

# Malaria, HIV and TB in Mozambique: Epidemiology, disease control challenges and interventions

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## Question

What is the evidence on epidemiology (including demographic and geographic inequalities) and disease control challenges of malaria, HIV and TB in Mozambique; and on the effectiveness of interventions aimed at preventing, detecting and treating these diseases in Mozambique?

## Contents

### 1. Summary

#### Part I: Epidemiology

2. Incidence of disease
3. Demographic variation
4. Geographic variation

#### Part II: Disease control challenges

5. Sectoral challenges: health care systems and capacity
6. Vertical care challenges
7. Surveillance challenges
8. Informational challenges

#### Part III: Interventions

9. Enabling environment
10. Addressing health systems and capacity
11. Integrated care
12. Surveillance
13. Education and communication

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# 1. Summary

Malaria, HIV and tuberculosis (TB) are significant public health concerns in Mozambique. Malaria was the fourth leading cause of death in the country in 2019, accounting for 42% of deaths among children under 5 years of age (Mugabe et al., 2021; USAID, 2018). Mozambique is among the top eight countries with the highest HIV prevalence; with the second highest mother-to-child transmission (MTCT) rate in the world (Fuente-Soro et al., 2021; Nacarapa et al., 2021). The incidence of TB is rising, with pediatric TB cases almost tripling in recent years (WHO, 2020b; Nguenha et al., 2018; Orlando et al., 2018). Mozambique has one of the highest global incidence of malaria-HIV and TB-HIV co-infection, which raises the likelihood of poor clinical outcomes (Moon et al., 2019; USAID, 2018). This rapid literature review highlights key aspects of the epidemiology of malaria, HIV and TB in Mozambique and challenges in prevention, detection and treatment; and surveys select interventions that seek to address these challenges.

## **Part I: Epidemiology**

**Demographic variation:** The epidemiological profiles of malaria, HIV and TB are closely related to socioeconomic factors in Mozambique (Baltazar et al., 2017). Children from poorer families and living in rural areas were more likely to test positive for malaria (Salvador et al., 2021). HIV prevalence is higher among women (15.4%) than men (10.1%), due in part to gender norms and inequalities that render women more vulnerable to HIV (McLemore et al., 2021). Women aged 25–29 were more likely to be HIV-positive, in contrast to girls aged 15–19, most likely due to many of the latter being in school and less sexually active (Dias et al., 2018). Key populations (KP): female sex workers (FSW), men who have sex with men (MSM) and people who inject drugs (PWID) - and their partners - account for about one third of new infections in Mozambique (Brooke et al., 2021). While women and girls may be more vulnerable to HIV infection, a recent study finds that adolescent and young adult males sought care with more advanced disease; took longer to start treatment; and were less likely to be retained in care (Akonkhai et al., 2021).

**Geographic variation:** Greater investment in public services in the southern region has exacerbated public health risks in northern and central provinces (Amimo et al., 2021). Prevalence of malaria can reach close to 70% in the northern and central regions, but is less than 3% in some provinces in the south (Arroz et al., 2018). Children living in rural areas have a higher risk of malaria infection (see Salvador et al., 2021). In the case of TB, four provinces in northern and central Mozambique account for 51% of the total national burden (WHO, 2020b; USAID, 2019). A recent study on HIV finds instead that women in the northern provinces of Cabo Delgado and Nampula were less likely to be infected than women in southern provinces (Ekholuenetale et al., 2020). Access to health care varies based on location: only 36% of people in rural areas have access to a health facility within 30 minutes of their home; and community-based TB and HIV services do not cover all rural areas (WHO, 2018). Conflict in Cabo Delgado and cyclones in northern and central Mozambique have produced mass displacement and the destruction of health facilities, undermining disease control (Amino et al., 2021).

## **Part II: Disease control challenges**

**Sectoral challenges - health systems and capacity:** Mozambique's disease control efforts are severely hampered by limited domestic resources; inadequate infrastructure; severe shortages of qualified public health professionals; and lack of essential medical supplies (PEPFAR, 2019; Baltazar et al., 2017; Rajkotia et al., 2017). Most funding to combat HIV, TB and malaria come from external sources. While this funding has contributed to significant improvements in health

outcomes, research on donor programming finds it has not strengthened the health system. The vast majority of resources flow 'off budget' to non-governmental organisation (NGO) clinical partners (Chapman, 2020; Pfeiffer & Chapman, 2019). Laboratory facilities are severely lacking in the country, even though they are critical to TB control among rural populations, allowing for faster and more convenient diagnosis and treatment (Tadeu & Geelhoed, 2016). Pronounced shortages of supply chain personnel in Mozambique has interrupted treatment for people receiving antiretroviral therapy (ART) or anti-TB medications (Bravo et al., 2020). The national health information system also remains underdeveloped, with clinical partners having developed disparate patient management systems (PMS) and parallel data collection systems (Pfeiffer & Chapman, 2019; Hochgesang et al., 2017). There are also inadequate infrastructure and human resources to implement PMS at many health facilities in the country (Hochgesang et al., 2017).

**Vertical care challenges:** While 96 percent of TB patients in Mozambique are tested for HIV, only 67.1% of HIV-positive patients were screened for TB in 2016 (Nguenha et al., 2018, 268). Given that TB is a common cause of death among PLHIV, it is essential to engage in rigorous screening for TB in HIV clinics (García et al., 2020; Moon et al., 2020; Nacarapa et al., 2020).

**Surveillance challenges:** It is extremely challenging to control epidemics if a large percentage of those infected remain undiagnosed (Nguenha et al., 2018). Non-receipt of HIV testing results is a challenge in Mozambique: one study found that approximately 51,000 HIV-positive persons who were tested did not receive their results (Mugabe et al., 2019). Although pregnant women in Mozambique are offered an HIV test at their first antenatal care (ANC) visit and retesting at specific stages after giving birth, women who did not access ANC are left behind, resulting in risk to them and undermining the prevention of MTCT (Lain et al., 2020). In the case of TB, despite a 61% increase in annual case notifications between 2013 and 2017, Mozambique still has one of the lowest case detection rates (CDRs) among the high TB burden countries – with an estimated 42% of people with TB unreached by the health system in 2018 (WHO, 2020b; USAID, 2018; López-Varela et al., 2016). Calculating CDR in children is even more challenging, with a high risk of under-diagnosis and under-estimation of TB cases (Moon et al., 2019; López-Varela et al., 2016). COVID-19 control measures and service disruptions have also affected the monitoring of malaria case-finding activities and HIV viral monitoring (Brooke et al., 2020; Golin et al., 2020).

**Informational challenges and stigma:** Studies have found low levels of knowledge among the general Mozambican population about HIV, TB and malaria symptoms, transmission, prevention and treatment (Budu et al., 2021; Lain et al., 2020; Portugaliza et al., 2019; USAID, 2019). HIV counselling sessions at ANC clinics can help women to better understand the meaning of their HIV status, risk exposure, and safer behaviours (Mugabe et al., 2019). Male engagement programmes remain limited in scope and scale in Mozambique (McLemore et al., 2021). However, research shows that men who had comprehensive HIV/AIDS knowledge were more likely to test for HIV compared to those with no such knowledge (Budu et al., 2021). HIV stigma can be a critical barrier to HIV testing and counselling, status disclosure, and treatment – for men and women (Budu et al., 2021; Chapman, 2020; Carrasco et al., 2017). Research on malaria awareness also finds that the heavy workloads of staff at ANC clinics means that they may not have the time to give detailed information about prevention strategies (Arnaldo et al., 2019).

### **Part III: Interventions**

**Enabling environment:** The Global Fund's Breaking Down Barriers Initiative provides support to scale-up programmes that remove human rights-related barriers to malaria, HIV and TB services (McLemore et al., 2021). Project Viva+, which involves the scale-up of paralegal and legal literacy

activities in Mozambique, has demonstrated successes in reducing human rights-related barriers to access services; and supporting retention in care – for example, through the removal of girls from premature unions in the Zambézia, Manica and Tete provinces (McLemore et al., 2021).

**Addressing health systems and capacity challenges:** The Mozambique Field Epidemiology Training Programme (MZ-FELTP) is a post-graduate in-service training programme that aims to build epidemiological capacity in: public health surveillance, disease control and response to outbreaks, and public health emergencies. Research on the HIV surveillance system finds that it has helped to strengthen Mozambique’s response to outbreaks and improved surveillance. The majority of graduates have also been retained in the Mozambique health system. Sustainability of the programme is an ongoing challenge, however (Baltazar et al., 2017). With regard to universal health care, studies of Mozambique’s long-lasting insecticidal nets (LLINs) universal coverage campaign (UCC) show that the initiative has significantly increased LLIN ownership and use (Arroz et al., 2018). Success factors include a collaborative planning process and strong coordination of campaign actors through central level coordination groups (Arroz et al., 2018). Studies of performance-based financing (PBF) in various provinces in Mozambique find that PBF can be more effective in advancing primary care service delivery than input financing alone – improving the initiation of treatment in the case of HIV; and the quality of hospital management and supervision (Rajkotia et al., 2017; Schuster et al., 2016).

**Integrated care:** Mozambique’s recent one-stop model for TB-HIV co-infected patients, in which TB nurses treat patients for TB and HIV, has simplified treatment for patients, with the vast majority of them initiating ART (Nguenha et al., 2018). Children are also being screened for HIV during routine growth monitoring and vaccination visits (Lain et al., 2020; Bergmann et al., 2017).

**Surveillance:** The National Tuberculosis Programme (NTP) and partners have recently adopted an active case-finding approach to identify missing TB cases (WHO, 2020b; Nguenha et al., 2018). The Challenge Tuberculosis (CTB) project, for example, has recruited and trained community health workers (‘TB activists’) to carry out various community-based activities. Monthly ‘cough days’<sup>1</sup> and house-to-house outreach were the most effective tools. The project has resulted in the detection of 46,675 people with TB over five years, representing a 27% contribution to total TB notifications in the areas over a 5-year period (WHO, 2020b). Those detected all started treatment (WHO, 2020b). To effectively monitor community-based TB services delivered by TB activists, CTB built a dashboard to collect and visualize community activity data electronically; and trained staff to engage in data management (WHO, 2020b; Makombe et al., 2019). The HIV surveillance system has also improved, through Biobehavioral Surveillance (BBS) Surveys, conducted by MOH in 2011-2013 among KPs (FSW, MSM and PWID). The data gathered has rendered KPs visible, confirmed their presence as high-risk groups; and resulted in enhanced capacity building and advocacy (Baltazar et al., 2021).

**Education and communication:** The collaboration of community actors (e.g. community leaders and teachers) and health professionals in social and behavioural change (SBC) activities, aimed at disease prevention, can extend their reach and improve effectiveness (da Fonseca et al., 2020). National and community HIV education campaigns have produced widespread awareness of universal prevention of MTCT, increasing ANC uptake (Fuente-Soro et al., 2021; Chapman, 2020). An evaluation of community based discussions on topics of relevance to HIV prevention and treatment, introduced by video stories of local Mozambicans, finds that they have contributed to changes in gender attitudes, gender roles and stigma; and to better HIV prevention knowledge

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<sup>1</sup> ‘Cough days’ involve educational sessions, screening, sputum collection and referrals (Makombe et al., 2019).

and behaviours (Figuerola et al., 2016). The use of 'Male Champions' - male-to-male community health agents – have also helped to influence uptake of ANC services; and raise HIV testing among men (Budu et al., 2021; Audet et al., 2016). Budgetary allocation constraints can undermine efforts to engage in education and SBC, however, as communication activities are funded to a lesser extent and are often subject to budget cuts (da Fonseca et al., 2020).

## Part I: Epidemiology

### 2. Incidence of disease

**Malaria:** Malaria is endemic country-wide in Mozambique. The estimated incidence was 305.4 cases per 1000 people at risk in 2019 (UNDP, 2020). The country accounts for 46% of the malaria burden in southern Africa and 4% of the global malaria case burden<sup>2</sup> (Mugabe et al., 2021; Salvador et al., 2021; WHO, 2021a; Brooke et al., 2020). Malaria was the fourth leading cause of death in the country in 2019, accounting for 42% of deaths among children under five years of age (Mugabe et al., 2021; USAID, 2018). The prevalence of malaria remained high between the national malaria indicators surveys in 2015 and 2018, amounting to 40% in 2015 and 39% in 2018, despite a significant rise in access to insecticide-treated nets (ITNs)<sup>3</sup> (Salvador et al., 2021).

**HIV:** Mozambique is among the top eight countries with the highest prevalence of HIV in the world (Nacarapa et al., 2021). In 2020, there were an estimated 2.1 million PLHIV in the country, up from 1.5 million in 2010 (Nacarapa et al., 2021). The prevalence of HIV among people aged 15-49 years was 12.6% in 2019 (UNDP, 2020). MTCT in Mozambique is the second highest globally (Fuente-Soro et al., 2021). The HIV epidemic has contributed to reduced life expectancy<sup>4</sup> and has orphaned an estimated 920,000 children (PEPFAR, 2019, 4). AIDS-related deaths have declined from a high of 71,756 in 2006 to 50,587 in 2019 (McLemore et al., 2021, 14). Health facilities offering ART increased from 255 in 2011 to 1,455 by 2018 (PEPFAR, 2019, 4). There has been a large rise in people on treatment, from about 300,000 (2012) to 1.3 million (2019) (McLemore et al., 2021, 14). The country achieved treatment coverage of over 55% by the end of 2018, which while a marked improvement, falls far from the 95% recommended by UNAIDS (Nacarapa et al., 2021).

**TB:** The incidence of TB is increasing in Mozambique, in contrast with the overall global trend, and remains a major public health issue in the country (WHO, 2020b; Orlando et al., 2018). The estimated incidence of TB was 551 cases per 100,000 in 2019 (UNDP, 2020). Children below age 15 comprise between 10 and 15% of all TB cases in the country (see Nguenha et al., 2018). The notifications of pediatric TB almost tripled from 3214 cases in 2011 to 9254 cases in 2016, increasing from 7% to 13% of all TB cases<sup>5</sup> (Nguenha et al., 2018). TB is a leading cause of death in Mozambique, with an estimated mortality figure of 43,000 people (145 per 100,000) in 2018 (WHO, 2020b).

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<sup>2</sup> Sub-Saharan Africa as a whole accounts for 93% of malaria cases and 94% of malaria-related deaths (Salvador et al., 2021; WHO, 2021a).

<sup>3</sup> In this report, as in the literature, ITNs are used interchangeably with long-lasting insecticidal nets (LLINs).

<sup>4</sup> Estimated by the World Health Organization (WHO) in 2016 to be 58 years for men and 62 years for women (see PEPFAR, 2019, 4).

<sup>5</sup> In Mozambique, children aged 0–15 years constitute around 50% of total national population (around 15 million); thus, the contribution of pediatric TB to overall TB is expected to be higher than in other countries (Nguenha et al., 2018).

**Malaria-HIV:** Mozambique has one the highest incidences of malaria-HIV co-infection in the world (Di Gennaro et al., 2018). HIV patients are more susceptible to malaria: many HIV-infected and HIV-exposed uninfected children in Mozambique are at increased risk for malaria and TB (Duffy et al., 2020; (Di Gennaro et al., 2018). Hospitalised children frequently have concurrent illnesses that can also simultaneously contribute to anaemia (Duffy et al., 2020). HIV-associated anaemia increases the risk of mortality (Duffy et al, 2020).

**TB-HIV:** Mozambique is one of 30 high TB and TB-HIV burden countries (Moon et al., 2019). HIV infection is the main driver for increased risk of developing TB (Moon et al., 2019; Nacarapa et al., 2020; USAID, 2018). In 2018, 36% of people who fell ill with TB in Mozambique were reported to be co-infected with HIV (incidence rate of 197 per 100,000) (McLemore et al., 2021; WHO, 2020b). It is estimated though that nearly 60% of TB patients in Mozambique are co-infected (Nacarapa et al., 2020). TB diagnosis is often challenging in PLHIV, particularly in resource-limited countries, resulting in delayed TB diagnosis and treatment (Orlando et al., 2018). Co-infection leads to an increased likelihood of poor clinical outcomes, including in the case of children (García et al., 2020; Moon et al., 2019; USAID, 2018). A study of treatment outcomes of TB in children in Chókwè District finds that while a large proportion of those treated had favourable results, outcomes were worse among co-infected children (Moon et al., 2019). TB also represents the main cause of death in PLHIV in Mozambique<sup>6</sup> (Orlando et al., 2018).

### 3. Demographic variation

#### Socioeconomic status

The epidemiological profile of malaria, HIV and TB in Mozambique are closely related to socioeconomic factors (Baltazar et al., 2017). A study of malaria and the use of ITNs in the country finds that the main predictors of malaria infection were region, place of residence and socioeconomic status. National surveys revealed that children from poorer families and children living in rural areas were more likely to test positive for malaria compared to those from wealthier families and/or living in urban areas (Salvador et al., 2021). Data from 2015 also indicate that children of mothers with lower education are more likely to contract malaria, possibly as they are less informed on how to protect their children from malaria and/or engage in activities that expose them to mosquito bites (Salvador et al., 2021). A study on the use of mosquito nets in Zambézia, Mozambique's second largest province, finds that usage is influenced by socioeconomic factors: higher education, understanding Portuguese, having a higher household income, and living in a house with electricity were positively associated with the female head-of-household sleeping under a mosquito net (Moon et al., 2016).

There are mixed findings about the association between socioeconomic status and HIV infection in Mozambique and elsewhere. While some studies suggest that people with low socioeconomic status (poverty, illiteracy) are more likely to be infected by HIV, others suggest that those with high socioeconomic status (higher income, allowing a lifestyle with multiple sexual partners) are more vulnerable (Ekholuenetale et al., 2020). A study on risk factors for HIV infection in women in Mozambique finds that women living in richer households, in a female-headed household, aged 25-29, and those widowed, divorced or not living with a partner, had higher odds of being HIV-positive (Dias et al., 2018). Similarly, a study of determinants of HIV infection in women in

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<sup>6</sup> PLHIV accounted for just over half (22,000) of the total number of deaths from TB recorded in 2018 (McLemore et al., 2021; WHO, 2020b).

Mozambique finds a significant association between household wealth quintile, female-headed household and HIV infection among Mozambican women (Ekholuenetale et al., 2020).

Research on HIV exposure status in children under the age of two in Mozambique finds that 'unknown HIV status exposure' in a child may be associated with poverty and underdevelopment (Lain et al., 2020). The majority of women in the study were poor, and those with no education were three times more likely to not know their children's HIV status compared to those with secondary education (Lain et al., 2020). Unknown status may imply limited access to healthcare, due to remote residential location, poor road conditions and limited transport availability, or lack of finances (Lain et al., 2020). Access to media, which is limited by poverty, can also result in lack of information and poor knowledge about HIV prevention and care<sup>7</sup> (Lain et al., 2020).

## Gender and key populations

Women tend to engage more in outdoor activities that place them in contact with mosquitos, such as water collection and gathering wood, which increases the risk of malaria transmission (Portugaliza et al., 2019). Research on TB in Mozambique finds that women frequently serve as caregiver to hospitalised sick relatives and could thus be at increased risk of exposure to TB, with the potential for transmission in their household (Moon et al., 2019). Studies conducted in southern Mozambique showed instead a higher TB burden among males below 5 and over 25 years of age (Nguenha et al., 2018, 265).

HIV prevalence is higher among women (15.4%) than men (10.1%), a pattern that remains among young women aged 15-24 (9.8%) and young men (6.9%) (McLemore et al., 2021, 14; Burke et al., 2019). Factors that increase women and girls' vulnerability to HIV include high rates of poverty; early sexual relations, multiple partners, and low condom use (Burke et al., 2010). Prevailing gender norms and inequalities increase this vulnerability: limited ability to negotiate condoms, transactional sex, and fear and experiences of violence and abandonment (Burke et al., 2019). School attendance lessens vulnerability to HIV, yet the school dropout rate is high for girls in Mozambique (Burke et al., 2019).

While women and girls may be more vulnerable to HIV exposure and infection, a study on retention and care of PLHIV in rural Mozambique finds that adolescent and young adult males sought care with more advanced HIV disease; had a longer time to ART initiation; and were less likely to be retained in care, before and after ART initiation (Akonkhai et al., 2021). The study also found that males have a 50% higher risk of mortality, compared to females (Akonkhai et al., 2021). This is in contrast to other multi-site research, which find a higher mortality risk among young females compared to young males (see Akonkhai et al., 2021).

While most HIV testing of men is conducted in voluntary testing sites, universal screening of women of reproductive age is mainly performed in antenatal clinics (Fuente-Soro et al, 2021; Chapman, 2020). In order to reduce MTCT, Mozambique has scaled-up a programme of maternal early test and treat (initially named 'Option B+'), which ensures universal lifelong treatment for pregnant women and treatment for their children.<sup>8</sup> A recent study on maternal HIV treatment in Mozambique finds that while over 90% of pregnant women access ANC, and over

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<sup>7</sup> Sixty-nine percent of interviewed women in the study reported not having television or radio at home, which higher rates in Cabo Delgado and Nampula provinces (Lain et al, 2020).

<sup>8</sup> The continuum of care to prevent MTCT includes maternal HIV testing, prenatal and postnatal ART and prophylaxis, safe birth practices, safe infant and young child feeding, and early infant HIV testing (Schuster et al., 2016).

90% are screened in their first or second visit, most women are not prepared to receive a positive result (Chapman, 2020). Disclosure of HIV-positive status can be a huge risk for women who lack income security and require spousal and family material and social support (Chapman, 2020). Women anticipated confrontation and blame and feared being barred from seeking treatment by their partner and family, which have resulted in lack of disclosure; and negative implications for emotional well-being, treatment follow-up, and MTCT (Chapman, 2020).

A study on MTCT in Manhiça District finds that approximately one third of women who had a child in the prior 4 years were living with HIV (Fuente-Soro et al., 2021). Although MTCT was below 5%, the case rate of new pediatric infections was 1654 per 100,000 live births, which exceeds the WHO target rate of 50 new infections per 100,000 to eliminate MTCT (Fuente-Soro et al., 2021). While the proportion of HIV-exposed children (HEC) in the study cohort that had been tested for HIV (before the age of 54 months) was close to 96%, early infant testing only occurred in 69.1% of HEC, due in part to lack of ANC for the mother (Fuente-Soro et al., 2021).

**Key populations:** KP who are at greater risk of HIV infection in Mozambique include: FSW (22.4% prevalence), MSM (8.3%) and PWID (45.8%) (see McLemore et al., 2021, 14). KP, along with their partners, are estimated to account for about one third of all new infections in Mozambique (Brooke et al., 2021). Yet, there is limited data describing the engagement of KP living with HIV in testing, care and treatment services (Brooke et al., 2021). Vulnerable groups also include transgender people, who remain largely invisible in Mozambique's HIV response with no accurate data for proper HIV surveillance (McLemore et al., 2021).

Surveys in Mozambique reveal lower awareness among MSM and FSW of their HIV status compared to those same groups in other Sub-Saharan African countries, although PWID participants reported higher awareness than other PWID in the region (Brooke et al., 2021). Data was most dire for MSM, where only 8.8% had knowledge of their HIV status (Brooke et al., 2021). ART engagement was also lower across all KP groups: of the MSM, FSW and PWID participants who were aware of their status, only 40.0% 52.6% and 47.2%, respectively, reported being on treatment (Brooke et al., 2021). This translates to two in five HIV-positive MSM participants, and one in two for both HIV-infected FSW and PWID participants (Brooke et al., 2021). Retention was high, however, once treatment is initiated, with both MSM and FSW above the 90% target (Brooke et al., 2021).

## Age-based variations

A study on malaria infection among children in Mozambique finds that older children have a higher probability of being bitten by mosquitoes when they are playing outside in the evening, while younger children up to age 2 may have lower exposure (Salvador et al., 2021). However, children in areas of high malaria transmission intensity develop immunity as they grow due to continuous exposure to infective mosquitoes' bites, which may allow older children to harbour parasites without developing malaria symptoms (Salvador et al., 2021).

There are variations in HIV status across age groups among women: women aged 25–29 years were more likely to be HIV-positive than those aged 45 years or older; whereas girls aged 15–19 years had the lowest odds of being HIV-positive (Dias et al, 2018). These results could be due to the fact that many girls aged 15–19 years are in school and are less sexually active than older age groups, giving them less exposure to HIV (Dias et al., 2018).



A study of malaria-HIV co-infection in Beira, Mozambique, finds that young and employed HIV patients are more susceptible to malaria. This is more likely if the person also has a previous history of TB (Di Gennaro et al., 2018). Young children with HIV or severe malnutrition are also at the highest risk of developing active TB following infection, with the risk of disease progression and unfavourable TB treatment outcomes more pronounced among those less than 2 years of age (Moon et al., 2019; Nguenha et al., 2018).

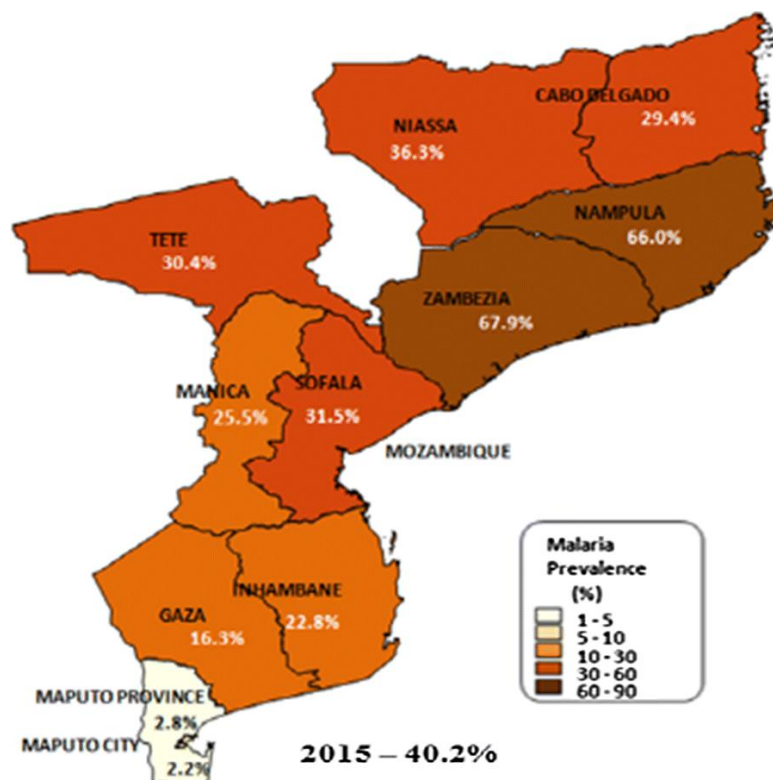
## 4. Geographic variation

### Regional and state variation

Research on public health risks of humanitarian crises in Mozambique highlights that investment policies and provision of public services have focused more on the southern region (Amino et al., 2021). This has produced geographical inequalities in the accessibility and quality of health products, services, and resources, exacerbating the public health risks in the northern and central provinces, which account for 78.5% of country's population (Amimo et al., 2021).

**Malaria:** The distribution of malaria prevalence in Mozambique is heterogeneous, with a higher prevalence in northern and central regions, compared to the southern region (Salvador et al., 2021; Arroz et al., 2018). While malaria prevalence in Mozambique was 39% in 2018, (Salvador et al., 2021), prevalence can reach close to 70% in the northern and central regions, but is less than 3% in certain provinces in the southern region (see Figure 1) (Arroz et al., 2018).

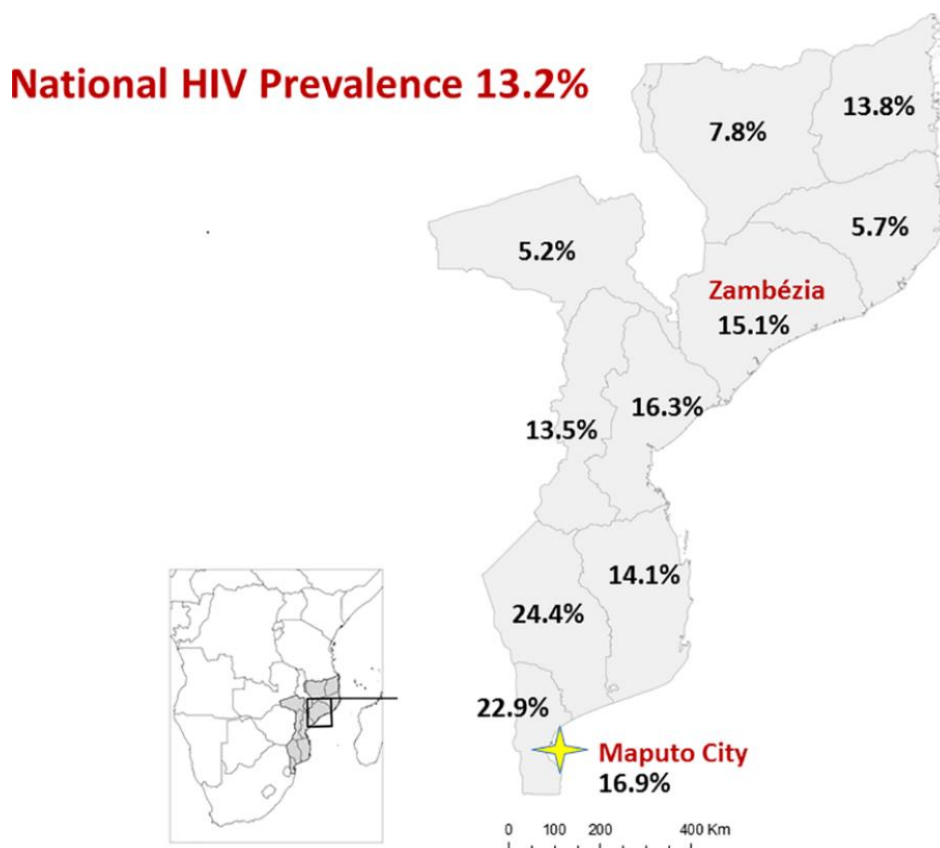
**Figure 1: Prevalence of malaria by province, Mozambique 2015**



Source: Arroz et al., 2018. Reproduced under Creative Commons Attribution 4.0 International License <https://malariajournal.biomedcentral.com/articles/10.1186/s12936-018-2406-2>

**HIV:** HIV prevalence rates vary throughout the country (see Figure 2). A study on determinants of HIV infection in women of reproductive age in Mozambique finds that women in the northern provinces of Cabo Delgado and Nampula had lower odds of HIV infection, while women in the southern provinces were more likely to have HIV infection (Ekholuenetale et al., 2020). This may be due to local cultural practices or prior health interventions (Ekholuenetale et al., 2020). Another study on HIV exposure status among children less than 2 years old finds that women living in the northern and central regions were 3 to 4 times more likely to have a child with ‘unknown HIV status’ compared to a woman residing in the southern region. The northern region is poorer and less developed, with the majority of people living in rural areas, which may result in limited access to healthcare and thus higher levels of unknown HIV status (Lain et al., 2020).

**Figure 2. HIV prevalence by province, Mozambique 2015.**



Source: Filimão et al., 2019; based on data from IMASIDA 2015. Reproduced under Attribution 4.0 International (CC BY 4.0). <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0213804>

**TB:** TB incidence and case detection rates (CDR) vary greatly across regions in Mozambique (López-Varela et al., 2016). Four provinces - Nampula, Sofala, Tete and Zambézia – represent 51% of the total TB burden in the country (WHO, 2020b; USAID, 2019). While the prevalence of HIV among TB patients may be decreasing at the national level, in some regions of the south of the country, the proportion of TB patients co-infected with HIV can reach up to 70% of all cases (see Figure 3) (Nguenha et al., 2018, 265).

### **Figure 3: HIV burden by district versus TB notification rates (MOH, 2017)**

Source: *Nguenha et al., 2018: 267. This figure has been removed for copyright reasons. The figure can be viewed at <https://link.springer.com/content/pdf/10.1007/s40475-018-0167-1.pdf>*

## **Rural-urban areas**

Mozambique's national malaria indicators surveys 2015 and 2018 reveal that children living in rural areas have a higher risk of malaria infection compared to those in urban areas (see Salvador et al., 2021). These results may be due to rural areas tending to be more suitable breeding grounds for malaria vectors and having a greater likelihood of precarious housing that allows the entry of mosquitoes (Salvador et al., 2021). Addressing malaria, HIV and TB epidemics can also be more challenging in rural areas. Although 66% of the country's population live in rural areas, only 36% of rural populations have access to a health facility within 30 minutes of their home (WHO, 2018). Community-based TB and HIV services are available, but they do not cover all rural areas (WHO, 2018). In areas where community-based services are limited or unavailable, PLHIV and those with TB must travel farther to health facilities at significant financial cost (WHO, 2018). Services are also often not integrated, making it more costly and complicated for people to be screened and treated for both TB and HIV (WHO, 2018). This lowers the likelihood of diagnosis and adherence to treatment for those diagnosed (WHO, 2018).

## **Conflict and disaster areas**

Mozambique has experienced various humanitarian crises, which have further undermined its already fragile health system (Amino et al., 2021). Over 424,200 people, mostly women and children, are estimated to have been internally displaced due to conflict in the northern province of Cabo Delgado between 2017 and 2020 (Amimo et al., 2021). Many medical staff also fled the region, leaving health facilities deserted (Amino et al., 2021). Cyclones Idai and Kenneth, which hit the central and northern regions in 2019, displaced over 2.2 million people (Amino et al., 2021). In the central province of Sofala, 28 out of 157 health facilities were entirely or partially destroyed, greatly undermining access to health care (Amimo et al., 2021). A rapid and massive intervention was implemented after the cyclones to distribute long-lasting insecticidal nets (LLIN), alongside campaigns to spray indoor insecticide, both of which may have contributed to averting malaria epidemics in the affected districts (Mugabe et al., 2021). Still, an increase in confirmed cases was noted in Búzi, a district of Sofala, between March and June 2019, compared with the same period in 2018 (Mugabe et al., 2021).

## **Part II: Disease control challenges**

### **5. Sectoral challenges: health systems and capacity**

Mozambique's inability to fully respond to health problems are due primarily to: limited domestic resources; poor and inadequate infrastructure; a critical shortage of qualified public health professionals, who are not equitably distributed throughout the country; and lack of essential medical supplies (PEPFAR, 2019; Baltazar et al., 2017; Rajkotia et al., 2017). Mozambique has a

severe public health professional shortage, with only 5 doctors and 24 nurses per 100,000 population, and 429 social workers in the country (Chapman, 2020; Nguenha et al., 2018).

A range of donors have financed vertical projects in Mozambique that focus on particular health challenges, such as malaria, HIV and TB (Pfeiffer & Chapman, 2019). The National Tuberculosis Control Program (NTP) in Mozambique was launched in 1977, with most of the funding coming from external sources, primarily the Global Fund to Fight HIV/AIDS, Tuberculosis and Malaria and the World Bank (Nguenha et al., 2018). This funding has allowed for significant expansion in testing, diagnosis and treatment, and for a more integrated approach to HIV/TB care/treatment (Nguenha et al., 2018). This has contributed to a greater treatment success rate among new TB cases, rising from 76% in 2003 to 79% in 2007 to 90% in 2017, alongside a rising number of total notified patients during this time (Nguenha et al., 2018, 268).

The vast majority of HIV/AIDS funding in Mozambique also comes from external sources, with only 3.5% coming from domestic funding (Whiteside et al., 2019). The United States introduced the President's Emergency Plan for AIDS Relief (PEPFAR) in Mozambique in 2004, eventually providing \$200–\$400 million per year: equal to approximately the entire budget of the national Ministry of Health (MOH) (Chapman, 2020). With support from PEPFAR and the Global Fund, the MOH has made significant progress in the fight against HIV/AIDS (Nacarapa et al., 2021; Chapman, 2020; Mugabe et al., 2019). The number of people on ART increased about four-fold; and the annual number of HIV tests performed increased from 4.6 million in 2016 to 6.5 million in 2017 (Filimão et al., 2019; Mugabe et al., 2019). ART coverage is still relatively low, however, with 54% of all estimated PLHIV receiving ART by the end of 2017 (Filimão et al., 2019).

These positive health outcomes have not been accompanied, however, with a strengthening of the country's health system. Rather, over 90 percent of resources flow 'off budget' to international and local NGO clinical partners, with little left for the public health system (Chapman, 2020; Pfeiffer & Chapman, 2019). NGO projects are frequently grafted onto the health system, without systemic support to the sector (Pfeiffer & Chapman, 2019). Little, if any, PEPFAR funding has supported basic health system building blocks such as health workforce expansion, transport, or infrastructure (Chapman, 2020; Pfeiffer & Chapman, 2019).

Mozambique's scale-up of maternal early test and treat, for example, reveals how progress has been constrained by inadequate human resources and infrastructure to provide the necessary follow-up efforts to keep mothers and exposed infants in care (Chapman, 2020). Understaffing means long clinic waits, which can also raise the risk of status disclosure and deter people from attending (Chapman et al., 2020). It also undermines the ability to provide consistent, comprehensive counselling, peer support or outreach to address stigma (Chapman et al., 2020).

**Laboratory facilities:** Laboratory services are essential for diagnosis and management of patients, and for disease control, yet they remain among the most neglected health services in Mozambique (Tadeu & Geelhoed, 2016). The laboratory network to support HIV care and treatment, for example, requires significant investment to expand diagnostic capacity, with only 400 (27.8%) of 1,438 health units housing laboratories (PEPFAR, 2019). A study of rural areas in Tete Province finds a higher level of health service utilisation in health facilities (HFs) with a laboratory, with nearly twice as many consultations and childbirths attended, four times more patients starting ART, and three times as many patients starting treatment for TB, compared to HFs without a laboratory (Tadeu & Geelhoed, 2016). The number of tests performed each month in the three HFs with a laboratory was nearly three times higher than in the three HFs without a laboratory. Diagnoses could also be made quicker and treatment started without delays since

there was no need for referrals for samples or patients (Tadeu & Geelhoed, 2016). The study also finds that lack of local laboratory services imposes considerable financial hardship, with many unable to afford the costs of traveling to access such services (Tadeu & Geelhoed, 2016).

**Pharmacy supply chain challenges:** While qualified supply chain personnel are limited throughout sub-Saharan Africa, shortages are especially pronounced in Mozambique (Bravo et al., 2020). Challenges include the training, retention, and accountability of supply chain staff, including warehouse managers, logistics managers, quality assurance people, accountants, stockers, shippers, and transportation managers (Bravo et al., 2020). In addition, supply chain systems in Sub-Saharan Africa typically do not provide real-time assessment of stocks. As such, health care workers are often uncertain as to whether nonadherence is due to patient-related factors or due to interruptions in medication availability (Bravo et al., 2020). Pediatric anti-retroviral medications and anti-TB medications may be especially vulnerable to stockouts as they may not be used in as high a volume as the adult medications for which supplies are more likely to be planned, with alternative supply paths (Bravo et al., 2020). It is also necessary to resolve shortages in diagnostic test kits, given the important of HIV testing as a key entry point into care and HIV education (Bravo et al., 2020). PEPFAR seeks to improve integration of logistics and transportation, and to invest in generating more accurate data on stock availability, including through a shared e-platform on facility level stocks (PEPFAR, 2019).

**Data management:** The Mozambican health information system remains underdeveloped and underfunded (Pfeiffer & Chapman, 2019). NGO clinical partners that have implemented donor projects have facilitated implementation of paper-based and electronic systems for individual patient care and routine aggregate reporting of key HIV indicators, as part of their support to MOH to strengthen systems for HIV service delivery (Hochgesang et al., 2017). In the absence of an overarching framework or governance to oversee and harmonise the various systems, however, clinical partners have developed disparate patient management systems and parallel data collection systems (Pfeiffer & Chapman, 2019; Hochgesang et al., 2017). An assessment, involving 18 public health facilities, finds that there is little harmonisation or common standards among implemented systems, undermining longitudinal patient tracking (Hochgesang et al., 2017). Research on health information systems also finds inadequate human resources and infrastructure to implement PMS at many health facilities in Mozambique (Hochgesang et al., 2017). There was a shortage in data entry staff in over half of the facilities assessed; limited training around data entry and electronic report generation; and printer and computer issues that hindered electronically generating and submitting reports (Hochgesang et al., 2017). (See also surveillance challenges in Part II: Disease control challenges.)

## 6. Vertical care challenges

Most TB patients in Mozambique are treated at one of the more than 1500 health facilities that focus on providing TB treatment (Nguenha et al., 2018). Still, 96% of TB patients are tested for HIV, and 95% of co-infected patients consent to early initiation of ART. The percentage of newly diagnosed HIV-positive patients who were screened for TB in 2016 is still low, however, at 67.1% and only 52% are started on isoniazid preventive therapy (Nguenha et al., 2018, 268). Without careful clinical TB screening of PLHIV prior to ART initiation, there are likely to be a significant number of undetected active TB cases, mainly in patients with advanced HIV infection (Nacarapa et al., 2020). Given that TB is a common cause of death among PLHIV, it is essential to engage in rigorous screening for TB in HIV clinics (García et al., 2020; Moon et al., 2020; Nacarapa et al., 2020). The poor treatment outcomes in patients with TB-HIV co-infection not on ART and

those who were on ART, but for less than 3 months, also highlights the need for integrated TB and HIV services (Nacarapa et al., 2020).

## 7. Surveillance challenges

Disease surveillance is necessary to determine disease prevalence, to identify outbreaks – and to monitor the effectiveness of control programmes. The MOH has identified the need to train multidisciplinary technical teams with epidemiologists and laboratory technicians as members of surveillance and outbreak investigation teams (Baltazar et al., 2017). Quality information on cases contributes to individual benefits, with those diagnosed better able to pursue treatment; and public benefits, reducing the risk of transmission and allowing for appropriate resource allocation (Nguenha et al., 2018).

Data from 2019 reveals that 77% of PLHIV in Mozambique were aware of their status, 60% were on treatment and 45% are virally suppressed, an improvement from 2015<sup>9</sup> (Brook et al., 2021). A study on receipt of HIV test results in adults aged 15–59 years old in Mozambique estimates that approximately 51,000 HIV-positive persons were tested but did not receive their results (Mugabe et al., 2019). This represents a missed opportunity to diagnose and treat a large group of PLHIV that have already accessed the health care system (Mugabe et al., 2019). The majority of respondents who self-reported non-receipt of HIV test results were: less educated, married or living with a partner, living in rural areas, primarily spoke a local language, unemployed, and from lower wealth indexes. Concerns over HIV stigma and confidentiality; and lower HIV knowledge and media exposure were also associated with non-receipt (Mugabe et al., 2019). The study recommends that tested individuals receive their results on the same day, and that health care workers ensure that they understand the result prior to leaving the site (Mugabe et al., 2019).

Early infant diagnosis of HIV and early treatment is associated with decreased child mortality (Fuente-Soro et al., 2021; Lain et al., 2020). A study on MTCT in children less than 2 years old in Mozambique finds, however, that approximately a third of children had an unknown HIV exposure status (Lain et al., 2020). Eighteen percent of interviewed mothers reported never having been tested for HIV, and about 4% reported that they did not receive their test result (Lain et al., 2020). Although pregnant women in Mozambique are offered an HIV test at the first ANC visit and retesting at delivery and every 3 months up to 9 months after the baby is born, the study reveals that many women were missed: 6% did not access ANC during their last pregnancy, 26% delivered outside a healthcare facility, and 20% did not have a postnatal visit within the infant's second month of life (Lain et al., 2020). A study based in Manhiça District also finds that lack of ANC uptake and lack of prevention of MTCT services were the main factors associated with late HIV-testing (2 months after birth) (Fuente-Soro et al., 2021). These findings highlight the need for an effective surveillance system that can: collect community-based data; track mother-child pairs; link their clinical data; and feed data to regional and national levels (Fuente-Soro et al., 2021).

Improving surveillance of TB in Mozambique and monitoring systems is also a critical priority (Nguenha et al., 2018). The Mozambique NTP has expanded laboratory capacity substantially and increased the annual number of TB case notifications by 61%: from 53,585 in 2013 to

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<sup>9</sup> The 2015 National AIDS Indicator Survey found that an estimated that 40% of PLHIV are aware of their status, 35% are on treatment and 23% are virally suppressed (see Brooke et al, 2021). In Mozambique, HIV testing is offered at Voluntary Counselling and Testing Units at health facilities; through community-based voluntary counselling and testing; and at all clinical care offices at the health facilities, through provider-initiated HIV testing. The primary mode of HIV testing in adults is through rapid diagnostic tests (Mugabe et al., 2019).

86,515 in 2017 (Ngunha et al., 2018, 265). This has included higher notifications in children, alongside improved treatment success rates for those diagnosed with TB (Ngunha et al., 2018). Despite this progress, Mozambique has one of the lowest CDRs among the high TB burden countries, due to a lack of testing and access to services (USAID, 2018; López-Varela et al., 2016). In 2018, an estimated 162,000 people fell ill with TB in Mozambique, yet only 93,546 were reported, leaving 68,454 cases (42%) unreached by the health system (WHO, 2020b). Patients diagnosed with TB in Mozambique have historically self-presented to health facilities with symptoms and from there, have been referred for testing. This passive approach has led to significant delays in diagnosis and treatment, which increases the risk of developing severe disease and death; and the risk of transmission (Ngunha et al., 2018).

Calculating CDR in children is even more challenging, with a high risk of under-diagnosis and under-estimation of TB cases due in part to low referral rates and difficulties in obtaining sputum samples from younger children (Moon et al., 2019; López-Varela et al., 2016). A study on treatment outcomes of TB in children in Chókwè District, Mozambique, finds that the possibility of misdiagnosis was high, since 84.5% of all cases were diagnosed based solely on clinical signs and symptoms alone, without bacteriologic confirmation (Moon et al., 2019).

**COVID-19:** COVID-19 control measures, such as physical distancing and restricted movements of people, have the potential to limit routine surveillance activities (Brooke et al., 2020). Provincial malaria control programmes having downscaled their active case-finding activities (Brooke et al., 2020). Community healthcare workers need to be given the capacity to fill surveillance gaps, including through training and distribution of personal protective equipment (PPE) and testing devices (Brooke et al., 2021). The promotion of mobile applications for immediate notification can allow for contact-free, timely notification of cases; and community health care workers can monitor patient adherence and treatment response through telephone follow-up if home visits are not possible (Brooke et al., 2020). HIV monitoring has also been affected by COVID-19 service disruptions, including in part due to limited PPE. PEPFAR has promoted the continuity of viral load monitoring through decentralised specimen collection points and telephone follow-up once results are received (Golin et al., 2020). Several PEPFAR implementers have aligned specimen collection with clients' multi-month ART refill dates. This can ease crowding at clinics and the use of clinic resources, which can be allocated to COVID-19 (Golin et al., 2020).

## 7. Informational challenges

Poor knowledge of infectious diseases and lack of awareness of prevention practices are key risk factors to disease control. In Mozambique, only 30% of women and 51% of men aged 15–24 reported comprehensive knowledge about HIV prevention practices (see Lain et al., 2020). There is also low community awareness of TB symptoms, transmission, prevention and treatment (USAID, 2019). A study on a malaria elimination project in Magude reveals limited community knowledge and misunderstandings about the concepts of malaria transmission and preventive measures (Portugaliza et al., 2019). Studies of treatment for malaria during pregnancy in Chókwè and Manhiça districts in southern Mozambique finds that although women perceived malaria to be a key disease affecting the local population, they were not aware of the risk of adverse maternal and birth outcomes associated with malaria (Amaldo et al., 2019).

All pregnant women in Mozambique must receive ANC that includes provider-initiated HIV counselling and testing. Sessions can help women to better understand: the meaning of their HIV status; risk exposure; and healthier and safer behaviours (Mugabe et al., 2019). Research finds

that HIV counselling and testing reduces HIV risk behaviours among HIV-positive individuals (Mugabe et al., 2019). While interventions to increase ANC service uptake have resulted in increased ART uptake among HIV positive pregnant women, many programmes have struggled with scale-up (Audet et al., 2016). This may be because, until recently, prevention of MTCT programmes have focused primarily on HIV-positive women, which neglects family dynamics and gender disparities (Audet et al., 2016). Mozambican women in rural areas, in particular, may need to ask permission from their male partners before making health care decisions. As such, males need to be engaged in ANC, which also requires overcoming social taboos (Audet et al., 2016). Research on malaria awareness also finds, however, that the heavy workloads of staff at ANC clinics means that women are not always given detailed information about malaria and prevention strategies during their visits (Arnaldo et al., 2019). Lack of information is likely to be associated with poor uptake of prevention measures in general (Arnaldo et al., 2019).

Men also need to be specifically targeted with regard to their own testing and care-seeking. Only 61% of men who are HIV-positive in Mozambique know their status (see Budu et al., 2021). A study on HIV knowledge and testing among men in Mozambique finds that men who had comprehensive HIV/AIDS knowledge were more likely to test for HIV compared with their counterparts who had no such knowledge (Budu et al., 2021). Men with comprehensive HIV/AIDS knowledge are more likely to have higher education and increased access to information from the media about testing centres and prevention methods; whereas low educational attainment and limited access to information is associated with low levels of HIV/AIDS knowledge; misconceptions and stigma (Budi et al., 2021). While male engagement programmes are recognised in national HIV policy as key to reducing HIV risk among men, as well as among women and girls, they remain limited in scope and scale (McLemore et al., 2021).

**COVID-19:** Communities may be resistant to malaria control operations during the COVID-19 pandemic, particularly indoor residual spraying (IRS) and early malaria treatment (Brooke et al., 2020). They should be given information (through communication messaging, training materials and visuals) on the need for uninterrupted operations; and how operations have been adapted in terms of physical distancing and sanitisation (Brooke et al., 2020). In the event of COVID-19 restrictions, launching IRS campaigns through the broadcast media rather than the usual community gatherings should also be considered (Brooke et al., 2020).

**Stigma:** A study on HIV stigma in Mozambique finds that it is a barrier to HIV testing and counselling; status disclosure and partner notification; and ART access and adherence (Carrasco et al., 2017). Peer educators interviewed indicated that PLHIV had a great fear of discrimination, marginalisation and judgement from friends, family members and the community, resulting in their silence and self-isolation (Carrasco et al., 2017). Recent studies have also shown that stigma is a key barrier to HIV testing uptake among men in Mozambique (Budu et al., 2021). Women also fear stigma and blame, resulting in reluctance to follow up with a positive test result (see Gender and key populations in Part I: Epidemiology). Peer educators and healthcare providers have tried to mitigate HIV stigma by informing their clients that HIV/AIDS is a disease like any other and emphasising that there are many forms of transmission (Carrasco et al., 2017). Research finds that PLHIV were better able to cope with their condition by normalising their HIV status and thinking about HIV/AIDS as similar to other diseases (Carrasco et al., 2017).

## Part III: Interventions



## 8. Enabling environment

Mozambique's HIV responses is guided by the National Strategic HIV and AIDS Response Plan, which recognises the importance of the enabling environment that addresses human rights and gender issues for the HIV response (McLemore et al., 2021). It prioritises four main categories of interventions: reducing stigma and discrimination, legal literacy, reducing discrimination against women and HIV-related legal services (McLemore et al., 2021). Mozambique's 2014 amended HIV Law includes non-discrimination protections for people living with HIV in public and private sectors (McLemore et al., 2021). Mozambique's TB response is guided by the country's national strategic plan for TB, which contains some elements that address human rights-related barriers to TB services, including addressing stigma and discrimination, as well as social and economic protection for people living with TB and their families (McLemore et al., 2021).

The Global Fund's Breaking Down Barriers Initiative provides support to countries to scale-up programmes to remove human rights-related barriers to malaria, HIV and TB services so as to increase the effectiveness of grants and ensure that health services reach those most affected (McLemore et al., 2021). Key programme areas include: stigma and discrimination reduction; training for health care providers on human rights and medical ethics; sensitisation of lawmakers and law enforcement agents; and legal literacy ('know your rights') (McLemore et al., 2021). In addition to the Global Fund, PEPFAR supports community-led monitoring and paralegal work, and AIDSfonds supports health care worker and police sensitisation efforts (McLemore et al., 2021). While there is willingness from the Mozambican government to support programmes to remove human rights-related barriers to access HIV and TB services, it has very limited domestic resources and relies on external funding (McLemore et al., 2021).

Project Viva+, which involves the scale-up of paralegal and legal literacy activities, has demonstrated successes in reducing human rights-related barriers to access services; and supporting retention in care (McLemore et al., 2021). Community activists are tasked with ensuring that people are supported throughout their care, and in the event of human-rights related barriers, they can refer these cases to paralegals to resolve (McLemore et al., 2021). Paralegals and legal literacy sessions have resulted in the removal of girls from premature unions in the Zambézia, Manica and Tete provinces (McLemore et al., 2021).

Despite this progress, recent research identifies gaps in human rights protections. In particular, there is inadequate knowledge of the size, demography and geographic location of HIV KP groups which hinders the ability to design and implement quality programming (McLemore et al., 2021). Respondents also highlighted the difficulty of obtaining redress from law enforcement for violations against FSW (McLemore et al., 2021). Further, while there appears to be a strong commitment in Mozambique to reduce HIV-related stigma and discrimination, there is limited programming to reduce human rights-related barriers to TB services (McLemore et al., 2021).

## 9. Addressing health systems and capacity challenges

**Training:** MZ-FELTP aims to build epidemiological capacity in public health surveillance, disease control and response to outbreaks and public health emergencies (Baltazar et al., 2017). It is a post-graduate in-service training programme, based on the acquisition of skills in applied

epidemiology and laboratory management<sup>10</sup> (Baltazar et al., 2017). Research on the HIV surveillance system finds that the programme has helped to strengthen Mozambique's response to outbreaks and improved disease surveillance systems and activities in the country (Baltazar et al., 2017). Further, the majority of MZ-FELTP graduates have been retained in the Mozambique Health System (Baltazar et al., 2017). The programme's sustainability is an ongoing challenge, however, as it is an intensive training program requiring significant human and financial resources (Baltazar et al., 2017). It is mostly funded by the United States Centres for Disease Control and Prevention (CDC), with some contributions from the MOH (Baltazar et al., 2017).

**Universal coverage:** Mozambique conducted a countrywide LLINs universal coverage campaign in 2016/2017. Studies demonstrate that the initiative has increased LLIN ownership and use and made progress in reaching universal coverage targets (Arroz et al., 2018). Success factors in the campaign and delivery model include a collaborative planning process and strong coordination of campaign actors through the establishment of central level coordination groups (Arroz et al., 2018). A National Coordination Group was created, which received support from four National Technical Sub-Groups in: training; communication; logistics; and data management (Arroz et al., 2018). Recent research has identified multi-level planning and implementation in the mass mosquito net distribution campaign as an example of successful coordination for malaria prevention and control (da Fonseca et al., 2020). Trainings were organised in a cascade manner at central, provincial and district levels, ensuring that lessons learned and modifications were incorporated in subsequent campaign phases (Arroz et al., 2018). (For discussion on the communication component, see Education and communication below.)

**Performance-based financing:** PBF incentives have gained attention as a promising strategy to improve healthcare delivery to vulnerable populations (Schuster et al., 2016). Proponents hold that financial incentives can increase outputs, quality and coverage of health services by motivating healthcare providers, while critics point to the risk of crowding out health workers' intrinsic motivation (Rajkotia et al., 2017). A study of a PBF programme addressing HIV and maternal and child health services in Gaza and Nampula provinces finds that PBF can be more effective in advancing primary care service delivery than input financing alone. While there were improvements in the initiation of ART treatment among pregnant women in both provinces, this was not the case among pediatric patients and other adults (Rajkotia et al., 2017). There were also differences between regions in the responsiveness to incentives<sup>11</sup> (Rajkotia et al., 2017). While PBF generally took approximately 12-15 months to garner a statistically significant effect, its effect tended to persist over time, especially in the north (Rajkotia et al., 2017).

Another study on the prevention of MCHT revealed that while all health worker cadres were motivated intrinsically and by social recognition, they were dissatisfied with low and late remuneration (Schuster et al., 2016). PBF has successfully improved quality of hospital management and supervision and support for peripheral facilities (Schuster et al., 2016). The study acknowledges, however, that incentives cannot overcome major structural barriers in

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<sup>10</sup> During the first six years of the program, more than 40 outbreaks were investigated, 37 surveillance system evaluations were conducted and 39 descriptive data analyses were performed. Surveillance activities were implemented for mass events and emergency situations. In addition, more than 100 oral and poster presentations were given by trainees at national and international conferences (Baltazar et al., 2017).

<sup>11</sup> For example, the number of new children age 0–23 months initiating ART did not improve in the North, while it achieved medium responsiveness in the South (Rajkotia et al., 2017)

health care at a systemic level, including a dearth of qualified human resources with the dedicated time to implement and sustain quality management principles (Schuster et al., 2016).

## 10. Integrated care

The MOH recognised at the beginning of the ART scale-up in Mozambique that HIV treatment services needed to be integrated into existing primary health care facilities in order to reach coverage targets, ensure equity, and link to other services that patients needed (Pfeiffer & Chapman, 2019). The NTP has recently moved to a one-stop model for TB-HIV co-infected patients in which TB nurses treat patients for TB and HIV, instead of patients visiting separate clinics (Nguenha et al., 2018). This has introduced more work for TB nurses, but simplified treatment for patients, and eliminates the risk of patients with active TB waiting in areas with PLHIV. Most patients attending these one-stop clinics are on ART (Nguenha et al., 2018).

One-stop facilities are also available for children, designed to identify more HIV-exposed infants and HIV-positive children during routine growth monitoring and vaccination visits (Lain et al., 2020; Bergmann et al., 2017). These visits purportedly increase the HIV testing rate among children under 2 years of age and enrolment in pediatric ART (Bergmann et al., 2017). Using the immunisation platform to improve HIV screening needs to be carefully planned, however, with a need to ensure acceptance by mothers and healthcare staff (Lain et al., 2020).

## 11. Surveillance

Delays in diagnosis and treatment of TB, due in part to the passive approach of detection (see earlier section on surveillance under II. Disease control challenges), is beginning to change as the NTP and partners pursue a more pro-active case-finding approach to identify missing TB cases (WHO, 2020b; Nguenha et al., 2018). This is being achieved through the implementation of community-based activities that bring services closer to those in need (WHO, 2020b). The Challenge Tuberculosis (CTB) project, funded by USAID, supported the NTP in introducing community-based TB interventions, actively finding people with TB and treating them. The CTB intervention was implemented in 68 districts in Nampula, Sofala, Tete and Zambézia provinces, which have the highest TB burden (WHO, 2020b). CTB partners recruited and trained 1133 community health workers, called TB activists, who received a small stipend to carry out active case-finding and treatment support activities. Providing a small stipend noticeably improved retention rates and motivation levels (WHO, 2020b). TB activists collaborated with implementing partners, existing community health workers and traditional healers (WHO, 2020b).

Community members were invited to take part in monthly TB education sessions, where TB screening was also available (WHO, 2020b). TB activists and community health workers also organised monthly 'cough days' in close coordination with health facilities and local leaders (WHO, 2020b; Makombe et al., 2019). Research on the state of TB in Mozambique attributes the rising proportion of patients diagnosed from community referrals in part to improved screening of patients through 'cough days' (Nguenha et al., 2018). The proportion increased nationally from 9% in 2015 to 21% in 2016 and was over 30% in Sofala, Nampula, and Zambézia in 2016 (Nguenha et al., 2018). Other health care services were provided during monthly cough days (e.g. screening for HIV), allowing for identification of co-infected people; and access to integrated services directly in the community, particularly crucial in rural areas (WHO, 2020b).

CTB demonstrated that community-based activities, and reliance on community health workers and activists, are effective in actively finding people with TB who would likely not otherwise have been diagnosed or treated and increasing notification rates (José et al., 2020; WHO, 2020b). Monthly cough days and house-to-house outreach were the most effective approaches, with one in four and one in five people, respectively, who were screened being diagnosed with TB (WHO, 2020b; Makombe et al., 2019). These approaches led to the detection of 46,675 people with TB over five years, representing a 27% contribution to the total number (172,545) of TB notifications detected in the four provinces over the five-year period (WHO, 2020b).<sup>12</sup> Those detected all started treatment (WHO, 2020b). TB activists were further mentored to support the creation of community TB support groups<sup>13</sup> (WHO, 2020b). Group members pooled efforts and resources and took turns visiting health centres every week to collect TB drugs for their fellow members, reducing individual transport costs and improving treatment adherence (WHO, 2020b; Nguenha et al., 2018).

To effectively monitor community-based TB services delivered by TB activists as part of the project, CTB built a Power BI dashboard to collect and visualize community activity data electronically (WHO, 2020b). This allowed for greater ease in linking community activity data, including monthly cough-day data, into the national health information system. CTB provided 75 digital tablets to support data collection for community activities and trained staff to engage in data management (WHO, 2020b; Makombe et al., 2019). The ongoing roll-out of electronic data management systems and development of standardised procedures in Mozambique can improve the proportion of TB cases that are confirmed, reduce delays to diagnosis, and help increase notification of confirmed TB cases (Nguenha et al., 2018).

**Key populations:** The MOH conducted five Biobehavioral Surveillance (BBS) Surveys in 2011-2013 among KPs (FSW, MSM and PWID) as part of the national HIV surveillance system (Baltazar et al., 2021). Prior to the BBS surveys, KP were largely hidden due to stigma and discrimination (Baltazar et al., 2021). Research finds that these surveys and the data gathered has rendered KPs visible, confirmed their presence as high-risk groups; and resulted in enhanced capacity building, advocacy, and the development of policies and guidelines for collaboration and improved quality of care (Baltazar et al., 2021). For example, the Platform for the Rights of Sex Workers network, formed after the survey, released a position paper in 2020 where they used the results of the BBS to provide background on the situation of FSW in Mozambique and advocated for renewed commitment to human rights and social protections for sex workers in the context of COVID-19 (Baltazar et al., 2021).

## 12. Education and communication

Education and communication programmes can raise knowledge and awareness and, in turn, improve testing and care seeking. Programming includes media coverage (radio and television slots); literature (pamphlets, posters and booklets); and in-person educational sessions (Brooke et al., 2020). Messaging should include information on disease symptoms, prevention measures, and advice on healthcare seeking adapted to each locality (Brooke et al., 2020). The collaboration of community actors (e.g. community leaders and teachers) and institutional actors (e.g. health professionals) in applying SBC activities can contribute to greater effectiveness in the

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<sup>12</sup> The NTP has since adopted this approach as the model to be used in community-based interventions country-wide (WHO, 2020b).

<sup>13</sup> 137 support groups were established with membership totalling 1060 former and current TB patients (WHO, 2020b).

prevention of malaria and other infectious diseases (da Fonseca et al., 2020). In order to integrate SBC into malaria prevention and control, it is important to define target groups and behaviour-improving targets (da Fonseca et al., 2020).

Mozambique's LLIN universal coverage campaign had a technical sub-group focused on communication, feeding into the National Coordination Group. The communication component of the successful initiative involved radio and television spots that were broadcast during household registration and distribution phases to mobilise the population to receive LLINs (Arroz et al., 2018). Advocacy materials were also created to support mobilisation of the population and ensure information consistency, alongside a free central level informational telephone hotline, with the purpose of clarifying doubts about the campaign and responding to questions regarding malaria or the LLINs (Arroz et al., 2018).

A study on SBC in two rural districts of Zambézia Province with high malaria burden finds that the inclusion of primary school teachers widened the reach of the SBC intervention, showing that actors outside of the health sector can be successfully involved in malaria prevention (da Fonseca et al., 2020). The involvement of school teachers has allowed for information on malaria prevention methods to reach students and their families (da Fonseca et al., 2020). A study conducted in Nampula and Niassa Provinces in northern Mozambique finds that community structures, comprised of at least 15 volunteers, have also been effective in delivering key malaria prevention messages, including the correct and consistent use of mosquito nets (da Fonseca et al., 2020). Another study of the *Ogumaniha* project, also aimed at malaria prevention and control, funded by USAID and implemented in Zambézia Province, finds that approximately 64% of households were in possession of at least one mosquito bed net<sup>14</sup> (Moon et al., 2016). The intervention involved a mixture of training and capacity building of local community volunteer groups and direct implementation of activities by consortium partners (Moon et al., 2016). Malaria related activities focused on community-based education messages and behaviour change communications promoting improved health-seeking; alongside active identification and referral of suspected malaria cases in the community (Moon et al., 2016).

The MOH and the Institute of Social Communication has also engaged in education and communication initiatives to improve knowledge of HIV prevention practices, such as broadcast television videos and radio programmes that disseminate information on HIV prevention and early testing (Lain et al., 2020). Coverage has been limited, however, and unable to reach an adequate number of people, resulting in ongoing lack of awareness (Lain et al., 2020). Another strategy adopted in Mozambique is to telecast videos on HIV prevention and treatment in the waiting area of healthcare facilities. This runs the risk, however, of failing to reach people who reside in remote rural areas and do not have access to healthcare facilities (Lain et al., 2020).

Other research finds that national HIV education campaigns have produced widespread awareness of universal prevention of MTCT (Chapman, 2020). Community interventions that promote health education among adolescent mothers during the prenatal and postnatal periods are found to have substantially decreased infant mortality rates and increased ANC uptake (Fuente-Soro et al., 2021). Recent research also finds that strong radio campaigns to reduce HIV-related stigma and discrimination have served as platforms for increasing legal literacy and access to legal services (McLemore et al., 2021). Retention in care remains a key issue, however. Strategies such as phone reminders, personal counselling or home-visits may help re-

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<sup>14</sup> This varied by geography, with a much higher proportion of households in Namacurra (90%) reported possessing a mosquito net, compared to Alto Molócuè (77%) and Namacurra (34%), respectively in 2014 (Moon et al., 2016).

engage women lost from ANC and ensure that women who initially tested HIV-negative during pregnancy or breastfeeding receive repeat testing (Fuente-Soro et al., 2021). Such outreach and communication can decrease the number of new pediatric HIV infections and facilitate the timely diagnosis of HIV and treatment initiation among HEC (Fuente-Soro et al., 2021).

SBC initiatives, alongside human rights-related interventions, are also important in tackling stigma, discrimination and gender norms that render particular groups more vulnerable to HIV risk (Burke et al., 2019). Tchova Tchova Histórias de Vida: Diálogos Comunitários<sup>15</sup> (TTHV), for example, was designed to address inequitable gender norms as a way to reduce HIV risk behaviours and decrease HIV stigma. It is premised on the principle that knowledge comes from collective dialogue (Figueroa et al., 2016). The programme was implemented in Sofala and Zambézia Provinces by community-based organisations (CBOs) and NGOs that carried out over 1,000 community discussions/debates in 267 villages, reaching a total of 32,679 men and women participants between 2009-2010 (Figueroa et al., 2016). Topics, introduced by video stories of local Mozambicans, included: condom use; preventing domestic violence; ART adherence, and how men and women can support each other at home (Figueroa et al., 2016).

An evaluation of TTHV finds that it contributed significantly to observed changes in gender attitudes, gender roles, and HIV stigma; and to better HIV prevention knowledge and behaviours (Figueroa et al., 2016). Participants had high recall of the stories, suggesting that they resonated with participants; and discussions helped foster critical thinking and an understanding of the issues (Figueroa et al., 2016). Group discussions also improved speaking skills, reflected in the positive effect that TTHV had on HIV communication among partners (Figueroa et al., 2016). Regular training sessions for TTHV facilitators is found to have increased the effectiveness and success of discussions (Figueroa et al., 2016). An accompanying radio show expanded the reach of TTHV, providing reinforcing messages in local languages and featuring testimonies of participants who had made changes in their lives and modelled positive behaviours (Figueroa et al., 2016). Each programme included a debate segment in which listeners could call in or text questions or comments to an HIV/AIDS specialist (Figueroa et al., 2016).

Other SBC interventions have targeted specific groups, such as adolescent girls. The Women First intervention adopts the Go Girls! curriculum, designed to reduce adolescent girls' vulnerability to HIV transmission in select communities in Mozambique by encouraging social empowerment of girls (Burke et al., 2019). It included facilitator-led group education sessions covering various topics, such as gender norms for boys and girl; how to communicate with adults and partners; preventing unwanted sexual advances; planning goals; and assessing values and money (Burke et al., 2019). The intervention also sought to encourage girls to stay in school as attendance has been shown to reduce girls' vulnerability to HIV (Burke et al., 2019). Research finds that such social interventions, combined with economic interventions (e.g. microfinance, cash transfers, income-generating activities, and vocational or business training) can be a promising strategy for reducing girls' vulnerability to HIV by providing access to financial resources that may reduce their engagement in sexual behaviours; and changing social norms with regard to how girls are perceived and treated (Burke et al., 2019).

Male engagement has also been targeted in Mozambique to address low ANC uptake during pregnancy and high refusals of HIV services among those who attended ANC (Audet et al. 2016). Focus group discussions have revealed that women who lack partner support are less likely to adhere to prescribed medication (Audet et al., 2016). Friends in Global Health (FGH),

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<sup>15</sup> Translates as 'Push Forward Life Stories: Community Dialogues'.

funded by PEPFAR, partnered with traditional birth attendants (TBAs), clinicians, and community members in Zambézia Province, to develop a community-based intervention aimed at increasing acceptability of ANC service uptake among pregnant women and their partners (Audet et al., 2016). The initiative trained a new type of male-to-male community health agent, 'Male Champions', focused on counselling male partners to create male-friendly community norms around engagement in spousal/partner pregnancies (Audet et al., 2016). In addition to influencing ANC service uptake behaviour, TBAs and Male Champions targeted social norms, for example, counselling male partners to speak out against gender-based violence, in order to create a sustainable model of behaviour change (Audet et al., 2016). A recent study on HIV testing among men in Mozambique attributes increased HIV testing uptake in recent years in part also to the use of 'Male Champions', who counsel male partners on the importance HIV testing (Budu et al., 2021).

While there are various programmes targeting stigma and social norms affecting HIV risk, research on the Global Fund in Mozambique finds that there have been few programmes specifically addressing stigma and discrimination in relation to TB, which impedes access to TB services (McLemore et al., 2021). There have also been some efforts by NTP and CTB to integrate attention to TB-related stigma and discrimination into communication and social mobilisation activities (McLemore et al., 2021). More recently, the OneImpact project, implemented in Maputo, involves a digital platform where individuals with TB can report issues they face related to stigma and discrimination (McLemore et al., 2021).

One of the biggest concerns about community-based projects, such as Male Champions is financial sustainability, given the intensive community infrastructure required to maintain the project (Audet et al., 2016). Budgetary allocation constraints at a larger scale can undermine efforts to engage in education and SBC as communication activities are funded to a lesser extent and are often subject to budget cuts (da Fonseca et al., 2020). For the period 2014–2019, the Mozambican NMCP allocated most of its resources, almost 79%, for medicines and commodities (mostly mosquito nets acquisition and implementation) and only 10% for communications (SBC), media and outreach, with another 10% for programme management (da Fonseca et al., 2020).

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## About this report

*This report is based on nine days of desk-based research. The K4D research helpdesk provides rapid syntheses of a selection of recent relevant literature and international expert thinking in response to specific questions relating to international development. For any enquiries, contact [helpdesk@k4d.info](mailto:helpdesk@k4d.info).*

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