

**Methods:** We have created a low-cost videolaryngoscope by combining a smartphone-compatible endoscope with a 3D printed hyper-angulated blade. The technology was iteratively designed using SolidWorks® 3D modeling software, and printed with the Dremel 3D20 Idea Builder using biocompatible PLA. The device is reusable and costs \$25. It was designed, manufactured and tested at United Mission Hospital, Tansen, Nepal.

**Findings:** The “Tansen Videolaryngoscope” was tested against a conventional Macintosh direct laryngoscope (DL) in a CPArline® airway manikin model. The study involved 32 participants with no prior videolaryngoscopy experience and varying levels of intubating skill. We found improved Cormack-Lehane grade of view on laryngoscopy (Videolaryngoscopy: 2.63 (SD: 1.54), Direct: 3.75 (SD: 1.14),  $p = .0035$ ), and increased “ease of use” with our device (Videolaryngoscopy: 1.31 (SD: .47), Direct: 2.28 (SD: .92),  $p = 0.000047$ ). There was not a statistically significant difference in the intubation success rate, time to visualize cords or time to pass ET tube between both laryngoscopes.

**Interpretation:** A smartphone compatible endoscope combined with a 3D printed blade provides a good basis for low-cost videolaryngoscopy. This work illustrates the potential for medical innovation in resource limited settings using simple, inexpensive technology. Further trials in a “difficult airway” manikin, followed by testing in patients, could enable this simple, low cost option for videolaryngoscopy to be clinically available in the near future.

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**Abstract #:** LAN.005

### Getting High Quality Data to Drive Programs: How is the Quality of the Data Collection System Associated with the Quality of Routine Health Data in Malawi?

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**Background:** Routine data can be a rich source of information for health systems. However, the perceived and actual quality of routine health data in low- and middle-income countries hinders its use for policy and programming. We conducted a data quality assessment (DQA) with the aim of characterizing the quality of routine data in Malawi's health system and identifying associated systems-level factors.

**Methods:** The DQA was led by the Central Monitoring and Evaluation Division of the Ministry of Health of Malawi. It was conducted in 15 randomly selected districts, stratified by zone. The sample included 16 hospitals, 90 randomly selected health centres, and 16 district health offices (DHOs), including one district with

two DHOs. Registers, monthly reports, and computerized records were reviewed for five service areas: antenatal care (ANC4), family planning, HIV testing and counseling (HTC), and acute respiratory infection (ARI) and pneumonia diagnosis. Interviews were conducted with facility and district personnel to assess current Health Management Information System (HMIS) functioning.

Data quality was characterized within four domains: availability; completeness; consistency; and validity. Analysis of variance and multiple linear regression were used to measure the association between data quality and facility and DHO performance in HMIS functional areas.

**Findings:** Data quality varied across service areas; median verification ratios, comparing register and report totals, ranged from 0.78 [IQR 0.25 – 1.07] for ARI to 1.00 [IQR 0.96–1.00] for HTC. Procedures required by Malawi's HMIS policy are not implemented at many facilities: only 60% of facilities report receiving a documented supervisory visit for HMIS in the six months preceding the assessment. Adherence to data quality practices is low, with a mean score of 0.51 out of 1.00 [SD 0.30]. Half of facilities have a full-time statistical clerk; however, employment of statistical clerks at facilities is not significantly associated with the availability or completeness of data.

**Interpretation:** These findings can guide improvements in Malawi's HMIS, including increased awareness of and adherence to existing policies. The associations between systems-level factors and data quality can inform efforts to strengthen HMIS in other LMICs.

**Source of Funding:** Funding was provided by Global Affairs Canada, the World Health Organization, Save the Children, and the Supporting Service Delivery Integration (SSDI) project.

**Abstract #:** LAN.006

### Bottlenecks and Red Tape Reduce Access to Government Support Programs by Botswana's Most Vulnerable Young Women

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**Background:** Botswana's HIV prevalence is among the highest worldwide, with young women disproportionately affected. Structural barriers such as poverty, lack of education, and gender violence mean that young women are unable to implement HIV-prevention choices. Transactional and age disparate sex increase their HIV risk. A national structural intervention, implemented as a stepped-wedge cluster randomized controlled trial (ISRCTN54878784), aims to prepare young women to apply to available government support programs and to align the programs in favour of young women. Records review revealed that these programs don't reach the most vulnerable.

**Methods:** An exploratory study reviewed demand- and supply-side challenges to accessing government support programs in the first intervention district. All participants gave verbal consent and received assurances of anonymity. A young woman from the district and a local researcher undertook semi-structured interviews with 18

young women (not in school/at work). The first author interviewed 4 local service providers. Thematic analysis relied on Nvivo.

**Findings:** The most vulnerable young women experience serious difficulties accessing government support programs. Lack of self-confidence and ambiguous navigating procedures block institutional assistance. Long delays in processing applications and lack of feedback on application status are discouraging. Successful candidates experienced community-level barriers like third parties unwilling to collaborate. Although motivated to help young women, service providers complained about youth attitudes and behaviour negatively affecting support program success-rates. Agricultural support programs may be incompatible with ambitions of youth unwilling to stay in rural areas. Lack of financial, material, and human resources hamper effective assistance and follow-up of applicants. Lack of available program placements and funding contribute to delays in support. Despite their ideas for improvement, service providers believe that effective change depends on political will, and national-level coordination and direction.

**Interpretation:** The available programs involved at least five line ministries; lack of coordination results in service gaps, overlap and competition, contributing to confusion among clients. Local service providers could improve vulnerable young women's access to programs by providing targeted and accessible assistance in application procedures, followed by timely and transparent feedback on application status. Stakeholder-constructed solutions are needed to overcome identified structural barriers.

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**Abstract #:** LAN.007

### Crowdsourcing to Promote HIV Testing among MSM in China: A Pragmatic Stepped Wedge Randomized Controlled Trial of a Crowdsourced Intervention

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**Program/Project Purpose:** Improving HIV testing for marginalized populations is critical to controlling the HIV epidemic. However, the HIV testing rate among men who have sex with men (MSM) in China remains consistently low. Crowdsourcing, the process of shifting individual tasks to a group, has been increasingly adopted to enhance public health programs and may be a useful tool for spurring innovation in HIV testing campaigns. We designed a multi-site study to develop a crowdsourced HIV test promotion campaign and evaluate its effectiveness against conventional campaigns among MSM in China.

**Structure/Method/Design:** The intervention was developed using crowdsourcing at multiple stages and is being evaluated with a stepped wedge randomized controlled trial (RCT). Intervention development consisted of a nationwide crowdsourcing contest followed by a designation. The crowdsourcing contest solicited campaign content through an open call, judging, and recognition of finalist entries, which became materials for the designation. The designation adopted the concept of a hackathon and allowed individuals

to collaborate on designing a comprehensive HIV test promotion campaign. The design elements of the winning entry were included in a HIV test promotion campaign to be evaluated through a stepped wedge RCT. Eight major metropolitan cities in China will be randomized to sequentially initiate intervention in groups of two at 3-month intervals.

**Outcome & Evaluation:** 1347 MSM who are 16 years of age or over, live in the intervention city, did not have HIV testing in the past 3 months, and are not living with HIV were recruited. Recruitment took place through banner advertisements on a large gay dating app along with other social media platforms. The intervention is ongoing. Participants will complete one follow-up survey every 3 months for 12 months to evaluate their HIV testing uptake in the past 3 months as the primary outcome.

**Going Forward:** Our large-scale RCT can improve understanding of crowdsourcing's long-term effectiveness in public health campaigns, expand HIV testing coverage among a key population, and inform intervention design in related public health fields. This study has been registered on [ClinicalTrials.gov](https://clinicaltrials.gov) (NCT02796963) and obtained IRB approvals from the Guangdong Provincial Center for Skin Diseases and STI Control, University of North Carolina at Chapel Hill, and University of California San Francisco.

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**Abstract #:** LAN.008

### HIV Therapy without HBV Co-management in Ethiopia Fosters Emergence of Unintended HBV Drug Resistance and Vaccine Evasive Variants

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**Background:** Hepatitis B virus (HBV) drug resistance and vaccine escape gene mutants were determined in patients with human immunodeficiency virus (HIV) co-infection and antiretroviral therapy (ART) exposure of with unknown HBV status. Moreover, the reciprocal HIV drug resistance profiles were examined in HBV-HIV co-infected patients who developed HBV drug resistance.

**Methods:** A total of 161 hepatitis B surface antigen (HBsAg) positive sera from HIV co-infected with and without ART exposure and drug naïve HBV mono-infected individuals were characterized using direct sequencing.

**Findings:** In 35 out of 161 study subjects (21.7%) HBV drug resistance mutations (DRMs) were detected with a frequency of 1.2% rtT184S, 6.2% rtV173L, 10.6% rtL180M, 10.6% rtM204V/I and 8.1% rtI233V which confer resistance mainly for entecavir, lamivudine and adefovir. The prevalence of the major DRMs in HBV-HIV co-infected individuals (with no significance difference among ART status) was higher than mono-infected individuals (41.4% vs. 10.7%). In contrast, none of HIV-1 patients showed no nucleos(t)ide reverse transcriptase inhibitors (NRTIs) drug resistance. However, 62.5% of them developed non NRTIs resistance mutations which confer resistance to nevirapine, efavirenz, etravirine