develop an infection within 1 month from the point of proven colonization?

Identifying the risk factors among healthy neonates for colonization with 3-GCRE could help pinpoint groups, apart from those having hospital-associated predisposing risk factors, at risk of developing multidrug-resistant infections. Tailored empiric antimicrobial therapy for community-acquired infection in neonates and early infants based on identified risk factors can promote better patient outcomes, ensure appropriate use and extend the efficacy of last resort antimicrobials, and help curb the amplification of AMR.