

## Session #2161

### 'Nudge to Test' or 'Test as a Nudge': Behavioural Economics and HIV Self Testing in East and Southern Africa

#### Organizer details

- First/given name Fern
- Last name Terris-Prestholt
- Affiliation United Nations Joint Programme on HIV/AIDS (UNAIDS)
- Country Switzerland
- Email address Terrisprestholtf@unaids.org

#### Organizer details

- First/given name Jason
- Last name Ong
- Affiliation Monash University
- Country Australia
- Email address jason.ong@monash.edu

#### Details of Chair

- First/given name Fern
- Last name Terris-Prestholt
- Affiliation United Nations Joint Programme on HIV/AIDS (UNAIDS)
- Country Switzerland
- Email address Terrisprestholtf@unaids.org

#### Details of discussant 1

- First/given name: Sandra G
- Last name: Sosa-Rubi
- Affiliation : National Institute of Public Health in
- Country : Mexico
- Email address : sandra.sosa.rubi@gmail.com

#### Details of discussant 2

- First/given name Mathew
- Last name Quaife
- Affiliation : London School of Hygiene and Tropical Medicine
- Country : UK
- Email address : Matthew.Quaife@lshtm.ac.uk

## Session overview

### Session title: ‘Nudge to Test’ or ‘Test as a Nudge’: Behavioural Economics and HIV Self Testing in East and Southern Africa

Primary field as outlined: Demand and utilisation of health services

#### Session description (750 word maximum)

To end the HIV/AIDS epidemic as a public health threat by 2030, we must continue to create context-driven solutions - especially to implement evidence-based strategies directed towards difficult-to-reach subpopulations. To accomplish this, lessons can be learnt from the successes in behavioural change from other disciplines.

Behavioural economics is a discipline that studies how individuals make choices within complex contexts, blending insights from psychology with traditional economics of decision-making. A key concept advanced by behavioural economists is that human behaviours are subconsciously influenced by means of choice architecture, which refers to actively designing the environment within which a choice is made to encourage better choices. The ideal choice environment is one that goes with the grain of individuals’ instincts or inherent cognitive and emotional biases to achieve better personal or social goals. The concept of choice architecture was proposed by Richard Thaler and Cass Sunstein, and popularised in their best-selling book *Nudge*. The theory underpinning choice architecture comes from decades of research in behavioural economics and related disciplines. The use of a behaviourally-informed framework can potentially facilitate reductions in the costs of health interventions and improvements in their uptake and cost-effectiveness.

Innovative intervention designs to improve the effectiveness of HIV prevention and treatment services in low socioeconomic settings have been able to induce behaviour changes among populations with high risk of HIV acquisition. Five main concepts, rooted in behavioral economic theory, support the design of new strategies to improve the use of HIV prevention intervention: a. cognition. b. salience of own health c. present vs future concepts. d. illusions vs reality and e. over-optimism and framing. All these concepts are applied in the design of strategies to incentivize the use of HIV services by the target population. The studies presented in this session suggest collectively that the definition of incentives depends on, among others, the ‘s aspirations, the type of conditionality, the size and modality of the incentive, etc., and that these choices can have real and important implications for their impact.

The aim of this session is to provide examples of how behavioural economics may be used in public health: either as a means to increase HIV self-testing uptake in itself or the role of HIV self-testing as a means of alleviating bottlenecks in accessing HIV prevention and treatment. We present results on the impact and costs of four behavioural trials that introduce a nudge using HIVST for: (1) rural communities in Malawi, (2) men in Zimbabwe, (3) partners of pregnant women in Malawi, and (4) high risk women in Kenya. The success of these nudges varied as do the unintended consequences.

We organised this session into four presentations and a structured discussion.

The first presentation is a researcher designed intervention. The three-armed trial evaluates the impact, total and unit cost of providing HIVST kits to pregnant women living with HIV for their partners, with and without a \$10 incentive to present for confirmatory testing in Malawi.

The second uses formative research to accommodate user preferences using human-centred design approaches and HIVST in a four armed trial of demand creation for voluntary medical male circumcision in Zimbabwe. Collin Mangenah will present the impact and costs of different combinations of human centred design and HIVST kit distribution to men in Zimbabwe.

The third approach is having communities design their own HIVST distribution strategy. This two-armed trial captures individual level repeat testing behaviours to show the extent of substitution from conventional testing to HIVST and the total costs and cost-effectiveness in terms of newly identified people living with HIV.

Lastly, we explore the impact of distributing HIVST kits to high-risk women to give to partners on the market for transactional sex acts.

Our two discussants have extensive experience in leading behavioural economics trials for HIV prevention, with experience across the Americas, Europe and Africa.

Each presenter will have 12 minutes to present, followed by 3 minutes of clarifying questions. A structured 30-minute discussion, will start with our discussants delivering 7-minute commentaries on cross cutting themes arising and to highlight some key issues to encourage a broader discussion with session participants. We will also invite comments from the audience on experiences and emerging methods.

This session supports global collaborations and networking across researchers based in Australia, UK, Malawi, Mexico, Switzerland, USA, Zimbabwe, it is gender balanced and includes presenters across career stages from PhD students through to Professor.

**Abstract ID# 6367: Abstract 1: Use of incentives to increase uptake in Malawi**

Linda Sande, Malawi-Liverpool-Wellcome Trust Clinical Research Programme

**Abstract ID# 6369 Abstract 2: Relative efficiency of demand creation strategies to increase voluntary medical male circumcision uptake in Zimbabwe**

Lead: Collin (& Sergio): Center for Sexual Health and HIV/AIDS Research (CESHHAR) Zimbabwe & PhD student Liverpool School of Public Health.

**Abstract ID# 6371 Abstract 3: Cost and cost-effectiveness of community-led delivery of HIV self-testing in Malawi: A pragmatic economic evaluation**

Lead: Pitchaya Indravudh, staff and PhD student, LSHTM

**Abstract ID# 6373 Abstract 4: Behavior change with a new HIV testing technology: a randomized trial of HIV self-tests to promote partner testing and HIV risk reduction in Kenya**

Lead: Harsha Thirumurthy, University of Pennsylvania

## Abstracts

- First/given name : Linda  
o Last name Sande  
o Email address Linda.Sande@lshtm.ac.uk  
o Affiliation: Malawi-Liverpool Wellcome Clinical Research Programme and PhD student at LSHTM  
o Country Malawi  
o Timezone: See Link:

[2021 Abstract Information - International Health Economics Association](#)

Title of Paper: **Investigating Costs Associated with HIV Treatment Initiation Using HIV Self-Testing and Financial Incentives in a Cluster Randomised Trial in Malawi**

- Funding sources: **Unitaid**
- Has the research being presented received ethics approval? **Yes**
- Is this abstract based on research involving primary data collection? **Yes**
  - If yes, is the presenter from (one of) the countries which is the subject of the research, or did the presenter invest considerable time working in the country (or at least one of the countries if a multi-country study) where primary data collection took place and developing a substantial relationship with colleagues in the country during the research?  
**Yes, presenter is from Malawi**
- Your presentation will be made available to those registered for the virtual congress. Would you like to make your presentation publicly available through posting on the website after the congress? **Yes**
- Does the presenter require financial assistance to participate in the conference? **Please note** that only residents of low- and middle-income countries, and full-time students, who do not have access to other funding sources will be considered for financial support, and that **very limited resources are available** for such support. **No**
  - Name, affiliation, country, and email address of **all authors (please include the presenter as the first author)**

**Linda A. Sande**, Malawi-Liverpool-Wellcome Trust Clinical Research Programme &  
London School of Hygiene and Tropical Medicine. Malawi.  
[Linda.Sande@lshtm.ac.uk](mailto:Linda.Sande@lshtm.ac.uk).

**Augustine T. Choko**, Malawi-Liverpool-Wellcome Trust Clinical Research  
Programme. [achoko@mlw.mw](mailto:achoko@mlw.mw).

**Cheryl Johnson**, World Health Organization. Switzerland. [johnsonc@who.int](mailto:johnsonc@who.int).

**Karin Hatzold**, Population Services International. South Africa. [khatzold@psi.org](mailto:khatzold@psi.org).

**Elizabeth L. Corbett**, London School of Hygiene and Tropical Medicine. United  
Kingdom. [liz.corbett@lshtm.ac.uk](mailto:liz.corbett@lshtm.ac.uk).

**Fern Terris-Prestholt**, United Nations Joint Programme on HIV/AIDS (UNAIDS).  
Switzerland. [Terrisprestholtf@unaids.org](mailto:Terrisprestholtf@unaids.org)

- Abstract

## Background

HIV self-testing (HIVST) is the self-sampling and interpretation of HIV status in private. Secondary distribution of HIVST involves receiving an HIVST kit for another's use. We invested the incremental costs of secondary distribution of HIVST to partners of pregnant women attending antenatal care (ANC) and newly identified HIV positive individuals (index) in Malawi.

## **Methods**

HIVST distribution of trial purchased kits was done as part of a 3-armed cluster randomised trial of 27 public health facilities using uninc incentivized health workers. Standard of care (SoC) gave the ANC and index clients invitation letters for their partners to come to the clinic for an HIV test. The intervention (HIVST\_only and incentive) arms were SoC+HIVST with the partners self-testing at home. The HIVST\_only arm encouraged partners to come to the clinic only if they screened positive. The incentive arm encouraged partners to come to the clinic regardless of their HIVST result and were given a \$10 incentive for coming. The incentives served a twofold purpose, they were compensation for the partners' involvement in a study assessing accuracy in interpretation of HIVST results and also encouraged linkage to care after a positive HIVST result. We present results of the SoC and incentive arms only.

Costing of the trial was incremental to conventional HIV testing and from a provider's perspective. We combined bottom-up and top-down costing approaches, split the costs between capital and recurrent and excluded any research costs. Capital costs were assumed a lifespan of 2 years and annualised at a 3% discount rate. Costing was done between 2018/19 and costs are reported in 2019 US\$.

## **Results**

A total of 1,600 and 1,903 were recruited in the SoC and incentive arms, respectively. A larger proportion of partners came to the clinic in the incentive arm than SoC: 59% vs 36%. The incentive arm was also associated with a higher positivity rate i.e 3% vs 1% in SoC. The cost per partner tested was \$14.94 in the incentive arm and \$12.37 in SoC. This cost excludes the financial incentives because we assumed the incentives influenced the decision to come to the clinic but not kit use. The cost of identifying an HIV+ (includes financial incentives) was also higher in the incentive arm. i.e. \$692.97 vs \$652.11. The additional cost of identifying an HIV+ over and above SoC was \$99.82.

## **Discussion**

People respond to nudges. Incentives applied in self-sampling technologies have the potential of encouraging linkage to follow-on care. The financial incentives applied in this study had an additional advantage of compensating for the cost

of seeking care for individuals with high opportunity costs. As expected, such an intervention costed more than SoC but was associated with better outcomes.

## **Conclusion**

Reaching populations left behind by conventional HIV testing approaches will require innovative delivery of testing services. Bundling HIVST with financial incentives for linking to care has the potential to improve testing uptake and linkage to care.

- Conflicts of interest: **None**

- First/given name      Collin
- Last name              Mangenah
- Affiliation              Center for Sexual Health and HIV/AIDS Research (CESHHAR) Zimbabwe & PhD student Liverpool School of Public Health.
- Country                 Zimbabwe
- Email address         Colin.Mangenah@lstmed.ac.uk

Title of Paper: **Relative Efficiency of Demand Creation Strategies to Increase Voluntary Medical Male Circumcision Uptake in Zimbabwe**

- Funding sources: Bill & Melinda Gates Foundation; Unitaid for the HIVST component (STAR Initiative).
- Has the research being presented received ethics approval? **Yes**
- Is this abstract based on research involving primary data collection? **Yes**
  - If yes, is the presenter from (one of) the countries which is the subject of the research, or did the presenter invest considerable time working in the country (or at least one of the countries if a multi-country study) where primary data collection took place and developing a substantial relationship with colleagues in the country during the research? **Yes, presenter is from Zimbabwe**
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  - Name, affiliation, country, and email address of **all authors (please include the presenter as the first author)**

**Collin Mangenah**, Center for Sexual Health and HIV/AIDS Research (CESHHAR) Zimbabwe, Harare, Zimbabwe & Liverpool School of Public Health (LSTM), Colin.Mangenah@lstmed.ac.uk.

Webster Mavhu, Center for Sexual Health and HIV/AIDS Research (CESHHAR) Zimbabwe, Harare, Zimbabwe & Liverpool School of Public Health (LSTM), [webster@ceshhar.co.zw](mailto:webster@ceshhar.co.zw).

**Diego Cerecero Garcia**, National Institute of Public Health (INSP), Division of Health Economics, Mexico, [diego.cerecero@uabc.edu.mx](mailto:diego.cerecero@uabc.edu.mx).

**Chiedza Priscilla Gavi**, Centre for Sexual Health and HIV/AIDS Research (CeSHHAR) Zimbabwe, Harare, Zimbabwe, [chiedzapgavi@gmail.com](mailto:chiedzapgavi@gmail.com).

**Polite Mleya**, Centre for Sexual Health and HIV/AIDS Research (CeSHHAR) Zimbabwe, Harare, Zimbabwe, [politemleya@gmail.com](mailto:politemleya@gmail.com).

**Progress Chiwawa**, Centre for Sexual Health and HIV/AIDS Research (CeSHHAR) Zimbabwe, Harare, Zimbabwe, [chiwawaprogress@gmail.com](mailto:chiwawaprogress@gmail.com).

**Sandra Chidawanyika**, Centre for Sexual Health and HIV/AIDS Research (CeSHHAR) Zimbabwe, Harare, Zimbabwe, [schidawaz@gmail.com](mailto:schidawaz@gmail.com).

**Getrude Ncube**, Ministry of Health and Child Care Zimbabwe, Harare, Zimbabwe, [getrudencube@yahoo.co.uk](mailto:getrudencube@yahoo.co.uk).

**Sinokuthemba Xaba**, Ministry of Health and Child Care Zimbabwe, Harare, Zimbabwe, [xabasino@gmail.com](mailto:xabasino@gmail.com).

**Dr Owen Mugurungi**, Ministry of Health and Child Care Zimbabwe, Harare, Zimbabwe, [mugurungi@gmail.com](mailto:mugurungi@gmail.com).

**Noah Taruberekera**, Population Services International Zimbabwe, Harare, Zimbabwe, [ntaruberekera@psi.org](mailto:ntaruberekera@psi.org).

**Ngonidzashe Madidi**, Population Services International Zimbabwe, Harare, Zimbabwe, [ngonimad@gmail.com](mailto:ngonimad@gmail.com).

**Katherine Fielding**, Faculty of Infectious Disease Epidemiology, London School of Hygiene & Tropical Medicine, London, UK, [katherine.fielding@lshtm.ac.uk](mailto:katherine.fielding@lshtm.ac.uk).

**Cheryl Johnson**, Department of HIV/AIDS, World Health Organization, Geneva, Switzerland, [johnsonc@who.int](mailto:johnsonc@who.int).

**Karin Hatzold**, Population Services International, Washington DC, USA, [khatzold@psi.org](mailto:khatzold@psi.org).

**Fern Terris-Prestholt**, United Nations Joint Programme on HIV/AIDS (UNAIDS), Geneva, Switzerland. [Terrisprestholtf@unaids.org](mailto:Terrisprestholtf@unaids.org).

**Frances Cowan**, Center for Sexual Health and HIV/AIDS Research (CESHHAR) Zimbabwe, Harare, Zimbabwe, & Department of International Public Health, Liverpool School of Tropical Medicine, [Frances.cowan@lstmed.ac.uk](mailto:Frances.cowan@lstmed.ac.uk).

**Sergio Bautista**, National Institute of Public Health (INSP), Division of Health Economics, Mexico, Cuernavaca, Mexico, [sbautista@insp.mx](mailto:sbautista@insp.mx).

- **Abstract**

## **Background**

Supply and demand-side factors continue to undermine VMMC uptake. Human centred design methods (HCD) are a design and management framework that develops solutions to problems by involving the human perspective in all steps of the problem-solving process. Relative economic costs of VMMC demand creation/service delivery modalities were assessed following PSI Zimbabwe's redesign of their interpersonal communication demand creation approaches drawing on market research and HCD methods.

## **Methods**

A RCT compared arms with and without two interventions implemented by trained and incentivised interpersonal communications mobilisers: i) standard demand creation augmented by HCD-informed approach; ii) standard demand creation plus offer of HIVST across five rural Zimbabwe districts. Full annual economic costs of VMMC demand creation/service delivery were analysed based on actual programme financial expenditures supplemented by health facility data collection to capture all resources used for service provision. Sites represented three models of service-delivery: static (offering VMMC continuously); integrated (recently capacitated facilities, offering VMMC intermittently) and; Mobile/outreach (for more remote sites). Average costs per client reached and circumcised were derived by dividing full total program costs by number of clients reached and circumcised. The relationship between unit cost and scale was assessed together with characteristics such as type of facility, urbanicity, ownership, and facility throughput. All costs were analysed in 2018 US dollars.

## **Results**

There was no evidence that the HCD-informed intervention increased VMMC uptake versus no HCD-informed intervention (IRR 0.87, 95%CI 0.38-2.02; p=0.75) nor did offering men a HIVST kit (IRR 0.65, 95%CI 0.28-1.50; p=0.31). Challenges with trial implementation saw <50% of IPC agents converting any men to VMMC, undermining the effect of demand creation and possibly reflecting acceptability and feasibility of the interventions. Total annual programme cost was \$752,585 across demand creation approaches. Average costs per client reached with demand creation plus cost per circumcision were \$58 and \$174, respectively. Highest costs per client reached were in the HCD arm – \$68 and lowest in standard mobilisation (\$52) and HIVST (\$55) arms, respectively. Highest cost per client circumcised was observed where HIVST and HCD were combined (\$226) and lowest in HCD alone (\$160). Demand creation and communication costs constituted 66% of costs compared to 34% for VMMC service-delivery. Vehicle running costs were the highest cost contributor (39%) ahead of staff costs (23%). VMMC unit costs were lowest in rural high-volume church clinics within the HIVST model (\$86) and highest in rural low-volume public-sector clinics within the standard mobilisation arm (\$288).

### **Discussion**

There was high variability in unit costs across arms and sites suggesting opportunities for cost reductions. Highest costs per client reached and circumcised were observed in the HCD+HIVST arm when combined with an integrated service-delivery setting where circumcision numbers were lower. Despite incurring similarly high demand creation activity-related costs, standard mobilisation and HCD arms had lower unit costs as they had a higher proportion of clients reached and circumcised. Mobilisation programmes that intensively target higher conversion rates as exhibited in the standard mobilisation and HCD arms provide greater scope for efficiency by spreading costs.

- Conflicts of interest: **None**

## **Cost and cost-effectiveness of community-led delivery of HIV self-testing in Malawi: A pragmatic economic evaluation**

### **Presenter**

First/given name: **Pitchaya**

Last name: **Indravudh**

Email address: **pitchaya.indravudh@lshtm.ac.uk**

Affiliation: **London School of Hygiene & Tropical Medicine**

Timezone: **Greenwich Mean Time**

Title of paper: **Cost and cost-effectiveness of community-led delivery of HIV self-testing in Malawi: A pragmatic economic evaluation**

Funding sources (Please indicate any significant funding sources for this submission or related research project): **Unitaid**

Has the research being presented received ethics approval? **Yes**

Is this abstract based on research involving primary data collection? **Yes**

If yes, is the presenter from (one of) the countries which is the subject of the research, or did the presenter invest considerable time working in the country (or at least one of the countries if a multi-country study) where primary data collection took place and developing a substantial relationship with colleagues in the country during the research? **Yes**

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### **Name, affiliation, country, and email address of all authors (please include the presenter as the first author)**

Pitchaya P Indravudh, Department of Global Health and Development, Faculty of Public Health and Policy, London School of Hygiene & Tropical Medicine, London, UK,  
pitchaya.indravudh@lshtm.ac.uk

Katherine Fielding, Department of Infectious Disease Epidemiology, Faculty of Epidemiology and Population Health, London School of Hygiene & Tropical Medicine, London, UK,  
katherine.fielding@lshtm.ac.uk

Linda A Sande, Malawi-Liverpool-Wellcome Trust Clinical Research Programme, Blantyre, Malawi,  
linda.sande@lshtm.ac.uk

Hendramoorthy Maheswaran, Institute of Population Health Sciences, University of Liverpool, Liverpool, h.maheswaran2@liverpool.ac.uk

Saviour Mphande, Malawi-Liverpool-Wellcome Trust Clinical Research Programme, Blantyre, Malawi, smphande@mlw.mw

Moses K Kumwenda, Malawi-Liverpool-Wellcome Trust Clinical Research Programme, Blantyre, Malawi, mkumwenda@mlw.mw

Richard Chilongosi, Population Services International Malawi, Lilongwe, Malawi,  
rchilongosi@psimalawi.org

Rose Nyirenda, Department of HIV and AIDS, Ministry of Health, Lilongwe, Malawi,  
nyirendarose@gmail.com,

Cheryl C Johnson, Global HIV, Hepatitis and Sexually Transmitted Infections Programmes, World Health Organisation, Geneva, Switzerland, johnsonc@who.int

Karin Hatzold, Population Services International, Washington D.C., USA, khatzold@psi.org

Elizabeth L Corbett, Department of Clinical Research, Faculty of Infectious and Tropical Diseases, London School of Hygiene & Tropical Medicine, London, UK, liz.corbett@lshtm.ac.uk  
Fern Terris-Prestholt, United Nations Joint Programme on HIV/AIDS (UNAIDS), Geneva, Switzerland, terrisprestholt@unaids.org

## **Abstract**

### **Background**

Community-based strategies can extend coverage of HIV testing and diagnose HIV at earlier stages of infection but can be costly to implement. Community-led approaches involve engaging underserved communities in disease prevention and management. Community participation in health programmes has been shown to improve health outcomes at low costs, as facilitated through improvements in community self-efficacy, capital, and cohesion, capital. We evaluated the cost and cost-effectiveness of community-led delivery of HIV self-testing (HIVST).

### **Methods**

This economic evaluation was based in a cluster-randomised trial allocating 30 group village head clusters in Mangochi district, Malawi to the community-led HIVST intervention in addition to the standard of care (SOC) or the SOC alone. The intervention involved mobilising community health groups to lead the design and implementation of seven-day HIVST campaigns. Unit costs of the intervention and SOC obtained from primary costings were applied to individual outcome and event data collected from a post-intervention survey. Incremental cost-effectiveness ratios (ICER) per person tested for HIV and tested HIV-positive in the last 12 months were estimated using cluster-level analysis, with uncertainty associated with ICER estimated using two-stage nonparametric bootstrap.

### **Results**

HIV testing in the last 12 months was higher in the community-led HIVST arm (84.9%, 3363/3960) compared with the SOC arm (65.7%, 2574/3920), with adjusted risk difference (RD) of 19.3% (95% CI 15.0-24.0%; Table 2). The intervention effect was greater among men (adjusted RD 23.1%, 95% CI 17.8-28.4%;  $p < 0.001$ ) than women (adjusted RD 17.2%, 95% CI 12.7-21.8%;  $p < 0.001$ ;  $p$ -value for interaction=0.002). The proportion of participants who tested HIV-positive in the last 12 months was also higher in the community-led HIVST arm (2.6%, 104/3960) than the SOC arm (1.7%, 67/3920; adjusted RD 1.2%, 95% CI 0.3-2.0%;  $p = 0.008$ ), with more pronounced differences among women (adjusted RD 1.6%, 95% CI 0.5-2.6%;  $p = 0.005$ ) compared with men (adjusted RD 0.5%, 95% CI -0.5-1.5%;  $p = 0.29$ ;  $p$ -value for interaction=0.06).

The mean provider cost per HIVST kit distributed through the community-led HIVST intervention was \$5.44. From the provider perspective, the incremental cost per person tested for HIV in the last 12 months was \$18.61, with the ICER lower for men (\$14.85) than women (\$21.78). The incremental cost per person tested HIV-positive in the last 12 months was \$311.19; in sub-group analysis, the ICER was \$668.49 for men and \$236.22 for women. At a threshold of \$315 per positive test, the probability that the intervention was cost-effective was 49.6%, though probabilities were considerably lower in scenario analyses excluding previously diagnosed or treated self-testers.

### **Conclusion**

Despite increasing HIV testing uptake at a low additional unit cost, adding community-led HIVST to the SOC is not likely to dominate as a cost-effective strategy within the context of this study. This largely stems from low substitution, with a high proportion of self-testing among individuals who had already recently tested. To maximise the value of community-led HIVST, we recommend periodic implementation, targeted delivery to populations with substantial undiagnosed HIV, and provision within a broader package of multi-disease services.

### **Conflicts of interest**

No conflicts of interest to declare.

4.

- o First/given name : Harsha
- o Last name Thirumurthy
- o Email address hthirumu@upenn.edu
- o Affiliation: University of Pennsylvania
- o Country USA
- o Timezone: See Link:

· Title of paper: Behavior change with a new HIV testing technology: a randomized trial of HIV self-tests to promote partner testing and HIV risk reduction in Kenya

- Funding sources National Institutes of Health
- Has the research being presented received ethics approval? **Yes**
- Is this abstract based on research involving primary data collection? **Yes**
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  - Name, affiliation, country, and email address of **all authors (please include the presenter as the first author)**

**Harsha Thirumurthy, University of Pennsylvania, USA**

**Ruchi Mahadeshwar, Brown University, USA**

**Nicholas Wilson, Reed College, USA**

**Kawango Agot, Impact Research and Development Organization, Kenya**

- Abstract

Nearly half of HIV-infected individuals in sub-Saharan Africa are unaware of their serostatus, and HIV incidence in the region remain high. HIV self-testing is a disruptive technology that has potential to promote partner testing, identify HIV-infected persons, and facilitate improved sexual decision-making. We report results from a randomized trial of an HIV self-testing intervention in which high-risk women in Kenya receive multiple self-tests for testing themselves and their partners over an 18-month period. Between June 2017 - August 2018, 2,087 high-risk women were enrolled from 66 community clusters in the Nyanza region of Kenya. Women in intervention clusters received multiple self-tests and were encouraged to offer tests to sexual partners with whom they did not anticipate using a condom. Over an 18 month follow-up period, we examined effects on women's knowledge of their partner's HIV status and women's sexual decision making. Results show that the HIV self-testing intervention increasing knowledge of partner testing and that in turn led to decreased use of condoms with HIV-negative partners and higher income from transactional

sex. Women offered an average of 8 self-tests to their sexual partners over 18 months. Women in the intervention group reported 35% higher primary partner testing than the control group ( $p < 0.001$ ). And in data obtained on the 3 most recent transactional sex encounters (over 11,000 encounters), we again found significantly higher rates of partner and couples testing among women's transactional sex partners. We similarly found a significant increase in partner testing. Finally, the intervention group identified 1.8 times ( $p < 0.01$ ) more HIV-positive sexual partners per participant and importantly, there was no increase in intimate partner violence due to the intervention. In addition, we find that HIV self-tests help women make decisions about whether to accept higher payments in exchange for condomless sex without accepting the higher HIV risk that is typically associated with condomless sex.

- Conflicts of interest **NONE**