

Optimizing documentation of HIV testing and counseling practices in the emergency department and inpatient wards of the Muhimbili National Hospital in Dar es Salaam, Tanzania: A program and evaluation plan

By

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## **ABSTRACT**

While the impact of the HIV epidemic is felt worldwide, Africa is disproportionately affected, accounting for 70% of people living with the disease. Early diagnosis and viral suppression are critical to controlling the disease. According to UNAIDS, children with HIV are less likely to receive treatment than are infected adults (24% vs 38%). This is true in Tanzania, a sub-Saharan country where less than 30% of those 14 years old and under living with HIV are receiving treatment, compared with 30-50% of infected adults. The first step towards receiving treatment is HIV testing, counseling, and referral. Prior analysis of the physician documentation patterns specific to HIV testing, counseling, and referral patients for children < 18 years old presenting to the Muhimbili National Hospital Emergency Department in Dar es Salaam, Tanzania revealed several opportunities for improvement. Of 1632 children testing during the one-year study period, the test result was documented for only 74%, counseling was documented for 17%, and referral for follow-up care was documented for 38% of those testing positive and surviving to discharge. The goal of this hospital-based program and evaluation plan is to increase documentation of HIV test results, counseling of patients and/or their parent(s) or guardian(s), and referral of those testing positive to follow-up care. This will be accomplished by engaging key stakeholders to inform the development, implementation, and refinement of the program and encourage participation. The program will be built around the WHO consolidated guidelines on HIV testing services and their “5Cs: Consent, Confidentiality, Counseling, Correct Results, and Connection.” The evaluation plan will measure the program inputs, outputs, and outcomes and be used to optimize the program. If proven successful, the program will be disseminated

to other hospitals and recommended for inclusion in undergraduate and graduate physician training programs.

**KEYWORDS:** HIV; AIDS; Testing; Pediatrics; Emergency Medicine; Sub-Saharan Africa

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## **LIST OF ABBREVIATIONS**

AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral Therapy
ED	Emergency Department
EID	Early Infant [HIV] Diagnosis
HIV	Human Immunodeficiency Virus
HCT	HIV Counseling and Testing
HTS	HIV Testing Services
ISP	Immunization Service Points
MNH	Muhimbili National Hospital
MUHAS	Muhimbili University of Health and Allied Sciences
PITC	Provider-Initiated Testing and Counselling
PMTCT	Prevention of Mother-To-Child Transmission
QA	Quality Assurance
UNAIDS	Joint United Nations Programme on HIV/AIDS
VCT	Voluntary Counseling and Testing
WHO	World Health Organization



## **Introduction**

According to WHO estimates, worldwide there were 35 million people living with HIV in 2013. Africa has been disproportionately impacted by the epidemic, accounting for an estimated 24.6 million (70%) of those living with the disease. (WHO, 2013) In an attempt to slow the spread of HIV, the Joint United Nations Programme on HIV/AIDS (UNAIDS) proposed an ambitious approach to controlling the epidemic, including the “90-90-90 targets.” (UNAIDS, 2014)

*The goal of these targets is that by 2020:*

- *90% of people living with HIV know their HIV status.*
- *90% of people who know their status receive treatment.*
- *90% of people on HIV treatment have a suppressed viral load so their immune system remains strong and they are no longer infectious.*

*The follow-up goal is to further increase the proportion of people meeting each of these metrics to 95% by 2030, the so-called, “95-95-95 targets.”*  
(UNAIDS, 2014)

While UNAIDS estimates that 15 million people will be receiving HIV treatment by the end of 2015, they note that children with HIV are less likely to receive treatment than are infected adults (24% vs 38%). (UNAIDS, 2014) This is true in Tanzania, one of the 30 countries that account for nearly 90% of all new HIV infections, where 30-50% of adults living with HIV are receiving anti-retroviral therapy compared with less than 30% of those 14 years old and under.(UNAIDS, 2014) The first step towards receiving treatment is HIV testing, counseling, and referral. In the setting of a generalized HIV epidemic, such as is the case in Tanzania, the World Health Organization (WHO) recommends provider-initiated testing and counselling (PITC) for all patients. This practice is not consistently employed in all settings and is especially uncommon in the clinical environment, even in among risk

populations and in areas with a high burden of disease. (WHO, 2015) Possible reasons for this disparity include limitations on time, testing supplies, and human resources in a busy acute care setting.

While it is understandable that other immediate patient care considerations often take priority, when rapid HIV testing is performed in the course of caring for acutely ill and injured patients, it is imperative that the results be documented, the patients counseled in the findings, and those testing positive are referred for follow-up care once the acute medical event has stabilized. Unfortunately, this is not always the case. Prior analysis conducted by Dr. Sawe and colleagues (that included this author) of a retrospective review of all pediatric visits (< 18 years of age) to the Muhimbili National Hospital (MNH) Emergency Department (ED) during 2012 (N=5540) found:

- 1632 (30%) were tested for HIV, in the ED or inpatient wards.
  - The test result was documented for 1213/1632 (74%).
  - Of 418 patients tested in the ED, counseling, or deferral of counseling, was documented for 70 (17%).
  - When documented as deferred to the ward, the ward clinician documented counseling for 15/42 (36%).
  - Overall, counseling was documented in 33% of patients testing positive versus 1.1% patients testing negative (odds ratio 43 [95% CI = 23 – 83]).
  - Of 199 patients who tested positive and survived to hospital discharge, referral for outpatient HIV clinic follow-up was documented for 76 (38%).
- (Sawe, 2015)

This study concluded that though nearly one third of patients were tested for HIV, “. . . physicians documented the provision, or deferral, of counseling in less than 20% of cases. When deferred to the inpatient setting, subsequent counseling was documented in just over a third of cases. Counseling was much more likely to be documented when the test result was positive. Of those patients testing positive, referral to CTC follow-up after discharge was documented in less than 40%. (Sawe, 2015) While it is possible that some patients received

undocumented counseling and referral, these data suggest that there is ample opportunity for optimization of documenting of HIV counseling and testing practices in the emergency and acute care setting at Muhimbili National Hospital. (Sawe, 2015)

The goal of this paper is to design a hospital-based program and evaluation plan to increase documentation the following in the medical record:

- Results of HIV tests performed in the ED and inpatient setting.
- Counseling of patients and/or their parent(s) or guardian(s).
- Referral of patients testing positive to follow-up care and HIV treatment.

The first section of the paper will summarize the existing literature on the topic of documentation of HIV testing and counseling in low- and middle-income countries. The second section will describe the program plan, implementation strategy, and timeline. Finally, the third section will describe the evaluation plan by which we will assess the impact of the program plan.

### **Literature Review**

A literature review was performed to identify previously published data on documentation practices for HIV test results, counseling and referral for follow-up care.

### **Search Strategy**

The PubMed MEDLINE database was searched for English language articles using the terms: ("Documentation"[Mesh] OR documentation) AND ("HIV"[Mesh] OR HIV) AND ("test result" OR "test results" OR "Counseling"[Mesh] OR counseling OR "Referral and Consultation"[Mesh] OR referral OR counseling) AND ("Africa"[Mesh] OR africa OR african OR Tanzania OR sub-Saharan OR sub-Sahara). This search returned 36 results.(Aderaye, Melaku, & Zenebe, 1996; Ajuwon, 2006; Alemie & Balcha, 2012; Audet et

al., 2013; Blair et al., 2014; Butt, Chindia, Vaghela, & Mandalia, 2001; Chakaya et al., 2002; Chibanda et al., 2010; Corneli et al., 2008; Duncan et al., 1995; Emmett et al., 2010; Geldmacher et al., 2007; Goar, Obembe, Audu, & Agbir, 2012; Hoke et al., 2014; Jewkes, 2000; Kambashi et al., 2001; Kevany et al., 2012; Kilonzo et al., 2009; Kolesnitchenko et al., 1993; Kraft et al., 2012; Leshabari, Blystad, & Moland, 2007; Makinde, Ezomike, Lehmann, & Ibanga, 2011; Mburu, Iorpenda, & Muwanga, 2012; Monyatsi et al., 2012; Muchedzi et al., 2010; Ndubuka & Ehlers, 2011; Njeru, Blystad, Shayo, Nyamongo, & Fylkesnes, 2011; Oluoch et al., 2015; Orem, Mbidde, & Weiderpass, 2008; Page-Shipp et al., 2012; Painter, 2001; S. J. Reynolds et al., 2012; Rusine et al., 2013; Sigaloff et al., 2012; Stoeckli, Steffen-Klopstein, Erb, Brown, & Kalish, 2000; Woldesenbet et al., 2015) Next, the CINAHL database and Google Scholar were search using the same terms, yielding an additional 9 results. (Alvarez, 2006; Baiden et al., 2005; Dahoma, 2011; Isaacs, 2004; Kakoko, Astrom, Lugoe, & Lie, 2006; Kotze, 2010; Matovu, 2005; Msuya et al., 2008; Obermeyer & Osborn, 2007) The searches were not limited by year, study methodology, or peer-review status.

## **Findings**

The titles and abstracts of each of the 45 articles were reviewed (appendix). The full text version of each potentially applicable article was retrieved and reviewed. Those found to be relevant to the program and monitoring plan are summarized.

A mixed methods analysis of PITC practices in Kenya, Tanzania, and Zambia conducted by Njeru, et al. in 2011 reported several pertinent findings. (Njeru et al., 2011) First, is the importance of counseling, both to educate and empower those testing negative with strategies to prevent infections, and to provide support to those testing positive to

diminish feelings of fear, worry, and guilt. This is an important aspect to consider in that in some of the study sites it was apparent that counseling was performed only for those testing positive, resulting in a missed opportunity for prevention education. Another key finding was the importance of allowing sufficient time such that the counseling session is not rushed and the patient is given information at the rate at which they can accept and process it. There was also concern expressed about the fact that at some sites PITC was considered a mandatory before other health care services were rendered, especially among pregnant women attempting to access prenatal and perinatal care. The authors conclude that "...there is an urgent need to reconsider the manner in which the opt-out approach to HIV testing is presently being implemented in order to protect each client's autonomy, protect the right to access HIV prevention, and to protect pregnant women from an unreasonable additional burden." (Njeru et al., 2011)

A cross-sectional study of 100 physicians and 97 nurse prescribers caring for HIV positive patients at a pediatric referral center in Botswana compared documentation rates for a random sample of 100 doctor-patient encounters and 96 nurse prescriber-patient encounters. (Monyatsi et al., 2012) The investigators found no significant differences between the two cadres in the rates of documentation of 8 specific clinical variables, with a cumulative total documentation rate for the 8 items of 96% among the nurse providers and 94.9% among the physicians ( $p = 0.335$ ). While this study involved providers caring for patients already diagnosed with HIV, it is similar to the background work for this program plan in that it used documentation of specific clinical variables as a surrogate marker to rate the quality of care. Also, the study data support the concept of "task-shifting," whereby certain patient care responsibilities traditionally carried out by physicians can be delegated to

specially trained nursing personnel, while preserving the standard of care. It is reasonable to assume that nursing personnel at the Muhimbili National Hospital ED and inpatient wards can be trained to perform and document HIV testing, counseling, and referral for follow-up care, a practice supported by the WHO guidelines. (WHO, 2015) In fact, these guidelines go even further, supporting the use of lay providers to perform HIV counseling and referral. From these data, we can conclude that increasing the number of personnel available to perform a given task should, in theory, increase the likelihood that task is completed. However, clear communication and coordination among the patient care is required to ensure that each member does not simply assume that one of the others will complete the task.

In another study, the authors report the results of two national surveys of 625 randomly selected public health care facilities in South Africa to describe early infant [HIV] diagnosis (EID) practices. (Woldesenbet et al., 2015) While greater than 95% of facilities provided EID services, including 72% at immunization service points (ISP). While just over two thirds of ISP provide EID services to infants with an HIV exposure documented in their medical record, these services were provided to only 9% of infants whose exposure status was unknown or undocumented. The authors also found that in nearly half of cases where the mother was HIV positive, their HIV status was not documented in the child's chart. Reasons for non-reporting of HIV positive by the mothers included fear of discrimination and limited knowledge of disease transmission. When provider initiated counseling and testing was offered at the infant's 6-week immunization visit, 95% of mothers accepted. These findings highlight the importance of PICT, with emphasis on counseling to address fears of discrimination and modes of HIV transmission to optimize early detection and treatment strategies.

A chart review of 19,168 patients receiving HIV testing at a voluntary counseling and testing (VCT) center in Ethiopia found that one quarter tested positive. (Alemie & Balcha, 2012) However, of the 4298 referred for follow-up care at the HIV chronic care clinic, only 27% subsequently registered at the clinic. These data suggest the need for strategies to increase compliance with follow-up recommendations after HIV diagnosis.

In a cross-sectional study of factors associated with access to antiretroviral therapy (ART) among 147 HIV-positive women in urban Zimbabwe, the investigators found that while 65% registered with the ART clinic, documentation of the referral was found in only 16% of cases. (Muchedzi et al., 2010) Of those registered, only 37% were on ART. The data analysis revealed that patients were more likely to access care and treatment if they understood the referral process (odds ratio [OR] = 3.21; 95% confidence interval [CI] = 1.89 – 11.65) and were enrolled in an HIV support group (OR = 2.34; 95% CI = 1.13 – 4.88). These data underscore the importance of the clarity of counseling and the availability of a psychosocial support network in optimizing HIV care.

A report on the implementation of an HIV Counseling and Testing (HCT) information management system in Nigeria reported on several “lessons learned” during the process. (Makinde et al., 2011) The authors report that team cohesion and open communication were critical in identifying and resolving gaps in the system. They further note that the initial documentation practices were lacking, with several significant data entry errors that improved significantly with re-training and ongoing data monitoring. Finally, automation of the data archiving and reporting process enhanced the program and made it easier to track indicators and highlight program results.

Difficulties with HCT in the ED are not limited to low- and middle-income countries. A review of the medical literature from the United States examining the reasons why physicians do not offer HIV testing identified three studies from the ED setting. Of 20 testing barriers identified by the authors, six were noted in more than one study: patient follow-up concerns, time required for testing, patient confidentiality issues, counseling requirements, and language/cultural barriers. (Burke et al., 2007)

In a large prospective trial performed at an urban ED in the United States, 4855 patients were randomized to have HIV testing and counseling offered by either dedicated counselor without other clinical responsibilities (2446 patients) or by a member of the existing clinical staff (2409 patients). (Walensky et al., 2011) Among those randomized to the HIV counselor arm, 80% were offered testing as compared to only 36% of those randomized to the clinical staff arm. The authors acknowledge, “In demonstrating that a counselor-based model will lead to the testing of more patients, we recognize that this model requires the addition of upfront resources.” While this study addressed testing and counseling rates rather than documentation of same, it does highlight the challenge of relying on clinical staff, with competing patient care responsibilities, to perform these tasks in a busy ED.

## **Discussion**

It is not unexpected that none of the identified literature was from the ED setting, given that emergency medicine is a nascent specialty in sub-Saharan Africa. However, there were several findings that will be useful in designing this program plan. Specifically, the importance of adequate counseling, for both those testing positive and those testing negative was emphasized as was the importance of allowing adequate time for the counseling session.



Additionally, the data demonstrate that there may be gaps in documentation that do not directly correlate to gaps in the quality of care or referral provided. Even so, there seem to be significant obstacles to care even once the referral is made and the program plan will need to provide a mechanism to address these issues in order to optimize patient care. Finally, data from the United States experience reveal that the challenges are not unique to low- and middle-income settings. However, to ensure acceptability and sustainability of the program, the program plan must take into account the local resource limitations and cultural considerations.

There is much work needed to optimize HCT practices. While this program will focus on documentation practices, the education component will be informed by the lessons learned from the available literature to increase the likelihood of success in improving HIV care.

## **Program Plan**

### **Theoretical Framework**

The ultimate success of this program will be largely determined by the degree to which the stakeholders are engaged, individually and collectively, in the program and whether they are willing and able to adapt their behavior toward a common goal. Given the stakeholders diversity, multiple theoretical models will influence the program.

The “Theory of Planned Behavior” will provide the conceptual framework for the physician intervention, aimed at increasing documentation of HIV test results, counseling, and referral. This model emphasizes the impact of the perception of control over the opportunities, resources, and skills required to implement an intervention on the participant’s

subsequent behavior (in our case, the physician's). (Rainburger, 2014) This approach also incorporates, from the "Theory of Reasoned Action," the physician's attitudes toward the intervention and their belief regarding the extent to which others (in this case, fellow emergency physicians, pediatrician colleagues, hospital administrators, and patients) support the intervention. (Rainburger, 2014) These factors are particularly important in a busy emergency department where physicians appropriately prioritize interventions that have an immediate impact on saving life and limb. Further, some emergency physicians may feel that HIV counseling and referral are not within the scope of their training or responsibility. As such, they may feel ill prepared to fill this roll and assume that downstream providers will accomplish these tasks. Likewise, the inpatient pediatricians may similarly, and appropriately, feel that the follow-up and chronic management of HIV infection is best accomplished in an outpatient setting. They may or may not realize that HIV testing was ordered, especially when the result is not recorded in the medical record. In other instances, they may assume that the provider ordering the test performed the counseling and referral. It is a reasonable assumption that all providers, regardless of specialty, understand and agree with the importance of HIV testing, recording test results, and ensuring the appropriate counseling and referral. If this is true, then an intervention aimed at providing structure around the process, enhancing communication, and emphasizing control over the opportunities, resources, and skills necessary to complete these tasks, combined with reinforcing the importance of this behavior to themselves and others, should help optimize practice and improve patient care.

To help inform the counseling of the patients and/or their parent(s) or guardian(s), we will adapt the "Stage Planning Programme Model," introduced by Whitehead in 2001 to

provide a conceptual framework for nursing health education and promotion practice.

(Whitehead, 2001) The initial step in this model is to decide which of two approaches is most appropriate for the activity: empowerment or prevention. The former will be the focus for counseling of those testing positive and the latter emphasized for those testing negative. The rationale for this dichotomy is that those testing positive will need significant education, encouragement, and support to ensure that they are empowered to understand the health consequences of HIV and the available resources for care. Conversely, those testing negative will need education on prevention and an understanding of the fact that avoiding infection is an ongoing lifelong process. Certainly, there is overlap, as those testing positive will require education on prevention of disease transmission. Likewise, those testing negative should be empowered to understand behaviors associated with avoiding infection so they may act accordingly. Either approach begins in Whitehead's "preparatory phase" with an assessment of the patient's needs, priorities, and available resources. This is followed by the "program development and implementation phase" and finally the "diffusion phase." (Whitehead, 2001)

### **Program Context and Overview**

The overarching aim of this program plan is to improve the care of children tested for HIV in the ED or inpatients wards of Muhimbili National Hospital by increasing documentation of test results, counseling of patients and/or their parent(s) or guardian(s), and referral of patients testing positive to follow-up care and HIV treatment. Successful implementation of this program plan will require buy-in and support of the respective stakeholder groups. As such, we will assemble a multi-disciplinary program team to serve as

an advisory board to inform the development, implementation, and refinement of the program and encourage participation. The program will be built around the WHO consolidated guidelines on HIV testing services (HTS) and their “5Cs: Consent, Confidentiality, Counseling, Correct Results, and Connection.” The WHO defines each of these elements as follows [from the consolidated guidelines on HIV testing services, page 10]:

- *Consent: People receiving HTS must give informed consent to be tested and counselled. (Verbal consent is sufficient; written consent is not required.) They should be informed of the process for HIV testing and counselling and of their right to decline testing.*
- *Confidentiality: HTS must be confidential, meaning that what the HTS provider and the client discuss will not be disclosed to anyone else without the expressed consent of the person being tested. Confidentiality should be respected, but it should not be allowed to reinforce secrecy, stigma or shame. Counsellors should discuss, among other issues, whom the person may wish to inform and how they would like this to be done. Shared confidentiality with a partner or family members – trusted others – and healthcare providers is often highly beneficial.*
- *Counselling: Pre-test information can be provided in a group setting, but all people should have the opportunity to ask questions in a private setting if they request it. All HIV testing must be accompanied by appropriate and high-quality post-test counselling, based on the specific HIV test result and HIV status reported. Quality assurance (QA) mechanisms as well as supportive supervision and mentoring systems should be in place to ensure the provision of high-quality counselling.*
- *Correct: Providers of HIV testing should strive to provide high-quality testing services, and QA mechanisms should ensure that people receive a correct diagnosis. QA may include both internal and external measures and should receive support from the national reference laboratory. All people who receive a positive HIV diagnosis should be retested to verify their diagnosis before initiation of HIV care or treatment.*
- *Connection: Linkage to prevention, treatment and care services should include effective and appropriate follow-up, including long-term prevention and treatment support. Providing HTS where there is no access to care, or poor linkage to care, including ART, has limited benefit for those with HIV.*

(WHO, 2015)

While these elements comprise the best practices, which our program will strive to achieve, there may be situations in the emergency and acute care setting where the elements

may need to be monitored to ensure feasibility. The absolute minimum requirements will be the providers document the test result, perform and document counselling of the patient and/or parent(s) or guardian(s), and ensure and document referral to follow-up HIV care.

### **Setting and Stakeholders**

Located in Dar es Salaam, Muhimbili National Hospital (MNH) is the largest public hospital in Tanzania and one of four top-level referral hospitals. The 1500-bed facility receives referrals from all over the country. As such, MNH serves a large number of patients, many of whom have a complex illness or injury that could not be adequately cared for at a lower level facility.

The MNH ED opened in 2010 and is the result of a public-private partnership between the Ministry of Health and Social Welfare and Abbott Fund Tanzania. The ED serves also as the primary clinical training site for the Muhimbili University of Health and Allied Sciences (MUHAS) 3-year Master of Medicine in Emergency Medicine residency training program. Both the ED and residency program are the first of their kind in Tanzania and among only a few such departments and training programs in sub-Saharan Africa. Since opening in January 2010, the ED has been staffed by interns (fresh medical school graduates) and registrars (registered medical practitioners who are 1 to 3 years post internship). The emergency medicine residency program was founded in late 2010 and the first class of emergency medicine resident physicians (all of whom worked as registrars before joining the 3-year residency program) began staffing the department in February of 2011. ( Reynolds, et al, 2012) Locally-trained emergency physicians provide clinical supervision, with support from board-certified emergency physicians from the USA, Canada, and South Africa. The

department serves a high acuity patient population from within Dar es Salaam and receives referral patients from throughout the country. Of the 36,000 patients seen each year, only 20% are discharged home from the ED. The top five categories of complaints seen in the department are trauma, infection, mental health, neoplasm and pregnancy-related issues. Among patients under 18, infectious diseases are the most common. ( Reynolds, et al., 2012)

There are several stakeholder groups that will be engaged in this program plan. They include the patients and their families, community leaders, public health officials, doctors and nurses working in the emergency department, and staff in the pediatric inpatients wards and the pediatric intensive care unit. We will also engage the providers who run the local HIV follow-up clinic to help ensure a smooth transition to follow-up care for those patients testing positive.

### **Anticipated challenges and Planned Solutions**

The emergency and acute care setting provides many challenges to the proposed program plan. First, the acuity of the patient's presentation and the typical overcrowding of the ED with multiple children and their parents often in a single resuscitation room could likely threaten the consent and confidentiality aspects of the rapid HIV testing, counseling and referral performed in the ED. The proposed solution is to designate a private consultation area in the ED for these sensitive activities and to ask the nurse to document the test result and counseling in real time. Likewise, available space and patient volume could hinder counseling efforts or impose suboptimal time constraints on the patient encounter and documentation effort. The proposed solution is to develop a streamlined minimum acceptable practice for documentation of test results, counseling, and referral practice by emergency

nurses as well as identifying other cadres capable of competently completing these tasks. This will be facilitated by creating an ED counseling logbook comprising standardized counseling checklists to be included in the chart of every patient who undergoes HIV testing in the ED. Due to the sensitive nature of this information, the test book will contain only patient initials and the medical record number and will be stored in a secure area of the emergency department. The emergency nurse will use the logbook to document the test result, counseling, and referral to the outpatient HIV follow-up clinic (for those testing positive). There will be a place on the form for both the nurse and the patient (or parent/guardian) to sign to acknowledge completion of the process. The form will be created in triplicate, with the original placed on the patient's chart, copy given to the patient (or parent/guardian), and the final copy remaining in the counseling booklet to be reviewed for quality assurance purposes. This approach will be familiar to the ED staff as it is similar to the standardized documentation currently used for all trauma patients. Finally, as previously mentioned, while task shifting will increase the number of providers available to document results, counseling, and follow-up care, it could also result in everyone assuming that someone else will take responsibility for these tasks. The proposed solution to this risk is to reinforce that the ED nurse caring for the patient and performing the HIV test bears primary responsibility for documenting the test result, counseling, and referring those testing positive to the outpatient HIV follow-up clinic. While these tasks may be delegated to other qualified personnel, the responsibility for oversight and ensuring task completion remains with the ED nurse. The program manager will review the counseling logbook daily and reconcile it with the HIV testing log. For those patients not entered into the counseling logbook, the program

manager will contact the clinical staff caring for the patients on the wards to prompt them to provide and document the counseling.

### **Goals and Objectives**

Program goals: increase documentation of the following in the medical record:

- Results of HIV tests performed in the ED and inpatient setting.
- Counseling of patients and/or their parent(s) or guardian(s).
- Referral of patients testing positive to follow-up care and HIV treatment.

Program objectives: we will achieve the above goals by:

- Delivering a brief educational intervention to the ED and inpatient clinical staff to review the WHO consolidated guidelines on HIV testing services, with particular emphasis on the “5Cs.”
- Identifying and attempting to mitigate barriers to realizing the program goals.
- Developing an implementation checklist to be included in the medical record of all children who undergo HIV testing in the ED to prompt documentation of test results, counseling of patients and/or parent(s) or guardian(s), and referral of those testing positive for follow-up and HIV treatment.

### **Implementation strategy and timeline**

The year 1 program activities are shown in Table 1. Implementation will begin with the hiring of a program manager and assistant to provide support for scheduling and conducting of the stakeholder meetings, creation and testing of the ED HIV counseling logbook and daily reconciliation with the HIV test log, and ongoing collection of the



program evaluation data. Initial stakeholder meetings will occur within 3 months of project initiation and will include specific discussions around cultural considerations; and the intervention development will be completed by the end of that time period (month 3). The intervention will then be deployed in the ED over the following month. One month after ED deployment, the stakeholders will meet again to review the initial results and consider the need for refinement of the intervention before deployment in the wards. During the first 3 months of the program, the evaluation data collection will be piloted to establish a baseline and allow for refinement of the data collection process as needed. When the intervention is deployed in the ED the post-intervention data collection will begin. Evaluation data will be distributed to the stakeholder groups quarterly for review and refinement if the intervention as needed.

Table 1. Gantt chart depicting the year 1 program activities

Program year 1												
Month	1	2	3	4	5	6	7	8	9	10	11	12
Hire program manager/assistant	■											
Stakeholder meetings	■	■	■									
Intervention development		■	■	■								
Intervention deployed in ED				■								
Review/refinement					■							
Intervention deployed in the wards						■						
Evaluation data collection piloted	■	■	■									
Ongoing evaluation data collection				■	■	■	■	■	■	■	■	■

### Budget

The annual program budget detail is presented in Table 2. The total annual expenditures will be \$23,200. Personnel costs will comprise the bulk of the expenditures, followed by food and beverages and equipment and supplies.

Table 2. Program Budget

<b>Personnel</b>	
<b>Program manager</b>	\$12,000
<b>Program assistant</b>	\$6000
<b>Equipment/supplies</b>	
<b>Tablet computer</b>	\$1200
<b>Projector</b>	\$500
<b>Photo copies</b>	\$500
<b>Printing</b>	\$500
<b>Office supplies</b>	\$500
<b>Food and beverage</b>	
<b>Refreshments for stakeholder meetings</b>	\$2000
<b>Total</b>	\$23,200

## **Evaluation Plan**

### **Rationale for Evaluation**

The evaluation plan helps to characterize the implementation of the program and its effects on the targeted behavior. This process provides program participants, administrators, funders, and other stakeholders with a clear view of the program's inputs, outputs, and outcomes. Furthermore, it can provide data that can be used to refine the program to optimize the results.

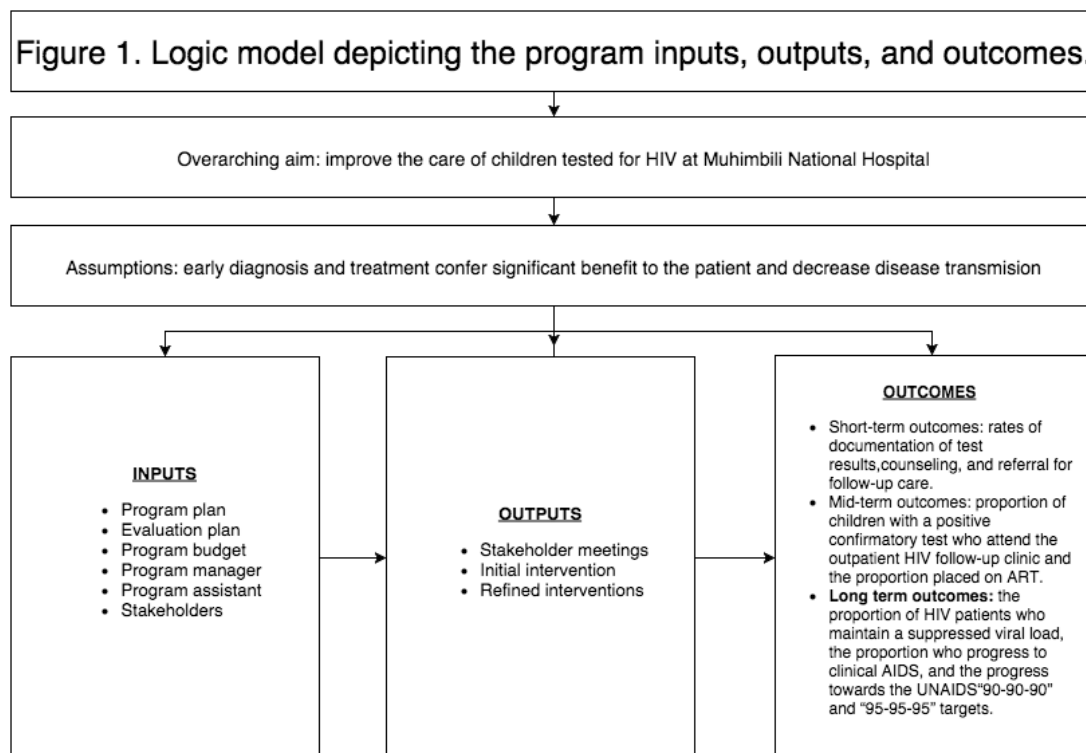
### **Evaluation Design and Methods**

The first three months of program development and implementation will be assessed by implementation documentation, simply noting whether or not tasks were completed according to the program plan and timeline. Deployment of the intervention will be evaluated by daily program monitoring, allowing for oversight and refinement of the process. The data for the measuring the outputs and short-term outcomes will be obtained through medical record review of each pediatric patient for whom an HIV test is ordered in the ED. The mid-

term outcome data will be obtained from the MNH pediatric outpatient HIV follow-up clinic. The long-term outcome data will be obtained from the MNH pediatric outpatient HIV follow-up clinic as well as regional and national data on the progress towards the UNAIDS 90-90-90 targets.

## Logic Model

The logic model (Figure 1) depicts the program inputs, outputs, and outcomes.



## Program Inputs

The program inputs include the money to support the program budget, the program manager and assistant, and the stakeholders (the patients and their families, community leaders, public health officials, doctors and nurses working in the emergency department, and staff in the pediatric inpatients wards and the pediatric intensive care unit).

## **Program Outputs**

The program outputs include the stakeholder meetings and initial and refined interventions, as well as an increase in documentation of testing and results, counseling of patients/guardians, referral for follow-up care.

## **Program Outcomes and Metrics**

**Short-term outcomes** include the rates of documentation of test results, counseling, and referral for follow-up care for children tested for HIV in the MNH ED. These outcomes will be measured by medical record audit of all children with an order for an HIV test in the ED. Each variable will be classified as documented or not documented. The target rate for documentation of the HIV result will be 85% initially and 95% by the end of year 1. The target rates of ED counseling and referral (for those testing positive) will be 80% initially (a four-fold increase from the baseline documented by Sawe, et al., 2005) and 90% by the end of year 1.

**Mid-term outcomes** include the proportion of (1) children testing positive for HIV in the MNH ED who are referred for confirmatory testing, (2) those with a positive confirmatory test who attend the MNH pediatric outpatient HIV follow-up clinic, and the (3) proportion placed on ART. These variables are currently available from the standard MNH pediatric outpatient HIV clinical records, recorded in real time by the clinical staff, and will be measured by monthly audit of these records by the program assistant and overseen by the program manager. Each variable will be classified as present or absent. The target rate for each of these metric will be 80% initially and 90% by the end of year 1.

**Long-term outcomes** include the proportion of (1) children testing positive for HIV in the MNH ED who maintain a suppressed viral load, (2) the proportion who progress to clinical AIDS, and (3) the progress towards the UNAIDS “90-90-90” and “95-95-95” targets. These variables will be classified according to the MNH pediatric outpatient HIV clinic, the Tanzania Ministry of Health, and the UNAIDS categorization. The target values for the end of year 1 will be improvement in each of the above metrics by 10%, a more conservative target given the multi-disciplinary effort required and factors affecting these outcomes that are beyond the control of the ED and inpatient staff.

### **Outcomes-based program refinement**

During the first 3 months of the program, the evaluation data will be piloted to establish a baseline and allow for refinement of the data collection process as needed. When the intervention is deployed in the ED the post-intervention data collection will begin. Evaluation data will be distributed to the stakeholder groups quarterly for review and refinement of the intervention as needed to optimize the opportunity to meet or exceed the pre-specified metrics for the short-, mid-, and long-term outcomes.

### **Dissemination plan**

Given that the MNH ED is the first full service ED in Tanzania and has more staff and resources than the acute care areas of the other public hospitals, it is likely that similar deficiencies in documentation are prevalent throughout the national public hospital system. As such, if the evaluation results demonstrate success of this program then the intervention will be presented to the Ministry of Health and promoted for more widespread use

throughout the country. This would begin at the three other top-level referral centers in Western (Bugando Medical Center in Mwanza), Southern (Mbeya Medical Center), and Northern (Kilimanjaro Christian Medical Center) Tanzania followed by diffusion to the district hospitals and health centers within each referral region.

### **Recommendation for Public Health Leaders**

Optimal care of patients infected with HIV and prevention of disease transmission depend upon early diagnosis. This can be accomplished by PITC of patients presented to the ED for medical care. However, if the test results and post-test counseling are not conveyed to the patient and/or their parent(s) or guardian(s) and referral to follow-up care is not made then the potential gains of early diagnosis are lost. Not only is the patient deprived of the opportunity to seek treatment, resulting in deterioration of their immune function and increased susceptibility to opportunistic infections and development of clinical AIDS, but this missed opportunity also constitutes a public health threat as patients with untreated HIV infection have higher viral loads and can more easily transmit the disease to others. This program plan aims to engage stakeholders to discuss these issues and develop an intervention to increase documentation (and performance) patterns around HIV testing of children in the ED. This approach will maximize the likelihood of identifying the barriers to improvement, so that they may be adequately addressed and patient care optimized.

### **Conclusion**

There is ample opportunity to improve documentation of HIV test results, counseling, and referral for outpatient follow-up care for children tested for HIV in the MNH ED. This

program plan is intended to develop and evaluate an intervention aimed at addressing this deficiency. The hope is that the intervention and attention to documentation will help bolster Tanzania's progress towards the UNAIDS "90-90-90" and "95-95-95" targets. If so, we will advocate to the Ministry of Health for support for widespread dissemination of this initiative throughout the Tanzanian health care system.

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## APPENDIX

Appendix. Summary table of all studies identified in the literature search.

<b>Author</b>	<b>Year</b>	<b>Study Summary</b>	<b>Included?</b>
<b>Oluoch, et al.</b>	2015	This Kenyan study used a structured approach to define a reference set of concepts and terms to describe AIDS defining illnesses to enhance the quality of data used to inform clinical decision-making.	No
<b>Woldesenbet, et al.</b>	2015	The study used data from 2 cross-sectional surveys from South Africa to identify factors associated with missed opportunities for EID at the 6-week immunization visit.	Yes
<b>Blair, et al.</b>	2014	The report from the United States (US) examined data from an ongoing surveillance system from 16 states and Puerto Rico to identify unmet needs and guide program planning the optimize HIV care and minimize disease transmission.	No
<b>Hoke, et al.</b>	2014	The authors describe a program to increase contraception options, especially long-term and permanent methods, among woman accessing prevention of mother-to-child transmission (PMTCT) services in South Africa.	No
<b>Audet, et al.</b>	2013	The authors evaluated HIV knowledge among traditional healers in Mozambique before and after an educational intervention.	No
<b>Rusine, et al.</b>	2013	This prospective cohort study, conducted in Rwanda, reports the 12-month viral load (VL) and HIV drug-resistance outcomes (HIVDR) among patients receiving first-line antiretroviral therapy (ART).	No
<b>Reynolds, et al.</b>	2012	The authors of this study, conducted in Uganda, report the rates of ART susceptibility among HIV-infected adults experiencing first- and second-line ART treatment failure.	No
<b>Alemie and Balcha</b>	2012	The authors of this retrospective record review report the prevalence of disease and linkage to the HIV chronic care clinic for a voluntary testing and counseling (VCT) clinic in Ethiopia.	Yes

<b>Author</b>	<b>Year</b>	<b>Study Summary</b>	<b>Included?</b>
<b>Sigaloff, et al.</b>	2012	The authors of this cross-sectional survey report the prevalence of ART resistance among adults with a new diagnosis of HIV-1 in Kenya.	No
<b>Page-Shipp, et al.</b>	2012	The authors reviewed data from 3 primary care clinics in South Africa to quantify TB/HIV integration.	No
<b>Mburu, et al.</b>	2012	This retrospective review analyzes a model of community mobilization and engagement of people living with HIV and it's potential impact on efforts to prevent vertical transmission.	No
<b>Kevany, et al.</b>	2012	The authors describe the development and implementation of the local adaptation of an HIV counseling, testing, and support services intervention in Thailand and sub-Saharan Africa	No
<b>Kraft, et al.</b>	2012	The authors investigate the incidence and origin of HIV-1 superinfection among HIV-discordant couples in Zambia	No
<b>Goar, et al.</b>	2012	This cross-sectional study describes the effect of depression on health care utilization in an outpatient department in Nigeria	No
<b>Monyatsi, et al.</b>	2011	This cross-sectional study compared the performance of nurses and physicians caring for HIV positive children in Botswana	Yes
<b>Makinde, et al.</b>	2011	The authors describe the factors associated with success and lessons learned from implementing a new HIV counseling and testing information management system in Nigeria	Yes
<b>Ndubuka and Ehlers</b>	2011	This study examined the predictive ability of pharmacy records and pill counts to characterize HIV treatment response	No
<b>Njeru, et al.</b>	2011	Mixed methods of analysis of PITC practices and lessons learned from 3 districts in Kenya, Tanzania, and Zambia	Yes
<b>Chibanda, et al.</b>	2010	This study screened a random sample of women attending routine 6-week postnatal clinic in Zimbabwe to document the prevalence and risk factors for postnatal depression, including the association with HIV status	No

<b>Author</b>	<b>Year</b>	<b>Study Summary</b>	<b>Included?</b>
<b>Muchedzi, et al.</b>	2010	This cross-sectional study examined factors associated with access to care for HIV-infected women in a PMTCT program in Zimbabwe	Yes
<b>Emmett, et al.</b>	2010	This cross-sectional study examined factors associated with virologic failure among HIV-infected Tanzanian children receiving ART	No
<b>Kilonzo, et al.</b>	2009	This paper reports efforts to establish and sustain health service delivery to survivors of sexual violence	No
<b>Cornelia, et al.</b>	2008	This qualitative study compared 3 models of PITC in the Democratic Republic of Congo	No
<b>Orem, et al.</b>	2008	The authors of this review describe the current status of clinical care and research challenges of Burkitt's lymphoma in Africa	No
<b>Leshabari, et al.</b>	2007	This interview-based study describes the infant feeding practices of HIV-positive mothers in Northern Tanzania	No
<b>Geldmacher, et al.</b>	2007	This investigation characterizes the T lymphocyte response to various HIV-1 subtypes in Southwest Tanzania	No
<b>Ajuwon</b>	2006	The authors provides an overview of the bioethical issues in HIV/AIDS research, testing, and counseling in Nigeria.	No
<b>Chakaya, et al.</b>	2002	This retrospective record review reports the outcomes of a TB retreatment program in Kenya, including the association with HIV status	No
<b>Painter</b>	2001	The authors of this review paper proposes the couples-focused VCT represents a high leverage HIV prevention strategy for African countries	No
<b>Butt, et al.</b>	2001	The authors report the spectrum of oral lesions among Kenyan patients hospitalized with HIV	No
<b>Kambashi, et al.</b>	2001	The authors describe the comparative utility of nucleic acid amplification techniques for the detection of pulmonary TB in a Zambian population with a high prevalence of HIV	No
<b>Jewkes</b>	2000	The author describes data, largely from South Africa, on the epidemiology and health impact of violence against women, including the association with HIV infection	No

<b>Author</b>	<b>Year</b>	<b>Study Summary</b>	<b>Included?</b>
<b>Stoekli, et al.</b>	2000	This cross-sectional study reports the molecular epidemiology of HIV-1 in Switzerland	No
<b>Aderaye, et al.</b>	1996	This prospective study examined the prevalence of HIV among Ethiopian patients with pleural TB and compared clinical characteristics and outcomes by HIV status	No
<b>Duncan, et al.</b>	1995	This cross-sectional analysis reported the prevalence of latent TB among Zambians at high risk of HIV infection	No
<b>Kolesnitchenko, et al.</b>	1993	The authors performed in depth serological analyses on 8 Ivory Coast patients who screened positive for retroviral infection	No
<b>Kotze and McDonald</b>	2010	The authors report on the evolution of a clinical information system used to manage the rollout of ART in South Africa	No
<b>Alvarez, et al.</b>	2006	The authors discuss a model to increase minority participation in research in the US	No
<b>Isaacs, et al.</b>	2004	The authors report on the role of the charge nurse in preventing the in-hospital spread of HIV in South Africa	No
<b>Dahoma, et al.</b>	2009	The authors report the estimated HIV prevalence and risk behavior among men who have sex with men in Zanzibar	No
<b>Msuya, et al.</b>	2008	The authors report on the rates and factors associated with male partner participation in VCT in Northern Tanzania	No
<b>Kakoko, et al.</b>	2006	The authors used the Theory of Planned Behavior to examine the use of VCT services among Tanzanian teachers	No
<b>Obermeyer and Osborn</b>	2007	The authors examine the influence of social and behavioral factors on HTC	No
<b>Baiden, et al.</b>	2005	This cross-sectional survey reports the perceptions and attitudes of respondents attending an antenatal clinic in Ghana	No
<b>Matovu, et al.</b>	2005	The authors report the VCT acceptance, risk profile, and HIV prevalence of an adult cohort in rural Uganda	No