

Comparing Dual Stain Cytology and Visual Inspection for Cervical Precancer in Kisumu Kenya A Diagnostic Accuracy Protocol

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Thematic Area: Women's Health and Diagnostic Evaluation | Manuscript Type: Study Protocol

ABSTRACT

Background: Local evidence is needed to assess dual-stain cytology against visual inspection with acetic acid (VIA) and to understand its place in HPV-based screening. **Objective:** To describe a proposed paired diagnostic accuracy study of p16INK4a/Ki-67 dual stain and VIA for cervical intraepithelial neoplasia grade 2 or worse (CIN2+) among women with and without HIV at a Kisumu referral hospital. **Methods:** The 2023 proposal specifies consecutive enrolment of 800 women aged 25–65 years, index testing, histopathological verification where indicated, masked interpretation and HIV-stratified analysis. Sensitivity, specificity and predictive values with 95% confidence intervals are planned; partial verification requires a prespecified remedy. Operational measures include specimen adequacy, turnaround and referral completion. The indicative budget is USD 255,085. **Status:** The proposal supplies a design and planning estimates, not participant outcomes. The reference-standard and sample-size provisions must be finalized before recruitment. Conclusions about comparative accuracy or implementation await completed data.

Keywords: cervical cancer screening; dual stain; HIV; diagnostic accuracy; protocol; Kisumu

1. INTRODUCTION

Persistent high-risk human papillomavirus (HPV) infection underlies most cervical cancers, while women living with HIV face increased risk of persistent infection and precancer. WHO recommends HPV DNA testing as the preferred primary screening method (WHO, 2021). Its 2024 guidance addresses dual staining as triage after a positive HPV test, with insufficient evidence for a specific recommendation among women living with HIV (WHO, 2024). A local comparison with VIA remains useful for service planning, provided any subsequent triage claim is evaluated in an HPV-positive population.

2. STUDY DESIGN AND SETTING

The 2023 proposal describes a prospective, facility-based, paired diagnostic accuracy study at Jaramogi Oginga Odinga Teaching and Referral Hospital, Kisumu. Consecutive consenting screening attendees aged 25–65 years would be recruited to a provisional target of 800. Prior hysterectomy, current treatment for cervical precancer or cancer, inability to consent and examination contraindications are proposed exclusions. Dr. Daniel A. Otworì is named Principal Investigator and Dr. Kennedy Moturi Assistant Principal Investigator in the source proposal. The proposed April 2023–March 2025 period is a plan and does not establish that recruitment occurred.

3. PROCEDURES AND OUTCOMES

Table 1. Prespecified study framework

Domain	Proposed measure or safeguard
Population	800 consecutively enrolled attendees; report screening flow and HIV strata.
Index tests	Dual-stain cytology and VIA in the same participants; masked readers and written thresholds.
Primary endpoint	Histologically confirmed CIN2+; CIN3+ secondary if cases permit.
Reference standard	Colposcopy-directed biopsy with masked pathology review; define verification of negative screens.
Analysis	Paired 2 × 2 tables, accuracy estimates and 95% confidence intervals.
Operations	Specimen adequacy, turnaround, referral completion and resource use.

After consent, staff would record screening history and HIV status under confidentiality safeguards, collect liquid-based cytology, perform VIA and colposcopy under approved clinical procedures, and process aliquots for dual staining with controls. HPV DNA testing is optional only if available and funded. Histopathology from a colposcopy-directed biopsy, rather than colposcopic impression, defines the primary target condition. The verification plan must state whether all participants or an appropriate sample of screen-negative women can receive reference assessment; selective biopsy after positive tests alone can bias accuracy estimates.

4. SAMPLE SIZE AND ANALYSIS

The target of 800 is provisional. At an assumed CIN2+ prevalence of 10%, approximately 80 reference-positive participants would be expected before losses, yielding a sensitivity estimate near 80% with an approximate 95% half-width of nine percentage points. This is a planning illustration, not an observed prevalence or power calculation. Final recruitment should account for expected prevalence, verification, invalid specimens and precision in each HIV subgroup.

For each index test, report paired 2×2 tables against histological CIN2+, sensitivity, specificity and predictive values with 95% confidence intervals. Estimate paired differences with intervals and use McNemar's test for appropriate paired comparisons. Report Cohen's kappa only as agreement. Present missing and indeterminate results and a participant flow diagram. If verification is incomplete, compare verified and unverified participants and prespecify a sensitivity analysis or inverse-probability weighting. HIV-stratified interaction analysis depends on adequate events. Report according to STARD 2015.

5. IMPLEMENTATION AND ETHICS

The proposed recruitment pace for 800 participants over July 2023–June 2024 is about 67 per month. A three-month feasibility review would examine enrolment, laboratory throughput and verification. The indicative USD 255,085 budget comprises USD 242,938 direct costs and USD 12,147 contingency; these amounts are planning allocations requiring quotations and funder approval. Ethics and site approvals, consent, confidential handling of HIV data, quality control and a referral pathway for abnormal findings are prerequisites. Any protocol changes require approval. These dates and costs do not verify that study activities occurred.

6. INTERPRETATION

This protocol reports no participant outcomes. It cannot establish CIN2+ prevalence, comparative test accuracy or benefit. Any future implementation recommendation should consider HPV-based screening guidance, valid-test rates, costs and completion of care, alongside the completed diagnostic estimates.

SOURCE NOTE

This manuscript develops the supplied 2023 proposal naming Dr. Daniel A. Otworu as Principal Investigator and Dr. Kennedy Moturi as Assistant Principal Investigator. The article byline follows the requested authorship; manuscript authorship and contributor approval should be finalized with the journal before submission.

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