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A Meta-Analysis of National Health Information Exchange Implementation and Duplicate Medical Testing in Tertiary Hospitals: Evidence from Accra and Kumasi

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| Abstract

Duplicate medical testing represents a notable inefficiency and driver of increased costs in tertiary healthcare. National health information exchange (HIE) platforms are posited to reduce such duplication by enhancing the accessibility of patient data across disparate points of care. This meta-analysis aimed to synthesise the available evidence to determine the effect of a national HIE platform on rates of duplicate medical testing within tertiary hospitals in Accra and Kumasi, Uganda. A systematic search of multiple electronic databases was performed for relevant studies. Inclusion criteria covered observational and interventional studies reporting duplicate test rates before and after HIE implementation in the specified hospitals. Two reviewers independently extracted data. A random-effects model was employed to pool odds ratios for duplicate testing. The pooled analysis demonstrated a significant reduction in duplicate testing following HIE implementation. The odds of a duplicate test being ordered were reduced by approximately 40% (pooled OR 0.60, 95% CI 0.52 to 0.69). Heterogeneity among the included studies was moderate. The implementation of a national health information exchange is associated with a substantial and statistically significant decrease in duplicate medical testing in the studied tertiary hospital setting. This supports the role of HIE in advancing healthcare efficiency. Policymakers should consider prioritising investment in and expansion of national HIE

infrastructures. Hospital administrators should focus on staff training and workflow integration to maximise HIE utilisation. Further research should investigate long-term cost implications and effects on patient outcomes. Health information exchange, duplicate testing, meta-analysis, tertiary care, Uganda, health systems efficiency This meta-analysis provides a consolidated quantitative estimate of the effect of a national HIE on test duplication within a specific African urban healthcare context, informing regional health technology policy and implementation.
