

Transformative approaches to rapidly and efficiently test demand creation interventions to promote HIV retesting in adults at increased risk of HIV

The Innovative Behavioral Intervention Strategies Megatrial (IBIS-Megatrial) Study

Protocol for the Aim 1 Pilot trial

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Glossary of Terms

ART	Antiretroviral therapy
FDR	False discovery rate
HCD	Human-centered design
HCW	Health care workers
HTS	HIV Testing Services
IDI	In-depth interviews
MoH	Ministry of Health
ML	Machine learning
NIH	National Institutes of Health
PrEP	Pre-exposure prophylaxis
RCT	Randomized controlled trial
SAB	Stakeholder advisory board
SSA	Sub-Saharan Africa
U=U	Undetectable = untransmittable
WHO	World Health Organization

Protocol Summary

Short Title: The Innovative Behavioral Intervention Strategies Megatrial (IBIS-Megatrial) Study- Pilot trial

Study Population: Adults at increased risk of HIV following baseline negative HIV test in Homa Bay County, western Kenya and two districts (Bushenyi and Ibanda Districts) in Southwestern Uganda.

Sample Size: Approximately 100 pilot participants.

Participating Sites: Existing HIV testing service sites at hospitals and clinics in Homa Bay County, Western Kenya and two districts (Bushenyi and Ibanda Districts) in Southwestern Uganda.

Study Objectives: Adapt behavioral economics Interventions to promote HIV retesting using a participatory prototyping approach.

Study Design: Adapt proven behavioral economics interventions for local implementation by conducting a pilot trial of interventions developed through human centered design workshops with healthcare providers and adults at higher risk of HIV exposure.

Study Duration: 4 months

Lay Summary

HIV re-testing is crucial in ensuring early identification of disease to promote well-being of an individual as well as preventing onward spread of infection by treating those identified to have disease promptly. The proposed study aims to identify approaches that would encourage individuals aged 15 years and above at high risk of HIV infection to retest. The study proposes to test up to 12 different strategies aimed at encouraging repeat testing of HIV. The different strategies are aimed at modifying individual behavior to enhance HIV testing. The study will focus on adapting proposed interventions to the local context and testing them on a small group of individuals in two hospitals.

Abstract

Introduction: Frequent HIV testing among persons at increased HIV risk is crucial for scaling up provision of pre-exposure prophylaxis, achieving early diagnosis and prompt antiretroviral therapy initiation. Despite guidelines recommending frequent retesting among adults at higher risk, studies from sub-Saharan Africa (SSA) suggest that retesting occurs infrequently. Although many people in sub-Saharan Africa (SSA) have ever tested for HIV, retesting rates are low and median time to HIV diagnosis after infection exceeds 2.5 years. *There is a vital need for interventions that increase routine retesting in persons at increased HIV risk.* We aim to use innovative methods to adapt, test and compare multiple low-cost behavioral interventions to increase HIV retesting among adults in rural Kenya and Uganda, with the goal of identifying interventions that can be rapidly implemented at scale.

Justification: Behavioral economics provides insights into *why* people may not engage in healthy behaviors such as HIV retesting and suggests low-cost interventions that address these barriers to healthy behavior. Recent innovations in behavioral design and large-scale, multi-arm field experiments enable us to rapidly adapt, test, and compare multiple behavioral interventions simultaneously. This project will use innovative methods to adapt, test and compare multiple low-cost behavioral interventions to increase HIV retesting.

Methods: We propose to use participatory prototyping to adapt proposed interventions to the local context and languages and to conduct intervention piloting: small scale implementation of prototypes to obtain feedback on intervention delivery. The 8-12 locally adapted nudge interventions will later be used in an individually randomized controlled trial of nudge interventions to promote HIV retesting 3-6 months after an initial HIV-negative test.

1. Study Synopsis

In this study, we will determine the effectiveness of multiple low-cost behavioral interventions, designed with end-user input, to promote HIV retesting among adults in rural Kenya and Uganda who have higher risk of HIV exposure.

The project will have the following aims:

Aim 1. Adapt behavioral economics interventions to promote HIV retesting using a participatory prototyping approach in rural Kenya and Uganda.

The research we propose can accelerate the pace of discovery of interventions to increase HIV retesting and transform future approaches to designing, testing, and comparing interventions for health behaviors.

1.1 Introduction

Frequent HIV testing among persons at increased HIV risk is crucial for achieving early diagnosis and prompt antiretroviral therapy initiation – key steps to reducing morbidity and eliminating transmission. HIV retesting can also support ongoing efforts to scale-up pre-exposure prophylaxis. Despite guidelines recommending frequent retesting among adults at higher risk, studies from sub-Saharan Africa (SSA) suggest that retesting occurs infrequently.

Behavioral economics provides insights into why people may not engage in behaviors like HIV retesting. Low HIV retesting stems from structural factors (e.g., stigma and opportunity costs), as well as various biases and heuristics in people's beliefs and behavior, constraints in attention, and reliance on incorrect mental models. Behavioral economics has also identified low-cost interventions ("nudges") that effectively account for these features of behavior. Building on our prior work that has identified barriers to HIV retesting, we have applied a Behavioral Design framework to select nudges that are effective in addressing the psychological underpinnings of each barrier to retesting. We will adapt the nudges to HIV retesting and local contexts through a participatory prototyping approach that brings together scientists and end users. We will then conduct a large-scale, multi-arm field experiment that features individual randomization and tests many different nudges. This "mega-trial" approach has recently been used to test behavioral interventions to promote other health behaviors in the US and offers many advantages over standard experiments that only test 1 or 2 interventions. With the same outcome being examined in all study arms, mega-trials allow for direct comparison of different interventions. Unlike 2-arm experiments, they also make it possible to identify which interventions work best for whom. In collaboration with Ministry of Health HIV testing sites in Kenya and Uganda, we will enroll a large study population of persons at high risk of HIV to conduct a mega-trial of low-cost behavioral interventions to promote HIV retesting.

Problem Statement: Frequent HIV testing among persons at higher risk of HIV infection is crucial for facilitating early treatment initiation for those who have become HIV-positive and for supporting engagement in appropriate HIV prevention interventions for those who test HIV-negative. Based on the literature and country guidelines, persons at increased risk of HIV may include members of key populations and other individuals with behaviors that may expose them to HIV infection such as persons who report sexual partners of unknown HIV status, persons newly diagnosed with other sexually transmitted infections and those who engage in transactional sex. Without frequent testing, persons who acquire HIV may go undiagnosed and untreated for months to years, with increased risk of morbidity, mortality and onward HIV transmission to others. The WHO recommends HIV testing every 3-6 months for adults at higher risk.¹ But although many people in sub-Saharan Africa (SSA), including eastern Africa, have ever tested for HIV, retesting rates are low and median time to HIV diagnosis after infection exceeds 2.5 years.² *There is a vital need for interventions that increase routine retesting in persons at increased HIV risk.*

Justification of the study: Behavioral economics provides insights into why people may not engage in healthy behaviors such as HIV retesting and suggests low-cost interventions that address these barriers to healthy behavior. Low HIV retesting rates stem from structural factors (e.g. stigma, transport costs, opportunity costs of time) as well as various biases and heuristics in people's beliefs and behavior (e.g. incorrectly low perceived HIV risk due to a prior negative test), constraints in attention (e.g. competing priorities), and reliance on inaccurate mental models (e.g. underestimating the benefits of ART). Behavioral economics research has identified low-cost interventions (often referred to as "nudges") that can effectively

account for these features of behavior and have the potential to increase HIV retesting rates. Nudges like small financial incentives, strategically framed information and messages, and changes in “choice architecture” (e.g., modifying default settings) have proven effective in promoting many health behaviors including vaccination, smoking cessation, gym attendance, and HIV testing. However, broader use of nudges has been hampered by two factors: (1) insufficient adaptation to specific behaviors (e.g. HIV retesting) or local contexts; and (2) the slow pace of testing each nudge in separate studies across different populations, settings, and time periods. *This has resulted in major gaps in our understanding of which behavioral interventions are most effective for specific behaviors like HIV retesting.*

2. Study Objectives

Aim 1. Adapt behavioral economics interventions to promote HIV retesting using a participatory prototyping approach in rural Kenya and Uganda. Building on our prior work that has identified barriers to HIV retesting, we will select about 10-15 low-cost interventions (“nudges”) that have proven to be effective in addressing the decision-making biases and constraints underlying those barriers. In Aim 1, we will pilot the intervention prototypes for acceptability, feedback and implementation outcomes in order to guide larger-scale testing of the interventions.

3. Background and Rationale

Frequent HIV testing among people at increased HIV risk is crucial for epidemic control. In much of sub-Saharan Africa (SSA), there is a vital need to increase routine testing among persons at higher risk of HIV exposure and close persistent gaps in HIV status awareness. For those who have recently become infected, frequent testing is critical for early diagnosis and prompt antiretroviral therapy (ART) initiation, thus reducing morbidity and eliminating HIV transmission risk.³⁻⁵ For those who are HIV-negative but remain at higher risk of HIV infection, retesting enables provision of effective biomedical HIV prevention modalities like pre-exposure prophylaxis (PrEP). World Health Organization (WHO) guidelines recommend retesting every 3-6 months for adults at increased HIV risk.¹ Though HIV testing services are widely available in SSA,^{6,7} rigorous studies that directly compare strategies for generating demand for HIV retesting are lacking.⁸

Despite WHO guidelines recommending frequent retesting among at-risk adults, regular retesting occurs infrequently in SSA and results in delayed HIV diagnosis following infection. Several surveys show that many adults have not had an HIV test in the prior year⁹⁻¹¹ and that the median time to HIV diagnosis following infection remains >2.5 years even as the proportion who have ever tested for HIV increases.² Global estimates of CD4⁺ cell count at HIV diagnosis and ART initiation are unacceptably low, with ~50% of people starting ART globally at CD4⁺ counts <350 cells/ μ L.^{12,13} This late diagnosis results in missed opportunities for HIV treatment as prevention along with avoidable morbidity and mortality. Increased retesting for HIV is fundamental to achieving earlier HIV diagnosis and ART start, particularly among persons at increased risk of HIV.

Behavioral barriers to retesting for HIV are distinct from those for one-time testing. In a study of adults at increased risk of HIV in southwestern Uganda recruited from bars, sites of commercial sex work and transport hubs, we found that although most adults (>80%) reported *ever* testing for HIV, few (18%) reported regular retesting for HIV every 3 months in accordance with Uganda guidelines.¹⁴ Similar findings have been reported elsewhere in SSA,¹⁵⁻¹⁷ suggesting that retesting is a distinct behavior from one-time testing. Although there are some shared barriers to first-time HIV testing and to HIV retesting, several distinct factors likely drive low retesting rates, including low perceived HIV risk (reinforced by a prior negative test: for example, in a study of young women at high HIV risk in South Africa, prior HIV testing was a significant predictor of lower perceived HIV risk¹⁸), inaccurate mental models of HIV infection (e.g. the belief that retesting is unnecessary if a person continues to feel healthy^{19,20}) and decreased salience of prevention over time (i.e. prevention fatigue).^{21,22}

There are few evidence-based interventions to promote retesting among high-risk persons. A recent systematic review of interventions to promote retesting found ten studies (only three in SSA) and reported that text message reminders were most effective.²³ Varying definitions of testing frequency limited cross-study comparisons. In a recent trial we conducted in Uganda, small financial incentives significantly increased retesting 3 and 6 months after a negative test among adults at increased risk of HIV.²⁴ Despite a 3-fold increase in retesting with incentives vs. counseling alone, 48% did not retest even with incentives.

Behavioral design – an approach used in behavioral economics research on health, education, and public service delivery – provides a framework for identifying interventions that promote retesting.

Behavioral design is a pragmatic approach for applying behavioral insights to problems that arise during program implementation. One highly effective and widely-used design framework, articulated by Datta and Mullainathan,²⁵ proceeds in four phases

(Fig. 1): **problem definition** (low HIV retesting); **diagnosis** (identify barriers ["actionable bottlenecks"] to retesting using qualitative inquiry and literature review, apply behavioral economics theory to determine the behavioral constructs underlying each barrier, and map low-cost, scalable behavioral economics interventions ["nudges"] to each barrier); **design** (adapt them to the specific behavior and local context), and **testing** (rigorously evaluate candidate interventions). This "DDDT" framework has been used to design effective programs in health,^{26,27} education,²⁸ and finance.^{29,30} We have also used it to design effective interventions for HIV testing in SSA^{31,32} and various health behaviors in Peru.^{33,34}

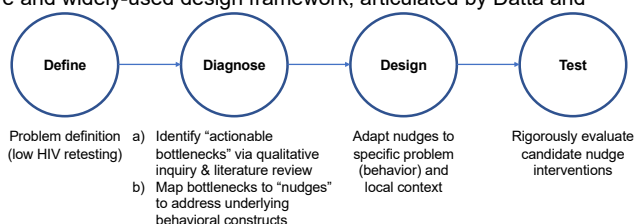


Fig 1. DDDT Behavioral Design framework, adapted from Datta & Mullainathan¹⁸

Large-scale, multi-arm field experiments (i.e., "mega-trials") that feature individual randomization and evaluate many different behavioral interventions can rapidly identify behavioral solutions and overcome the challenge of comparing results of standalone trials. Recent years have seen important advances in how behavioral interventions are tested. In large-scale field experiments, researchers have sought to identify solutions for public health priorities in the US like exercise and flu vaccination uptake. Working with health systems (e.g., Penn Medicine, Geisinger) and private sector partners (Walmart, 24 Hour Fitness), they have conducted mega-trials of many interventions (20-50 interventions in each trial) in large populations (from 30,000-700,000 persons).³⁵⁻³⁸ Such trials make it possible to test *many* interventions in the same population on the same outcome.³⁹ Publication bias is less likely in such trials since results are reported for every intervention that is tested, and there is a smaller risk of expending significant effort and resources to test only one intervention that may ultimately prove to be ineffective. This approach also increases the speed and reduces the cost with which we learn about each intervention, thus accelerating scientific discovery.

Mega-trials enable the use of innovative machine learning methods to estimate heterogeneous treatment effects, making it possible to identify optimal interventions for subgroups. The range of biases that affect human behavior and the heterogeneity of barriers to retesting mean that a single "one size fits all" approach to promoting retesting is unlikely to work for all persons at risk of HIV. We therefore need to understand not just which approaches work best *on average*, but *which approaches will work best for whom*. With large sample sizes, advances in machine learning can be used to address precisely this question.

Our proposed mega-trial has the potential to influence how researchers and programs test behavioral interventions to promote many other health behaviors that affect HIV and other diseases. Advantages of our approach include the cost, efficiency, and speed with which we can learn which interventions work best overall and for priority populations. Although our trial will focus on HIV retesting and will take place in largely rural communities, our methodology will be generalizable to many other health problems and settings. For example, this project can influence future research to test interventions to promote behaviors ranging from retention in HIV care, medication adherence, screening for non-communicable diseases, and vaccination uptake.

6.4 Procedures

We identified behavioral interventions through a process that included a literature review of barriers to HIV testing, qualitative work following our prior retesting trial^{42,43}, and insights from behavioral economics. We also invited behavioral scientists and HIV testing experts who have conducted studies in sub-Saharan Africa to propose potential behavioral interventions to promote HIV retesting. Many of these interventions were designed to brief messages that could be shared with HIV testing clients in Kenya and Uganda.

Table 2 below lists each of the 11 candidate interventions (i.e. brief messages) that we identified and then refined using feedback from participants in the Aim 1 prototyping workshops. These messages will be delivered to participants through a video that will be shown to participants on a tablet computer by the HIV testing counselor during their standard HTS counseling procedures. Each video will feature narration recorded by a digital avatar to ensure consistency and neutrality in delivery to participants. Each intervention will also include two follow-up SMS messages at 8 weeks and 11 weeks after the baseline visit. These 11 behavioral intervention messages will be further refined for local acceptability through the Aim 1 intervention pilot testing process.

Table 2. Behavioral Intervention categories for the IBIS Aim 1 pilot trial and Aim 2 Megastudy.

Intervention Name	Core concepts included in the intervention messages
HIV risk assessment	- Emphasize that a negative test does not mean that previous HIV infection risk behavior(s) were low risk - Enable people to re-assess their own personal risk at a later/future date - Suggest HIV risk behaviors to reflect on - If participant has engaged in one or more behaviors, emphasize their need to re-test
U=U messaging	Explain benefits of finding out one's HIV-positive status as early after infection as possible and starting treatment as soon as possible. These benefits include: -Prevent you from transmitting HIV to anyone -Live a normal life, with freedom in your sexual choices and ability to start a family without transmitting HIV
Healthy Living	-Convey the message that regular HIV testing is one part of a healthy lifestyle -Use examples to connect/compare retesting to other ways to protect/improve overall health
Community benefits	- Emphasize that regular testing keeps your community safe and healthy by reducing chances that you transmit HIV unknowingly - Call for responsibility- do your part for the community, you are an integral part of the solution
Fresh start effect	- Using a specific moment in time (having just tested HIV-negative) to motivate a healthy behavior (i.e. a "fresh start" moment) - emotional unburdening of resolving uncertainty (not knowing your status is more stressful than knowing your status, whether positive or negative, and being able to take healthy steps after knowing you are negative or positive)
Education-based #1	- Provide basic scientific information about HIV virus and transmission - Mention private, individual benefits of early HIV treatment
Education-based #2 ("gamification")	-Increase attention to HIV re-testing reminder through interactive trivia questions -Correct or reinforce understanding about HIV prevention, transmission, and retesting

Default appointment	- Having a set appointment will reduce uncertainty about availability for retest visit - Having an opt-out option for the future retesting appointment - A planning prompt to be specific about your future plan for retesting - Gentle/soft commitment: by picking a date, mentally agree to come back to retest
Reserved for you	- Make participant aware that the test is available, a test kit has been reserved for the participant, and the clinic is welcoming the participant to receive it - "VIP status-" you are lucky/special to have this opportunity
Social norms	- Reduce stigma and normalize retesting by explaining that it is a common practice for people to be aware of their HIV status and get tested often when they are at risk - I.e., don't be part of the small proportion that isn't getting regularly tested - Leverages social pressure to participate in retesting - Uses a relatable community member to deliver the message
Empowerment/ goal-setting	- Encouraging motivation of participants to set a goal for follow-up testing - Empowering individuals through promotion of HIV retesting

B. Nudge intervention pilot testing: Study staff and HCWs will pilot each intervention among approximately 10 HIV testing clients at MoH clinics in Kenya & Uganda combined (N= approximately 100 participants total: i.e. up to approximately 50 per country, depending on the number of Aim 1 interventions). Participants will be randomly assigned to the interventions. Recruitment will be of persons at high risk of HIV who have recently tested HIV-negative and are encouraged to retest for HIV in 3 months. Study staff and HCW will record their experiences with feasibility of intervention delivery (was it easy to implement, challenges encountered), and implementation outcomes (time to implement, fidelity to delivery [messaging, services], pilot participant acceptability).

6.5 Measurements

The main outcome will be 8-12 locally adapted nudge interventions, inclusive of messaging in local languages and practical insights into implementation.

6.6 Data collection & management

Nudge intervention pilot testing:

a) *Staff/HCW implementation logbooks:* Study staff and HCW logbooks on hand-held computers (tablets) or back up paper logbooks will be provided to record staff/HCW experiences with intervention delivery.

b) *Pilot test survey:* Study staff will conduct brief surveys (in clinic or by phone) using hand-held computers (tablets) or paper questionnaires (as back up, if tablets are not functioning, with subsequent data entry into computers or tablets). Data will be transferred via secure electronic transfer to our data center facilities in Kenya and/or Uganda and stored on a secure server.

c) *Pilot test HIV Test Results:* Staff working at the study community clinics will record all lab test results, including HIV antibody test results, and HIV diagnosis status information, under each pilot participant's study identification number (ID) in either paper lab logs or computers.

9. Engagement of Stakeholders

At the beginning and end of our study, we will convene meetings with local stakeholders comprised of MoH and implementing partner leaders and policymakers to share the study design and results.

10. Human Subjects

10.1 Risks to Human Subjects

There are relatively few risks to study participants. The primary risks involved in study participation are inadvertent HIV status disclosure or HIV risk factor disclosure with associated stigma and inadvertent coercion with incentives to participate in research. Given the sensitive and private nature of the HIV test results to be collected during implementation of the research aims, extra cautions will be put in place to ensure maintenance of privacy, confidentiality, and security of the data obtained. Data collection and storage procedures will include the use of encrypted, password-protected devices and servers.

Potential risk of exposure to SARS-CoV-2 during clinic visits: SARS-CoV-2 virus is easily transmitted from person-to-person through infected respiratory droplets/airborne droplet nuclei via sneezing, coughing, talking, singing or through handling fomites recently contaminated by infected droplets. We will be enrolling intervention piloting participants who have already chosen to engage in HIV testing services during the COVID-19 pandemic, but nonetheless, will ensure that participants are well-informed regarding the potential risk of SARS-CoV-2 exposure when leaving their homes and visiting clinics, and ensure a safe clinical environment for participants and study staff members.

10.2 Adequacy of protection against risks

Informed Consent: Written informed consent will be obtained from all participants by trained research assistants. The research assistants will find a private place in the clinic and carefully explain the nature and purpose of the study to each potential participant, as well as the various interventions they may receive (e.g., text messages regarding HIV retesting that will be sent to some participants at no cost to them). The consent process will be offered in English as well as the major local dialects in southwestern Uganda (Runyankole) and western Kenya (Swahili and Dholuo). Our study team has prior experience in obtaining both written and verbal informed consent for research and clinical trials within the cultural context of Kenya and Uganda. The informed consent procedure has been designed to maximize understanding of potential risks. Participants may decline to participate at any point.

Maintaining Privacy and Avoiding Stigmatization: Study visits to recruit, screen, consent, and enroll participants will occur in private clinic rooms or spaces to reduce the unlikely possibility of stigmatizing study participants. Every effort will be made to ensure privacy is maintained when participants return for HIV retesting, and when referrals are made to the HIV clinic for persons screening HIV positive or the prevention clinic for persons who wish to engage in combination prevention services, including pre-exposure prophylaxis (PrEP). HIV testing is confidential and linked to participants by a unique study identification number. In addition, we will also obtain verbal consent from participants for receiving text messages.

Minimizing coercion to participate in research: To minimize the likelihood of persons feeling pressured to participate in research we will emphasize the concepts of individual voluntary choice to participate in research and the need for individuals to respect the voluntary choice of others during the process of obtaining informed consent. Study participants will also be informed that study enrollment can be stopped at any point during the study at their request.

Data Security: All information will be recorded using study identification numbers, rather than participant names, and stored securely in locked offices at the study data centers. All study computers are password encrypted and kept in locked offices.

SARS-CoV-2 Biosafety: To minimize any risk to participants or study staff, we will take the following precautions:

- a) Participants: To minimize risk to Aim 1 HCD workshop participants, we will hold workshops in outdoor spaces or well-ventilated indoor spaces with (optional) face mask provision. To minimize risk to Aim 1 intervention piloting and Aim 2 trial participants from study staff or other persons at the health center, interviews will take place in well-ventilated (by natural ventilation) clinical rooms with all participants and

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staff having access to masks throughout the interview process, according to Kenyan or Ugandan guidelines.

b) **Study staff:** To minimize risk to study staff from potentially SARS-CoV-2 virus infected participants, participants will be provided masks that they may wear during indoor encounters. Study staff will be offered SARS-CoV-2 vaccination (according to national guidelines in Kenya and Uganda), if not already vaccinated, and provided masks that they may wear during participant interactions. All study staff will perform handwashing or alcohol-based hand disinfectant use between each participant encounter. Any face shield or mask that is contaminated by visible droplets (e.g. participant sneezes or coughs on the face mask/shield) will be disposed of and replaced or disinfected after that participant's encounter.

Institutional Review Board Approval: Approval from the UCSF institutional review board, the Kenyan institutional review boards (the Scientific Ethics Review Unit [SERU] at KEMRI), and the Ugandan institutional review boards (the School of Medicine Research and Ethics Committee [SOMREC], and the Uganda National Council for Science and Technology [UNCST]) will be obtained prior to initiation of study activities. All study staff are required to undergo training in human subjects' research, and good clinical practice (GCP).

Biosafety – Universal precautions: All study staff will be trained on universal precautions according to WHO guidelines to help prevent the spread of infectious diseases. Staff will perform handwashing or use an alcohol-based hand sanitizer before and after participant encounters, and after removing gloves. Staff will wear personal protective equipment like gloves, masks, and face shields as applicable during sample collection and processing to avoid exposure to blood and other bodily fluids. All sharps will be properly disposed of in sharp boxes which will be provided. Surfaces used for testing of participant specimens on-site will be cleaned daily. Medical waste will be conducted according to the health facility's medical waste disposal procedures.

10.3 Potential benefits

The primary benefits of the proposed research to participants are support in engaging with retesting for HIV in adults at increased risk of infection, along with post-test counseling and referral to HIV care if HIV-infected or prevention services if HIV-uninfected and receiving small financial incentives for HIV retesting if randomized to the incentive arm. The benefits for the community may include increased engagement in HIV testing and prevention by adults at high-risk of infection, and early diagnosis and prompt linkage to antiretroviral therapy for those who retest HIV-positive.

10.4 Importance of the knowledge to be gained

The minimal risk in this study is far outweighed by the importance of knowledge to be gained. Given the public health importance of achieving high uptake of retesting for HIV testing among adults at high risk of infection, it is vital to have effective, low-cost interventions that can be used to achieve these objectives. Our study will provide crucial information on the comparative effectiveness of low-cost demand generation interventions adapted to local contexts and HIV retesting behavior. Each of the interventions selected for adaptation is based on "nudges" that have proven effective in addressing the behaviors underpinning specific barriers to HIV retesting we have identified in prior research and selected using a Behavioral Design framework. We will also evaluate heterogeneous treatment effects and share our findings with key stakeholders to facilitate rapid scalability of effective interventions in resource-limited settings.

11. Publication of Research Findings

The findings from this study may be published in a medical or economics journal. No individual identities will be used in any reports or publications resulting from the study. The researchers will publish results of the study in accordance with NIMH, UCSF, Makerere University, UNCST and SERU/KEMRI guidelines.

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