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Evidence based QUality Improvement for Prescribing Stewardship in ICU (EQUIPS-ICU): protocol for type III hybrid implementation-effectiveness study

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Abstract
Background: Approximately half of all antimicrobial prescriptions in intensive care units (ICUs) may be inappropriate, including those prescribed when not needed, in unnecessary combinations or for longer durations than needed. Inappropriate prescribing is costly, exposes patients to unnecessary side-effects and drives population-level antimicrobial resistance, the prevalence and consequences of which are greatest in low- and middle-income countries. However, the implementation of interventions to improve the appropriateness of antimicrobial prescribing has been variable and requires further study. Methods: We propose a type III hybrid implementation/effectiveness interventional cohort trial in 35 ICUs in up to 11 low- and middle- income countries. The study intervention is a structured review of antimicrobial prescriptions as

recommended by the World Health Organisation. Strategies to support stakeholder-led implementation include development of local protocols, registry-enabled audit and feedback, and education. Evaluation of implementation, and the determinants of its success, is informed by the RE-AIM framework and the Consolidated Framework for Implementation Research respectively. The primary outcome is a composite measure of fidelity, reach and adoption. Secondary outcomes describe the effectiveness of the intervention on improving antimicrobial prescribing. Qualitative interviews will assess relevant implementation acceptability, adaptations and maintenance. A baseline survey will investigate ICU-level antimicrobial stewardship structures and processes. Discussion: This study addresses global policy priorities by supporting implementation research of antimicrobial stewardship, and strengthening associated healthcare professional competencies. It does this in a setting where improvement is sorely needed: low- and middle- income country ICUs. The study will also describe the influence of pre-existing antimicrobial stewardship structures and processes on implementation and improve understanding about the efficacy of strategies to overcome barriers to implementation in these settings. Trial registration: This study protocol has been registered with ClinicalTrials.gov (ref NCT06666738) on 31 Oct 2004. https://clinicaltrials.gov/study/NCT06666738?term=NCT06666738&rank=1. © The Author(s) 2025.

Author Keywords
Antimicrobial Resistance; Antimicrobial Stewardship; Audit & Feedback; Critical Care; Implementation; Intensive Care; Low- and Middle- Income Countries; Quality Improvement

Index Keywords
antiinfective agent; antimicrobial stewardship, human, implementation science, intensive care unit, organization and management, prescribing error, prevention and control, total quality management; Anti-Bacterial Agents, Antimicrobial Stewardship, Humans, Implementation Science, Inappropriate Prescribing, Intensive Care Units, Quality Improvement

Chemicals/CAS
Anti-Bacterial Agents

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