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## **HIV Research “Year in Review” in Haiti**

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prepared for Ministère de la Santé Publique et de la Population (MSPP) in Haiti

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## **Introduction**

For this issue of the Epidemiologic Surveillance Bulletin, we summarize the prior year's research on populations living with HIV (PLWH) in Haiti for World AIDS Day 2020.

## **Methods**

We retrieved 50 articles from PubMed (pubmed.gov) for articles written in English using the search term [Haiti\* AND (HIV OR "human immunodeficiency virus" OR AIDS)] from December 2019 to November 19, 2020 (approximately 1 year). We included studies that of cohorts of people living with HIV in Haiti, patients enrolled from Haiti in multi-country clinical studies and studies involving populations at substantial risk of HIV in Haiti. We excluded studies of Haitian populations in other countries, study protocols, perspectives, and opinion articles. The final review contains summaries of 28 studies. We grouped into relevant themes when possible and summarized each paper.

## **Results**

Allorant et al. 2020

The authors created a tool comparing quality of care performance by HIV clinics in the iSanté health network in Haiti using the following process of care (1-3) and continuity of care (4-6) measures: 1) Patient started ART within 1 month of HIV diagnosis, 2) Patient up-to-date with respect to viral load testing, 3) Use of multi-month scripting (MMS) per guidelines based on definition of stable patients who are eligible for MMS, 4) Patient has returned within 30 days of expected ART refill date, 5) Patient has returned within 30 days of expected ART refill date and 6 months after starting ART, 6) Patient has returned within 30 days of expected ART refill date and 6 months after starting ART AND patient pregnant or postpartum at time of starting ART.

A composite score combining these measures was created. Advanced statistical methods were used to avoid identifying too many clinics as over or under performers relative to their peer clinics to obtain a reasonable number of clinical targets for quality of care improvements. Clinics (n=90) are not identified to the reader but 1-8 clinics are shown graphically as over-under performers on the panel of measures. (Allorant et al., 2020)

### **Two studies on FSW**

Budhwani et al. 2020

The authors surveyed female sex workers (FSW) about condom use with different partner types among those either working inside Haiti or the Dominican Republic (DR) along the border of the two countries. About 81% of FSWs working on the Dominican side of the border used a condom every time they had sex with a client, compared to 38% of FSWs on the Haitian side of the border (See **Figure 1** for additional survey items). Haitian FSW were more socioeconomically disadvantaged and sent money back to families more frequently. The authors hypothesize differences due to environments in Haiti and DR such as comprehensive sex education taught in DR schools. This study included because of the population were highly vulnerable to HIV but technically did not include FSW with HIV. (Budhwani et al., 2020)

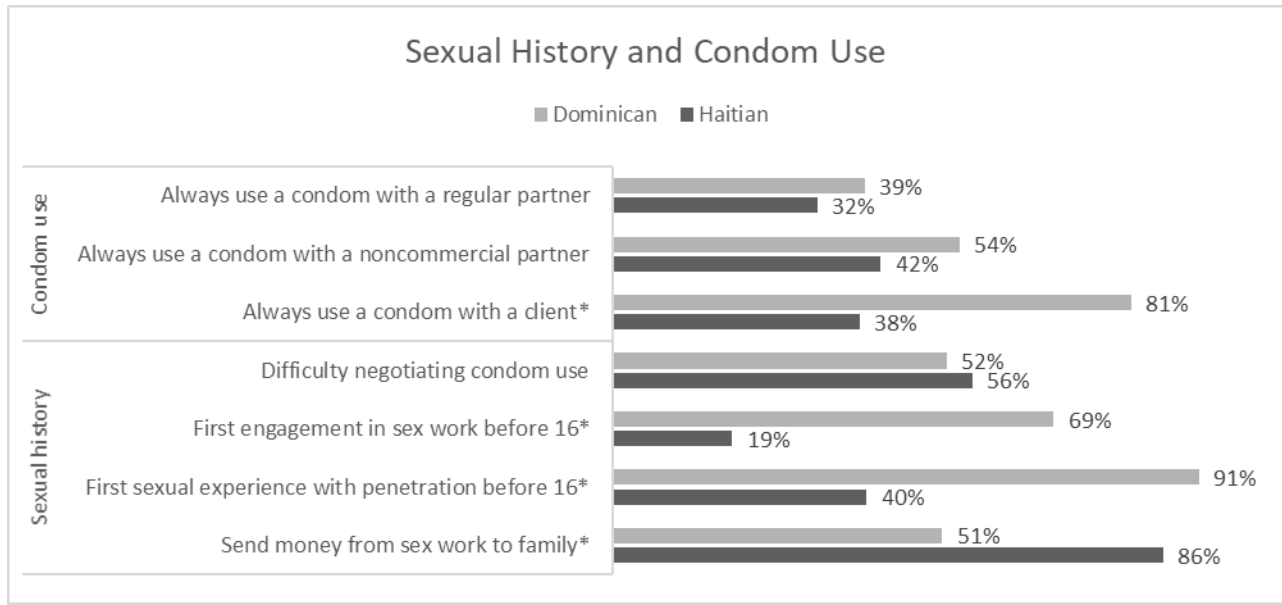


Figure 1. Authors' reproduction of results from Table 1 of Budhwani et al. 2020.

Yam et. al 2020

This was a cross-sectional study of HIV-related stigma among MSM, FSW, and PLWH of Haitian descent living in the DR. The researchers used a modified version of the standardized HIV Stigma Index to examine stigma in health care settings. They found that, although PLWH of Haitian descent had the lowest levels of HIV-related stigma, they also had the lowest levels of viral suppression. They attributed these findings to legal and political barriers preventing PLWH of Haitian-descent to access healthcare in the DR. (Yam et al., 2020)

**Two genetic studies, one also on FSW.**

Currenti et al. 2020

This study used genetic information from 26 mother/child pairs where HIV was transmitted from mother to child from the GHESKIO clinic. The purpose was to examine whether genetic adaptations that strengthen the virus by reducing the immune system response (T cell response) in the mother are transmitted to child. Most adaptations seem to be transmitted but can "revert" in the child. Even though virus may have "pre-adapted" to child's immune system given similarities to the mother, the child may still mount an immune response but little research into this response has been conducted. (Currenti et al., 2019)

Jean Louis et al. 2020

The authors aimed for this study to explore the prevalence and dynamics of transmission of HIV-drug resistant mutations among Haitians. Eligible participants, including naive and treatment-experienced patients, were selected from Port-au-Prince, Haiti from 09/2018-07/2019. HIV-1 sequences were analyzed from men who have sex with men, female sex workers, and their partners. Overall, it was found that there was a 58.8% prevalence of drug-resistant mutations with female sex workers being a significant predictor. (Jean Louis et al., 2020)

Franke et al. 2020

This study examined the use of bedaquiline and delamanid to treat rifampin resistant or MDR TB in multiple countries which included 2 patients from Haiti. The study examined when patient sputum converted from TB+ to TB- after treatment began. The study was unique because it included HIV+ patients which are typically excluded from these types of studies. Patients with HIV were less likely to be sputum-negative than patients without HIV 6 months after starting treatment.(Franke et al., 2020)

**One clinical case study.**

Fратиани 2020

This is a case study documenting a rare presentation of cutaneous (skin) TB seen in an emergency department in Gonaives, Haiti, in 2016. The patient subsequently tested positive for HIV but even though she was transferred to a facility in Port-au-Prince, ART treatment was not available in the city at that time. Provides detailed symptomology and clinical images. We note that the author incorrectly reports that 2.4% of the US population is known to be HIV positive.(Fратиани, 2020)

Puttkammer et al. 2020

The authors implemented an EMR-based alert system in 1 clinic from the iSanté health network and compared to another without the alert. The alert consisted of an EMR pop-up window triggered by a data-driven clinical prediction model that would identify patients at-risk of not taking ART medications (see Figure 2). The study examined measures in the clinics such the proportion of patients with 1) VL suppression, 2) days covered, and 3) >7 days late for last ART pickup. **Of note was the very high rate of patients missing VL results.** They conducted qualitative assessments to understand the acceptability of the intervention among clinicians and patients. Patients liked knowing their color-coded status. The intervention seemed to lead to improvements in the number of patients with suppressed VLs and other medication measures. Regarding the number of VL tests missing, Rich et al. 2020 found 47% (53% available) of patients identified across Haiti were missing viral load results despite some evidence that the viral load had been completed. The INTR site in this study had similar levels of missingness (44%) but the CNTR was considerably more available (13% missing). Rich et al. also provides comparative details on patients with and without VL results in Haiti. (Puttkammer et al., 2020b)



Figure 2. Author's modification of alert prompts from Puttkammer et al. 2020.

### Two studies on isoniazid therapy

Weinberg et al. 2020

This study was not focused on Haiti but the overall sample includes 15 pregnant women from Haiti living with HIV and on ART. The authors examined whether biological tests used to identify tuberculosis infection during pregnancy lose their ability to detect TB due to suppressed immune function and in the presence of isoniazid preventative therapy (IPT). The positivity on that test went from 30% (entry) to 25% (delivery) and back to 32% (post-partum) demonstrating that some tuberculosis positive patients could be missed during pregnancy. (Weinberg et al., 2020)

Theron et al. 2020

This study's goal was to compare the safety of starting isoniazid preventative therapy in women with living HIV either during pregnancy or after delivery. Pregnant women living with HIV on ART from 8 countries with high TB incidence were assigned to initiate 28 weeks of isoniazid preventative therapy during pregnancy or at 12 weeks after delivery. Statistical analyses determined that fetal demise, preterm delivery, low birth weight, or congenital anomalies, and neonatal death at 7 and 28 days were higher in women on immediate isoniazid preventative therapy compared to deferred isoniazid preventative therapy. (Theron et al., 2020)

Puttkammer et. al 2020

This was a retrospective cohort study using an interrupted time series approach to assess 6-month ART retention under three different ART eligibility guidelines in Haiti: pre-Option B+, Option B+ (universal ART for pregnant women), and Test and Start (universal ART for all PLWH). The researchers reported a statistically significant decline in ART retention after 6 months from 78.4% during pre-Option B+ to

75.0% during Test and Start. Same-day ART was linked to a 14% reduced likelihood of ART retention after 6 months. These results suggest that efforts to improve patient-centeredness and support after ART initiation are needed in Haiti, particularly among those prescribed same-day ART, to increase ART retention levels. (Puttkammer et al., 2020a)

**Four studies came from the Caribbean, Central, and South America network for HIV epidemiology (CCASAnet).**

Giganti et al. 2019

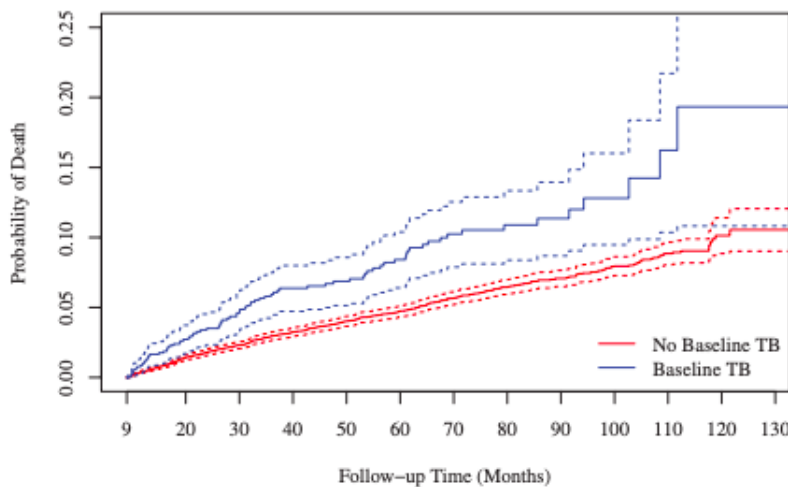
The authors evaluated the impact of a source document verification audit on reporting discrepancies in nine HIV observational databases from CCASAnet. The variables with the highest proportion of discrepancies were dates of clinic visits and diagnoses and prior history of HIV before enrollment. The results indicated that the audit led to improved data quality over the study period. (Giganti et al., 2019)

Lotspeich et al. 2020

This study evaluated the efficacy of self-audits compared to travel-audits to preserve the integrity of HIV observational data in the CCASAnet cohort. The authors reported similar error rates observed by both self-auditors and travel-auditors which suggests travel-audits may be replaced with self-audits in some settings. (Lotspeich et al., 2020)

Koenig et al. 2020

The researchers compared time to death among patients living with HIV with and without TB using statistical analyses. Overall, it was found that patients with TB were more likely to be male, older, less educated, with lower CD4 counts, and residing in Haiti or Peru. The authors found that PLWH who present with baseline TB, or diagnosed TB plus or minus 30 days from enrollment, have an elevated risk of long-term mortality after TB treatment completion compared with people without baseline TB. (Koenig et al., 2020)



**Figure 1.** Probability of death (95% confidence interval) after treatment completion among patients with and without baseline TB. Abbreviation: TB, tuberculosis.

Belaunzaran-Zamudio et al. 2020

The authors conducted a study to estimate the prevalence and incidence of non-communicable diseases among people 50 years of age (stratified by less than or greater than 50 at enrollment) or older receiving care for HIV during 2000-2015 in six centers affiliated with the CCASAnet (see **Figure 3**). The authors estimated the annual and overall prevalence and incidence of **comorbid or multimorbid** cardiovascular diseases, diabetes, hypertension, dyslipidemia, psychiatric disorders, chronic liver and renal diseases, and non-AIDS-defining cancers. The authors found that the overall annual prevalence of non-communicable diseases increased during 2000-2015 with half or more from each group having at least one non-communicable disease at the last visit. The most common disease at the last visit for both groups were dyslipidemia, hypertension, psychiatric disorders, and diabetes. Overall, the authors identify the need for planning for the provision of complex, primary care for aging adults living with HIV. (Belaunzaran-Zamudio et al., 2020)

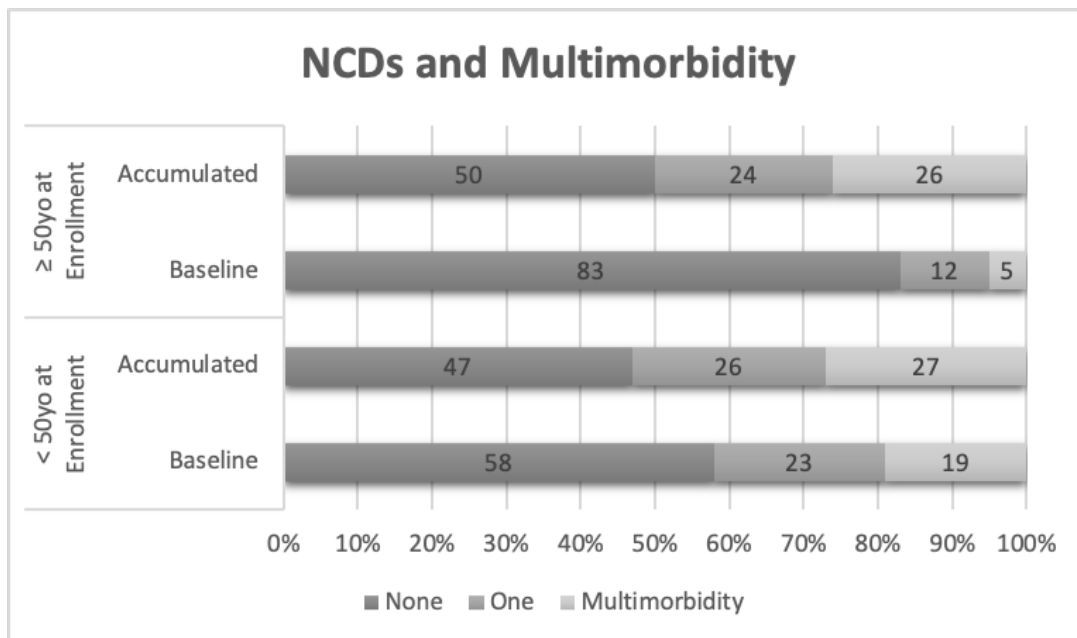


Figure 3. Author’s modification of data from Belaunzaran-Zamudio et al. 2020

Rich et. al 2020

This was a retrospective cohort study which evaluated the determinants of delayed viral suppression among people newly initiated on ART therapy in Haiti from 2013-2017. The researchers analyzed clinical data from the national HIV surveillance system (SALVH) and found that nearly 40% of the population experienced delayed viral suppression. This finding is higher than previously estimated. Higher odds of delayed viral suppression were observed among younger PLWH, those living in the Ouest department, with CD4 counts below 200 cells/mm<sup>3</sup>, and receiving lamivudine (3TC), zidovudine (AZT), and nevirapine (NVP) combined ART regimens. The authors also highlighted issues with data completeness, which may have led to selection bias in their study. (Rich et al., 2020)



Hamilton et. al 2020

This study investigated geographic heterogeneity in self-reported HIV testing behaviors among men in Haiti using data from the Haiti Demographic and Health Survey. The authors reported that only 34% of men surveyed reported ever testing for HIV in the past, which was more likely among men living in the Northern and Southern regions compared to the Central region. High HIV-associated stigma and poor knowledge of HIV transmission were associated with reduced odds of testing. (Hamilton et al., 2020)

Jean Louis et. al 2020

This was a cross-sectional study of *Neisseria gonorrhoeae* (NG) and *Chlamydia trachomatis* (CT) prevalence among MSM living with or without HIV in Haiti. The researchers reported high prevalence of CT (11.1%) and NG (16.2%) which were associated with lower levels of education. MSM living with HIV were significantly less likely to be infected with CT as compared to MSM who tested negative for HIV. (Jean Louis et al., 2020)

Wang et al. 2020

The authors conducted a retrospective cohort study consisting of 66,042 patients from over half of Haiti's national ART therapy (ART) clinics. Trends of VL testing and second line ART regimen usage were measured using data from the iSanté electronic data system. The authors described patients' VL testing status in five categories (no test, suppressed, unsuppressed followed by no test, re-suppressed, and confirmed failure). For the patients with confirmed failure, the authors reported ART adherence level using the percentage of days that patients had medication in their possession. Statistical methods were used to estimate how many second-line ART switches occurred with VL testing status with there being a significant increase in the rate of patients who switched from first- to second-line ART if their VL test confirmed virological failure while on first-line treatment. Overall, it was found that Haiti has been able to significantly expand VL testing access; however, there are still opportunities to broaden confirmatory testing as a means to promote positive patient outcomes, strong ART adherence, and prompt switching to second-line regimens for patients with ART failure despite strong ART adherence. (Wang et al., 2020)

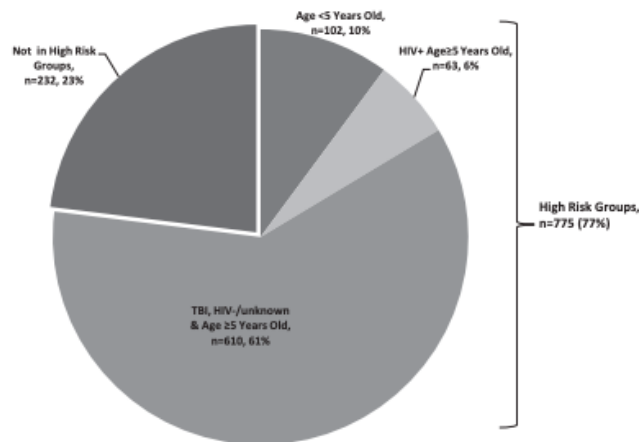
Rahill et al.

The authors conducted focus groups with transwomen and transmen in Haiti's Cité Soleil slum who offered their perspectives on overall well-being, identities, and HIV-protective and risk factors. For the group participants, it was found that their gender expression was a factor that attributed to recurring, humiliating, and intentionally injurious sexual assaults against participants, overall increasing their risk of HIV acquisition. Due to lack of confidentiality and stigma, participants were hindered from access to available HIV resources. The authors support this through providing personal anecdotes from the focus groups which detail both sexual and physical violence that participants had experienced. The authors mention that integrated socio-behavioral and health programs to challenge existing gender inequities, while simultaneously providing training on human rights and HIV risk reduction for Haitian sexual and gender minorities, were needed. (Rahill et al., 2020)

Gupta et al. 2020

The authors conducted a cross-sectional study of adult MDR-TB cases and their household contacts in 8 countries with high TB burden. Overall, it was found that that out of the patients who were considered

high-risk for tuberculosis infection, 6% of patients greater than 5 years of age were infected with HIV and 61% were negative or had unknown HIV status. The author states that one of their objectives were to also describe the prevalence of TB disease, tuberculosis infection, and HIV among household-contacts. (Gupta et al., 2020)



**Figure 4.** Proportion of household contacts that were identified as high-risk contacts. Some household contacts met multiple criteria as follows: age <5 years old group: 1 HIV+ & TBI, 1 HIV+ only, 1 TBI only; HIV+ & age ≥5 years old group: 43 TBI. TBI was diagnosed by either interferon gamma release assay or tuberculin skin test. Abbreviations: HIV, human immunodeficiency virus; TBI, tuberculosis infection.

Villalba et al. 2020

The authors aimed to analyze gender differences in the association between childhood sexual abuse (CSA) and substance use, including alcohol use, as well as sexual risk behaviors among Haitians living with HIV. Results showed that participants who experienced childhood sexual abuse had increased odds of hazardous drinking and having unprotected sex compared to those who did not, while marijuana use was only significantly increased in women. Authors note that the results demonstrate the need for future research to better understand the role of gender in the relationship between childhood sexual abuse and risky behaviors among person living with HIV.

(Villalba et al., 2020)

### Two studies from the national surveillance system (SALVH)

Delcher et al. 2020

The purpose of this article was to describe SALVH's development, key contributions to population health, emerging operational threats, and future directions. The authors describe case-based surveillance and the expansion of SALVH over the decade of Haiti recovering from the massive earthquake of 2010. Additionally, the author describes current threats to case-based surveillance (CBS) and SALVH including funding cuts, software, hardware, and staffing component infrastructure. The

author mentions new directions that include advancements in technology related to CBS/SALVH and concludes with reiterating the importance of HIV CBS in Haiti. (Delcher et al., 2020b)

Delcher et al. 2020

The authors evaluated the impact of the 12 January 2010 earthquake on HIV cases from SALVH and assessed the characteristics of people living with HIV 1-year before and after the earthquake. The earthquake was associated with an immediate and statistically significant decline of 31.4, 29.9, and 32.2% in monthly case counts for all three clinical networks – iSante, GHESKIO, Zamni Lasante, respectively. Earthquake Zone 8 (severe) was the only zone to experience a statistically significant decline of 45.5% in the monthly case counts. Although declines experienced by each clinical network were substantial, they were not catastrophic. By 2012, SALVH case reports had largely surpassed pre-earthquake levels; an increase not accounted for by the opening of new clinics post-earthquake. (Delcher et al., 2020a)

Fene et al. 2020

This study investigated the magnitude and distribution of the main causes of death, disability, and risk factors in Haiti for the period 1990-2017. Analysis was based on public data from the Global Burden of Disease (GBD) study 2017. Although the causes of disability adjusted life-years (DALYs) from HIV/AIDS have decreased by 0-15% among women aged 15-49 years, HIV/AIDS was still the leading cause and second leading cause of DALYs for men and women aged 15-49 years in Haiti in 2017, respectively. (Fene et al., 2020)

Conserve et al. 2020

The purpose of this study was to assess the perspectives of women living with HIV (WLWH), their male partners, and healthcare professionals on the perceived advantages and disadvantages of HIV self-testing (HIVST), and recommendations for implementing HIVST in Haiti, with a focus on secondary distribution of HIVST to men by WLWH. Key informant interviews (n = 16) and focus groups (n = 9) were conducted in 2017 in Haiti. The participants for the focus groups were healthcare workers (n = 44), Option B+ clients (women) (n = 31), and male partners (n = 13) of pregnant or post-partum women living with or without HIV receiving services at two Departmental hospitals in Port-au-Prince and Cap-Haitien. Perceived HIVST advantage included an increase in the number of people who would learn their HIV status and start treatment. The perceived disadvantages were lack of support to ensure self-testers initiate treatment, uncertainty about male partner's reaction, risk of violence towards women delivering HIVST kits after receiving an HIVST kit from a woman, and the inability of women to counsel a man when his self-test result is positive. (Conserve et al., 2020)

Richterman et al. 2020

This study reports risk factors for mortality during long-term follow-up over the most recent decade in a rural Haitian cohort of people with HIV who are in care and receiving antiretroviral therapy (ART). This observational study of 464 adults with HIV receiving ART in rural Haiti is one of the few reporting factors associated with mortality over long-term follow-up in a low-income setting. With <10% overall loss to follow-up, one-quarter of the participants died with an overall median follow-up time of nearly 6 years. The concurrent findings of high mortality and high clinical retention for people with HIV on ART in rural

Haiti suggest that regular clinical follow-up and provision of ART are insufficient to prevent poor outcomes and impoverished settings. (Richterman et al., 2020)

Ramaiya et al. 2020

The mixed-methods study utilized self-report and observational data to investigate relationships between patient-provider communication (PPC) and information, motivation, and behavioral skills (IMB) among 128 patients initiating ART in Haiti. Effective PPC may have downstream impacts on ART adherence in the Haitian context, in part by generating improvements in IMB constructs. A majority of participants (57%) agreed that physicians considered patients' needs when recommending HIV medications, which may bolster adherence to ART by increasing patient motivation. (Ramaiya et al., 2020)

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