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Index testing implementation dynamics in high-gap and low-gap districts of Zimbabwe: a program process evaluation

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ABSTRACT:

— ***Objective:*** Zimbabwe has been implementing Index contact tracing and testing (ICT) since 2019 to accelerate epidemic control through enhanced identification of people living with HIV. We identified two comparable provinces (structure, catchment, and location) yet with contrasting HIV prevalence rates to evaluate the program and provide recommendations that can augment program performance.

— ***Materials and Methods:*** A process evaluation of the ICT program was conducted at eight randomly selected districts shared between Manicaland and Matabeleland South provinces. A logical framework model was applied to evaluate program inputs and processes correlated with outputs and their contributions toward outcomes. Microsoft Excel 2021 was used to summarize data as frequencies and proportions.

— ***Results:*** Over one year, we enrolled 1,393 health workers shared between Manicaland (57.1%, n=795) and Matabeleland South (42.9%, n=598). An overall 80.6% (n=14,500) of the targeted rapid test kits and 84.9% (n=24,200) of HIVST kits were supplied, resulting in intermittent deficiencies in both provinces. A copy of the ICT register was identified per facility against an average of 3 entry points each. Manicaland conducted 33.5% of their targeted ICT training against 80% for Matabeleland. Implementing planned activities scored 62.2% for Manicaland and 81.8% for Matabeleland South. Manicaland recorded an HIVST reactivity rate of 7.7% (871/11,320), whilst Matabeleland South documented a reactivity rate of 6.2% (679/10,890) against a target of 10%. Both provinces scored over 60% of their target for identifying HIV-positive individuals (Manicaland: 61.1%, Matabeleland South: 79.5%). An overall positivity rate of 62.8% (n=742/1,181) was obtained among index contacts.

— ***Conclusions:*** Index testing proved to be a resource-intensive HIV testing model, yet decidedly effective in identifying individuals living with HIV among index contacts. The resource demand is justified by the high-positivity rates, which can be further aided through implementation of fidelity, critical to expediting epidemic control by mopping up clients living with HIV without the knowledge thereof.

— ***Keywords:*** *HIV testing services, Index contact tracing and testing, Index testing cascade, Positivity yield, Comparative program evaluation, Process evaluation.*

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INTRODUCTION

Zimbabwe is one of the top five countries in Southern Africa that bear a generalized HIV epidemic, primarily driven by unprotected sex. Further, it is home to 1.27 million people living with HIV (PLHIV), including 19 million adults and 69,972 children[1]. The Zimbabwe population-based impact assessment (ZIMPHIA) conducted in 2020 uncovered an adult HIV prevalence of 12.9%, accompanied by an annual incidence of 0.38%. This translates into approximately 31,000 new cases annually[2].

Although it is encouraging that the total number of new HIV infections declined nationally from 98,668 in 2003 to approximately 31,000 in 2020, a large testing gap remains. This contributes to the generalized epidemic status that the country is struggling to shake off. Nearly half of the young people (15-24 years) living with HIV in Zimbabwe do not know their status[3].

In 2016, Zimbabwe started implementing targeted HIV testing following the 2015 World Health Organization (WHO) guidelines[4]. Key to the targeted testing strategy is Index testing (Index contact tracing and testing) as a proven high-yield HIV testing innovation, documenting as high as 40% positivity yield in evidence-generation settings.

Index testing is when members of a household, biological children and sexual partners of individuals newly diagnosed with HIV (the index clients) are offered HIV testing services[5]. Index testing may also be expanded to HIV-positive clients on antiretroviral therapy (ART) with unsuppressed viral loads (VL)[6].

Index testing also referred to as partner notification services, is premised on the fact that people's knowledge of their HIV status, as well as their partner's status, is critical to global HIV prevention, risk reduction and treatment. The services are important, not only to curb the onward transmission of HIV in the community but also to other sexually transmitted infections.

Given its potential, ensuring that the index testing program is implemented consistently using a standard operating framework to obtain the expected results is crucial. Therefore, the objectives of this study were: 1. to evaluate how the index testing program is being implemented in 2 selected provinces of the country; 2. to contrast the strategies being used against the results being obtained; 3. to derive lessons that can enhance the program.

MATERIALS AND METHODS

Study Design

We conducted a comparative, process-outcome program evaluation, modelled around a logical framework.

The Logical Framework Approach

A logical framework approach was used for problem analysis. This was used to assess the inputs availed for the program, the processes carried out, the outputs realized, and the outcomes of the index testing program comparatively.

The logical framework is a planning matrix that shows the links between goals, purposes, activities and outcomes of a proposed intervention or program (Figure 1).

Input indicators

Input indicators included resources and materials invested in the program for Manicaland compared with Matabeleland South provinces, assessed for adequacy. The inputs for the Index testing program included policy and guideline documents [e.g., standard operating procedure manuals (SOP)], transportation and communication facilities, digital media, financial resources, donor support, human resources (i.e., facility and community health workers, HIV test kits and commodities), IEC materials and stationery (i.e., registers, monthly summary sheets).

Process indicators

Processes are the activities conducted employing the inputs provided for the program. These included capacity building for facility and community health workers, demand generation initiatives, program implementation approaches including offering index contact tracing, contact elicitation, tracing and testing, documentation and reporting, review and planning meetings conducted, advocacy and community mobilization and linkage to post-testing services.

Output indicators

These are short-term logical outputs of implementing program activities. These included the number of health facilities implementing the ICT program, the proportion of health workers trained, the acceptance rate, the elicitation rate, and the proportion of contacts tested and linked for the post-test services.

Outcome indicators

Outcome indicators included medium-term logical consequences/results of achieving some outputs and their contribution towards the achievement of program goals. The ICT programme outcome indicators included the number of healthcare workers trained at the facility and community level, and HIV-positive clients identified. The outcome indicators further included ICT contribution towards the achievement of national goals, the number and proportion of positive clients initiated on ART, and the proportion of HIV-negative clients linked to preventive services.

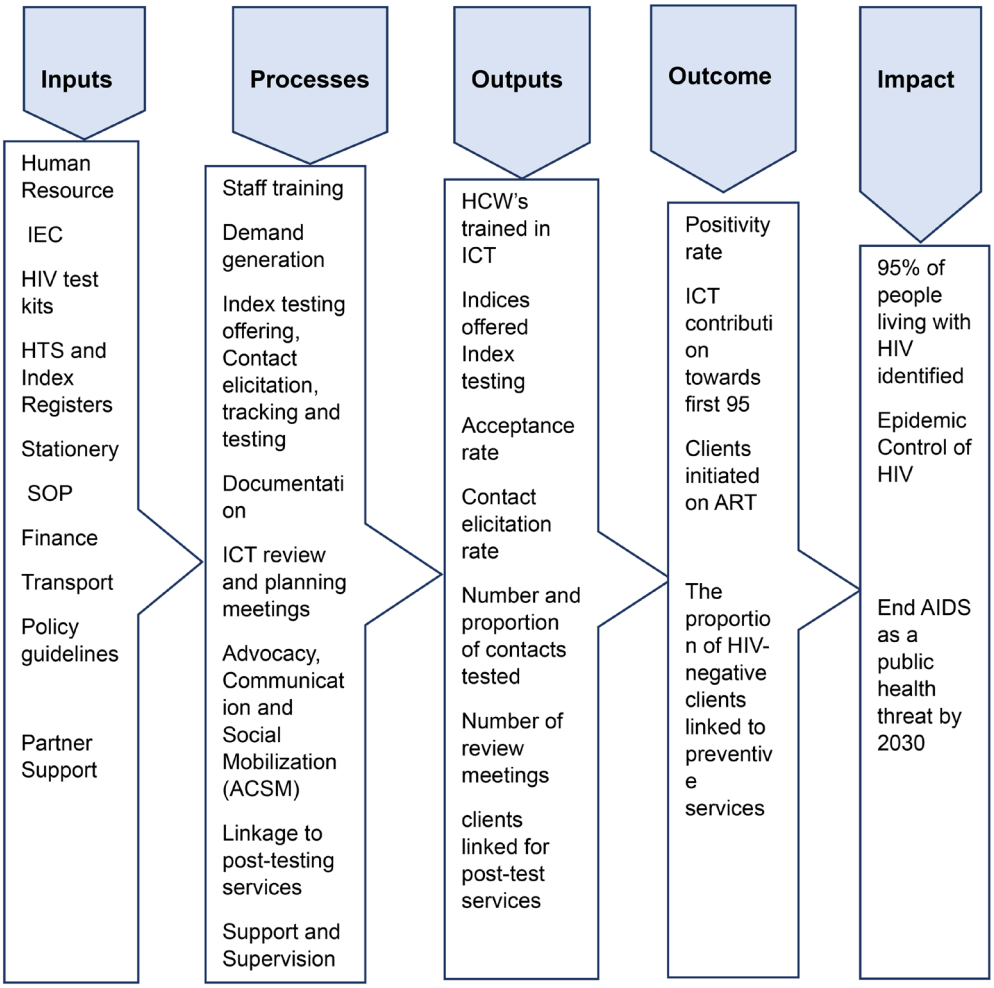

Figure 1. Index testing logical framework.

Setting

General setting

Zimbabwe is a landlocked, low-income country in Southern Africa located between Botswana, South Africa, Mozambique, and Zambia. It has an estimated population of 16 million people and a human development index of 0.571, and it was ranked number 150 out of 189 countries globally in 2019[7]. The country is divided into two urban provinces, 8 rural provinces and 62 districts.

Zimbabwe Index Case Testing (ICT) programme

The ICT program is part of the HIV testing Services (HTS) package under the HIV Prevention department within the AIDS and TB Programme (ATP) under the Ministry of Health and Child Care (MOHCC). The ATP oversees and coordinates the development of HIV/AIDS health policies and sets up national standards and guidelines as part of the national response to HIV in Zimbabwe[8].

The ICT project was formatively started in 2017 as a targeted testing innovation before being enhanced in 2019, devised enhanced Index Testing and Counselling (eITC)[9]. This resulted in the MOHCC, in collaboration with supporting partners designing a pilot ICT register and including the ICT-related indicators in the national database, DHIS2. The program is implemented both at the facility and in the community, taking into account client preferences for tracking their contacts. This results in a cascade tracked through national tools that include registers, DHIS2 and eHR to measure offer rates, acceptance, tracking approaches and their results, as well as linkage to post-test services. Various healthcare workers are involved in implementing the program, including nurses, primary counsellors, community health workers, Community Adolescent Treatment Supporters (CATS), Community Facility referrals and other linkage cadres. HIV self-testing plays a crucial role in contact tracing through the secondary distribution of test kits, in the process, this facilitates disclosure of HIV diagnosis to contacts.

The project continues to expand in terms of coverage, mainly driven through Implementing Partner (IP) support and is now an essential part of HTS, the entry

point to prevention and treatment services. HTS implementation is guided through strategic documents that include the HTS strategy, comprehensive HIV programming and the Zimbabwe national AIDS strategic plan[10].

Study site

The study sites were two out of 10 provinces in Zimbabwe.

- Manicaland is a province in eastern Zimbabwe. It is the country's second-most populous province, with a population of about 2 million, as of the 2022 census[11]. The province is divided into ten administrative subdivisions of seven rural districts and three towns/councils, including the provincial capital, Mutare[11]. Manicaland is on the eastern border with Mozambique and covers an area of 36,459 square kilometres (14,077 square miles), which is equivalent to 9.28% of the total area of Zimbabwe. Its economy is largely centred around industry and agriculture, particularly manufacturing, diamond and gold mining, timber, tea and coffee plantations, and tourism[12]. In 2020, Manicaland recorded the lowest HIV prevalence of 9.6%, compared with the national average of 12.9%.
- Matabeleland South Province covers the south-eastern plateau of Zimbabwe and it stretches to the Botswana border on the southwest and South Africa to the south[11]. It is the least populous province in Zimbabwe with a population of 760,345, as of the 2022 census. The province is divided into six districts. Gwanda is the capital, and Beitbridge is the province's largest town. Its economy is largely centred around subsistence farming and livestock farming[13]. In 2020, Matabeleland South province recorded[2] the highest HIV prevalence in the country, at 15.4%, compared with the national average of 12.9%.

Client Population

All healthcare facilities in the four districts of Matabeleland South (namely Gwanda, Insiza, Umzingwane, and Mangwe), and four districts of Manicaland province (namely Buhera, Chipinge, Makoni and Mutare) were involved in the ICT programme between 1 January 2021 and 31 December 2021, therefore were included in this study.

Exclusion Criteria

We excluded health facilities that were not involved in the ICT program during the period of the study.

Sampling

Purposive sampling criteria were used to identify the two provinces in this study based on having to contrast HIV prevalence rates, according to the ZIMPHIA results[2]. Manicaland had the least prevalence at 9.6%, whilst Matabeleland South had the highest prevalence at 15.4%.

Manicaland districts were therefore deemed low-gap, whilst Matabeleland South districts were considered high-gap. We then randomly selected four districts from each province to make up eight districts from which all their facilities were included.

Data Variables, Sources of Data and Data Collection

Data were collected between April and June 2022 using a structured data collection form (**Supplementary File 1**). The template was used to collect data at the site level and verified with the data collected from the implementing partners that are providing technical support to the ICT program within public health institutions in Manicaland [Zimbabwe Health Interventions (ZHI), and Matabeleland South province [The Organization for Public Health Interventions and Development (OPHID)].

Statistical Analysis

Data were gathered per province, single-entered, and analysed using Microsoft Excel 2021 to generate frequencies and proportions. The inputs and processes were obtained from documented activities at the facility, district, and provincial levels, and this was contrasted with what the supporting partners provided from their databases. The outputs were taken out from primary source documents at the facility level and contrasted with the electronic database at the district level (DHIS2).

Ethical Considerations

Approval to conduct this study was obtained from the Ministry of Health and Child Care Head Office, the Joint Research Ethics Committee for the University of Zimbabwe Faculty of Medicine and Health Sciences and Parirenyatwa Group of Hospitals (JREC 280/2021) and the Medical Research Council of Zimbabwe (MRCZ/A/2783). Written informed consent was obtained from all participants and no client-identifying information was collected during the study.

RESULTS

Inputs Injected into the Index Testing Program

Human resource inputs

A total of 1,393 human resource cadres were shared between the two provinces, with Manicaland having 57.1% (n=795) against Matabeleland South at 42.9% (n=598). The most common ICT modality was facility-based for both provinces, constituting 62.3% (n=868) against the community level, and most of the health workers were nurses who constituted 38.3% (n=533) of the total whilst

Table 1. Human resource inputs for the Index testing Program, Manicaland and Matabeleland South Provinces, 2021 (N=1,393).

Variable	Category	Manicaland (N= 795)	%* 57.1	Matabeleland South (N=598)	%* 42.9	Total	%*
Entry level	Facility	487	61.3	381	63.7	868	62.3
	Community	308	38.7	217	36.3	525	37.7
Designation	Nurses (RGN & PCN)	232	29.2	301	50.3	533	38.3
	Primary Counsellors	259	32.6	217	36.3	476	34.2
	CRF/CLF	89	11.2	64	10.7	153	11.0
	CATS	215	27.0	16	2.7	231	16.6
Median years in service		9 Q_1=6; Q_3=11		5 Q_1=4; Q_3=10			

*Column percentage. RGN – Registered General Nurse; PCN – Primary Care Nurse; CRF – Community Referral Facilitator; CLF – Community Linkages Facilitator; CATS – Community Adolescent Treatment Supporter.

Community Adolescent Treatment Supporters (CATS) were the least at 16.6% (n=231). In addition, health workers from Manicaland had a median age in service of 9 years (IQR 1.6-11) against Matabeleland South with 5 years (IQR 1.4-10) in service. Overall, the human resources provided were lower than the minimal number required to conduct ICT activities efficiently (Table 1).

Material resource inputs

The four districts of Manicaland included in this study had 98 health facilities. All facilities received a copy of the Operational Service Delivery Manual (OSDM)[14], constituting 58.2% of the supplies provided. Of the 88 facilities in the four districts in Matabeleland South province, 89.8% (n=79) received the OSDM. For ICT standard operating procedures, the adult HTS Screening tool, IPV Screening tool and ICT registers, a target of 3 copies per facility was recommended. However, only 7.1% (n=21) of the IPV screening tools were supplied to Manicaland whilst Matabeleland South received 87.9% (n=232) of their target. An overall 80.6% (n=14,500) of the targeted Rapid test kits and 84.9% (n=24,200) HIVST kits were supplied, and this resulted in sporadic shortages of the commodities, resulting in interrupted service provision for periods not exceeding two weeks for both provinces, as indicated by gaps within the registers and DHIS2 and verified by zero stock levels.

Manicaland received 61.2% (n=180) of their targeted ICT registers, whilst Matabeleland South received 83.3% (220) of their target. This translated to all health facilities receiving at least one copy of the ICT register though this did not cover all entry points, which is 3 per facility. Information, education, and communication materials (IEC) were supplied at 28.9% (289) of the targeted ICT pamphlets for Manicaland, whilst Matabeleland South received 33.6% (n=336) of their target. Manicaland had two vehicles out of the targeted 5 (40%), whilst Matabeleland South had 3 out of 5 vehicles (60%) (Table 2).

Table 2. Material resource inputs for the Index testing Program, Manicaland and Matabeleland South Provinces, 2021.

Variable	Category	Manicaland			Matabeleland South		
		Target	Provided	%*	Target	Provided	%*
Guidelines	OSDM	98	57	58.2	88	79	89.8
	ICT SOP	294	106	36.1	264	230	87.1
	Adult HTS Screening tool	294	172	58.5	264	210	79.5
	Job Aide	294	110	37.4	264	225	85.2
	IPV Screening tool	294	21	7.1	264	232	87.9
Test kits	HIV RDT kits	15,000	11,000	73.3	18,000	14,500	80.6
	HIVST kits	30,000	24,000	80.0	28,500	24,200	84.9
Documentation	HTS Registers	490	312	63.7	440	420	95.5
	ICT Registers	294	180	61.2	264	220	83.3
	Referral slips	600	400	66.7	500	425	85.0
IEC Materials	Pamphlets	1,000	289	28.9	1,000	336	33.6
	Flow Charts	600	277	46.2	500	375	75.0
Transport	Motor vehicles	5	2	40.0	5	3	60.0
	Motorcycles	8	6	75.0	10	8	80.0

*Row percentage. OSDM – Operational Service Delivery Manual; ICT SOP – Index Case Testing, Standard; Operational Procedure; IPV – Intimate Partner Violence; RDT – Rapid Diagnostic Tests; HIVST – HIV Self-test; IEC – Information Education and Communication.

Processes implemented

Processes for the ICT program included capacity building, demand creation, support and mentorship activities, review meetings and quality improvement (QI) initiatives. The QI initiatives included identifying key indicators of interest per quarter to monitor the quality of services being provided. Manicaland managed to conduct 33.5% (n=4) of their targeted ICT training, whilst Matabeleland South did 80% (n=12). Both provinces conducted all quarterly nurse's meetings and community meetings for demand creation as targeted. Manicaland conducted 58.3% (n=7) of the targeted monthly data review meetings, whilst Matabeleland South missed three meetings, scoring 75% (n=9). Only one out of 4 targeted visits were conducted by the province and district for Manicaland, whilst Matabeleland South received 2 out of 4 provincial visits and 1 out of 4 district visits. The visits are scheduled for key support and mentorship activities. These are provided by a higher level to the implementing site and used as an opportunity to address pertinent issues faced by the sites (Table 3).

Outputs of the Index Testing Program

The program's outputs included the total number of HIV-positive individuals identified through the ICT program, the number of facilities that were implementing the program through community and facility initiatives, and the cascades generated for the program. We further included the role of HIV self-testing through secondary distribution to index contacts. Manicaland had 37 facilities which were not actively involved in ICT activities, translating to a 62.2% (n=61) level of implementation, compared with Matabeleland South which scored 81.8% (n=72/88) performance. Both provinces scored above 60% of their target for identifying HIV-positive individuals (Manicaland: 61.1%, Matabeleland South: 79.5%). Both provinces implemented more facility-based ICT activities (Manicaland: 54%, Matabeleland South: 59.5%) than activities in the community (Manicaland: 43.6%, Matabeleland South: 52.3%), according to what they had targeted to perform. The index testing cascade for Manicaland reflected high performance on the linkage of positive contacts for ART (95.7%). Further, it also showed an acceptance rate (94.3%) and contacts who are tested after tracking (81.2%). A positivity yield of 52.1% (n=461/884) was documented among the contacts tested. For Matabeleland South province, the highest performances were linked to ART (98.1%), acceptance rate (95.3%) and offer rate (83.8%). A positivity yield of 62.8% (n=742/1,181) was documented among the index contacts tested. The targets were to offer index testing to all index cases, test all elicited contacts and link all positive contacts.

The HVST kits received met the target of 24,000 for Manicaland, whilst Matabeleland South received 98% (n=23,868) of their set target. Both provinces experienced stockouts of the test kits (3 weeks for Manicaland and 2 weeks for Matabeleland South). An average of 57.7% (22,210/47,868) of results were shared. Manicaland scored a reactivity rate of 7.7% (871/11,320), whilst Matabeleland South documented a reactivity rate of 6.2% (679/10,890). The target was to share 80% of HIVST results and achieve a 10% reactivity rate. Manicaland had 97.5% (849/871) of the reactive results confirmed positive through provider-delivered testing, whilst Matabeleland South had 95% (638/679) of its reactive results confirmed positive. The targets were to confirm all reactive self-test results (Table 4).

DISCUSSION

This study uncovered the resource-intensive nature of the ICT program where the amount of material and human resources deployed were correlated to the results obtained (identification of new HIV-positive clients). The outputs

Table 3. Processes Implemented for the Index testing Program, Manicaland and Matabeleland South Provinces, 2021.

Variable	Category	Manicaland			Matabeleland South		
		Target	Provided	%*	Target	Provided	%*
Capacity building	ICT Training/ sensitisations	12	4	33.3	15	12	80.0
	ICT Refresher	8	4	50.0	8	6	75.0
Review meetings	Monthly data review	12	7	58.3	12	9	75.0
	Virtual contact with team members	12	4	33.3	12	6	50.0
	Quarterly nurses' meetings	4	4	100.0	4	4	100.0
Demand generation activities	Community meetings	4	1	25.0	4	1	25.0
	Campaigns	8	0	0.0	8	2	25.0
	Radio programs	10	3	30.0	8	2	25.0
Support and Mentorship	District visits	4	1	25.0	4	2	50.0
	Provincial visits	4	1	25.0	4	1	25.0
	Supporting partner visits	4	2	50.0	4	3	75.0
Quality Improvement	Initiatives to enhance quality	12	8	66.7	12	8	66.7

*Row percentage. ICT – Index Case Testing.

Table 4. Outputs of the Index testing Program, Manicaland and Matabeleland South Provinces, 2021.

Variable	Category	Manicaland			Matabeleland South		
		Target	Provided	%*	Target	Provided	%*
Implementation	Facilities implementing Index testing	98	61	62.2	88	72	81.8
	HIV positive clients identified	3,250	1,986	61.1	4,500	3,576	79.5
ICT activities conducted	Community	365	159	43.6	365	191	52.3
	Facility	365	197	54.0	365	217	59.5
ICT Cascade	Offered	2,673	1,986	74.3	3,576	2,998	83.8
	Accepted	1,986	1,873	94.3	2,998	2,858	95.3
	Tracked	1,986	1,332	67.1	2,858	2,2 46	78.6
	Tested	1,332	1,082	81.2	2,246	1,355	60.3
	Positives identified	884	461	52.1	1,181	742	62.8
	Linkage to ART	461	441	95.7	742	727	98.1
HIVST Distribution	Kits Distributed	24,000	24,000	100	24,200	23,868	98.6
	Shared results	19,200	11,320	59.0	19,360	10,890	56.3
	Reactive tests	1,089	871	80.1	1,132	679	60.0
	Confirmed Positive	871	849	97.5	679	638	94.0

*Row percentage. ICT – Index Case Testing; HIVST – HIV Self-testing.

validate the means, given the goal to achieve epidemic control for HIV, through mopping up HIV-positive individuals who do not know their status in the community. Despite receiving lower human and material resource capacity, Matabeleland South province complemented this through processes that produced better HIV positivity rates.

Strengths

The availability of Index Case Testing (ICT) registers facilitated the construction of cascades that tracked the offer, acceptance, tracking and testing of contacts. The obtained large sample size enabled us to study the trend and factors that influenced positivity yield against contact tracking and testing modalities. The study was done using routinely collected programmatic data, which was representative of the reality on the ground.

Limitations

Our study utilized the ICT data only to calculate HIV-positivity yield, against the set targets for the program, which is not representative of the overall performance of the HTS program. The findings should therefore be interpreted in the context of the ICT program and its specific targets. We did not qualitatively evaluate the program but restricted our analysis to logical framework-guided process evaluation.

Interpretation of Key Findings

This study provided crucial insights into the performance of the ICT program in Manicaland and Matabeleland South provinces.

First, the ICT program needs adequate resource supply to yield desired results. The resource-intensive nature of the program is exposed through the strong correlation between resources supplied and results obtained. In this study, human and material resources deployed at the facility and community level influenced the results obtained. The index testing positivity rates of 52% for Manicaland and 63% for Matabeleland South observed in this study are not comparable with the 6% positivity yield observed in the general population, where resource supply is not comparable with what was provided in this study. Our findings are consistent with other studies on the subject[9,15]

Second, the ICT program had the potential to achieve improved results compared to what was obtained in this study. First, not all facilities within the recruited districts were implementing the program (Manicaland 37/61, Matabeleland South 72/88). Low implementation coverage dampened potential as indicated in standard operating procedures emphasizing vigilance to obtain ideal results[16,17]. Secondly, providing only one ICT register per healthcare facility where the minimum entry point was 3 per facility, limited the implementation of the program as health workers could be discouraged by having to request the register from another entry point or having to refer clients for contact elicitation where the register was placed, for documentation index testing should be ideally offered at the point of diagnosis and referring clients to a different entry point is associated with client attrition, which may be contributed by confidentiality concerns [18].

Third, both provinces implemented the ICT program with a bias towards the facility entry points (Manicaland: 54%, Matabeleland South: 59.5%) compared to the community level. Facility implementation requires contact testing at the facility achieved through client referrals, whilst community implementation entails tracking and

testing the clients within their communities[9,19]. The client preferences for the facility or community-based ICT are respected in standard practice. In this study, community-based ICT is documented as being more effective[20].

Finally, HIVST was demonstrated to be an effective contact tracing enabler that contributed to the identification of people living with HIV, as reflected in a reactivity rate of 7.7% (n=871) for Manicaland and 6.2% (n=679) for Matabeleland South province. This happened despite documented stockouts even during the study period, as well as a low average result-sharing rate of 57.7%. However, 97.5% and 95% of the HIVST reactive results were confirmed using provider-delivered testing for Manicaland and Matabeleland South provinces, respectively. Confirming all results is imperative to fully yield the results of HIV-positive clients identified through self-screen.

Implications for Policy and Practice

Documentation of the ICT program in a dedicated register (ICT Register) was found to be an indispensable practice that allows tracking of the program performance and identification of areas that need strengthening. However, implementation fidelity is required to ensure that all identified index cases are offered contact tracing services, employing differentiated approaches for facility and community tracking to suit the unique needs of everyone.

There is a need to provide adequate resources, according to set targets, to realize the full potential of the program, considering its resource-intensive nature. This is justifiable by the results attained, which have the potential to catapult the nation to epidemic control by mopping up individuals living with HIV with an unknown HIV status.

The programme in Zimbabwe will benefit from expanding ICT services to all healthcare facilities across all provinces and districts, as a proven effective strategy to identify individuals living with HIV. The stratagem is effective in high- and low-gap districts and is demonstrated in this study. In addition, all clients receiving an HIV diagnosis should be offered index testing. This will assist the nation to achieve its HIV testing goals and reduce the client risk of transmitting the virus to their partners or reinfection in case their partner is HIV positive.

CONCLUSIONS

Index testing is a resource-intensive HIV testing model that is highly effective in identifying individuals living with HIV among the contacts of index cases. The resource demand is justified by the high positivity yield and is crucial to expediting epidemic control by mopping up clients living with HIV with an unknown HIV status. Our findings are coherent with previous results correlating resource supply with positive yield output.

What is already known about this topic?

- Index testing is a known high-yield HIV testing services innovation.
- It is recommended by the WHO to enhance targeted testing and accelerate the achievement of HIV testing targets.
- National policies and guidelines are required to guide Index testing implementation.
- What this study adds:
- It is essential to provide adequate resources (human and material) to reap the best results out of ICT. The resources provided correlate with the outputs obtained.
- Implementation fidelity is needed where program implementation adheres to laid down standard operating procedures to obtain good results.
- Differentiated contact elicitation, tracking and testing are imperative for the success of the project. This includes the strategic use of HIVST to facilitate contact tracing.

Availability of Data and Materials:
The dataset used in this study is provided in **Supplementary File 1.**

Conflict of Interest:
The authors declare that they have no competing interests.

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Authors' Contributions:
Conception and design: all authors; development of data capture tools: HDM, OM, JC, MT; data collection: HDM, OM; data entry: HDM, OM; data analysis and interpretation: all authors; preparing the first draft of the manuscript: all authors; critical review and approval of final draft: all authors.

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Ethics Approval:
Approval to conduct this study was obtained from the Ministry of Health and Child Care head office, the Joint Research Ethics Committee for the University of Zimbabwe Faculty of Medicine and Health Sciences and Parirenyatwa Group of Hospitals (JREC 280/2021) and the Medical Research Council of Zimbabwe (MRCZ/A/2783).

Informed Consent :
Written informed consent was obtained from all participants and no client-identifying information was collected during the study.

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