African Journal of Public Health and Health Systems

A Systematic Review of Stepped-Wedge Trials for Surgical Site Infection Reduction in African District Hospitals: A Focus on Quality Improvement Collaboratives

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Published: 06 May 2004 | **Received:** 02 December 2003 | **Accepted:** 24 March 2004

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DOI: 10.5281/zenodo.18528611

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Abstract

Surgical site infections (SSIs) contribute significantly to patient morbidity and mortality in low-resource healthcare settings. Quality improvement collaboratives (QICs) are a strategy to reduce SSI rates, and the stepped-wedge trial (SWT) design is considered pragmatic for evaluating such interventions in operational contexts. The specific effectiveness of QICs evaluated through SWTs in African district hospitals is not well established. This systematic review aimed to synthesise evidence from stepped-wedge trials on the impact of quality improvement collaboratives designed to reduce surgical site infection rates in African district hospitals. A systematic search of multiple electronic databases was conducted in accordance with PRISMA guidelines. Included studies were stepped-wedge trials evaluating a QIC intervention targeting SSI reduction in district-level hospitals in Africa. Data on study characteristics, intervention components, and outcomes were extracted. Study quality was assessed using appropriate risk of bias tools. The search identified a limited number of relevant studies. A consistent theme was the logistical and methodological complexity of implementing robust stepped-wedge trials in these settings. One identified study reported a positive direction of effect, with the collaborative intervention associated with a relative reduction in SSI rates, though the effect size varied across sites. There is a scarcity of high-quality evidence from stepped-wedge trials on the effectiveness of QICs for SSI reduction in African district hospitals. While preliminary findings indicate potential benefit, considerable challenges in trial design and execution are common. Future research should prioritise well-designed, contextually adapted stepped-wedge trials incorporating rigorous process evaluation. Investment is required to strengthen local capacity for surgical outcomes research and data collection to facilitate robust evidence generation. surgical site infection, stepped-wedge trial, quality improvement collaborative, district hospital, Africa This review consolidates the current evidence on a specific trial methodology for a critical public health intervention, highlighting evidence gaps and practical challenges to inform future research and policy in African health systems.

Keywords: *surgical site infection, quality improvement collaborative, stepped-wedge trial, district hospital, sub-Saharan Africa*

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