Knowledge, evidence and learning for development

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

*Huma Haider*
*Independent consultant*
*18 February 2022*

## Question

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

## Contents

# 1. Summary

Zimbabwe is a lower-middle income country in southern Africa with a population of approximately 15 million. Malaria, HIV and tuberculosis (TB) remain important public health concerns in the country, despite significant progress over the past two decades.

- Malaria incidence has declined markedly between 2003 and 2019 (by 81% from 2003 to 2015), but has risen since, particularly during the Covid-19 pandemic (Gwitira et al., 2020; Tapera, 2019).
- Zimbabwe is one of 22 high burden countries for HIV (Chimwaza et al., 2021). While HIV prevalence has declined from 27.2% in 1998 to 11.9% in 2020, Zimbabwe has the fifth highest HIV prevalence in sub-Saharan Africa (UNAIDS, 2020; UNDP, 2020b).
- Zimbabwe is among the 14 high burden countries for TB, multi-drug resistant TB and TB-HIV coinfection (UNDP, 2020c). TB case incidence and mortality have declined by over 60% between 2011 and 2018, however, TB mortality remains high, at 15% among notified TB clients (Global Fund, 2020; UNDP, 2020b).

This rapid literature review highlights key aspects of the epidemiology of malaria, HIV and TB in Zimbabwe and challenges in prevention, detection and treatment; and surveys select interventions that seek to address these challenges. It has not been possible to provide a comprehensive and dedicated review of the many interventions in Zimbabwe in this report.

The Covid-19 pandemic is addressed as a key control challenge for malaria, HIV and TB – with various Covid-19 related issues sign-posted throughout the report. Covid-19 mitigation measures have affected the delivery and utilisation of HIV, TB, and malaria services: the largest effect is projected to result from interruption of antiretroviral therapy (ART); decline in TB case detection; and interruption of preventive indoor residual spraying (IRS) and long-lasting insecticidal net (LLIN) distribution campaigns, respectively (Amimo et al., 2020).

**Part I: Epidemiology**

**Demographic variation**

**Socioeconomic status:** The epidemiological profiles of malaria, HIV and TB in Zimbabwe are closely related to socioeconomic factors. Use of mosquito nets in Zimbabwe is influenced by higher education levels, material resources and good quality housing (Tapera, 2019). The high costs of TB care-seeking can be 'catastrophic' for low-resource households, deterring access to health care (Tadokera et al., 2021).

**Gender and Key Populations/High Risk Groups:** TB incidence in Zimbabwe is higher among males than females; whereas HIV prevalence is higher among women (14.7%) than men (9.1%) (UNAIDS, 2020). Prevalence is high among key populations, particularly sex workers (41.4%) and men who have sex with men (MSM) (31%) (Global Fund, 2020). However, young female sex workers (FSWs) are often left behind in research and in service provision (Napierala et al., 2018). High risk groups in TB include the elderly; people living with HIV (PLHIV); miners; prisoners; healthcare workers; and refugees (Sengai et al., 2019).

**Age:** Children, adolescent girls and young women (AGYW) in Zimbabwe also face disproportionate risk for HIV (Oberth et al., 2021). At the same time, HIV increasingly affects older populations, with the mean age of PLHIV expected to increase from 31 to 45 years

between 2015 and 2035 (Smit et al., 2018). This suggests that in addition to integration of HIV services within reproductive health services for youth, HIV care will increasingly need to be integrated with prevention and care for non-communicable diseases (NCDs)[1] among aging adults (Smit et al., 2018; Taramusi et al., 2018).

### Geographic variation

High malaria-risk zones are located in the northwest to southeast borders of Zimbabwe (Gavi et al., 2021); while high HIV prevalence is observed in the south, southwest and central regions of Zimbabwe (Gwitira et al., 2018; Cuadros et al., 2019). TB hotspots and spatial clusters are also common in southern and central parts of the country (Gwitira et al., 2021). Rural areas tend to have lower-level health facilities that are not as prepared to provide essential malaria services (Pellegrino et al., 2022); whereas urbanites and urban areas face greater challenges in the case of HIV (Cheza et al., 2021). High HIV prevalence and high clustering of TB is found in border areas, with high levels of movement, economic activities and overcrowding (Cuadros et al., 2019; Gwitira et al., 2021).

### Donor financing

Zimbabwe has received US$1.67 billion worth of grants from the Global Fund to fight AIDS, TB and malaria (GFATM) since 2003 (Global Fund, 2020). Many of the select interventions discussed in this report are funded by GFATM grants. The vast majority of Global Funds resources has been allocated to HIV programming (which is also funded to a large extent by the U.S. President's Emergency Plan for AIDS Relief—PEPFAR). HIV grants have been used to promote universal access to HIV prevention, testing, treatment, care and support services — including information, education and communication (IEC) initiatives; surveillance systems; community mobilisation; counselling services; and home-care (UNCT Zimbabwe, 2018). Malaria grants have focused on vector control (IRS, LLIN); diagnosis and case management; and IEC (Global Fund and UNDP, n.d.). TB grants have been used to increase the number of TB diagnostic centres; strengthen laboratory capacity; and improve supply chain management (Global Fund and UNDP, n.d.).

## Part II. Disease control challenges and Part III. Select Interventions

### Health systems

**Challenges**: Health systems challenges in Zimbabwe include a shortage of medicines, health care personnel, and infrastructure; suboptimal surveillance; and inadequate data management (Banda Chitsamatanga et al., 2021; Chung et al., 2020; Global Fund, 2020). Supply chain management in Zimbabwe is partially effective, with weaknesses in available storage for health products, and in transportation (Global Fund, 2020; Makurumidze et al., 2020a). Vertical programming, common to donor funding, has had limited positive impact on overall health systems strengthening (Ncube & Chataway, 2019).

**Interventions:** There has been an increasing policy focus on horizontal (systems strengthening) programming as a means of building cohesion between key systemic elements: finance, IT service provision, human resources, technology, leadership and governance (Ncube & Chataway, 2019). Training and mentoring programmes, aimed at improving productivity and

[1] These include hypertension, chronic kidney disease, cardiovascular diseases, depression and cancers (Smit et al., 2018)

quality of health care operations, have resulted in better data monitoring and higher motivation and confidence among nurse participants, in the case of malaria (Chung et al., 2020); and sustained increases in testing uptake and ART initiation, in the case of HIV (Mandewo et al., 2020). Training of supply chain personnel, alongside investment in larger storage facilities and transport vehicles, have improved supply chain management in Zimbabwe (UNDP, 2020c). The adoption of results-based financing (RBF) has not functioned as designed to create incentives in achieving particular health care indicators, as funds have been used to support basic running costs (Witter et al., 2020). There is some limited evidence, however, of improvements in in the quality of data reporting, stemming from RBF (Witter et al., 2020).

**Service provision**

**Challenges**: Zimbabwe faces a critical shortage in its health workforce. Covid-19 has exacerbated the situation, with the reassignment of health workers away from malaria, HIV and TB to meet Covid-19 demands (Mukwenha et al., 2020). Low levels of training and high workloads of health care staff has contributed to poor data documentation, treatment deferral, and loss to follow up (LTFU) of patients overall (Global Fund, 2020; Nyakura et al., 2019). HIV testing misclassification errors have been reported, which can lead to failure to provide ART in the case of false-negatives or inappropriate ART initiation in the case of false-positives (Gregson et al., 2021; Rufu et al., 2018). Particular groups also suffer from less access to services: HIV programming, for example, has largely been orientated to adults, with less attention to the needs of children, adolescents, and young people living with HIV (Taramusi et al., 2018).

**Interventions**: Zimbabwe has sought to increase overall coverage of its health services among those at risk. LLINs have been routinely and universally distributed through mass campaigns in Zimbabwe. Despite significant improvements in coverage and access of LLINs, utilisation has declined in the past decade—requiring intersectoral approaches to address socioeconomic barriers (Tapera, 2019). Decentralisation and a 'Test and Treat' (treat all as quickly as possible) approach has contributed to improvements in uptake in ART, although there is a need to improve the quality of service delivery in lower level primary health centres (Makurumidze, 2020b; Rufu et al., 2018).

Differentiated service delivery— particularly peer-led programmes targeting AGYW and FSW, have proven effective in improving their initiation into treatment, adherence, retention, viral-load (VL) suppression results, and psychological well-being (Mavhu et al., 2020; PEPFAR, n.d.). Integrated service delivery, such as in the case of TB and HIV, has also been beneficial in providing a convenient, less costly 'one-stop' service for co-infected populations (USAID and KNCV, n.d.). Service integration, also involving integration of Covid-19 testing services, has the potential to reduce costs (for providers and patients) associated with multiple visits; and to improve the quality of care (Smit et al., 2018).

**Surveillance**

**Challenges**: A recent Global Fund audit in Zimbabwe reveals an under-estimation of people living with HIV due to various data discrepancies; and gaps in communicating test results to patients (Global Fund, 2020). It also finds inadequate surveillance systems to track patients to ensure initiation and adherence to treatment (Global Fund, 2020). An estimated 30% of TB patients in Zimbabwe were either not diagnosed or not registered in the National TB Control Programme (NTP), due in large part to passive case detection, whereby people self-present

themselves to clinics (Sengai et al., 2019). Covid-19 mitigation measures have also contributed to less testing for malaria, HIV and TB (Thekkur et al., 2021; WHO, 2020a).

**Interventions**: The HIV case surveillance system in Zimbabwe, which was designed to integrate within existing health information systems, has performed well generally; but delayed return of VL test results has been a significant problem, in addition to inadequate training of data entry clerks in data analysis (Nsubuga et al., 2020). Active TB case finding, such as the Tas4TB programme, which uses mobile X-ray trucks to provide TB screening, has contributed to higher case notifications among high-risk groups and the general population (Sengai et al., 2019). Point of care testing (POCT), which brings clinical testing and monitoring to remote health clinics, has also been effective in improving early infant HIV diagnosis; and reducing the turn-around time for HIV VL and TB test results (PEPFAR, 2021a).

**Awareness, knowledge, education and communication**:

**Challenges**: Continued sensitisation of vulnerable communities through IEC programmes are needed in rural districts to enhance uptake of malaria interventions (Mbunge et al., 2021b). Failure to book or late booking of antenatal care (ANC) appointments, which include information and counselling sessions on malaria and HIV, have resulted in delayed or limited education in disease prevention and treatment for pregnant women and their partners (Chimwaza et al., 2021).

**Interventions**: Social and behaviour change communication (SBCC) is a key malaria control strategy in Zimbabwe, aiming to counter IRS refusal, for example. However, the effectiveness of these SBCC interventions is not yet known (Mbunge et al., 2021b). Studies have shown peer education groups to be effective in increasing uptake of HIV services among AGYW; yet, few have assessed their efficacy in Zimbabwe (Oberth et al., 2021). The Sista2Sista programme is a structured peer group intervention in Zimbabwe aimed at improving health outcomes among vulnerable AGYW. Peer groups, led by female mentors called behaviour change facilitators, meet weekly over the course of one year, engaging in exercises that cover a range of topics. Graduates of the programme were more likely to take an HIV test, less likely to get married and less likely to drop out of school (Oberth et al., 2021).

# Part I: Epidemiology

# 2. Incidence of disease

## Malaria

Over half of Zimbabwe's population live in malaria-transmission areas (Tapera, 2019). Malaria is the third highest cause of morbidity and mortality in the country (Tapera, 2019). Reported cases range between approximately 300,000 and 500,000 per year (Mbunge et al., 2021a). Malaria incidence declined by up to 81% from 2003 to 2015 across all age groups (Gwitira et al., 2020). It fell further by 24% between 2015 and 2019, from 29 cases per 1,000 population at risk to 22 cases per 1,000 (UNDP, 2020c). Total cases reported have risen since, by about 19% in 2019 (approximately 310,000), compared to 2018 (approximately 260,000) (see Table 1) (Mbunge et al., 2021a; WHO, 2021a). When comparing 2015 and 2020, there is no difference (<5% increase or decrease) in case incidence or mortality rate (Figure 1) (WHO, 2021a).

**Table 1: Reported malaria cases by method of confirmation, 2010–2020**

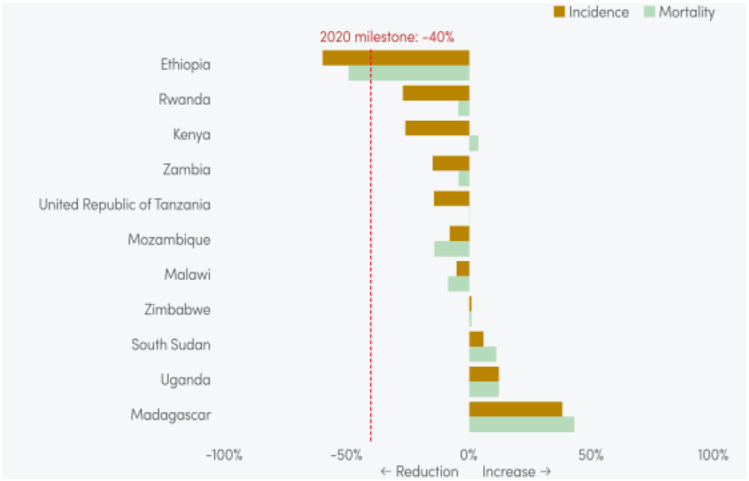
| WHO region Country/area | | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Zimbabwe[2] | Suspected cases | 912 618 | 480 011 | 727 174 | 1 115 005 | 1 478 357 | 1 638 438 | 1 400 095 | 1 831 823 | 1 293 392 | 1 324 299 | 1 389 065 |
| | Presumed and confirmed | 648 965^ | 319 935 | 276 963 | 422 633 | 572 944 | 482 379 | 384 029 | 767 069 | 264 018 | 308 173 | 447 381 |
| | Microscopy examined | | 10 004 | | | | | | | 2 771 | | |
| | Microscopy positive | 249 379 | | | | | | | | | | |
| | RDT examined | 513 032 | 470 007 | 727 174 | 1 115 005 | 1 453 689 | 1 638 438 | 1 330 069 | 1 533 030 | 1 290 621 | 1 297 197 | 1 356 433 |
| | RDT positive | 249 379 | 319 935 | 276 963 | 422 633 | 548 276 | 482 379 | 314 003 | 468 276 | 264 018 | 308 173 | 447 381 |
| | Imported cases | | | | | | 180 | 358 | 768 | 672 | | |

**Reported malaria deaths, 2010-2020**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Zimbabwe | 255 | 451 | 351 | 352 | 406 | 200 | 351 | 527 | 192 | 266 | 400 |

*Source: WHO, 2021a: 240. Reproduced under CC BY-NC-SA 3.0 IGO https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2021*

**Figure 1: Change in estimated malaria incidence and mortality rates, 2015–2020**



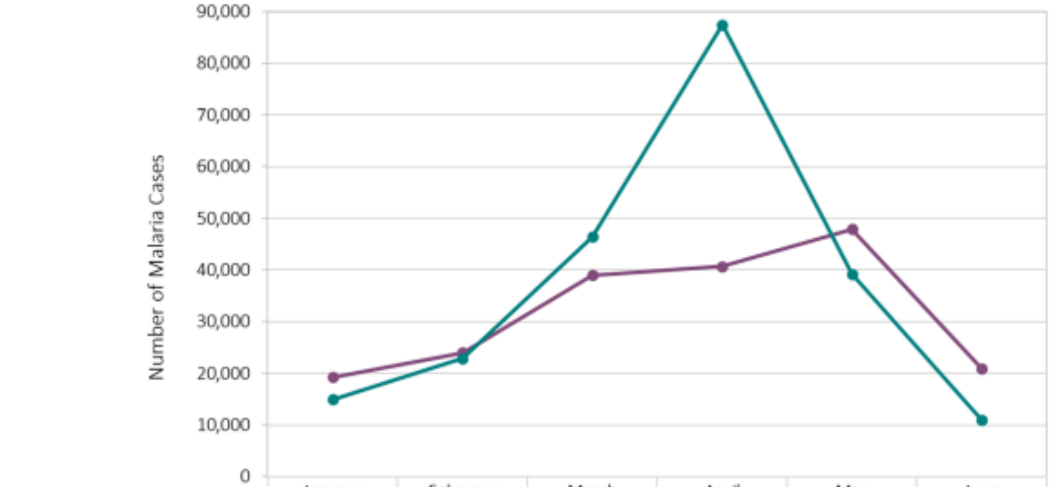

*Source: WHO, 2021a: 147. Reproduced under CC BY-NC-SA 3.0 IGO https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2021*

Significant progress toward malaria elimination has been achieved through various control measures, such as IRS, distribution of LLIN[2], artemisinin-based combination therapy, and intermittent preventive treatment in pregnancy (Mbunge et al., 2021a).

**Covid-19:** The Covid-19 pandemic has undermined this progress (Mbunge et al., 2021b). One study finds that there was a higher than expected increase in malaria cases and deaths from January-June 2020, compared to January-June 2017–2019, which resulted in an excess of over 30,000 malaria cases and 75 malaria deaths (see Figures 2 and 3) (Gavi et al., 2021). Another study also finds that Zimbabwe recorded a significant spike of malaria incidences, after the onset of Covid-19. For further discussion, see Covid-19 challenges in Part II.

[2] The country distributed 844,000 Long-Lasting Insecticidal Nets in 2018 against a target of 595,000 (Global Fund, 2020).

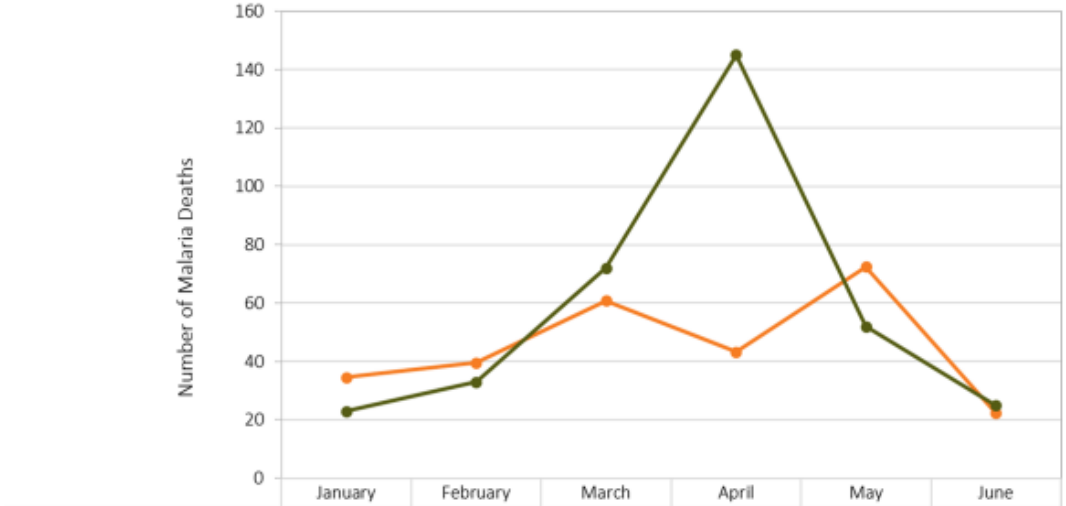
**Figure 2: Expected and Actual Malaria cases- January-June 2020**




| | January | February | March | April | May | June |
|---|---|---|---|---|---|---|
| Expected 2020 malaria cases | 19,233 | 23,966 | 38,979 | 40,669 | 47,923 | 20,893 |
| Actual 2020 malaria cases | 14,938 | 22,868 | 46,411 | 87,466 | 39,212 | 10,965 |

Source: Gavi et al., 2021: 6. Reproduced under a Creative Commons Attribution 4.0 International License https://link.springer.com/content/pdf/10.1186/s12936-021-03770-7.pdf

**Figure 3: Expected and Actual Malaria deaths- January-June 2020**




| | January | February | March | April | May | June |
|---|---|---|---|---|---|---|
| Expected 2020 malaria deaths | 35 | 40 | 61 | 43 | 72 | 22 |
| Actual 2020 malaria deaths | 23 | 33 | 72 | 145 | 52 | 25 |

Source: Gavi et al., 2021: 6. Reproduced under a Creative Commons Attribution 4.0 International License https://link.springer.com/content/pdf/10.1186/s12936-021-03770-7.pdf

## HIV/AIDS

Zimbabwe is one of 22 high burden countries, globally; and has the fifth highest HIV prevalence in sub-Saharan Africa (Chimwaza et al., 2021). There are an estimated 1.3 million people living with HIV (PLHIV) in Zimbabwe and approximately 38,000-39,000 new infections reported annually (UNDP, 2020b; UNDP, 2020c; Mukwenha et al, 2020; Nsubuga et al., 2020). The number of new infections has decreased by 35.3% between 2010 and 2018 - from 62,000 in 2010 to 45,000 in 2015 to 38,000 in 2018, which has led to a decline in prevalence (UNDP, 2020b; Makurumidze et al., 2020a).

HIV prevalence has declined from 27.2% in 1998 to 15% in 2010 to 12.7% in 2018, but remains one of the highest rates in the world (Cheza et al., 2021; Global Fund, 2020; UNDP, 2020; Cuadros et al., 2019). The estimated prevalence for 2020 is 11.9% (UNAIDS, 2020). HIV incidence per 1,000 adults fell from 8.52 to 4.86 between 2010 and 2018, declining to an estimated 2.75 in 2020 (UNAIDS, 2020; Global Fund, 2020). National HIV estimates and projections predict a continued decline in HIV incidence based on current epidemic patterns and programme coverage, but not a sufficient enough decline to achieve global 2020 and 2030 targets (see Figure 5) (UNDP, 2020b).

**Figure 4: Projected trends in New HIV Infections**

Source: GAM Zimbabwe Country report data (January 2019 - December 2019: 12), reported in UNDP, 2020b: 56. This figure has been removed for copyright reasons. The figure can be viewed at: https://www.zw.undp.org/content/zimbabwe/en/home/library/zimbabwe-progress-review-report-of-sustainable-development-goals.html

HIV/AIDS remains the top cause of death in Zimbabwe (see Table 2). HIV deaths decreased from 54,000 to 22,000 annually between 2010 and 2018, making Zimbabwe one of five countries globally to halve AIDS mortality in that period (Global Fund, 2020; UNDP, 2020b). AIDS mortality per 100,000 declined from 409.4 in 2010 to 126.7 in 2019 - a 68% drop (UNDP, 2020b). National HIV estimates and projections predict a continued decline in mortality based on current epidemic patterns and programme coverage but not a sufficient enough decline to achieve global 2020 and 2030 targets (see Figure 5) (UNDP, 2020b).

**Figure 5: Projected trend in AIDS deaths**

Source: GAM Zimbabwe Country report data (January 2019 - December 2019: 13), reported in UNDP, 2020b: 57. This figure has been removed for copyright reasons. The figure can be found at https://www.zw.undp.org/content/zimbabwe/en/home/library/zimbabwe-progress-review-report-of-sustainable-development-goals.html

**Table 2: Priority causes of conditions causing deaths in Zimbabwe**

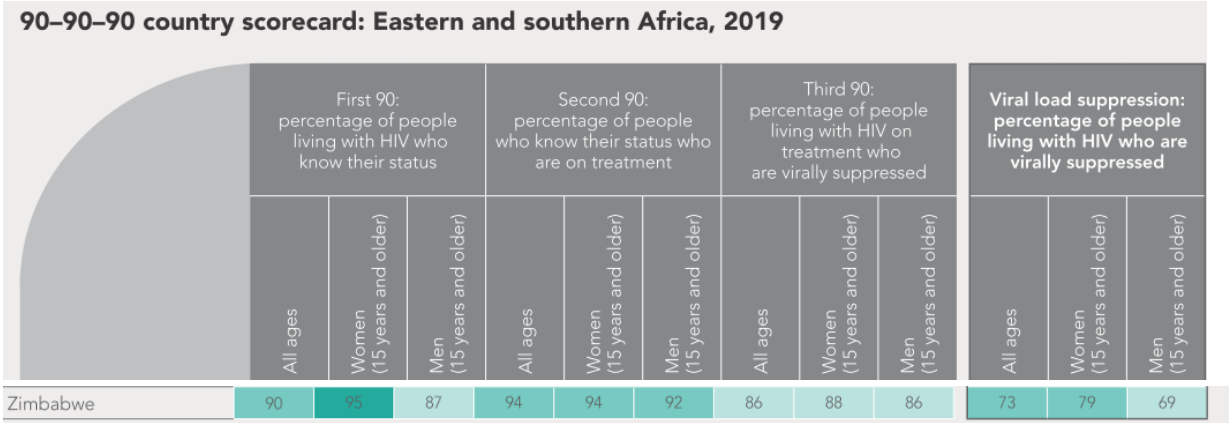
| Number | 1990 rank | Number | 2010 rank | Number | 2020 rank | Key | Condition |
|---|---|---|---|---|---|---|---|
| 1 | HIV/AIDS | 1 | HIV/AIDS | 1 | HIV/AIDS | | Injuries |
| 2 | Lower respiratory infections | 2 | Lower respiratory infections | 2 | Lower respiratory infections | | Communicable disease |
| 3 | Diarrheal diseases | 3 | Diarrheal diseases | 3 | Diarrheal diseases | | Noncommunicable disease |
| 4 | Preterm birth complications | 4 | Tuberculosis | 4 | Cardiovascular diseases | | |
| 5 | Tuberculosis | 5 | Malaria | 5 | Cancers | | |
| 6 | Neonatal encephalopathy | 6 | Preterm birth complications | 6 | Nutritional deficiencies | | |
| 7 | Congenital anomalies | 7 | Self-harm | 7 | Congenital anomalies | | |
| 8 | Malaria | 8 | Road injury | 8 | Malaria | | |
| 9 | Protein–energy malnutrition | 9 | Stroke | 9 | Diabetes | | |
| 10 | Road injury | 10 | Protein–energy malnutrition | 10 | Injuries | | |
| 11 | Meningitis | 11 | Neonatal encephalopathy | 11 | Other NCDs | | |
| 12 | Measles | 12 | Congenital anomalies | 12 | Transport injuries | | |
| 13 | Stroke | 13 | Interpersonal violence | 13 | Mental and substance use disorders | | |
| 14 | Self-harm | 14 | Meningitis | 14 | Respiratory diseases | | |
| 15 | Maternal disorders | 15 | Mental disorders | 15 | Neurological disorders | | |
| 16 | Drowning | 16 | Neonatal sepsis | 16 | Digestive diseases | | |
| 17 | Interpersonal violence | 17 | Ischemic heart disease | 17 | Muscoskeletal disorders | | |
| 18 | Ischemic heart disease | 18 | Drowning | 18 | Self-harm | | |
| 19 | Hypertensive heart disease | 19 | Hypertensive heart disease | 19 | Interpersonal violence | | |
| 20 | Typhoid fevers | 20 | Cirrhosis | 20 | Maternal disorders | | |
| 21 | Syphilis | 21 | Diabetes | 21 | Liver diseases | | |
| 22 | Iron-deficiency anemia | 22 | COPD | 22 | Other communicable diseases | | |
| 23 | Neonatal sepsis | 23 | Measles | 23 | Natural disasters | | |
| 24 | Diabetes | 24 | Chronic kidney diseases | 24 | Conflict and terrorism | | |
| 25 | Fire | 25 | Fire | 25 | | | |
| 26 | Rheumatic heart diseases | 26 | Typhoid fevers | 26 | | | |
| 27 | Chronic kidney diseases | 27 | Syphilis | 27 | | | |
| 28 | Cirrhosis | 28 | Iron deficiencies | 28 | | | |
| 29 | COPD | 29 | | 29 | | | |

Adopted and adapted from Institute for Health Metrics and Evaluation (2016; 2018; 2020) and the Zimbabwe health strategy (2021–2025). COPD: Chronic obstructive pulmonary disease

*Source: Nyabani, 2021. Reproduced under CC BY-NC-SA https://www.ijncd.org/article.asp?issn=2468-8827;year=2021;volume=6;issue=4;spage=166;epage=171;aulast=Nyabani#*

These health gains are due in large part to the growing and widespread use of ART, with coverage on track to reach 100 percent by 2030 (Cheza et al., 2021; Makurumidze et al., 2020a; UNDP, 2020). A Global Fund audit revealed that Zimbabwe does well against the Joint United Nations Programme on HIV/AIDS (UNAIDS) 90-90-90 targets by 2020: of the estimated 1.3 million PLHIV in 2018, 90% knew their HIV status; of the people that know their HIV status, 95% are on ART; of those on ART, 87% have viral suppression (Global Fund, 2020). This data is similar to the figures for 2019 (see Figure 6) and 2020 (see Figure 7). The Global Fund audit report cautions, however, that Zimbabwe seems to do well against the targets because of the overall under-estimation of PLHIV (see Surveillance challenges in Part II) (Global Fund, 2020).

**Figure 6:**




*Source: UNAIDS, 2020. Reproduced with permission from UNAIDS https://aidsinfo.unaids.org/*

**Figure 7: HIV/AIDS-related investment and impact**

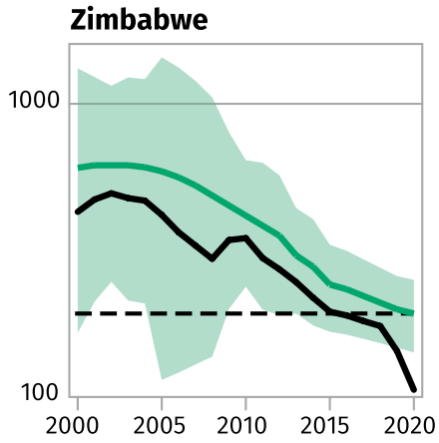
Source: Global Fund, 2021: 28. This figure has been removed for copyright reasons. The figure can be found at https://www.theglobalfund.org/media/11304/corporate_2021resultsreport_report_en.pdf

## Tuberculosis

Zimbabwe is among the 14 high burden countries for TB, multi-drug resistant TB and TB-HIV coinfection (UNDP, 2020c). The incidence of tuberculosis has decreased at a higher rate in Zimbabwe, compared to global and regional rates (UNDP, 2020). TB case incidence declined by 67% between 2011 and 2018 - from 633/100,000 in 2011 to 278/100,000 in 2014 to 210/100,000 in 2018 (see Figure 8) (UNDP, 2020c; WHO, 2021b). TB incidence in 2019 was 199/100,000 (see Figure 10).

**Figure 8: TB burden 2000-2020 -** rate per 100,000 population per year (log scale)[3]

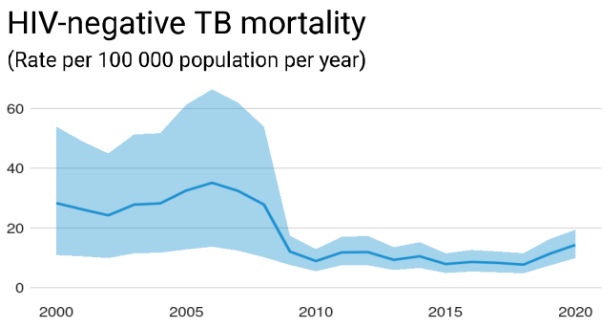
[3] TB incidence rates are shown in green. The black solid lines show notifications of new and relapse cases for comparison with estimates of the total incidence rate. Shaded areas represent uncertainty intervals. The horizontal dashed line shows the 2020 milestone of the End TB Strategy.




*Source: WHO, 2021b: 13. Reproduced under CC BY-NC-SA 3.0 IGO https://www.who.int/publications/i/item/9789240037021*

The TB mortality rate decreased by 60%, from 13/100,000 in 2014 to 7.7/100,000 in 2018 (see Figure 9) (Global Fund, 2020). Despite these gains, deaths from TB remain high, at 15% among notified TB clients, likely attributed to late treatment seeking behaviour and comorbidities such as HIV and diabetes (UNDP, 2020b). Treatment coverage and treatment success rate both exceeded 80% by 2018, with an 83% treatment coverage rate in 2018. Coverage dropped to 71%, however, in 2019 (see Figure 10) (Global Fund, 2020 and 2019; UNDP, 2020b).

**Figure 9:**




Source: WHO 2021 database. Reproduced under CC BY-NC-SA 3.0 IGO. https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2021

**Figure 10: TB-related investment and impact**

Source: Global Fund, 2021: 42This figure has been removed for copyright reasons. The figure can be found at https://www.theglobalfund.org/media/11304/corporate_2021resultsreport_report_en.pdf

## Co-infection

PLHIV are susceptible to opportunistic diseases due to their weakened immune systems (Cheza et al., 2021). It has been reported that such immune suppression is associated with severe

malaria (Gwitira et al., 2018). There is a greater mortality rate among patients with both TB and HIV than patients with TB alone (see Table 3). Sixty-two percent of diagnosed TB patients were HIV co-infected in 2018, down from 68% in 2014 (Zvinoera et al., 2021; UNDP, 2020b). A recent study finds that areas where TB clusters were detected coincide with areas where clusters of HIV prevalence were detected, suggesting co-infection (Gwitira et al., 2021). Studies have also shown that the TB epidemic in Zimbabwe is largely driven by HIV (Gwitira et al., 2021). In turn, the declining TB case notification rates in Zimbabwe has coincided with the scale-up of ART (Gwitira et al., 2021).

**Table 3:**

Estimates of TB burden*, 2020

| | Number | (Rate per 100 000 population) |
|---|---|---|
| Total TB incidence | 29 000 (21 000-37 000) | 193 (142-251) |
| HIV-positive TB incidence | 16 000 (11 000-20 000) | 104 (77-136) |
| HIV-negative TB mortality | 2 100 (1 500-2 900) | 14 (9.9-19) |
| HIV-positive TB mortality | 5 900 (4 100-8 000) | 40 (28-54) |

*Source: WHO 2021 database Reproduced under CC BY-NC-SA 3.0 IGO. https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2021*

# 3. Demographic variation

## Socioeconomic status

Zimbabwe's public health financing model is mostly hospital-based. Public health subsidies generally follow the bigger and higher-level hospitals at the expense of smaller, lower-level ones. This has perpetuated inequalities, since richer people tend to use the bigger and higher-level hospitals to a greater extent than poorer and rural populations (Shamu et al., 2017).

The epidemiological profiles of malaria, HIV and TB in Zimbabwe are closely related to socioeconomic factors. A recent poverty assessment survey in Zimbabwe (based on indicators such as housing quality, level of education and income levels) revealed that the five districts with spatial overlap of malaria and HIV had a higher average poverty prevalence rate (75%) than the average national poverty prevalence (63%) (ZIMSTAT; cited in Gwitara et al., 2018). Studies on the use of LLIN in Zimbabwe also finds that usage is influenced by socioeconomic factors: higher education levels, material resources, good quality housing (which is more common in urban areas), and community outreach improve access and utilisation of LLINs (Tapera, 2019). For further discussion, see Rural-urban areas under Geographic variation.

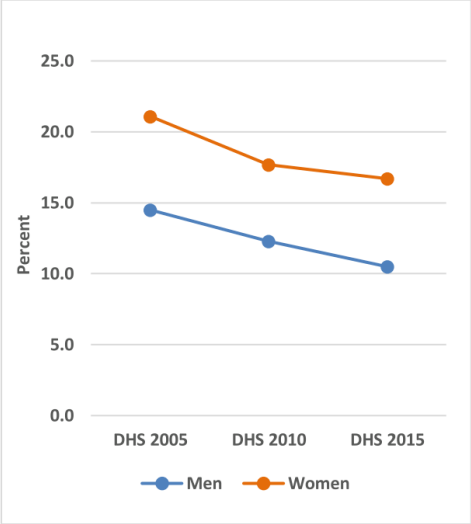
A study on TB health seeking behaviours in Harare finds that there are significant costs associated with initiation of care and treatment, which can be a large burden for those with lower socioeconomic status and thus a deterrent to care-seeking (Tadokera et al., 2021). From initial symptoms to initiation of treatment, patients made a median number of three health care visits, amounting to a median cost of 13% of their total annual household income (Tadokera et al., 2021). Indirect costs include loss of income due to time taken when sick or to seek treatment. At least 30% of households surveyed incurred TB related costs which can be considered as

'catastrophic' (above 20% of annual household income) (Tadokera et al., 2021). Delayed health seeking is higher among the informally employed with limited safety nets (Tadokera et al., 2021).

## Gender and key populations

TB incidence in Zimbabwe is higher among males than females, with 21 and 15 cases per 1,000 people, respectively, in 2017 (Muniu & Amendah, 2019). In contrast, HIV prevalence in Zimbabwe is higher among women than men (see Figure 11) (Muniu & Amendah, 2019; Taramusi et al., 2018). The rate was 14.7% among women and 9.1% among men in 2020 (UNAIDS, 2020). An estimated 65% of new adult HIV infections in 2020 were acquired by females and 35% among males (UNAIDS, 2020).

**Figure 11: HIV prevalence by sex: 2005-2015**




*Source: Taramusi et al., 2018: 13. Reproduced under Creative Commons Attribution 4.0 International. https://openknowledge.worldbank.org/bitstream/handle/10986/33270/Phase-1-Report-National-and-Provincial-HIV-Acquisition-and-Transmission-Estimates-and-Patters-in-Zimbabwe-A-Mathematical-Modelling-Analysis.pdf?sequence=1&isAllowed=y*

AGYW in Zimbabwe face disproportionate risk for HIV (Oberth et al., 2021). HIV prevalence among young women is estimated to be 5.2% in 2020 compared to 2.9% for young men (UNAIDS, 2020). Social and structural factors, such as early sexual debut and transactional sex, are key drivers of infection, particularly among AGYW (Muniu & Amendah, 2019). There has been more progress in reducing new infections among AGYW in countries in Africa that have higher completion rates for lower secondary school (Global Fund, 2021).

Zimbabwe nears optimal ART coverage, with 96% of men and 98% of women who know their status on ART in 2020, up from 88% and 89% coverage, respectively, in 2016 (see Figure 12) (PEPFAR, 2021a). To reach higher levels of coverage, Zimbabwe evolved its broad case finding programme to concentrate on closing gaps in particular regions and among particular population groups, including key populations and children (PEPFAR, 2021a).

**Figure 12: Progress toward 95-95-95 in Zimbabwe**

Source: PEPFAR, 2021a: 27. This figure has been removed for copyright reasons. The figure can be viewed at https://www.state.gov/wp-content/uploads/2020/12/PEPFAR-COP21-Guidance-Final.pdf

**Key populations (KPs):** High risk groups in TB comprise the elderly; PLHIV; miners; prisoners; healthcare workers; refugees; those previously diagnosed with TB; and contacts of TB patients (Sengai et al., 2019). The HIV epidemic is high among key populations, with 41.4% prevalence among sex workers, 31% prevalence among MSM, and 28% among prisoners (Global Fund, 2020). Younger FSWs were more likely to report having had an HIV test in the past 6 months; however, only 62% of HIV-positive FSWs reported being on ART (Napierala et al., 2018). Stigma around sex work and HIV remain key barriers to engagement in services (Matambanadzo et al., 2021; Napierala et al., 2018). Other challenges faced by younger women include lack of knowledge, and limited socioeconomic empowerment and autonomy (Napierala et al., 2018).

Young FSWs are also often left behind in research and in service provision (Napierala et al., 2018). There have been few interventions targeting their specific needs and even less that have been taken to scale (Napierala et al., 2018). While the Global Fund grant is supporting key community activities for AGYW and KPs, 90% of health facilities have no government-based KP or AGYW-related programmes, apart from a few sensitisation sessions and support group discussions (Global Fund, 2020). Higher government prioritisation of KPs and AGYW is necessary to attain higher coverage among them (Global Fund, 2020). PEPFAR is supporting the development of government guidelines whereby stable KPs are referred into government ART sites (PEPFAR, 2021a).

## Age-based variations

**Children, adolescents and young people**: HIV programmes and services have been largely orientated to adults, with limited attention to the specific needs of children, adolescents, and young people living with HIV (CAYPLHIV) (Taramusi et al., 2018). CAYPLHIV experience late diagnosis and disclosure, higher rates of loss to follow-up, poor adherence, and less viral suppression than adults (Taramusi et al., 2018; PEPFAR, n.d.). According to a recent Global Fund audit, Zimbabwe has made slow progress in fighting HIV among children aged 0-14 years (Global Fund, 2020). Only 57% of the estimated 91,000 children living with HIV in Zimbabwe know their status; 57% of them are on ART; and 52% of those on ART are virally suppressed (Global Fund, 2020). Early infant HIV testing in Zimbabwe dropped from 82% in 2017 to 52% in early 2019 – due to low levels of testing at birth, as only high-risk newborns were tested (Global Fund, 2020). A study on the Zimbabwe Vitamin A for Mothers and Babies (ZVITAMBO) trial finds that HIV-exposed uninfected (HEU) infants in the trial had poorer health outcomes than HIV-unexposed infants: the former had increased morbidity and mortality rates; higher risk of stunting, wasting and being underweight; 50% more hospitalisations in the neonatal period; and 30% more sick clinic visits during infancy (Evans, 2016).

**Older populations**: Approximately one-third of PLHIV were older than 35 years of age in 2000, rising to approximately 50% in 2015; and forecasted to be two-thirds by 2030 (Taramusi et al., 2018). Another study predicts that mean age of PLHIV will increase from 31 to 45 years between 2015 and 2035 (Smit et al., 2018). This changing demographic suggests that in addition to integration of HIV services within reproductive health services for youth, HIV care will increasingly need to be integrated with prevention and care for NCDs among aging adults (Smit et al., 2018; Taramusi et al., 2018). For further discussion, see Sectoral challenges in Part II.

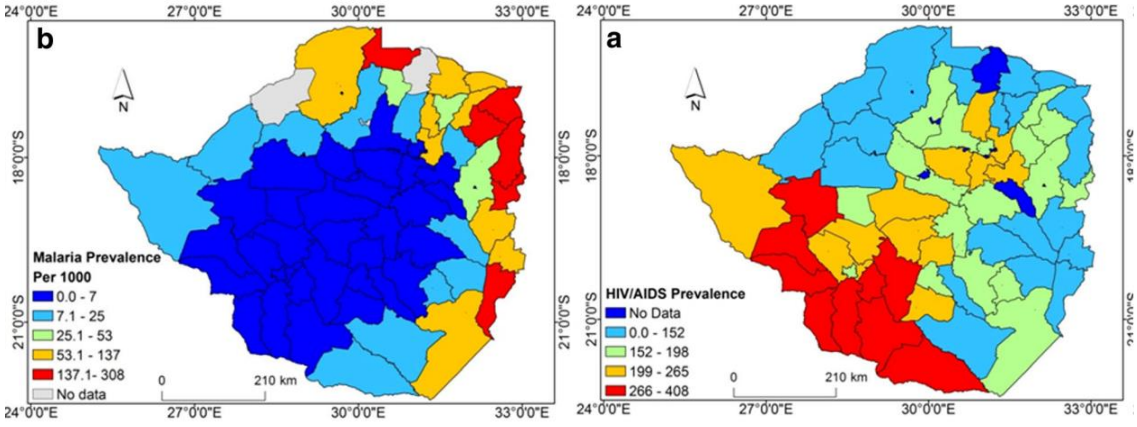
# 4. Geographic variation

## Regional and state variation

**Malaria**: Areas from the northwest to southeast borders of Zimbabwe are characterised as high malaria-risk zones, whereas areas along the central plateau and in the southwest of the country experience little to no malaria transmission (Gavi et al., 2021). Other research finds that the primary cluster of malaria is in the northeastern region of the country (see Figure 13) (Gwitira et al., 2018); and that high malaria transmission is still observed in the northern and eastern parts of the country (Global Fund, 2020). In 2016, most (82%) of malaria cases occurred in three of the ten provinces: Manicaland, Mashonaland East and Mashonaland Central. The risk of malaria is highest in regions bordering Mozambique and Zambia (Muniu & Amendah, 2019).

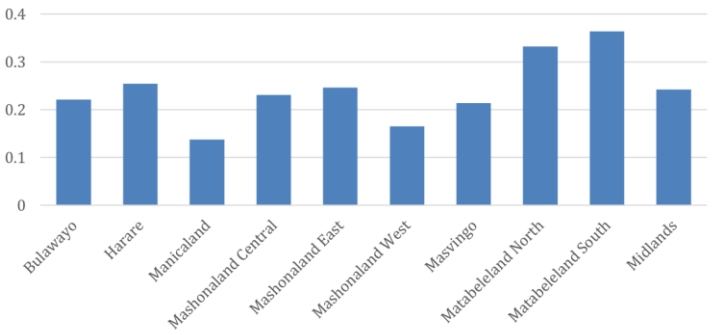
**HIV:** High HIV prevalence was observed in the south, southwest and central regions of Zimbabwe, whereas the eastern and northern regions have low prevalence (see Figure 13) (Gwitira et al., 2018; Cuadros et al., 2019).The highest prevalence is in the southwest (Cuadros et al., 2019). The decline in HIV prevalence is more pronounced in the northern and eastern provinces (Harare, Manicaland, Mashonaland Central, East and West); whereas prevalence has only moderately declined or has stabilised in the southern and western provinces (Bulawayo, Matabeleland South & North, Midlands, Masvingo) (see Figures 14 and 15) (Taramusi et al., 2018). Despite these geographic variations in in prevalence and reported risk practices, HIV service coverage and outcomes are relatively uniform in Zimbabwe (Taramusi et al., 2018).

**Figure 13: Spatial distribution of annual malaria and HIV prevalence in Zimbabwe- 2016**



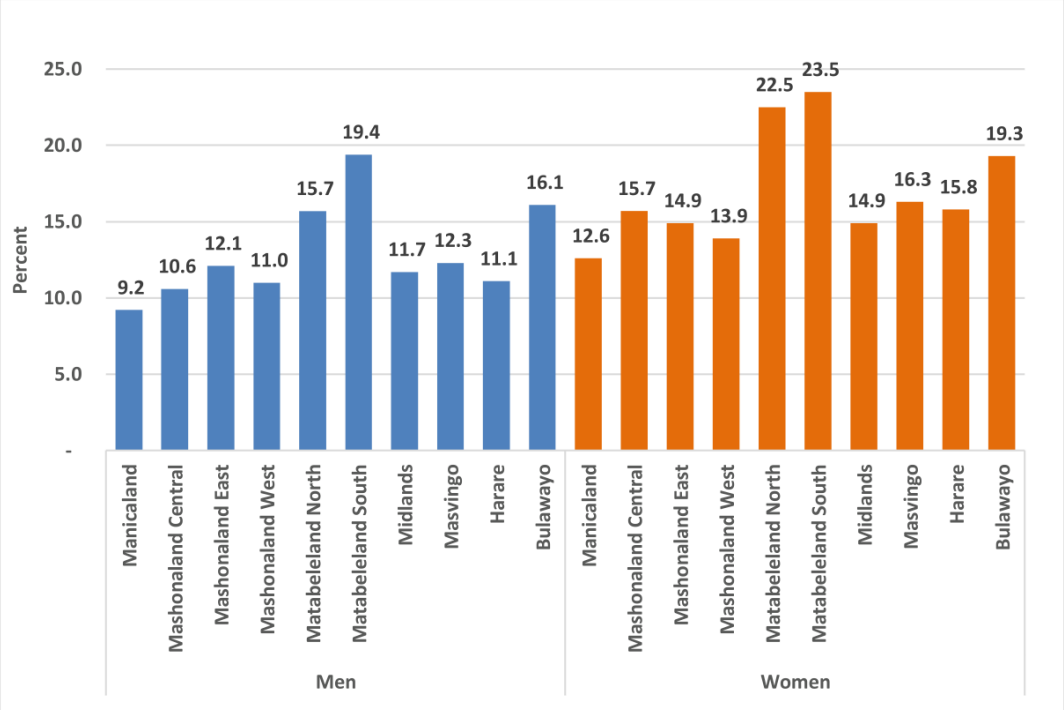

*Source: Gwitira et al., 2018: 4. Reproduced under Creative Commons Attribution 4.0 International License. https://link.springer.com/content/pdf/10.1186/s12879-018-3513-y.pdf*

**Figure 14: Total estimated HIV incidence rates per 100 person/years in 10 provinces- 2017**




*Source: Taramusi et al., 2018: 35. Reproduced under Creative Commons Attribution 4.0 International. https://openknowledge.worldbank.org/bitstream/handle/10986/33270/Phase-1-Report-National-and-Provincial-HIV-Acquisition-and-Transmission-Estimates-and-Patters-in-Zimbabwe-A-Mathematical-Modelling-Analysis.pdf?sequence=1&isAllowed=y*

**Figure 15: HIV prevalence by province**



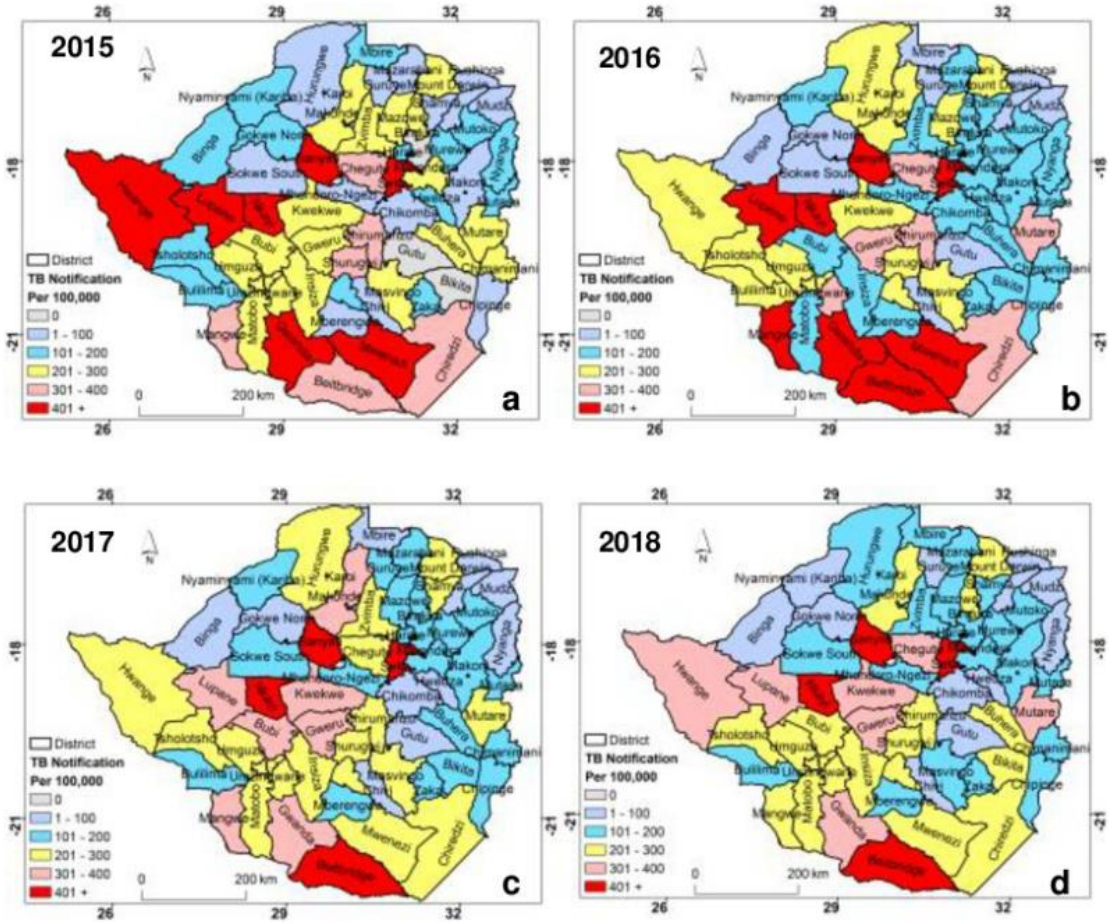

*Source: ZIMPHIA, 2015-6; cited in Taramusi et al., 2018: 35. Reproduced under Creative Commons Attribution 4.0 International. https://openknowledge.worldbank.org/bitstream/handle/10986/33270/Phase-1-Report-National-and-Provincial-HIV-Acquisition-and-Transmission-Estimates-and-Patters-in-Zimbabwe-A-Mathematical-Modelling-Analysis.pdf?sequence=1&isAllowed=y*

**TB**: A recent study indicates that statistically significant TB hotspots and spatial clusters are common in central and southern parts of Zimbabwe (see Figure 16) (Gwitira et al., 2021). These regions are dominated by large urban areas and rural districts characterised by formal and illegal mining activities. The occurrence of TB hot-spots and clusters in these areas may be associated with overcrowding and greater disease transmission (Gwitira et al., 2021). In addition, mining activities expose miners to silica dust which increases the vulnerability of the populations to TB (Gwitira et al., 2021). Other characteristics that increase the risk of small scale artisanal miners to TB include poor health care services, inadequate personal protective equipment; relatively young age; and HIV infection, which is common among this population (Gwitira et al., 2021).

## Rural-urban areas

The majority of individuals and families living in rural areas in Zimbabwe cannot afford health care, which is compounded by the inability of the government to finance the health system (Banda Chitsamatanga et al., 2021). A study on malaria service readiness in different districts finds that rural areas tend to have lower-level health facilities that are not as prepared to provide essential malaria services (Pellegrino et al., 2022). In contrast, urbanites and urban areas face greater challenges in the case of HIV. The Zimbabwe Demographic and Health Survey demonstrates a slightly higher HIV prevalence rate in urban areas than in rural areas (Cheza et al., 2021). HIV-infected populations lacking ART coverage and viral suppression were also concentrated in the main cities and urban settlements such as Bulawayo, Harare, Ruwa and Chitungwiza (Cuadros et al., 2019).

**Figure 16: Spatial distribution of TB notification per 100,000 of the population at district level in Zimbabwe in 2015, 2016, 2017, 2018**




*Source: Gwitira et al., 2021: 4. Reproduced under Creative Commons Attribution 4.0 International License. https://link.springer.com/content/pdf/10.1186/s12879-018-3513-y.pdf*

## Areas of migration

A study of HIV vulnerable areas in Zimbabwe finds high numbers of HIV-infected men and high HIV prevalence in areas close to the borders with Botswana, Mozambique and South Africa (Cuadros et al., 2019). These areas are commercial transport corridors, with increased diamond mining activities and mobility between neighbouring countries, which could contribute to fuelling the burden of HIV infections (Cuadros et al., 2019). A study on spatial patterns of TB in Zimbabwe showed that southern districts such as Chiredzi and Beitbridge had high clustering but relatively low hotspot occurrence, compared to its neighbours. Beitbridge is a border town characterised by high population movements between South Africa and Zimbabwe (Gwitira et al., 2021). Chiredzi and Mwenezi are sugarcane growing districts: high economic activities from the agricultural business could be responsible for high local transmission associated with overcrowding in these areas (Gwitira et al., 2021).

# Part II: Disease control challenges

## 5. Health systems and service provision challenges

Health systems strengthening in sub-Saharan Africa faces many challenges, including over-reliance on disease-specific interventions and poorly functioning, inadequately resourced health care facilities (Ncube & Chataway, 2019). Operational challenges in Zimbabwe include shortages of medicines, health care personnel, and infrastructure; and suboptimal surveillance and data management (Banda Chitsamatanga et al., 2021; Chung et al., 2020; Global Fund, 2020).

### Financial resources and vertical programming

Government health expenditure in Zimbabwe increased from 6.6% of total public spending in 2012 to 9.4% in 2016 (Global Fund, 2020). The current health financing model remains unsustainable with heavy reliance on external financing and out-of-pocket financing (UNDP, 2020b; Shamu et al., 2017). For further discussion, see Donor financing in Part III.

Donors have tended to engage in vertical programming—supporting the introduction of new drugs and treatments and building capacity to treat a particular disease; however, this has had limited positive impact on overall health systems strengthening (Ncube & Chataway, 2019). Early successes derived from vertical initiatives tend to be limited by a lack of integration (Ncube & Chataway, 2019). There has been an increasing policy focus on horizontal (systems strengthening) programming as a means of building cohesion between key systemic elements: finance, IT service provision, human resources, technology, leadership and governance (Ncube & Chataway, 2019). Service integration has the potential to reduce costs (for providers and patients) associated with multiple visits; and to improve the quality of care (Smit et al., 2018). Malaria-HIV co-infection, for example, calls for simultaneous interventions targeting the same community, including awareness campaigns, sex education, access to LLINs and improved living conditions (Gwitira et al., 2018). Differentiated service delivery models for HIV and TB clients could streamline the delivery of health services and reduce the time clients spend at health facilities (see Differentiated service delivery in Part III) (Mukwenha et al, 2020).

Non-communicable diseases are also found to undermine malaria elimination (Mbunge et al., 2021a) and to be more common among PLHIV (Smit et al., 2018; Taramusi et al., 2018). Data from 2015 reveal that an estimated 33% of PLHIV are diagnosed with at least one key NCD, compared with an estimated 14% of HIV-negative persons (Smit et al., 2018). By 2035, adult PLHIV are forecasted to be nearly twice as likely to suffer from at least one key NCD and three times more likely to suffer from multiple key NCDs compared with HIV-negative persons (Smit et al., 2018). The identification of cost-effective chronic disease service delivery models to manage the dual burden of HIV and NCDs will be critical to maintain the quality of health services (Smit et al., 2018). NCD services will need to be expanded and integrated into HIV care programmes. Some HIV programmes have already shifted from vertical programmes, focused on HIV diagnosis and treatment, to integrated care management, incorporating testing and treatment for other conditions and exploring community-based delivery (Smit et al., 2018).

**Covid-19:** Since August 2020, the Ministry of Health and Child Care (MOHCC) in Zimbabwe has trained staff and distributed rapid diagnostic tests (RDTs) to health clinics to increase Covid-19 testing rates. Malaria and Covid-19 co-infection may lead to more severe complications and increase the risk of death (Pellegrino et al., 2022). Covid-19 and TB infections have similar

symptoms: as such, the management of patients with respiratory symptoms requires testing for both infections (Nhari et al., 2020). The overlap and commonalities for surveillance, screening, diagnosis, care, and management can be leveraged to respond to both diseases, drawing on extensive experience, and knowledge of TB researchers and healthcare workers on infection control (Nhari et al., 2020).

## Human resources

Zimbabwe faces a critical shortage in its health workforce, with only 0.08 physicians and 1.2 nurses and midwives per 1,000 population[4] (Global Fund, 2020; Mundagowa & Chimberengwa, 2020). Changes in the country's monetary policy also delayed salary payments to health workers in recent years, which can lower staff morale and contribute to brain drain (Muniu & Amendah, 2019). The Global Fund grant in Zimbabwe provides for a top-up allowance for health care workers as an incentive to retain them (Muniu & Amendah, 2019).

**Covid-19:** Health workers have been reassigned to meet Covid-19 testing demand, leading to fewer people conducting HIV and TB testing (Mukwenha et al., 2020). Medical staff anxiety and burnout also influences the degree of HIV and TB testing, as staff are overwhelmed with Covid-19 testing (Mukwenha et al., 2020).

## Capacity and data management

The Global Fund audit finds that counsellors at twenty-one visited health facilities had not received any training on HIV testing and counselling services for over two years (Global Fund, 2020). High workload for a low number of counsellors was observed at all visited facilities, enhancing risks of treatment initiation being deferred and consequent loss of patients (Global Fund, 2020). A study on the prevention of mother to child transmission (PMTCT) programming in Zimbabwe finds that there was poor routine data documentation, with almost half of the records missing data (Nyakura et al., 2019). In a PMTCT study conducted in Harare city, 90% of the study population lacked adequate information to determine whether the mother belonged to the high risk MTCT group or not (Nyakura et al., 2019).

Misclassification errors have been reported in rapid diagnostic HIV tests in Zimbabwe (Gregson et al., 2021). HIV infection may be wrongly diagnosed as a result of poor quality control, administrative errors and lack of training and supervision of staff, which poses a risk for the 'Test and Treat' approach[5] (Rufu et al., 2018). A recent study reveals that high proportions of HIV-positive pregnant women (10.9%) and men (6.6%) attending routine PMTCT services in Zimbabwe in 2017 received false-negative results. False-HIV-negative results can lead to failure to provide ART, PMTCT and early infant diagnosis (EID) services, which can cause increased morbidity, mortality and new infections. At the same time, false-HIV-positive test results can lead to inappropriate ART initiation, causing unnecessary side-effects, stigma and psychological distress – and a substantial waste of health care resources[6] (Gregson et al., 2021). For further discussion, see Surveillance challenges below.

[4] This is well below the WHO's recommended minimum target of 2.3 doctors, nurses and midwives per 1,000 population (Global Fund, 2020; Mundagowa & Chimberengwa, 2020).
[5] Under the 'Test and Treat' approach, all people testing positive for HIV should start ART as soon as possible, and within 1 week.
[6] The proportions of HIV-negative pregnant women (0.34%) and men (0.14%) receiving false-positive results were low, but 3.5% of women already on ART may be uninfected. In 2017, 978,000 adults were on ART at an

## Supply chain management

Inadequate infrastructure for storage of health products, insufficient funding and staff to manage the supply chain, and weaknesses in ordering systems in Zimbabwe have resulted in stockouts at health facilities (UNDP, 2020c). The Global fund audit assessed supply chain management in Zimbabwe as partially effective (Global Fund, 2020). While there were no material stockouts or expiration of antiretrovirals detected at any level for the three diseases during 2018-19, with stock counts and warning mechanisms for near-to-expiry products in place, storage capacity remains problematic (Global Fund, 2020). While the country is expanding the drug storage capacity of central and regional warehouses, overall capacity requirements are almost twice the current warehousing capacity, with a need for an updated assessment of warehousing needs (Global Fund, 2020). Gaps were also noted around timely and accurate data entry into inventory systems (Global Fund, 2020). Transportation has also been an issue: in the GFATM HIV Round 8 grant, the majority of the implementing partners and sub-sub recipients in Zimbabwe had transport management systems which were below standard (Makurumidze et al., 2020a).

**Covid-19:** The HIV and TB response in Zimbabwe relies heavily on imported consumables, test kits, and medications. Since Covid-19, supply chain activities for these products have been disrupted by closure of borders and grounding of cargo ships and flights (Mukwenha et al, 2020).

# 6. Covid-19 challenges

Covid-19 mitigation measures, such as travel restrictions, border closures, curfews, lockdowns, and social distancing, have affected the delivery and utilisation of essential health services (see Figure 17) (Gavi et al., 2021; Heuschen et al., 2021; Mbunge et al., 2021b; Thekkur et al., 2021). Health facilities have also been closed due to lack of staff and inadequate PPE; and of the ones that remain open, only a few patients were allowed in at a time, resulting in long waiting queues outside, which may have deterred patients (Heuschen et al., 2021; Thekkur et al., 2021). Reduced income during lock-downs due to inability to perform informal work, has also undermined the ability to pay the costs for routine care, drugs or transportation fees (Heuschen et al., 2021). Fear of becoming infected with Covid-19 has also deterred attendance at health facilities (Heuschen et al., 2021).

The largest effect of Covid-19 related disruption of HIV, TB, and malaria services is projected to result from interruption of ART, decline in TB case detection, and interruption of IRS and LLIN distribution campaigns, respectively (Amimo et al., 2020). The suspension of IRS and LLIN distribution, shortages of malaria commodities, and reduced demand for health services have hindered the continued delivery of malaria services (Gavi et al., 2021; Mbunge et al., 2021b). A recent modelling analysis by the WHO predicted a >20% rise in malaria morbidity and >50% mortality in sub-Saharan Africa during the Covid-19 pandemic as a result of a 75% reduction in routine malaria control measures and shortage of anti-malarial drugs (Zawawi et al., 2020). Another study finds that while 70% of facilities in Manicaland Province were ready to provide malaria services, there were increases in malaria incidence and mortality which could reflect decreased service utilisation (Pellegrino et al., 2022). Additional challenges in the case of TB include: the diversion of human and diagnostic resources from TB services, misdiagnosis of TB

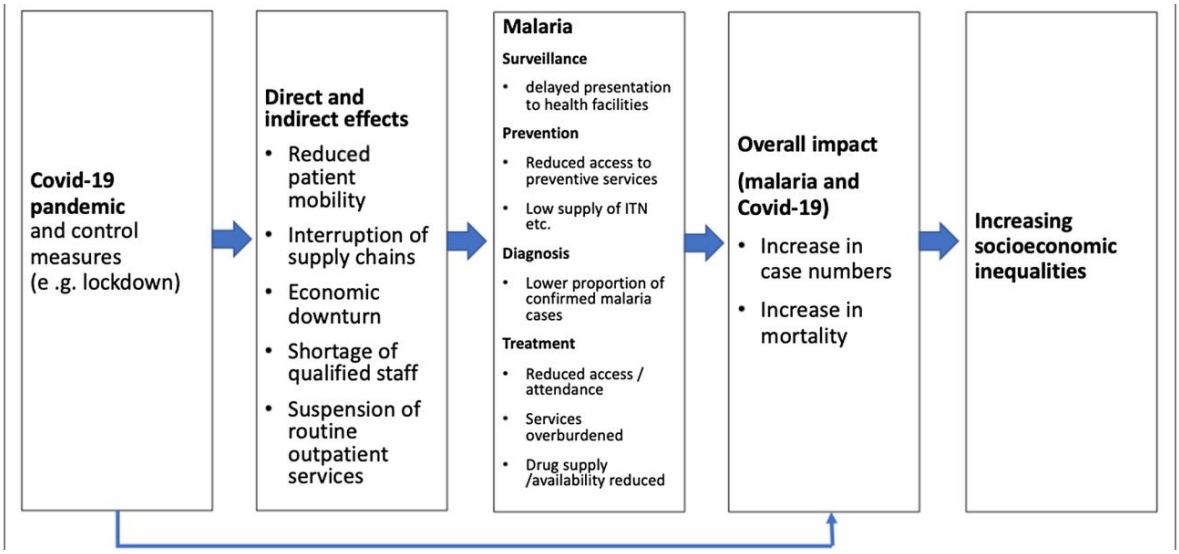
annual cost of $450 each; therefore, more than $15 million may be wasted on unnecessary treatment every year (Gregson et al., 2021).

in areas where Covid-19 testing is not available; and TB stigmatisation as some of the symptoms of TB and Covid-19 are similar (Nhari et al., 2020).

In Zimbabwe, 23% of PLHIV indicated lack of access to TB treatment during the pandemic, due to Covid-related disruptions and cost of medicines (Amino et al., 2020). Sixty percent of those reporting a problem did not know where to go to get their HIV medications because of closure of their usual pharmacy, due to Covid-19 restrictions, and 31% did not know where to go to get their HIV medications because they were not in the part of the country where they usually access HIV medications (Amimo et al., 2020).

For further discussion on Covid-19 related challenges, see the sections below on Surveillance challenges and Informational challenges.

**Figure 17: The Effects and Impact of Covid-19 control measures on Malaria control**




*Source: Heuschen et al., 2021: 4. Reproduced under Creative Commons Attribution 4.0 International License. https://link.springer.com/content/pdf/10.1186/s12936-021-03872-2.pdf*

# 7. Surveillance challenges

The MOHCC in Zimbabwe transitioned from paper-based reporting to national health information systems (NHIS) in 2010 to capture and manage surveillance and integration of health data at district, provincial and national levels (Mbunge et al., 2021a). While the introduction of NHIS and district health information systems version 2 (DHIS2)—an open-source software platform for reporting, analysing and disseminating health data, funded by a Global Health grant—have allowed for a more accurate, complete, reliable and efficient system for surveillance of malaria, tuberculosis, and HIV/AIDS, challenges remain (Mbunge et al., 2021b).

**Data discrepancies and under-estimation of cases:** Recent survey data on HIV indicate substantial progress on identification, treatment, and viral load suppression among PLHIV (Nsubuga et al., 2020). However, a recent Global Fund audit suggests that Zimbabwe seems to do well against the 90-90-90 targets because of a likely under-estimation of people living with HIV (Global Fund, 2020). The audit detected a high discrepancy between data from Zimbabwe's National HIV Testing Services Strategy for 2017-2020 and the HIV programme data; and

implausible estimates that suggest data inaccuracies[7] (Global Fund, 2020). Data from the health facilities visited vary markedly with data reported in the DHIS2: there were 5-15% variances in treatment numbers between the reports from health facilities and the numbers reported in DHIS2. An ART census also revealed significant data quality deficiencies, impacting the reliability of treatment coverage results (Global Fund, 2020).

**Inadequate notification and tracking**: The audit also reports a gap in communicating test results to patients generally: only 54% of the 26,000 sampled cases received test results back at the facility, out of which 89% were virally suppressed (Global Fund, 2020). This is attributed to the lack of a systematic process to track people on ART for VL testing (including tracking Zimbabweans who work in South Africa), and to low numbers of healthcare workers (Global Fund, 2020). Non-functional VL machines used for POCT[8] also contributed to low levels of VL testing (Global Fund, 2020). This is due to electricity issues and lack of standard procedures and tools for the transportation of samples to referral laboratories (Global Fund, 2020). In the case of children (0-14 years), only 57% of an estimated 91,000 living with HIV know their status, due to low birth testing (Global Fund, 2020). Out of ten visited facilities with POCT machines, eight were following the national guidelines of testing only high-risk newborns (4% of newborns), while the other two were testing all newborns. The former approach, combined with a weak follow-up mechanism, results in a missed opportunity to easily test newborns, with no assurance they will get tested at a later stage (Global Fund, 2020).

Only 70% of the 264,000 new HIV cases identified between January 2017 and June 2019 were initiated on ART (Global Fund, 2020). Key factors behind this lower percentage include the lack of a mechanism to track patients; the lack of programmes targeting KPs and AGYW at public health facilities; and inaccurate data (Global Fund, 2020). In the case of PMTCT, retention on ART post ANC booking was 89% at 1 month, 84% by month 3, declining to 73% by the sixth month (Chimwaza et al., 2021). The study showed that women who started ART at other facilities and registered for ANC at the study facility had no patient booklet, undermining the monitoring of pregnant women already on ART but taking their treatment at other facilities (Chimwaza et al., 2021). There is an urgent need to expand the use of the existing electronic systems to enable longitudinal follow-up of mothers during the ART follow-up; and to train every health care worker in routine data collection (Chimwaza et al., 2021; Nyakura, 2019).

The TB case notification system tracks data on case detection and treatment. In 2017, TB treatment coverage in Zimbabwe was estimated to be 71%, meaning that almost 30% of TB patients were either not diagnosed or not registered in the NTP (Sengai et al., 2019). A study on the surveillance system in Mhondoro-Ngezi district finds that while the TB case notification system was deemed acceptable, simple, representative and useful by health worker participants, notification remained low and data was always two weeks late (Magande et al., 2017). This was attributed to passive case detection, poor community involvement, and an inadequate number of diagnostic centres. As a result, a third diagnostic centre is being set up (Magande et al., 2017).

**Passive case finding**: Zimbabwe has for many years relied heavily on a passive case finding strategy, whereby patients self-present to health facilities with symptoms and from there, have been referred for testing (Sengai et al., 2019). This can result in delayed diagnosis and

[7] Current estimates suggest approximately 130,000 undetected HIV cases in Zimbabwe; at the current detection rate, cumulative detected cases are likely to surpass total estimated population in 2020, which would clearly be a data inaccuracy (Global Fund, 2020.

[8] POCT involves the use of portable and simple-to-operate devices to quickly generate diagnostic test results from a range of specimens in a range of clinical settings (Ncube & Chataway, 2019).

treatment. The NTP has more recently, in collaboration with partner organisations, adopted various active case finding (ACF) strategies, such as the use of mobile trucks for targeted active TB screening. See Surveillance interventions in Part III (Sengai et al., 2019).

A study on rural health centres in Guruve finds high LTFU, with one in five persons with presumptive pulmonary TB lost before laboratory investigations were completed (Murongazvombo et al., 2019). This could be due to the long distances between rural health centres and health facility laboratories and shortage of environmental health technicians who transport specimens (Murongazvombo, 2019). Another study conducted in Bulawayo finds that high pre-treatment LTFU is due to insufficient tracking of patients to diagnosis and treatment; and long delays during testing and from diagnosis to treatment (Mugaur et al., 2018). The study also recommends community-based active case finding strategies, particularly among vulnerable populations, and improvements in access to point of care diagnostics (Mugauri et al., 2018).

**Covid-19**: Covid-19 mitigation measures have threatened the functioning of malaria surveillance systems (Heuschen et al., 2021). A study on 23 malaria endemic countries in sub-Saharan Africa finds that there was a 22% reduction overall in malaria tests performed in April-June 2020, as compared to April-June 2019, with diagnosis and treatment services beginning to stabilise at the end of 2020 and in early 2021 (WHO, 2020a). However, seven countries, including Zimbabwe, still had reductions of over 30% in malaria testing (WHO, 2020a).

A recent study finds a substantial decline in testing for TB and HIV in Zimbabwe during the Covid-19 period (March 2020-February 2021) (Thekkur et al., 2021). There was an overall decrease in the numbers of persons presenting with presumptive pulmonary TB (PTB) (40.6%), people diagnosed with bacteriologically confirmed PTB (30.1%) and people being registered for TB treatment (33.7%) in the Covid-19 period compared to the pre-Covid-19 period (Thekkur et al., 2021). For presumptive PTB, the overall decrease was greater in children (71.3%) compared with adults (38.6%), but almost similar between males (38.4%) and females (36.0%) (Thekkur et al., 2021). Similarly, HIV testing declined by 62.8% in the first 6 months of Covid-19, compared with the pre-COVID-19 period; and by 37.6% in the second 6 months (Thekkur et al., 2021). The overall decrease was greater for children (70.2%) compared with adults (62.4%) and greater for males (79.1%) compared with females (53.6%) (Thekkur et al., 2021). Another study based on the period April to June 2020 finds that there was a 59% reduction in the number of clients tested for HIV and receiving their results, a 15% reduction in the distribution of HIV self-test kits; and a 51% reduction in patients newly diagnosed with HIV initiated on ART (Mukwenha et al, 2020).

These declines in HIV testing have been due in large part to the cessation of voluntary medical male circumcision services, which provided for HIV testing; diversion of laboratory services from testing for HIV and TB to testing for Covid-19; and the national lockdown, during which community-based HIV testing was temporarily suspended (Thekkur et al., 2021; Mukwenha et al, 2020). Better integration and screening of TB and Covid-19; and HIV and Covid-19 at the health facility and community level; HIV self-testing; and greater use of digital platforms for case finding and drug adherence could help to sustain TB and HIV services (Thekkur et al., 2021).

During Covid-19, a monthly surveillance system was adopted in both NTP and HIV programming, rather than quarterly reporting, in order to be able to detect and respond to changes in testing and outcomes (Thekkur et al., 2021). This system has experienced challenges, however, in terms of timeliness and integration. In some cases, sending health data from the district health facility to the national level using the Tally system took up to a month (Mbunge et al., 2021b).

There was also no real-time integration of health data amongst the various systems, making it difficult for healthcare workers to integrate and consolidate reports (Mbunge et al., 2021b).

# 8. Awareness and knowledge challenges

Poor knowledge of infectious diseases and lack of awareness of prevention practices are key risk factors to disease control. A recent study on malaria in Zimbabwe finds that there was a notable decline in exposure to malaria messages despite relatively high ownership of radios, televisions and mobile phones among the households surveyed in 2016 (Mbunge et al., 2021b). Another study conducted in rural areas in southern Zimbabwe finds that the community had fairly good knowledge of malaria as the majority of participants could identify the cause, signs and symptoms of malaria; and there was high awareness of LLINs (Mundagowa & Chimberengwa, 2020). Health promotion messages should thus emphasize the importance of closing eaves and other entry points of the malaria vector, and constructing better houses (Mundagowa & Chimberengwa, 2020). Continued sensitisation of vulnerable communities through IEC programmes are important in rural districts to enhance uptake of malaria interventions – and in the case of LLINs, to counter misuse and inconsistent use (Mbunge et al., 2021b).

A study on malaria in pregnancy in Zimbabwe finds that there was underutilisation of prevention strategies (e.g. LLINs) by 45% of participants, which was mainly due to failure to book for ANC or late booking (Gidiri, n.d.). Health education through accessible media is necessary in malaria endemic regions to emphasise the need for early booking for ANC and use of malaria preventive measures during pregnancy (Gidiri, n.d.). In the case of PMTCT HIV programming, community engagement (e.g. mentor mothers, male champions and community support groups) has been shown to increase early retention of pregnant women in care, which allows for more effective prevention measures (Chimwaza et al., 2021). Since retention rapidly decreases within the first 6 month after ANC booking, repeated counselling and reminders for women on ART of their appointments via phone calls and text messaging should be considered. They have been proven effective in increasing retention (Chimwaza et al., 2021).

**Covid-19:** National Covid-19 mass media campaigns have resulted in less likelihood of HIV, TB, and malaria clients attending health facilities due to fear of contracting Covid-19. There is a need to provide adequate health information to encourage HIV-positive individuals and TB clients to continue visiting health facilities as needed (Mbunge et al., 2021b; Mukwenha et al, 2020). Covid-19 also presents a challenge to disseminate information while maintaining physical distancing, especially in rural communities where inequality in access to information and the digital divide is common (Mbunge et al., 2021b). Rural health centres have traditionally been disseminating information through community gatherings, posters, billboards, and pamphlets among others, some of which may not be feasible during the pandemic. It is important to develop alternative information dissemination methods, such as through mobile phones, radio, and television (Mbunge et al., 2021b).

**Stigma**: There are still discriminatory attitudes towards PLHIV: 20% of respondents of a recent survey reported experiences of HIV-related discrimination in health-care settings (UNDP, 2020b). More recently, there has also been stigma and discrimination towards people suffering from Covid-19. A study on TB programming during the pandemic recommends that the government engage in combined education and awareness campaigns on Covid-19 and TB (or on Covid-19 and HIV), with civic groups, media organizations, and community leaders. This could encourage individuals to seek medical attention without fear of discrimination (Nhari et al., 2020).

# Part III: Select Interventions

## 9. Overview of donor financing

The GFATM, established in 2002, classifies Zimbabwe as a 'High Impact' country, meaning it has a very large Global Fund portfolio and a ‘mission critical’ disease burden (Global Fund, 2020). Zimbabwe has received US$1.67 billion worth of grants from GFATM since 2003 to fight HIV, TB, malaria, and strengthen its health system (Global Fund, 2020). Overall disbursements amounted to $1.5 billion as of November 2019 (Global Fund, 2020). The Fund allocated $474 million to Zimbabwe for the 2018-2020 implementation cycle: $403 million (85%) for HIV programmes, $48 million for malaria programmes, and $23 million for TB programmes (Global Fund, 2020). The Fund allocated $500 million for the 2020-2023 cycle (UNDP, 2020b). The UNDP is the Principal Recipient (PR) of the HIV grants; while the MoHCC is the PR for malaria and TB programmes.

**Malaria**: The Global Fund accounted for 58% of total malaria funding in Zimbabwe in the 2015-2017 implementation period (see Figure 18) (Muniu & Amendah, 2019). The Fund also accounts for a large proportion of malaria funding in the 2018-2020 period, as reported by donors and the government, alongside USAID (see Table 4). Grants have focused on various aspects of disease control including: vector control (IRS, LLIN); diagnosis and case management; and IEC to (Global Fund and UNDP, n.d.).

**Figure 18: Percentage of malaria funding by source for 2015-2017**

*Source: Ithibu, A., & Amendah, D, 2019: 15. This figure has been removed for copyright reasons. The figure can be viewed at https://newsite.aidspan.org/wp-content/uploads/2022/03/Domestic-financing-for-HIV-TB-and-malaria-1.pdf*

**Table 4: Malaria contributions to Zimbabwe’s malaria programming – 2018-2020**

| WHO region Country/area | Year | Contributions reported by donors | | | |
|---|---|---|---|---|---|
| | | Global Fund[1] | PMI/USAID[2] | World Bank[3] | UK[4] |
| Zimbabwe | 2018 | 13 338 190 | 15 446 409 | 0 | 0 |
| | 2019 | 17 512 630 | 15 181 693 | 0 | 0 |
| | 2020 | 32 077 379 | 15 000 000 | 0 | 0 |

| | Contributions reported by countries | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Government (NMP) | Global Fund | World Bank | PMI/USAID | Other bilaterals | WHO | UNICEF | Other contributions[7] |
| 2018 | 2 786 540 | 16 973 379 | 0 | 11 000 000 | 0 | 118 000 | 0 | 0 |
| 2019 | 3 765 250 | 25 931 599 | | 11 208 498 | | 140 000 | | |
| 2020 | 1 782 150 | 12 796 329 | | 12 000 000 | | | | |

Source: WHO, 2021a: 172. Reproduced under *CC BY-NC-SA 3.0 IGO* *https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2021*

**HIV**: The Global Fund accounted for 48% of the main funding for HIV in Zimbabwe in the 2015-2017 implementation period. Domestic resources financed less than 4% of the HIV national strategic plans (see Figure 19) (Muniu & Amendah, 2019). Funding is used to promote universal access to HIV prevention, testing, treatment, care and support services — including IEC initiatives; surveillance systems; community mobilisation; counselling services; and home-care.

(see Table 5) (PEPFAR, 2021b; UNCT Zimbabwe, 2018) There is also a specific focus of Global Fund grants on PMTCT programming and programmes targeting adolescents and youth and KPs (UNCT Zimbabwe, 2018). PEPFAR has also been a key donor of HIV programming in Zimbabwe since 2006 (see Table 5).

**Table 5: Annual HIV investment profile in Zimbabwe by programme area**

*Source: HIV resource alignment. Domestic government and other funders' data; cited in PEPFAR, 2021b: 19. This table has been removed for copyright reasons. The table can be viewed at https://www.state.gov/wp-content/uploads/2021/09/Zimbabwe_SDS_Final-Public_Aug-11-2021.pdf*

**Figure 19: Percentage of HIV funding by source for 2015-2017**

Source: *Ithibu, A., & Amendah, D, 2019: 12. This figure has been removed for copyright reasons. The figure can be viewed at https://newsite.aidspan.org/wp-content/uploads/2022/03/Domestic-financing-for-HIV-TB-and-malaria-1.pdf*

**TB**: The Global Fund was the single largest source of external TB funding for Zimbabwe, at 33% of funding in the 2015-2017 implementation period (see Figure 21) (Muniu & Amendah, 2019). Grants have been used to increase the number of TB diagnostic centres; strengthen laboratory capacity; and improve supply chain management (Global Fund and UNDP, n.d.).

**Figure 21: Percentage of TB funding by source for 2015-2017**

Source: *Ithibu, A., & Amendah, D, 2019: 15. This figure has been removed for copyright reasons. The figure can be viewed at https://newsite.aidspan.org/wp-content/uploads/2022/03/Domestic-financing-for-HIV-TB-and-malaria-1.pdf*

# 10. Addressing health system challenges

## Training

**Peer-led training and mentoring**: Operational delivery challenges in malaria elimination in Zimbabwe need to be addressed with training in management and team work (Chung et al., 2020). A scalable training and mentoring programme, developed by MOHCC and other partners, was designed to improve: productivity, coverage, and quality of operations; management capacity; and frontline workers' problem solving skills— at the district, clinic, and village level in three provinces of Zimbabwe (Chung et al., 2020). It was based on change management principles, participatory organisation development approaches, and quality improvement methods (Chung et al., 2020). A key component of the approach is that the individuals or teams facing certain operational challenges work with peers to solve these challenges at training events (Chung et al., 2020).

The training programme was implemented in Matabeleland South in 2016–2017, scaling up to Matabeleland North and Midlands, in Zimbabwe during 2017–2018 (Chung et al., 2020). Research finds that the programme resulted in significant operational improvements, including better data management in Matabeleland South; greater motivation and confidence among nurses after training in case management, and better data quality, in Matabeleland North; and greater goal-orientation and routine data monitoring in Midlands (Chung et al., 2020). Participants from all provinces also gained skills in listening, communicating, facilitating discussions, and making presentations (Chung et al., 2020).

A study on HIV testing uptake and ART initiation for pregnant women and HIV-exposed infants in Zimbabwe in 2014-2018 attributes high rates of testing and treatment initiation to a one-off clinical mentorship training[9] in 2013 for nurses in 56 predominantly rural health-facilities (Mandewo et al., 2020). Following the training, annual HIV testing uptake in pregnant women was consistently high >90% and ART initiation in HIV-positive women was also consistently high >95% (Mandewo et al., 2020). For HIV-exposed infants, testing uptake was consistently >95%, with performance better in urban facilities and facilities with more nurses trained; however, initiation of ART in children was sub-optimal (Mandewo et al., 2020). This high rates were sustained even three to four years post mentorship (Mandewo et al., 2020).

## Results-based financing

Since its introduction in 2011–12, RBF in Zimbabwe has provided an estimated extra US$2 per capita amount, focused on core maternal and child health indicators, along with one indicator targeting new outpatient cases (Witter et al., 2020). However, the crash in national budgets in the country has meant that RBF has covered basic running costs, functioning less as an incentive and more as a useful general source of resources at primary level (Witter et al., 2020). Nonetheless, research finds that RBF has served to improve the quality of reporting by public, predominantly primary level facilities overall. On a facility by facility basis, however, over 50% of facilities are still having errors, even on simple indicators like antenatal care visits, even after 3–5 years of RBF implementation and support (Witter et al., 2020). In addition, payments attached

[9] The training included five-days of classroom training by clinicians and nurses, seven-days when the nurse was attached to a clinician involved in ART care and four-months of supervision from a clinical mentor and multidisciplinary team observing nurse´s practices in HIV and ART management and care (Mandewo et al., 2020).

to indicators, such as new wider indicators that address coverage of TB services, are considered in some cases to be so low as to be demotivating (Witter et al., 2020).

## Supply chain management

**Warehousing and storage enhancements**: Global Fund investments have helped to scale impact across the three diseases and the health sector in Zimbabwe through support to procurement and supply chain management (PSM) systems (UNDP, 2020c). UNDP, through the Global Fund, has invested nearly US$30 million, for example, in warehousing and storage enhancements since 2014. A key element of this support has been for the construction of new provincial warehouses in Masvingo and Mutare; and the central medical store in Harare (UNDP, 2020c). UNDP also supported the construction or renovation of pharmacy stores in clinics and hospitals; and health facilities for TB infection control and diagnosis (UNDP, 2020c).

**Reliable transportation:** UNICEF and UNDP have supported transportation through the provision of refrigerated trucks and double cabs that have facilitated effective supervision of the movement of products from central and peripheral warehouses to health facilities across the country (UNDP, 2020c). In the past, lack of sufficient vehicles contributed to stockouts or forced health facilities to pick up products using alternative transport at their own cost (UNDP, 2020c). The initiative has also supported coordination among PSM governance institutions, which has created better linkages between technical-level issues and policy decisions; and shortened the time lag between decisions and implementation (UNDP, 2020c).

**Training of supply chain personnel:** In order to address challenges with supply chain personnel, UNDP initiated two major training programmes in 2017: a short certification course by the Chartered Institute of Procurement and Supply (CIPS) and an 11-18-month post-graduate course in pharmaceutical procurement and supply chain offered by the Empower School of Health. These courses seek to improve participants' understanding of the entire supply chain and address bottlenecks (UNDP, 2020c). As of 2019, 48 staff have graduated from the Empower programme and 120 personnel have completed either level 2 or 3 CIPS certification (UNDP, 2020c).

# 11. Addressing service provision challenges

## Universal health care

In order to address inequality and inequities to accessing care, Zimbabwe has been moving towards a UHC model since 2009, which seeks to provide equitable access to care for poor and vulnerable populations (Shamu et al., 2017). Zimbabwe has sought to increase overall coverage of its health services among those at risk.

**Malaria - mass campaigns and distributions of LLINs:** LLINs have been routinely and universally distributed through mass campaigns in Zimbabwe. According to the Zimbabwe demographic and health survey, approximately 48% of households owned at least one LLIN in malaria-transmission zones (Tapera, 2019). Despite significant improvements in coverage and access of LLINs using mass campaigns and routine distributions, with ownership increasing by 42% from 2010 to 2015, LLIN utilisation has been decreasing in transmission regions (Tapera, 2019). Utilisation amongst children under-five decreased from 32% in 2010 to 21% in 2015; and among the general population from 27% in 2010 to 18% in 2015 (Tapera, 2019). Since access

and usage of LLINs are influenced by socioeconomic factors, intersectoral approaches are needed to address barriers in usage (Tapera, 2019).

**HIV – achieving widespread uptake of ART through decentralisation and 'Test and Treat':** A recent study on ART programming in Zimbabwe finds that decentralisation has contributed to improvements in uptake in ART among children, adolescents and adults, alongside support for earlier ART initiation (Makurumidze, 2020b). Decentralisation was supported by policy shifts and significant investments in training, supervision and clinical mentoring (Makurumidze, 2020b). Data show a substantial increase in the proportion of patients receiving ART at the Primary Health Care (PHC) level (Makurumidze, 2020b). The study finds, however, that receiving ART at PHC level was associated with attrition; whereas a prior evaluation finds that retention among patients receiving ART at PHC level was better than among those initiating ART at higher levels of care, in particular district/mission hospitals (Makurumidze, 2020b). It is important to improve the quality of care at PHC facilities in order to improve retention; in addition to improving monitoring processes such that patients who self-transfer to another PHC facility of choice are tracked and not considered to have left treatment (Makurumidze, 2020b).

Research on Zimbabwe's 'Test and Treat' approach (initiating treatment as soon as possible and within 1 week), launched in 2016, finds that it can reduce LTFU before starting treatment (Rufu et al., 2018). A study conducted in 16 mission hospitals in four provinces of Zimbabwe reveals that the majority (94%) of people newly diagnosed with HIV were enrolled in care, and nearly 80% were initiated on ART (Rufu et al., 2018). Those tested in maternal and child health departments had a significantly higher likelihood of same-day ART initiation than others, likely due to Zimbabwe's focus on PMTCT programming (Rufu et al., 2018). There is some evidence, however, to suggest that rapid initiation of ART in pregnant women can increase LTFU after treatment has started, due to their having insufficient time to accept their HIV status (Rufu et al., 2018). The rapid roll-out of the 'Test and Treat' approach was associated with training of health workers, intense advocacy and community sensitisation, all of which may have helped to remove the social, cultural and health system-related barriers that prevent newly diagnosed HIV-infected people from taking up immediate life-long treatment (Rufu et al., 2018).

## Differentiated service delivery

**Peer-led delivery models for AGYW**: Zimbabwe has scaled up pediatric and adolescent HIV services since 2004, contributing to approximately 80% of the estimated 72,887 children and 63,176 adolescents diagnosed with HIV on ART by December 2017 (Willis et al., 2018). The scale-up included adoption of Community Adolescent Treatment Supporter (CATS) programmes– tailored for children, adolescents and young adults living with HIV. Such programming integrates peer-led, community interventions within national service delivery, with the goal of improving young people's experience across the HIV spectrum and providing ongoing support for their mental health, social protection, and sexual and reproductive health (SRH) (PEPFAR, 2021a; Willis et al., 2018). Studies of Zvandiri, an Africaid programme that adopts this model, finds that it has been successful in improving the quality of care for adolescents and young people and their retention in care. Adolescents and young people living with HIV, 18–24 years old, are trained and mentored by MOHCC and Africaid as peer counsellors (CATS) (Willis et al., 2018). Monthly community-based support groups, community outreach teams, and clinic-based Zvandiri Centres provide safe spaces for accessing clinical and social services and linking youth to other forms of assistance, including education in SRH and life skills (PEPFAR, n.d.).

An evaluation of the effectiveness of Zvandiri finds a lower prevalence of incomplete VL suppression and mortality among adolescents with HIV receiving enhanced support through the programme than among those receiving standard HIV care (Mavhu et al., 2020). Another study showed that this model improved linkage (100% of the 535 new HIV-positive youth identified were started on ART); retention in care (from 44.2% to 71.8% in a study of 50 adolescents); adherence to treatment; disclosure; and psychosocial well-being (PEPFAR, n.d.). A small-scale research study, conducted in a rural district of northern Zimbabwe, also finds that the programme improved adherence, retention, and psychosocial well-being, self-esteem, self-worth and confidence of adolescents living with HIV (PEPFAR, n.d.). Home visits and CATS text message reminders were considered particularly effective in achieving better adherence and retention (Mayhu et al., 2020; PEPFAR, n.d.). A process evaluation finds that the intervention had positive effects on participants through shared experiences, role modelling, supportive friendships, improved home and clinic environments, and improved treatment literacy of adolescents and their caregivers (Mayhu et al., 2020). The programme was notably more costly to implement, however, than standard interventions (Mavhu et al., 2020). Zvandiri has since evolved from an NGO-led model into a government-led, decentralised approach with technical and implementation support from the NGO (Willis et al., 2018). The Zvandiri Mobile Database App, developed for CATS and Africaid staff, captures real-time quantitative and qualitative data in each district (Willis et al., 2018).

**Peer-led delivery models for FSW**: Sisters with a Voice, established in Zimbabwe in 2009, provides community-led differentiated HIV prevention and treatment services to FSW. This includes HIV testing and counselling, reproductive health services, condom provision, and health education supported by trained peer educators, and a programme of participatory activities to build community empowerment (Matambanadzo et al., 2021; Napierala et al., 2018). The Sisters programme reached approximately 65,000 FSW by the end of 2017 (Napierala et al., 2018); and over 26,000 FSW annually in 2019 and 2020 (Matambanadzo et al., 2021). The programme has also begun providing additional services targeting younger FSWs, which have been scaled up with Global Fund resources (Napierala et al., 2018). A key strength of Sisters is its integrated model of government ownership; services delivered through a network of fixed-site and mobile clinics co-located within MoHCC clinics; and reliance on peer educators (Matambanadzo et al., 2021). Despite the impact of Covid-19 restrictions on mobility, adaptations to the programme contributed to a large increase in uptake of HIV prevention medications, compared to pre-Covid levels. These included the establishment of ‘access points’ outside clinics, consultations and follow-ups via phone and WhatsApp, ‘talk time’ with peer educators, and greater supply of medication in order to minimise the frequency of clinic visits (Matambanadzo et al., 2021).

**Integrated HIV-TB care:** Given high rates of HIV-TB co-infection, differentiated service delivery models for HIV and TB clients can streamline the delivery of health services and reduce the need for multiple visits to multiple facilities (Mukwenha et al, 2020). This can both reduce costs for patients and minimise exposure to Covid-19. Challenge TB, funded by USAID, has supported integrated care and prevention for TB-HIV patients, with a one-stop model for co-infected patients. Care providers offer TB and ART medication, counselling, and education during single clinic visits (USAID and KNCV, n.d.). Diabetes mellitus screening, an important risk factor for TB, was also integrated into the service package (UNDP, 2020b).

# 11. Surveillance

The Global Fund and PEPFAR have invested in case surveillance throughout sub-Saharan Africa. The HIV case surveillance system in Zimbabwe was designed to integrate within existing health information systems at the facility level. A study on the pilot project finds that the system (paper-based and digital) performed well in terms of surveillance and informatics attributes; however, delayed return of VL test results was a significant problem (Nsubuga et al., 2020). At the health facility level, the system enabled staff to order the exact number of antiretroviral drugs that were needed for their clients and thus minimise wastage; however, there was limited evidence of the system´s usefulness at district and provincial level (Nsubuga et al., 2020). The study finds that training was minimal, however, representing a missed opportunity to train data entry clerks in data analysis that could benefit the entire health sector. In addition, respondents reported that the new case surveillance forms added on top of pre-existing forms increased the burden of work on staff (Nsubuga et al., 2020). A workflow analysis could be conducted to reduce duplicative and redundant paperwork and registers at health facilities (Nsububga et al., 2020). Printer paper and toner cartridges are also needed on hand such that analyses can be printed and posted; along with better linkages of data entry to the MOHCC local area network (Nsubuga et al., 2020).

**Self-testing:** Self-testing has been introduced and scaled up in Zimbabwe through PEPFAR programming, with the distribution of over 55,000 self-test kits to KPs by mid-2020 and peer outreach to follow up. The programming is considered successful in reaching KPs, in particular MSM, through community-based kit distribution, follow-up for diagnostic testing and linkage to treatment and prevention services (PEPFAR, 2021a). The receipt of results has been problematic, however, due to the lack of data systems that simultaneously deliver results to the facility and the patient. Zimbabwe has developed a text messaging system that sends a notification to patients that their results are ready,[10] which is currently being used for COVID-19 testing. It could potentially be incorporated for HIV viral load and EID results reporting (PEPFAR, 2021a).

**Active case finding:** Delays in diagnosis and treatment of TB are due in part to a passive approach of detection (see Surveillance in Part II). The Tas4TB programme, initiated in 2017 in 15 priority districts in Zimbabwe, adopts an active case finding approach using mobile X-ray trucks, offering free health services to the population, including hard-to-reach groups (Sengai et al., 2019). The medical team[11] and the truck arrive at a designated site and actively screen people who come forward, including those from high risk groups (HRGs). Data are collected using a smart phone android application that links with a central electronic database in real time (Sengai et al., 2019). The programme's focus is on identification of cases, with little attention paid to further linkage to care and treatment outcomes, which it leaves to local health facilities (Sengai et al., 2019).

A study of Tas4TB's performance in 2017 finds that it had a high TB diagnostic yield in the selected districts, at approximately 1700/100,000, which suggests that active case finding can play an important role in TB case notification (Sengai et al., 2019). Although case notifications in the non-HRGs were four times lower than in HRGs, they were still high at 800/100,000 (Sengai

[10] If the VL is suppressed, they will be advised to go to the clinic on the next appointment. If the result is non-suppressed, the clients will be advised to visit their facilities as soon as possible. At the same time, another notification is sent to the Clinician at the facility with an actual result and Patient unique ID (PEPFAR, 2021a).
[11] The medical team comprises nurses, counsellors, radiographers, laboratory scientists, medical officers; data officers; and health promoters, who mobilise communities, identify screening sites and schedule dates.

et al., 2019). Linkage to care and treatment was sub-optimal, with nearly one in five diagnosed patients failing to start treatment (Sengai et al., 2019). Treatment success was only 60% among all diagnosed patients, and 74% among those who started treatment (Sengai et al., 2019).

**Point of care testing:** POCT has also had a significant impact on health care by bringing clinical testing and monitoring from the central referral hospital to the remote health clinic (Ncube & Chataway, 2019). Zimbabwe is one of 15 UNITAID-supported early adopter countries that have successfully trialled HIV POCT as part of an EID programme (Ncube & Chataway, 2019). Research on POCT in Zimbabwe identifies various local capacity building initiatives of relevance. One initiative increased capacity utilisation of the GeneXpert devices for VL monitoring from 11% to 67% by integrating HIV with TB testing (Ncube & Chataway, 2019). Turnaround times for TB testing were reduced from 3 weeks to 1 day with excellent clinical outcomes for combined TB-HIV treatment (Ncube & Chataway, 2019). Challenge TB has supported the development of a POC plan that includes guidance on integrated use of GeneXpert for TB and HIV (USAID and KNCV, n.d.).

Another study conducted in rural Zimbabwe finds that compared to centralised testing, decentralised testing on GeneXpert had considerably shorter overall median turnaround time to result delivery (reduced from 27 days to 1 day for HIV VL and from 17 days to 1 day for HIV EID) (Ndlovu et al., 2018). Of the 12 infants who tested positive in the study, 10 (83.3%) were immediately initiated on ART (Ndlovu et al., 2018). Findings support extending POCT beyond EID to also cover HIV VL and TB; although decentralisation can be costly and requires regular on-site supervision (Ndlovu et al., 2018). POCT can be used to diagnose various other diseases, such as Covid-19, helping respond to co-infection, improve test efficiency and lower testing cost (PEPFAR, 2021a).

# 12. Education and communication

Education and communication programmes can raise knowledge and awareness and, in turn, improve testing and care seeking.

**Social and behaviour communication change**: SBCC is a key malaria control strategies in Zimbabwe. It aims to counter IRS refusal, for example, which can be linked to fear and ignorance of the impact of chemical spraying, and perceived side effects (Mbunge et al., 2021b). SBCC activities in rural health centres are carried out by nurses and environmental health technicians through scheduled and ad-hoc health education sessions to patients and vulnerable populace. Malaria posters and pamphlets written in local languages are also used to relay malaria messages in hard-to-reach areas; while in urban areas, messages are relayed on walls at local shops and branded public transport vehicles. The effectiveness of these SBCC malaria interventions is not yet known, however (Mbunge et al., 2021b). A more recent campaign strategy to engage the local leadership (e.g. chiefs, village heads) and the community, and the introduction of messaging through mobile technology, could also help to reduce IRS refusal (Mbunge et al., 2021b).

**Peer education**: Numerous studies have shown peer education groups or club-based interventions to be an effective mechanism for increasing uptake of HIV and SRH services among AGYW; however, few have assessed the efficacy of such interventions in Zimbabwe (Oberth et al., 2021). The Sista2Sista programme is a structured peer group intervention in Zimbabwe aimed at improving health outcomes among vulnerable AGYW — initiated in 2013 by

the MOHCC and United Nations Population Fund (Oberth et al., 2021). AGYW are selected through a door-to-door approach, based on a risk assessment tool focused on: self-awareness, education, social relationships, sexual knowledge and financial awareness (Oberth et al., 2021). Peer groups, led by female mentors called behaviour change facilitators, meet weekly over the course of one year, engaging in exercises that cover a range of topics, including HIV, stigma and discrimination, gender and power, and financial awareness. Exercises involve different learning techniques, including group storytelling, debate, song, interactive role play and visual representations. Group exercises are complemented by ad hoc individual sessions (Oberth et al., 2021). A recent study of the programme finds that participants who received more intensive individual support were more likely to graduate from the programme[12] (Oberth et al., 2021).

Graduates of the programme were more likely to take an HIV test, less likely to get married and less likely to drop out of school. At higher thresholds of programme completion, additional positive outcomes were observed: participants who completed all of the exercises were more likely to return to school, more likely to use contraception, more likely to report sexual abuse, and less likely to become pregnant as adolescents (Oberth et al., 2021). Outcomes related to school attendance and the use of a family planning method were sustainable up to one year post-intervention (Oberth et al., 2021). Despite the strong effect of the programme on increased uptake of HIV testing, the overall coverage of HIV testing among participants was low at 15%. This may be due to stigma and unfriendly health services that act as barriers to HIV testing for AGYW (Mavedzenge et al., 2016). Provision of on-site testing—or community, mobile, or home-based testing modalities—may increase uptake among participants and other AGWY (Oberth et al., 2021; Mavedzenge et al., 2016).

# 13. References


Amimo, F., Lambert, B., Magit, A., & Hashizume, M. (2020). The potential impact of the COVID-19 pandemic on HIV, tuberculosis, and malaria control in Africa: a systematic review of modelling studies and population surveys. https://assets.researchsquare.com/files/rs-103235/v1/16ec3dac-7ba2-42ad-a025-104f0bd25d83.pdf?c=1631860368

Banda Chitsamatanga, B., & Malinga, W. (2021). 'A tale of two paradoxes in response to COVID-19': Public health system and socio-economic implications of the pandemic in South Africa and Zimbabwe. *Cogent Social Sciences*, *7*(1), 1869368. https://doi.org/10.1080/23311886.2020.1869368

Cheza, A., Tlou, B., & Zhou, D. T. (2021). Incidence of non-communicable diseases (NCDs) in HIV patients on ART in a developing country: Case of Zimbabwe's Chitungwiza Central Hospital—A retrospective cohort study (2010–2019). *Plos one*, *16*(5), e0252180. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0252180

Chimwaza, A. N., Tweya, H., Mugurungi, O., Mushavi, A., Mukungunugwa, S., Sithole, N., ... & Taramusi, I. (2021). Early retention among pregnant women on 'Option B+'in urban and rural Zimbabwe. *AIDS Research and Therapy*, *18*(1), 1-8. https://link.springer.com/article/10.1186/s12981-021-00333-3

Chung, A. M., Case, P., Gosling, J., Gosling, R., Madinga, M., Chikodzore, R., ... & Mberikunashe, J. (2020). Scaling up malaria elimination management and leadership: a pilot in three provinces in


[12] Among those who received no individual sessions, the graduation rate was 64.58%; rising to 67.82% for those receiving 10 or more individual sessions; to 75.86% with 20 or more individual sessions; and to 83.14% with 30 or more individual session (Oberth et al., 2021).

Zimbabwe, 2016–2018. *Malaria journal*, *19*(1), 1-14. https://malariajournal.biomedcentral.com/articles/10.1186/s12936-020-03255-z

Cuadros, D. F., Li, J., Mukandavire, Z., Musuka, G. N., Branscum, A. J., Sartorius, B., ... & Tanser, F. (2019). Towards UNAIDS Fast-Track goals: targeting priority geographic areas for HIV prevention and care in Zimbabwe. *Aids*, *33*(2), 305-314. https://journals.lww.com/aidsonline/Fulltext/2019/02010/Towards_UNAIDS_Fast_Track_goals__targeting.14.aspx

Evans, C., Humphrey, J. H., Ntozini, R., & Prendergast, A. J. (2016). HIV-exposed uninfected infants in Zimbabwe: insights into health outcomes in the pre-antiretroviral therapy era. *Frontiers in immunology*, *7*, 190. https://doi.org/10.3389/fimmu.2016.00190

Gavi, S., Tapera, O., Mberikunashe, J., & Kanyangarara, M. (2021). Malaria incidence and mortality in Zimbabwe during the COVID-19 pandemic: analysis of routine surveillance data. *Malaria journal*, *20*(1), 1-9. https://link.springer.com/article/10.1186/s12936-021-03770-7

Gidiri, M. F., Bishi, R., & Magwali, T. L. (n.d.) A Study of the Outcomes of 103 Pregnant Women Admitted with Malaria at Three District Hospitals in Mashonaland East Province and One Central Hospital in Harare Province in Zimbabwe. http://45.113.122.54/pdfs/ajnh/v2-i2/4.pdf

Global Fund (2021). *The Global Fund: Results Report 2021*. Geneva: The Global Fund. https://www.theglobalfund.org/media/11304/corporate_2021resultsreport_report_en.pdf

Global Fund (2020). *Global fund grants in Zimbabwe: Audit report.* Geneva: The Global Fund. https://www.theglobalfund.org/media/9476/oig_gf-oig-20-008_report_en.pdf

Global Fund and UNDP (n.d.) *Global Fund increases support to Zimbabwe.* http://www.zw.undp.org/content/dam/zimbabwe/docs/hivaids/UNDP_ZW_HIVAIDS_Global%20Fund%20Support%20Zw.pdf

Gregson, S., Moorhouse, L., Dadirai, T., Sheppard, H., Mayini, J., Beckmann, N., ... & Nyamukapa, C. (2021). Comprehensive investigation of sources of misclassification errors in routine HIV testing in Zimbabwe. *Journal of the International AIDS Society*, *24*(4), e25700. https://doi.org/10.1002/jia2.25700

Gwitira, I., Karumazondo, N., Shekede, M. D., Sandy, C., Siziba, N., & Chirenda, J. (2021). Spatial patterns of pulmonary tuberculosis (TB) cases in Zimbabwe from 2015 to 2018. *Plos one*, *16*(4), e0249523. https://doi.org/10.1371/journal.pone.0249523

Gwitira, I., Mukonoweshuro, M., Mapako, G., Shekede, M. D., Chirenda, J., & Mberikunashe, J. (2020). Spatial and spatio-temporal analysis of malaria cases in Zimbabwe. *Infectious Diseases of Poverty*, *9*(05), 45-58. https://doi.org/10.1186/s40249-020-00764-6

Gwitira, I., Murwira, A., Mberikunashe, J., & Masocha, M. (2018). Spatial overlaps in the distribution of HIV/AIDS and malaria in Zimbabwe. *BMC infectious diseases*, *18*(1), 1-10. https://link.springer.com/article/10.1186/s12879-018-3513-y

Heuschen, A. K., Lu, G., Razum, O., Abdul-Mumin, A., Sankoh, O., Von Seidlein, L., ... & Müller, O. (2021). Public health-relevant consequences of the COVID-19 pandemic on malaria in sub-Saharan Africa: a scoping review. *Malaria journal*, *20*(1), 1-16. https://link.springer.com/article/10.1186/s12936-021-03872-2

Ithibu, A., & Amendah, D. (2019). Domestic financial contributions to HIV, TB and malaria. Aidspan. https://newsite.aidspan.org/wp-content/uploads/2022/03/Domestic-financing-for-HIV-TB-and-malaria-1.pdf

Magande, P. N., Chirundu, D., Bangure, D., Gombe, N. T., & Tshimanga, M. (2017). Evaluation of the Tuberculosis Case Notification System, Mhondoro-Ngezi District, Zimbabwe, 2016. *Open Journal of Epidemiology*, *7*(01), 1. https://doi.org/10.4236/ojepi.2017.71001

Makurumidze, R., Tafara, G. N., Tapiwa, M., Takundwa, L., & Tshimanga, M. (2020). Assessment of the transport management systems for National Acquired Immunodeficiency Syndrome (AIDS) Council of Zimbabwe Global Fund Round 8 grant sub-recipients and implementing partners, 2014. *The Pan African Medical Journal*, *37*. https://doi.org/10.11604/pamj.2020.37.226.21202

Makurumidze, R., Mutasa-Apollo, T., Decroo, T., Choto, R. C., Takarinda, K. C., Dzangare, J., ... & Rusakaniko, S. (2020b). Retention and predictors of attrition among patients who started antiretroviral therapy in Zimbabwe's national antiretroviral therapy programme between 2012 and 2015. *PloS one*, *15*(1), e0222309. https://doi.org/10.1371/journal.pone.0222309

Mandewo, W., Muchuchuti, C., Shoko, O., Timire, C., Takarinda, K. C., Harries, A. D., ... & Mahomva, A. (2020). Prevention of mother-to-child transmission activities after one-off clinical mentorship training in selected health facilities, Zimbabwe: 2014-2018. *Pan African Medical Journal*, *36*(1). https://www.ajol.info/index.php/pamj/article/view/212969

Matambanadzo, P., Busza, J., Mafaune, H., Chinyanganya, L., Machingura, F., Ncube, G., ... & Cowan, F. M. (2021). "It went through the roof": an observation study exploring the rise in PrEP uptake among Zimbabwean female sex workers in response to adaptations during Covid-19. *Journal of the International AIDS Society*, *24*, e25813. https://onlinelibrary.wiley.com/doi/epdf/10.1002/jia2.25813

Mavhu, W., Willis, N., Mufuka, J., Bernays, S., Tshuma, M., Mangenah, C., ... & Cowan, F. M. (2020). Effect of a differentiated service delivery model on virological failure in adolescents with HIV in Zimbabwe (Zvandiri): a cluster-randomised controlled trial. *The Lancet Global Health*, *8*(2), e264-e275. https://icap.columbia.edu/wp-content/uploads/Jan-2020-Journal-Club.pdf

Mbunge, E., Millham, R., Sibiya, N., & Takavarasha Jr, S. (2021). Is malaria elimination a distant dream? Reconsidering malaria elimination strategies in Zimbabwe. *Public Health in Practice*, *2*, 100168. https://doi.org/10.1016/j.puhip.2021.100168

Mbunge, E., Millham, R., Sibiya, M. N., & Takavarasha, S. (2021b). Impact of COVID-19 on Malaria elimination: juxtaposing indoor residual spraying and mobile phones in Buhera Rural District, Zimbabwe. https://www.researchsquare.com/article/rs-173130/latest.pdf

Mugauri, H., Shewade, H. D., Dlodlo, R. A., Hove, S., & Sibanda, E. (2018). Bacteriologically confirmed pulmonary tuberculosis patients: Loss to follow-up, death and delay before treatment initiation in Bulawayo, Zimbabwe from 2012–2016. *International Journal of Infectious Diseases*, *76*, 6-13. https://doi.org/10.1016/j.ijid.2018.07.012

Mukwenha, S., Dzinamarira, T., Mugurungi, O., & Musuka, G. (2020). Maintaining robust HIV and tuberculosis services in the COVID-19 era: A public health dilemma in Zimbabwe. *International Journal of Infectious Diseases*, *100*, 394-395. https://doi.org/10.1016/j.ijid.2020.09.1425

Mundagowa, P. T., & Chimberengwa, P. T. (2020). Malaria outbreak investigation in a rural area south of Zimbabwe: a case–control study. *Malaria journal*, *19*(1), 1-10. https://malariajournal.biomedcentral.com/articles/10.1186/s12936-020-03270-0

Muniu, S., & Amendah, D. (2019). The Global Fund programs in challenging monetary environment: Example of Zimbabwe. Kenya: Aidspan – Independent observer of the Global Fund. https://aidspan.org/sites/default/files/publications/The-Global-Fund-programs-in-challenging-monetary-environment-Example-of-Zimbabwe.pdf

Murongazvombo, A. S., Dlodlo, R. A., Shewade, H. D., Robertson, V., Hirao, S., Pikira, E., ... & Tshuma, C. (2019). Where, when, and how many tuberculosis patients are lost from presumption until treatment initiation? A step by step assessment in a rural district in Zimbabwe. *International Journal of Infectious Diseases*, *78*, 113-120. https://doi.org/10.1016/j.ijid.2018.10.013

Napierala, S., Chabata, S. T., Fearon, E., Davey, C., Hargreaves, J., Busza, J., ... & Cowan, F. M. (2018). Engagement in HIV care among young female sex workers in Zimbabwe. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, *79*(3), 358-366. https://journals.lww.com/jaids/fulltext/2018/11010/engagement_in_hiv_care_among_young_female_sex.11.aspx

Ncube, V., & Chataway, J. (2019). Harnessing innovative HIV point-of-care testing for health systems strengthening: early lessons from Zimbabwe. *Innovation and Development*, *9*(2), 287-304. https://doi.org/10.1080/2157930X.2019.1567851

Nhari, L. G., Dzobo, M., Chitungo, I., Denhere, K., Musuka, G., & Dzinamarira, T. (2020). Implementing effective TB prevention and treatment programmes in the COVID-19 era in Zimbabwe. A call for innovative differentiated service delivery models. *Public Health in Practice*, *1*, 100058. https://doi.org/10.1016/j.puhip.2020.100058

Ndlovu Z, Fajardo E, Mbofana E, MaparoT, Garone D, Metcalf C, et al. (2018) Multidisease testing for HIV and TB using the GeneXpert platform: A feasibility study in rural Zimbabwe. PLoS ONE 13(3): e0193577. https://doi.org/10.1371/journal.pone.0193577

Nsubuga, P., Mabaya, S., Apollo, T., Sithole, N., Komtenza, B., Matare, T., ... & Gasasira, A. (2020). Evaluation of the Zimbabwe HIV case surveillance pilot project, 2019. *The Pan African Medical Journal*, *37*. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7992901/

Nyabani, P. (2021). Epidemiological transition and the dual burden of communicable and noncommunicable diseasein Zimbabwe. *International Journal of Noncommunicable Diseases*, *6*(4), 166. https://www.ijncd.org/article.asp?issn=2468-8827;year=2021;volume=6;issue=4;spage=166;epage=171;aulast=Nyabani

Nyakura, J., Shewade, H. D., Ade, S., Mushavi, A., Mukungunugwa, S. H., Chimwaza, A., ... & Mugurungi, O. (2019). Viral load testing among women on 'option B+'in Mazowe, Zimbabwe: How well are we doing?. *Plos one*, *14*(12), e0225476. https://doi.org/10.1371/journal.pone.0225476

Oberth, G., Chinhengo, T., Katsande, T., Mhonde, R., Hanisch, D., Kasere, P., ... & Madzima, B. (2021). Effectiveness of the Sista2Sista programme in improving HIV and other sexual and reproductive health outcomes among vulnerable adolescent girls and young women in Zimbabwe. *African Journal of AIDS Research*, *20*(2), 158-164. https://doi.org/10.2989/16085906.2021.1918733

Pellegrino, J., Tapera, O., Mberikunashe, J., & Kanyangarara, M. (2022). Malaria service provision in Manicaland Province, Zimbabwe during the coronavirus pandemic: A cross-sectional survey of health facilities. *Journal of Global Health Reports*, *6*, e2022004. https://www.joghr.org/article/31597.pdf

PEPFAR (2021a). PEPFAR 2021 Country and Regional Operational Plan (COP/ROP) Guidance for all PEPFAR Countries. PEPFAR. https://www.state.gov/wp-content/uploads/2020/12/PEPFAR-COP21-Guidance-Final.pdf

PEPFAR (2021b). Zimbabwe: Country Operational Plan COP 2021. PEPFAR. https://www.state.gov/wp-content/uploads/2021/09/Zimbabwe_SDS_Final-Public_Aug-11-2021.pdf

PEPFAR Solutions Platform (BETA) (n.d.). Zvandiri: Peer Counseling to Improve Adolescent HIV Care and Support. https://static1.squarespace.com/static/5a29b53af9a61e9d04a1cb10/t/5a5a6ca353450a8d5ab40fd7/1515875502345/2.17+-+Zimbabwe+CATS+-+long+form+-+1.13.18.pdf

Rufu, A., Chitimbire, V. T. S., Nzou, C., Timire, C., Owiti, P., Harries, A. D., & Apollo, T. (2018). Implementation of the 'Test and Treat' policy for newly diagnosed people living with HIV in Zimbabwe in 2017. *Public Health Action*, *8*(3), 145-150. https://doi.org/10.5588/pha.18.0030

Sengai, T., Timire, C., Harries, A. D., Tweya, H., Kavenga, F., Shumba, G., ... & Sandy, C. (2019). Mobile targeted screening for tuberculosis in Zimbabwe: diagnosis, linkage to care and treatment outcomes. *Public Health Action*, *9*(4), 159-165. https://doi.org/10.5588/pha.19.0040

Shamu, S., January, J., & Rusakaniko, S. (2017). Who benefits from public health financing in Zimbabwe? Towards universal health coverage. *Global public health*, *12*(9), 1169-1182. https://doi.org/10.1080/17441692.2015.1121283

Smit, M., Olney, J., Ford, N. P., Vitoria, M., Gregson, S., Vassall, A., & Hallett, T. B. (2018). The growing burden of noncommunicable disease among persons living with HIV in Zimbabwe. *AIDS*, *32*(6), 773. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5856639/

Tapera, O. (2019). Determinants of long-lasting insecticidal net ownership and utilization in malaria transmission regions: evidence from Zimbabwe Demographic and Health Surveys. *Malaria journal*, *18*(1), 1-7. https://malariajournal.biomedcentral.com/articles/10.1186/s12936-019-2912-x

Taramusi, I., Sisimayi, C., Benedikt, C., Fraser, N., del Mar Quiroga, M., Minnery, M., ... & Kelly, S. (2018). National and Provincial HIV Acquisition and Transmission Estimates and Patterns in Zimbabwe. https://openknowledge.worldbank.org/handle/10986/33270

Thekkur, P., Takarinda, K. C., Timire, C., Sandy, C., Apollo, T., Kumar, A., ... & Harries, A. D. (2021). Operational research to assess the real-time impact of COVID-19 on TB and HIV services: The experience and response from health facilities in Harare, Zimbabwe. *Tropical Medicine and Infectious Disease*, *6*(2), 94. https://doi.org/10.3390/tropicalmed6020094

UNAIDS (2020). *Zimbabwe 2020: HIV and AIDS estimates.* https://aidsinfo.unaids.org/

UNCT Zimbabwe (2018). Global Fund Unveils Additional $502 million to Zimbabwe. UN Country Team in Zimbabwe. https://reliefweb.int/report/zimbabwe/global-fund-unveils-additional-502-million-zimbabwe

UNDP (2020a). Human Development Indicators 2018: Zimbabwe. https://hdr.undp.org/en/countries/profiles/ZWE

UNDP (2020b). *Zimbabwe Progress Review Report of Sustainable Development Goals (SDGs),* December 2020. UNDP Zimbabwe. https://www.zw.undp.org/content/zimbabwe/en/home/library/zimbabwe-progress-review-report-of-sustainable-development-goals.html

UNDP (2020c*) Healthy systems for healthy people: The impact of UNDP-managed Global Fund investments in procurement and supply chain systems in Zimbabwe*. May 2020. UNDP Zimbabwe

https://www.zw.undp.org/content/zimbabwe/en/home/library/hiv_aids/the-impact-of-undp-managed-global-fund-investments-in-procuremen.html

USAID and KNCV (n.d.) *Challenge TB: Final report.* USAID and KNCV Tuberculosis Foundation https://challengetb.org/reportfiles/Challenge_TB_Final_Report.pdf

Willis, N., Napei, T., Armstrong, A., Jackson, H., Apollo, T., Mushavi, A., ... & Cowan, F. M. (2018). Zvandiri—bringing a differentiated service delivery program to scale for children, adolescents, and young people in Zimbabwe. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, *78*, S115-S123. https://journals.lww.com/jaids/FullText/2018/08152/Zvandiri_Bringing_a_Differentiated_Service.8.aspx

Witter, S., Chirwa, Y., Chandiwana, P., Munyati, S., Pepukai, M., Bertone, M. P., & Banda, S. (2020). Results-based financing as a strategic purchasing intervention: some progress but much further to go in Zimbabwe?. *BMC health services research*, *20*(1), 1-18. https://link.springer.com/article/10.1186/s12913-020-5037-6

WHO (2021a). *World Malaria report 2021.* Geneva: World Health Organisation (WHO). https://www.who.int/teams/global-malaria-programme/reports/world-malaria-report-2021

WHO (2021b). *Global tuberculosis report 2021.* October. Geneva: World Health Organisation (WHO). https://www.who.int/publications/i/item/9789240037021

Zawawi, A., Alghanmi, M., Alsaady, I., Gattan, H., Zakai, H., & Couper, K. (2020). The impact of COVID-19 pandemic on malaria elimination. *Parasite epidemiology and control*, *11*, e00187. https://doi.org/10.1016/j.parepi.2020.e00187Get rights and content

Zvinoera, K., Olaru, I. D., Khan, P., Mutsvangwa, J., Denkinger, C. M., Kampira, V., ... & Kranzer, K. (2021). The impact of changing the diagnostic algorithm for TB in Manicaland, Zimbabwe. *Public health action*, *11*(4), 196-201. http://dx.doi.org/10.5588/pha.21.004

## Suggested citation

Haider, H. (2022). *Malaria, HIV and TB in Zimbabwe: Epidemiology, disease control and interventions.* K4D Helpdesk Report 1086. Brighton, UK: Institute of Development Studies. DOI: 10.19088/K4D.2022.037

## 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.*

*K4D services are provided by a consortium of leading organisations working in international development, led by the Institute of Development Studies (IDS), with Education Development Trust, Itad, University of Leeds Nuffield Centre for International Health and Development, Liverpool School of Tropical Medicine (LSTM), University of*

*Birmingham International Development Department (IDD) and the University of Manchester Humanitarian and Conflict Response Institute (HCRI).*