

EXECUTIVE SUMMARY

KNOWLEDGE IS POWER

KNOW YOUR STATUS,
KNOW YOUR VIRAL LOAD



Mandisa Dukashe and her family live in Eastern Cape, South Africa. Mandisa is a trained nurse and works in the response to HIV to ensure quality control in health-care settings. She is living with HIV and encourages people to get tested for HIV. Her husband and two daughters are all HIV-negative.

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The full report is available at <http://www.unaids.org/>.

FOREWORD

Increasingly when I meet people living with HIV, I am hearing about the importance of HIV testing being freely available by anyone who wants to know their HIV status. And I am hearing how important it is to keep HIV suppressed.

Having an undetectable viral load—a level of HIV in a person’s blood so low that it can’t be detected—is vital. It improves the health of people living with HIV and reduces deaths. People with sustained viral load suppression have effectively no risk of sexually transmitting the virus to a partner who is HIV-negative.

I have seen the successes. A full 75% of people living with HIV knew their HIV status in 2017, up from 66% in 2015—in three short years the number of people living with HIV who don’t know their status fell from a third to a quarter. Worldwide, the percentage of people living with HIV who are virally suppressed has increased significantly, from 38% in 2015 to 47% in 2017. But access is mixed. In some parts of the world, getting a viral load test is easy—it is fully integrated into a person’s treatment regime—but in other places it is close to impossible, with only one viral load machine for the entire country.

To reach the 90–90–90 targets, including the target of ensuring that 90% of people on treatment have a suppressed viral load, we have to redouble our efforts to reach the millions who are not aware of their HIV status and to reach the millions who are not virally suppressed.

To reach the millions who do not know their status, we need universal access to HIV testing services—HIV testing should be as widely available as pregnancy testing. To reach the millions who are not virally suppressed, we need viral load monitoring to be as available in Lilongwe as in London. HIV testing and viral load testing should be universal.

In the past few years, we have seen incredible innovations become available that are helping to revolutionize the AIDS response. HIV self-testing kits allow people to test for HIV in privacy, expanding testing rates among hard-to-reach populations. HIV self-testing is reaching more and more men, young people and key populations—gay men and other men who have sex with men, sex workers, transgender people, people who inject drugs, prisoners and other incarcerated people and migrants. And point-of-care viral load testing machines are bringing virological testing nearer to the people who need it.

But technology alone will not be enough to ensure that people can access the HIV testing services they need. Stigma, discrimination and abuses of human rights are still among the biggest barriers to the uptake of all HIV services, including testing. Stigma and discrimination must be confronted wherever it is experienced. Human rights, including one of the most fundamental, the right to health, need to be upheld if we are ever to reach our goal of ending AIDS.

HIV testing gives people the knowledge they need to make choices—choices on the right options for treatment and prevention. Knowledge really is power. The power of people to determine the right options to keep healthy. And the power to stay well and live long and productive lives. Let's ensure that everyone has that power.

Michel Sidibé

UNAIDS Executive Director



EXECUTIVE SUMMARY

The end of knowledge is power . . . lastly, the scope of all speculation is the performing of some action, or thing to be done.

Thomas Hobbes
De Corpore (1655)

Skill to do comes of doing; knowledge comes by eyes always open, and working hands; and there is no knowledge that is not power.

Ralph Waldo Emerson
"Old Age," an essay within the collection *Society and Solitude* (1870)

Knowledge is power. These words of wisdom have been passed down through the centuries. Initially this "power" likely referred to political power—the power to rule over others—but by the Age of Enlightenment, the power provided by knowledge was considered more personal. Knowledge gave individuals power over their environment and circumstances: the power to control their own destiny.

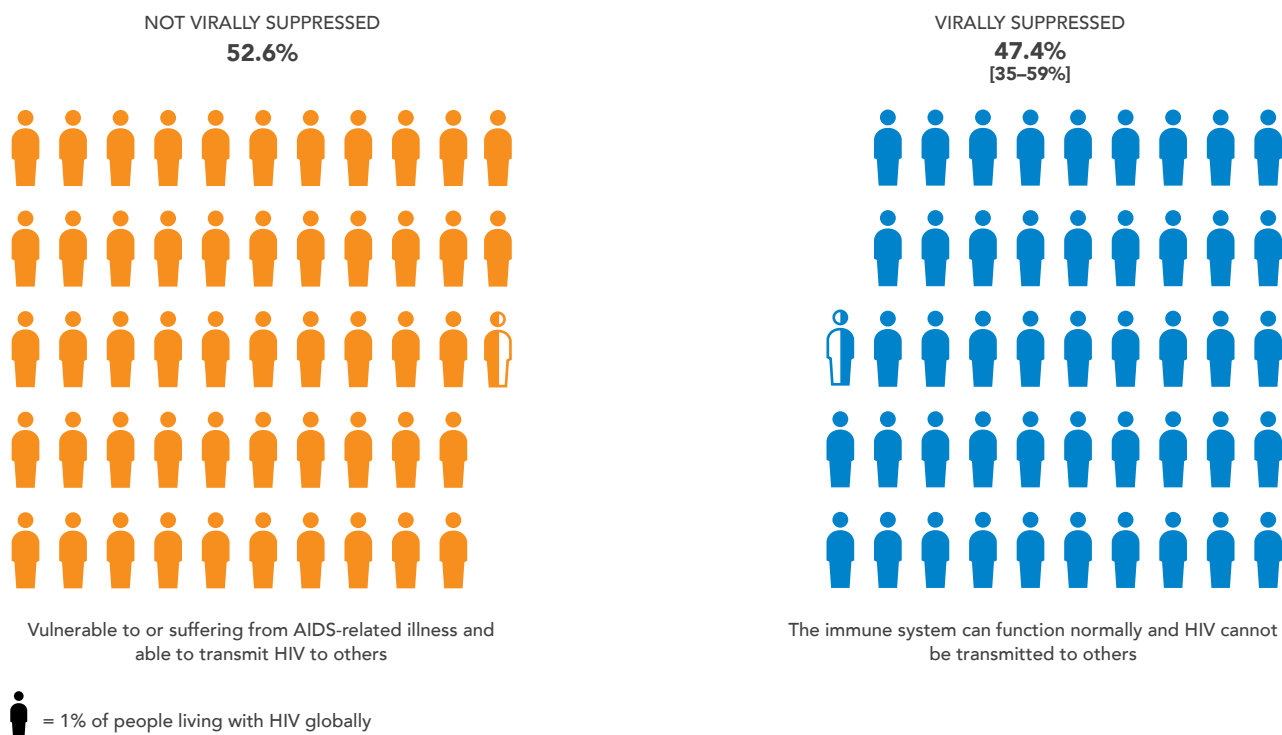
For people who may have been exposed to HIV, knowledge is critical to making informed decisions about their future. An HIV test is a serious event with potentially serious outcomes. But no matter the result, the test provides vital information. A negative result is an opportunity to take deliberate steps to prevent future acquisition through prevention methods tailored to that individual's risks. A positive test result—and a confirmatory diagnosis—is never welcome news, but for people living with HIV, it is a necessary first step towards a long and healthy life.

Initiation of antiretroviral therapy must follow as soon as possible. But treatment by itself is not sufficient. Durable viral suppression is needed to ensure both a normally functioning immune system and that HIV will not be transmitted to others. Viral load testing is required to confirm that antiretroviral therapy is successfully suppressing viral load.

More than half of people living with HIV have unsuppressed viral loads

Despite the critical roles that HIV testing and viral load testing play in the lives of people living with HIV, about one in four globally did not know their HIV status in 2017, and viral load testing coverage remained low in many parts of the world. Gaps across the HIV testing and treatment cascade leave more than half of all people living with HIV globally with unsuppressed viral loads (Figure 1), increasing the danger of HIV drug resistance and threatening efforts to meet the impact targets within the 2030 Agenda on Sustainable Development.

Figure 1. More than half of people living with HIV not virally suppressed
People living with HIV, by viral suppression status, global, 2017



The latest available data from countries show that progress towards the 90–90–90 testing and treatment targets has been strongest in eastern and southern Africa, Latin America and high-income countries. Among countries where data were available, 24 countries had achieved or were on track to achieve the first 90; and 26 countries had fully achieved or were on track to fully achieve the second 90 (Table 1).¹ However, progress towards the end goal—viral suppression—is lower. At the end of 2017, just 12 reporting countries had fully achieved or were on track to fully achieve the third 90, which translated to 73% of people living with HIV having durably suppressed viral loads.

Progress varies by region. The Asia and the Pacific and the Caribbean regions will need to accelerate their testing and treatment programmes to get on track to reach the 90–90–90 targets by 2020. Knowledge of HIV status is relatively high in eastern Europe and central Asia (73%), but treatment coverage (36%) and viral suppression (26%) are alarmingly low. Testing, treatment and viral suppression levels in Middle East and North Africa and western and central Africa are considerably off track.

Progress within regions, income levels and epidemic settings also vary. In Asia and the Pacific, for example, Cambodia has nearly achieved the 90–90–90 targets, while progress has been slower in Indonesia, Pakistan and Philippines. In eastern and southern Africa, low-income Rwanda has fully achieved the second 90, while treatment coverage and viral suppression are lower in upper-middle-income South Africa, despite achievement of the first 90. In western and central Africa, performance along the cascade in Burkina Faso, Burundi and Cabo Verde is much higher than the regional average.

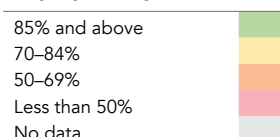
¹ Achievement of the first 90 is defined as 90% of people living with HIV know their HIV status, and on track is defined as 85–89% at the end of 2017. Full achievement of the second 90 is defined as 81% of people living with HIV accessing treatment, and on track is defined as 75–80% at the end of 2017. Full achievement of the third 90 is defined as 73% of all people living with HIV have suppressed viral loads, and on track is defined as 65–72% at the end of 2017.



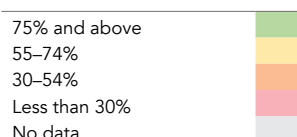
Table 1. High testing and treatment coverage in eastern and southern Africa and high-income countries
 Progress toward the 90–90–90 targets, all ages, by country, 2017

| | Knowledge of status among all people living with HIV (%) | Percentage of all people living with HIV who are on treatment | Percentage of all people living with HIV who are virally suppressed |
|---|--|---|---|
| ASIA AND THE PACIFIC | 74 | 53 | 45 |
| Afghanistan | | | |
| Australia | | 82 | |
| Bangladesh | 35 | 19 | |
| Bhutan | | | |
| Brunei Darussalam | | | |
| Cambodia | 88 | 87 | 83 |
| China | | | |
| Democratic People's Republic of Korea | | | |
| Fiji | | | |
| India | 79 | 56 | |
| Indonesia | 42 | 14 | |
| Japan | | 82 | |
| Lao People's Democratic Republic | 75 | 47 | 45 |
| Malaysia | 83 | 45 | 42 |
| Maldives | | | |
| Mongolia | 32 | 28 | |
| Myanmar | | 66 | |
| Nepal | 64 | 49 | 44 |
| New Zealand | | 78 | |
| Pakistan | 15 | 8 | 8 |
| Papua New Guinea | | 55 | |
| Philippines | 71 | 36 | |
| Republic of Korea | | | |
| Singapore | 91 | 77 | 72 |
| Sri Lanka | 68 | 37 | 34 |
| Thailand | 98 | 72 | 62 |
| Timor-Leste | | | |
| Viet Nam | | 50 | 43 |
| CARIBBEAN | 73 | 57 | 40 |
| Bahamas | | 57 | 39 |
| Barbados | | 49 | |
| Belize | | 31 | |
| Cuba | 80 | 66 | 43 |
| Dominican Republic | 77 | 52 | 43 |
| Guyana | | 64 | |
| Haiti | | 64 | |
| Jamaica | 75 | 34 | 17 |
| Suriname | 65 | 51 | 43 |
| Trinidad and Tobago | | 62 | |
| EASTERN AND SOUTHERN AFRICA | 81 | 66 | 52 |
| Angola | | 26 | |
| Botswana | 86 | 84 | 81 |
| Comoros | 28 | 27 | |
| Eritrea | | 62 | |
| Eswatini | 90 | 85 | 74 |
| Ethiopia | 73 | 71 | 32 |
| Kenya | | 75 | 63 |
| Lesotho | 80 | 74 | 68 |
| Madagascar | 8 | 7 | |
| Malawi | 90 | 71 | 61 |
| Mauritius | | | |
| Mozambique | 59 | 54 | |
| Namibia | 90 | 84 | 74 |
| Rwanda | | 83 | |
| South Africa | 90 | 61 | 47 |
| South Sudan | | 13 | |
| Uganda | 81 | 72 | 56 |
| United Republic of Tanzania | | 66 | 48 |
| Zambia | | 75 | |
| Zimbabwe | 85 | 84 | |
| EASTERN EUROPE AND CENTRAL ASIA | 73 | 36 | 26 |
| Albania | 66 | 42 | 14 |
| Armenia | 66 | 45 | 38 |
| Azerbaijan | | 46 | 22 |
| Belarus | 79 | 46 | 30 |
| Bosnia and Herzegovina | | | |
| Georgia | 48 | 39 | 35 |
| Kazakhstan | 79 | 43 | 24 |
| Kyrgyzstan | 75 | 39 | 27 |
| Montenegro | 84 | 59 | 54 |
| Republic of Moldova | 56 | 34 | 27 |
| Russian Federation | 81 | 36 | 27 |
| Tajikistan | 51 | 33 | 22 |
| The former Yugoslav Republic of Macedonia | 72 | 52 | 45 |
| Turkmenistan | | | |
| Ukraine | 56 | 40 | 23 |
| Uzbekistan | 41 | 29 | |
| LATIN AMERICA | 77 | 61 | 52 |
| Argentina | 75 | 66 | |
| Bolivia (Plurinational State of) | 75 | 36 | 23 |
| Brazil | 84 | 64 | 59 |
| Chile | 70 | 59 | 53 |
| Colombia | | 54 | |
| Costa Rica | 66 | 54 | |
| Ecuador | 64 | 54 | 34 |
| El Salvador | 74 | 48 | 31 |
| Guatemala | 67 | 39 | 28 |
| Honduras | | 52 | 45 |
| Mexico | 64 | 62 | 46 |
| Nicaragua | | 48 | 21 |
| Panama | 70 | 53 | 21 |
| Paraguay | 68 | 39 | 22 |
| Peru | | 67 | |
| Uruguay | 82 | 57 | 44 |
| Venezuela (Bolivarian Republic of) | | | |

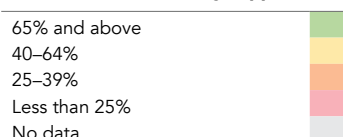
Knowledge of status among all people living with HIV (%)



Percentage of all people living with HIV who are on treatment



Percentage of all people living with HIV who are virally suppressed



| | Knowledge of status among all people living with HIV (%) | Percentage of all people living with HIV who are on treatment | Percentage of all people living with HIV who are virally suppressed |
|-------------------------------------|--|---|---|
| MIDDLE EAST AND NORTH AFRICA | 50 | 29 | 22 |
| Algeria | 84 | 80 | 58 |
| Bahrain | 76 | 45 | |
| Djibouti | | 27 | |
| Egypt | 51 | 24 | |
| Iran (Islamic Republic of) | 41 | 19 | 13 |
| Jordan | | | |
| Kuwait | 72 | 64 | 59 |
| Lebanon | | 61 | |
| Morocco | 69 | 57 | 46 |
| Oman | | | |
| Qatar | 68 | 54 | 32 |
| Saudi Arabia | | | |
| Somalia | | 28 | |
| Sudan | | 15 | |
| Syrian Arab Republic | | | |
| Tunisia | | 31 | |
| United Arab Emirates | | | |
| Yemen | | | |
| WESTERN AND CENTRAL AFRICA | 48 | 40 | 29 |
| Benin | | 55 | 42 |
| Burkina Faso | 88 | 65 | 49 |
| Burundi | 80 | 77 | |
| Cameroon | 71 | 49 | |
| Cabo Verde | | 75 | |
| Central African Republic | 53 | 32 | |
| Chad | | 45 | |
| Congo | 32 | 29 | |
| Côte d'Ivoire | 54 | 46 | 35 |
| Democratic Republic of the Congo | 59 | 55 | |
| Equatorial Guinea | | 38 | |
| Gabon | 77 | 59 | |
| Gambia | | 32 | |
| Ghana | | 40 | |
| Guinea | | 35 | |
| Guinea-Bissau | | 30 | |
| Liberia | | 29 | |
| Mali | | 32 | 13 |
| Mauritania | 33 | 33 | 22 |
| Niger | 55 | 52 | |
| Nigeria | 38 | 33 | |
| Senegal | 71 | 54 | 41 |
| Sierra Leone | 47 | 39 | 24 |
| Togo | 66 | 57 | |

| | Knowledge of status among all people living with HIV (%) | Percentage of all people living with HIV who are on treatment | Percentage of all people living with HIV who are virally suppressed |
|---|--|---|---|
| WESTERN AND CENTRAL EUROPE AND NORTH AMERICA | 85 | 76 | 65 |
| Austria | 88 | 84 | 62 |
| Belgium | | | |
| Bulgaria | 87 | 43 | 25 |
| Canada | | | |
| Croatia | | | |
| Cyprus | | 65 | |
| Czechia | 97 | 68 | 64 |
| Denmark | 88 | 83 | 83 |
| Estonia | | 72 | |
| Finland | | | |
| France | | 81 | |
| Germany | | 74 | |
| Greece | 96 | 67 | |
| Hungary | | 59 | 55 |
| Iceland | | | |
| Ireland | 87 | 73 | 69 |
| Israel | | | |
| Italy | 87 | 86 | 66 |
| Latvia | | | |
| Lithuania | 94 | 29 | 22 |
| Luxembourg | 86 | 78 | 70 |
| Malta | | | 38 |
| Netherlands | 87 | 80 | 76 |
| Norway | | 90 | |
| Poland | | | |
| Portugal | 91 | 80 | 71 |
| Romania | 92 | 76 | 52 |
| Serbia | 91 | 64 | |
| Slovakia | 87 | 75 | |
| Slovenia | 73 | 58 | 58 |
| Spain | | 82 | |
| Sweden | | | |
| Switzerland | | | |
| Turkey | | | |
| United Kingdom | | | |
| United States of America | | | |
| GLOBAL | 75 | 59 | 47 |

Note: Data are for 2017, except as follows: 2016 - Austria, Czechia, Denmark, Germany, Italy, Luxembourg, Netherlands, Portugal, Serbia, Slovenia; 2015 - Croatia and Hungary. Estimates are for citizens of the country only for Kuwait and Saudi Arabia.

Source: UNAIDS special analysis, 2018; for more details see annex on methods in the 2018 UNAIDS report *Miles to go*.

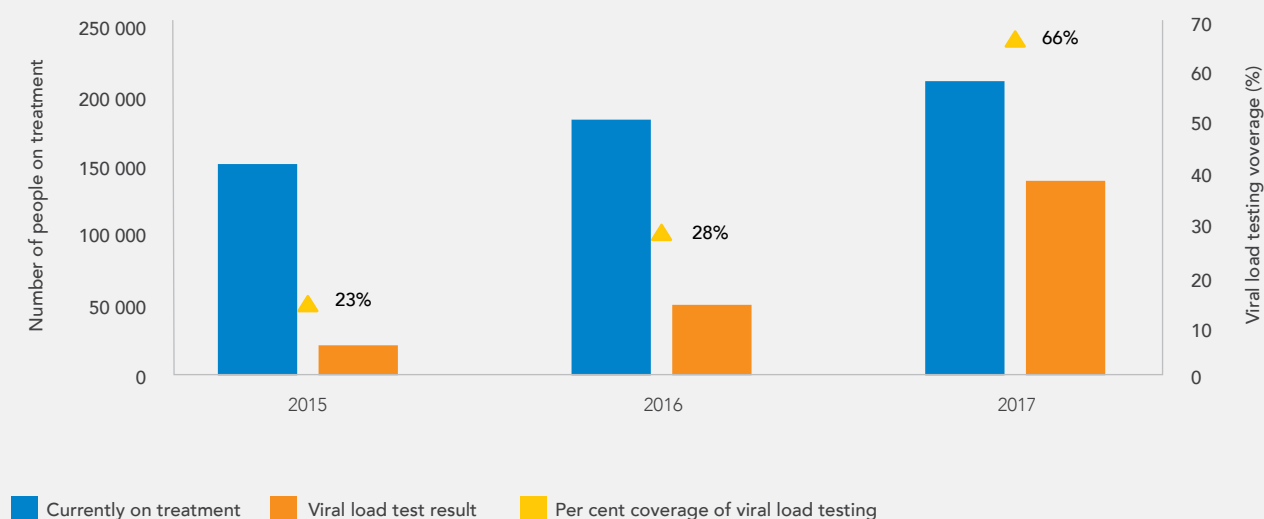
Addressing the large viral suppression gap in western and central Africa

There are huge gaps along the testing and treatment cascade in western and central Africa. At the end of 2017, less than half (48%) of people living with HIV knew their HIV status in the region, just two in five (40%) were accessing antiretroviral therapy, and less than one third (29%) were virally suppressed. Although the region is home to just 6% of the global population, it accounted for one third (34%) of the estimated 9.4 million undiagnosed people living with HIV and nearly one quarter (22%) of the 19.4 million people living with HIV who were not virally suppressed in 2017.

Insufficient domestic funding, weak health systems, user fees for health care, humanitarian situations and high levels of stigma and discrimination have undermined efforts to scale up HIV testing and treatment in the region. A growing number of countries in the region have signed on to a catch-up plan, a compact between countries and the international community to address bottlenecks to scale-up, accelerate national responses and reach a trajectory to achieve the 90–90–90 targets by 2020 (1).

Shared responsibility between national governments and the international community can quickly close important gaps, as seen in Côte d'Ivoire, where the United States President's Emergency Plan for AIDS Relief (PEPFAR) is supporting a national scale-up plan for viral load testing. In just three years, as the number of people on treatment doubled, 10 additional laboratories began viral load testing, and viral load testing coverage increased from 14% in 2015 to 66% in 2017 (Figure 2), with coverage projected to reach 75% by the end of 2018 (2).

Figure 2. Scaling up viral load testing in Côte d'Ivoire
Number of people on treatment and viral load testing coverage, Côte d'Ivoire, 2015–2017



Source: Adje-Toure C, CDC-Côte d'Ivoire. Challenges and access to viral load testing in Africa: example of Côte d'Ivoire. Presentation. (https://www.iasociety.org/Web/WebContent/File/EduFundCoteIvoire_Christiane_Adje-Toure.pdf; accessed 14 November 2018).



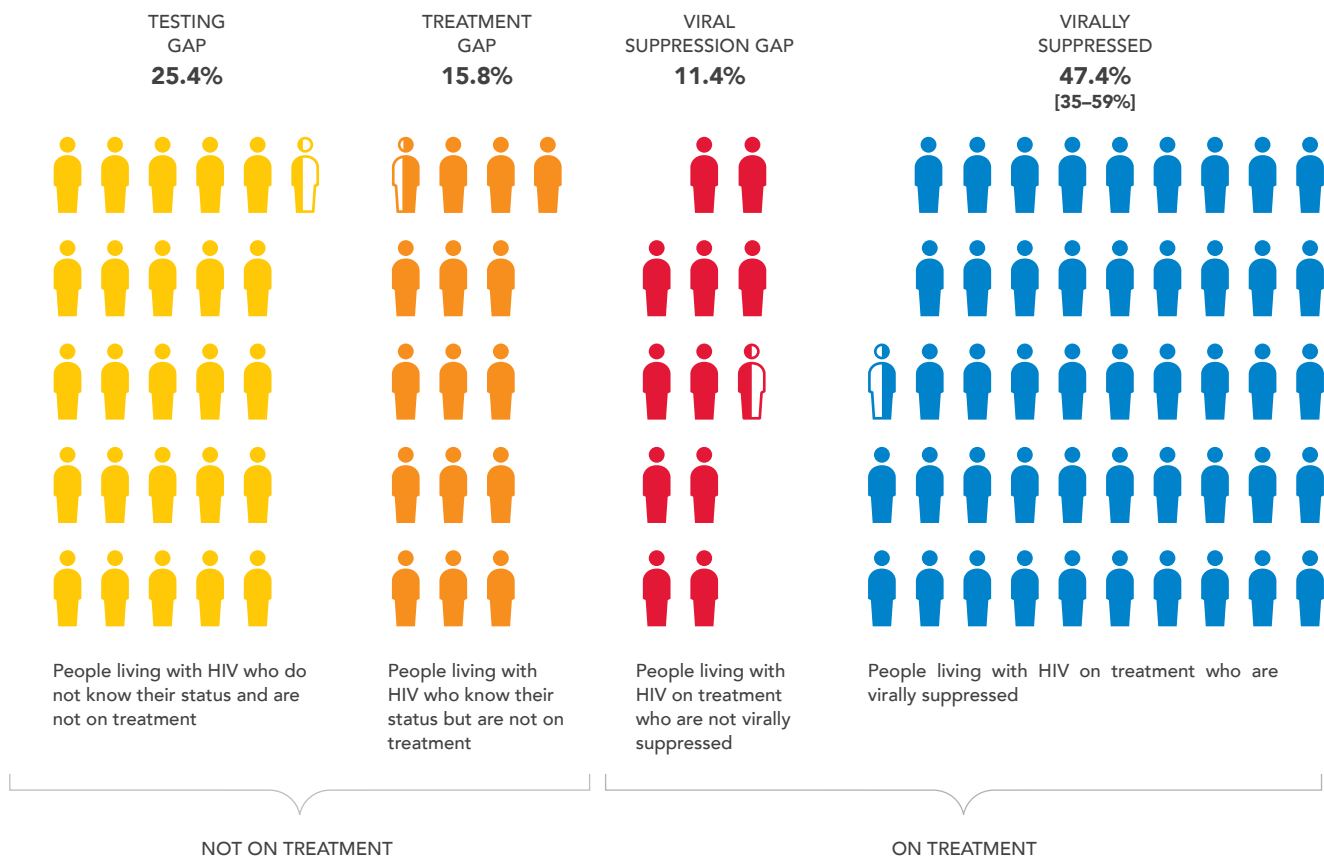
Knowledge of HIV status and viral suppression gaps

Among the 53% of people living with HIV who were not virally suppressed, the largest gap in the HIV testing and treatment cascade is HIV testing. One quarter of people living with HIV globally were unaware of their HIV status, another 16% were aware of their HIV status but not on treatment, and an estimated 11% were on treatment but not virally suppressed (Figure 3).

Although the gap in knowledge of HIV status is the largest, the viral suppression gap is growing more prominent. Knowledge of HIV status and treatment coverage globally have increased more rapidly than viral suppression. As a result, the percentage of people living with HIV who are on treatment but not virally suppressed has remained static at 11% in recent years, and the viral suppression gap's share of the total gap has grown from 18% in 2015 to 21% in 2017 (Figure 4).

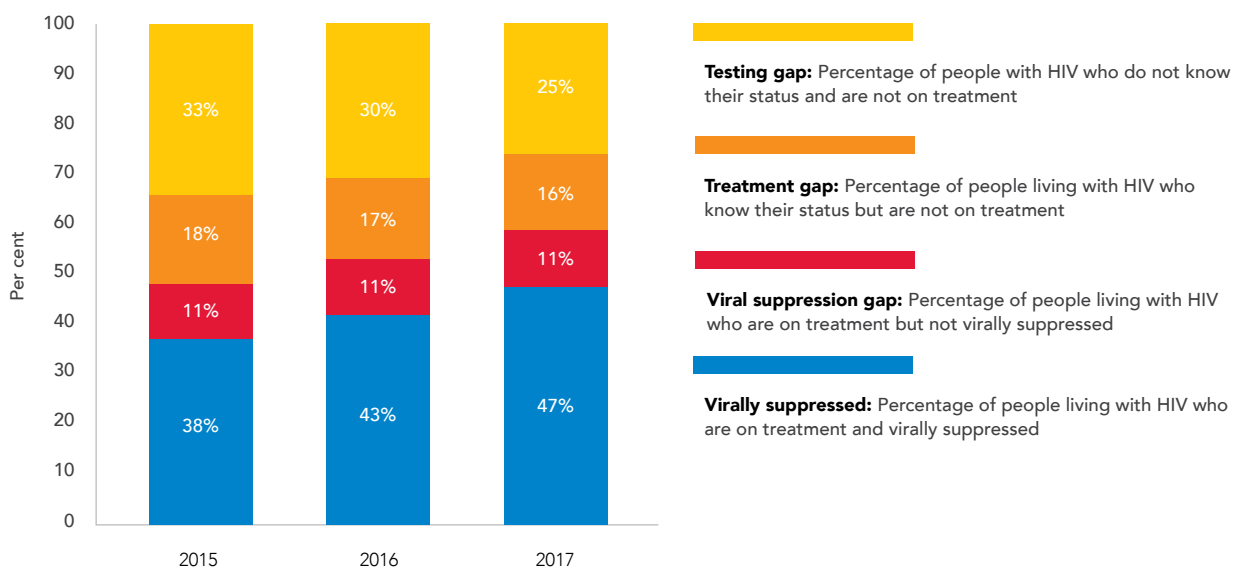
Three gaps on the path to viral suppression

Figure 3. Knowledge of status, treatment and viral suppression gaps, global, 2017



= 1% of people living with HIV globally

Figure 4. Knowledge of status, treatment and viral suppression gaps, global, 2015–2017



Source: UNAIDS special analysis, 2018.

The viral load testing gap

Monitoring viral load is the recommended approach for checking that treatment is working and determining whether viral suppression is achieved and maintained (3). Viral load monitoring is also used for diagnosing and confirming treatment failure.

Viral load testing is already the standard of care for people living with HIV in most high-income countries. However, viral load testing coverage remains low in many parts of the world. Among the 79 countries that reported 2017 data to UNAIDS, one quarter (21) indicated that less than half of people on treatment received an annual viral load test; another 15% of these countries (12) reported that between half and three quarters received an annual viral load test (Table 2). Greater political will and funding are needed to scale up capacity in low-income and middle-income countries (4).

Table 2. Low viral load testing coverage in many countries

Viral load testing coverage among people on treatment, countries with available data, 2017

| 75% and above | | | | 50–74% | Less than 50% | |
|--------------------|----------------------------------|---------------------|---|---------------|----------------------------|-------------|
| Algeria | El Salvador | Lithuania | Russian Federation | Azerbaijan | Afghanistan | Malaysia |
| Armenia | Eswatini | Maldives | Saudi Arabia | Cambodia | Albania | Mauritania |
| Bahamas | Georgia | Mexico | Singapore | Côte d'Ivoire | Benin | Myanmar |
| Barbados | Honduras | Mongolia | Sri Lanka | Cuba | Burkina Faso | Nigeria |
| Brazil | Jamaica | Montenegro | Tajikistan | Ethiopia | Burundi | Pakistan |
| Bulgaria | Kazakhstan | Morocco | Thailand | Greece | Cameroon | Philippines |
| Chile | Kenya | Oman | The former Yugoslav Republic of Macedonia | Namibia | Gabon | Senegal |
| Comoros | Kuwait | Panama | Tunisia | Nepal | Ghana | South Sudan |
| Croatia | Kyrgyzstan | Paraguay | Uganda | Nicaragua | Iran (Islamic Republic of) | Togo |
| Czechia | Lao People's Democratic Republic | Peru | Uruguay | Suriname | Jordan | Viet Nam |
| Dominican Republic | Lebanon | Qatar | | Ukraine | Madagascar | |
| Ecuador | Lesotho | Republic of Moldova | | Uzbekistan | | |

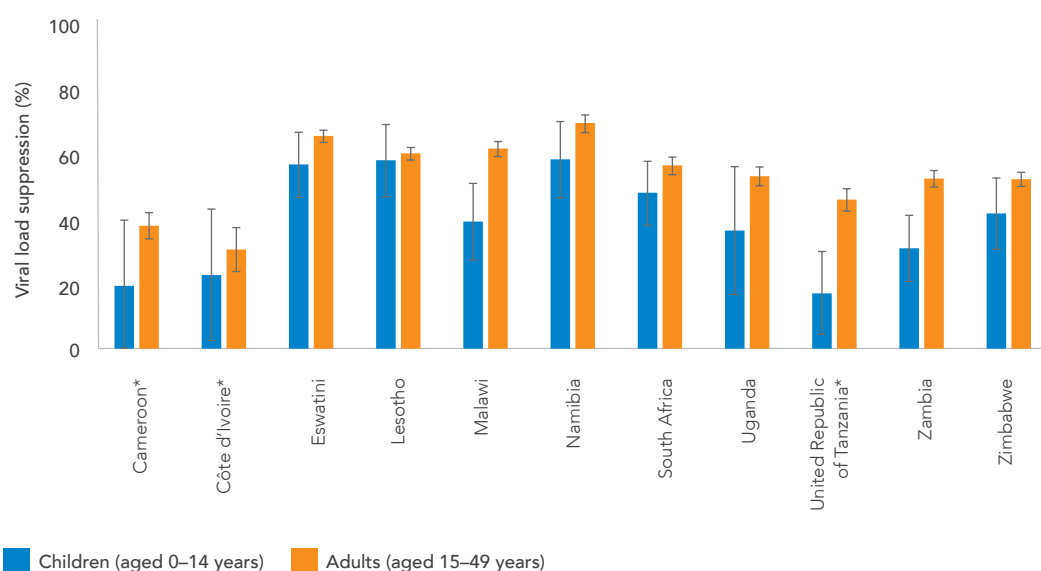
Source: UNAIDS 2018 estimates; Global AIDS Monitoring, 2018.

Common patterns of inequity

There are common patterns of inequity within countries. Knowledge of HIV status, treatment coverage and viral suppression rates are consistently lower among children, young people and men. Knowledge of HIV status among key populations at higher risk of HIV infection varies widely country by country, and the majority of evidence points to weaker treatment adherence and lower viral suppression among female sex workers, people who inject drugs, transgender women and men, prisoners and gay men and other men who have sex with men. Young women and girls face gender-related barriers to services, including gender-based violence and denial of sexual and reproductive health rights. Particular barriers also exist for migrants, refugees, people living with disabilities and other vulnerable groups.

For example, children living with HIV face numerous challenges that widen the gaps along the HIV testing and treatment cascade. Multiple visits to a health facility are required to determine an infant's HIV status through virological testing. Furthermore, many infants are unable to start treatment before the period of peak mortality at two or three months of age; without treatment, up to 50% of children born with HIV will die before their second birthday (5–7). The development of optimal paediatric drug formulations also lags behind adult drug development. These challenges often translate to lower rates of viral suppression, as can be seen in data from national surveys conducted in 11 countries in sub-Saharan Africa (Figure 5).

Figure 5. Lower viral suppression among children
Percentage of people living with HIV with suppressed viral loads, children and adults, 11 countries, 2015–2017



Source: Cameroon Population-based HIV Impact Assessment (CAMPBIA), 2017; Côte d'Ivoire Population-based HIV Impact Assessment (CIPBIA), 2017–2018; The Swaziland HIV Incidence Measurement Survey 2 (SHIMS2), 2016–2017; Lesotho Population-based HIV Impact Assessment (LePHIA), 2016–2017; Malawi Population-based HIV Impact Assessment (MPHIA), 2015–2016; Namibia Population-based HIV Impact Assessment (NAMPBIA), 2017; South African National HIV Prevalence, Incidence, Behaviour and Communication Survey, 2017; Uganda Population-based HIV Impact Assessment (UPBIA), 2016–2017; Tanzania HIV Impact Survey (THIS), 2016–2017; Zambia Population-based HIV Impact Assessment (ZAMPBIA), 2015–2016; The Zimbabwe Population-based HIV Impact Assessment (ZIMPBIA), 2015–2016.

* Estimates for children (aged 0–14 years) are based on a small number of unweighted cases (25–49) and should be interpreted with caution.

Disempowerment driven by stigma and discrimination and violence

HIV-related stigma and discrimination disempowers people living with HIV and people at risk of HIV infection. Studies across continents and cultures show that taboos and misunderstandings about HIV persist, discouraging people from seeking the knowledge and services they need. In Zambia, fear of negative reactions from family members can lead to caregivers avoiding testing a child who may have been exposed to HIV (8). In the United States of America, anticipated rejection following seroconversion is a significant barrier to testing for gay men and other men who have sex with men and transgender women (9). For many men at risk of HIV infection in South Africa, HIV testing and linkage to care are fraught with fear and trauma stemming from the previous loss of parents and loved ones to AIDS-related illnesses before treatment was widely available (10). Women living with HIV in Eswatini may drop out of treatment to avoid the dishonour that could result from their HIV status being disclosed (11).

Dozens of countries have passed legislation that explicitly prohibits discrimination on the basis of HIV status. However, legal barriers remain on the books in many places, including laws that criminalize nondisclosure, exposure or transmission of HIV. Breaches of confidentiality in health-care settings still occur with alarming frequency. When news of one's HIV-positive status result may lead to rejection, violence or criminal prosecution, the consequences of taking an HIV test or regularly visiting a health facility for medicine refills or viral load testing can appear worse than the consequences of avoiding these services.

Violence is a very real threat for women living with HIV and members of key populations. Women living with HIV who experience intimate partner violence are significantly less likely to adhere to treatment, and they therefore have worse clinical outcomes and lower viral suppression (12, 13). Violence—and the threat of violence—is also linked to legal contexts in which members of key populations may be arrested or otherwise targeted for drug use, sex work, same-sex sexual acts or changing their gender. Criminalization of these behaviours can be a powerful deterrent to seeking HIV testing and treatment. Laws that require young people to have the consent of a parent to access health-care services can constrain them from seeking such services.

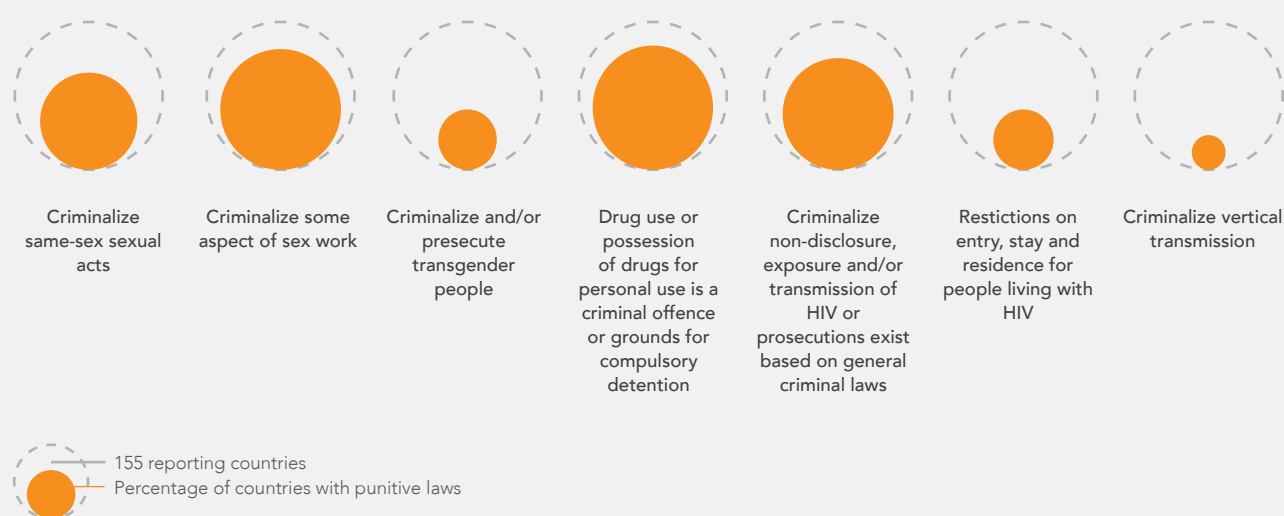


Credit: Frank Schultze/Alamy

Legal barriers

In the United Nations General Assembly's 2016 Political Declaration on Ending AIDS, it was agreed to review and reform legislation that may create barriers or reinforce stigma and discrimination. However, country reports to UNAIDS show that legal barriers remain in many countries.

Figure 6. Percentage of reporting countries with legislation that hampers the AIDS response, global, 2018



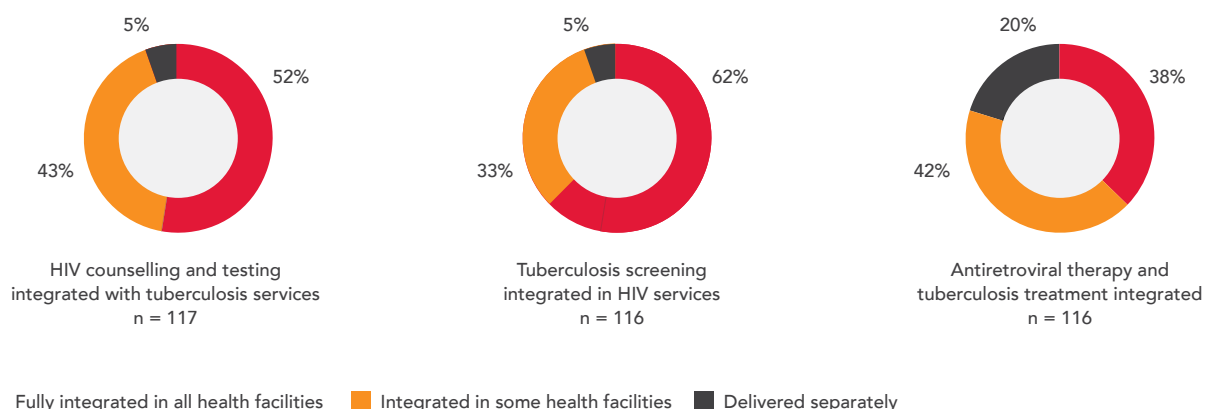
Source: See the July 2018 UNAIDS publication, *Miles to go*, for detailed sourcing.

Too far, too expensive, too long, too complicated

Where services are difficult to access—such as where people must travel long distances to a clinic or where clinic hours are not suited to individuals or groups—the uptake of these services tends to decrease. Food insecurity, costs associated with HIV and viral load testing (including for the tests themselves), other health-care costs, transport costs, lost income and opportunity costs contribute to later treatment initiation, lower treatment adherence and higher rates of AIDS-related mortality (14–18). Long wait times at clinics or having to return for test results increase the percentage of people who seek testing but don't receive a result.

Delays between an HIV diagnosis and treatment initiation further slow efforts to increase treatment coverage. Adherence to treatment can also be a challenge when support mechanisms are not in place, especially for young people and men. Insufficient integration of tuberculosis and HIV services leaves nearly half of people living with HIV and tuberculosis unaware of their coinfection and lacking the treatment they need (Figure 7) (19). As a result, tuberculosis remains the leading preventable cause of death among people living with HIV. Suboptimal retention in HIV treatment and care, drug stock-outs and inadequate support for treatment adherence favour the emergence and transmission of HIV drug resistance (20).

Figure 7. More tuberculosis–HIV integration required
 Percentage of countries reporting delivery of integrated HIV and tuberculosis services, global, 2017



Source: 2017 National Commitments and Policy Instrument.

Expanding knowledge through active, diversified and rights-based approaches

Safeguarding the right to health of people at risk of HIV and those living with HIV requires the delivery of HIV services that are available, accessible, acceptable, of good quality and delivered according to established human rights principles. Within this human rights-based approach, innovations in HIV testing and viral load testing are contributing to progress towards the 90–90–90 targets.

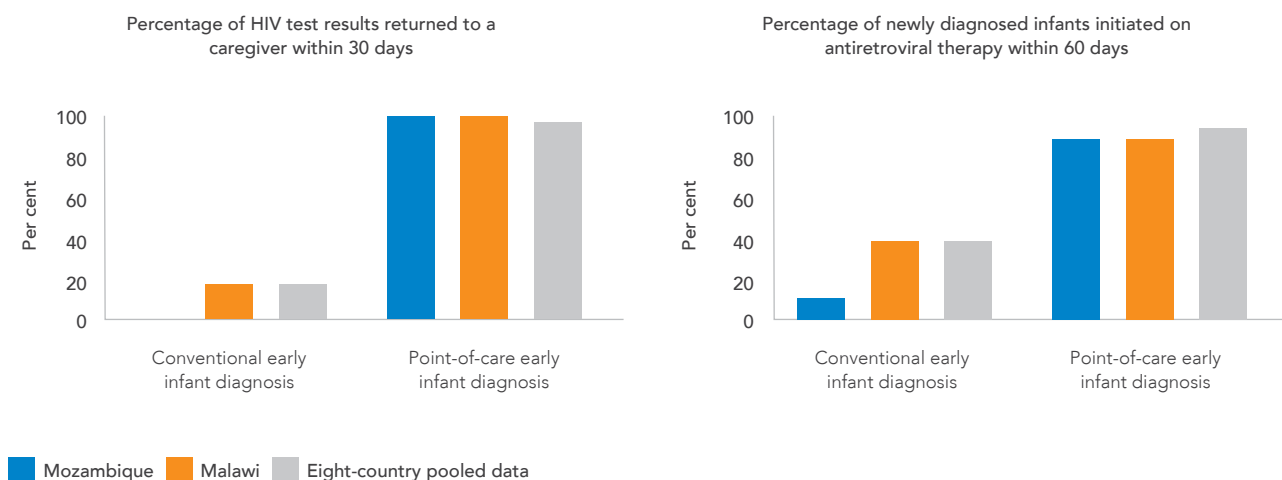
A human rights-based approach to HIV calls for the following:

- Availability, accessibility, acceptability and good quality of services.
- Nondiscrimination and equality.
- Privacy and confidentiality.
- Respect for personal dignity and autonomy.
- Meaningful participation and accountability (21).

Point-of-care virological testing technologies are providing faster results for both infant diagnosis and viral load monitoring for people on treatment. Point-of-care assays for early infant diagnosis are being rolled out in 15 African countries, shortening the time it takes to return infant test results to caregivers from weeks to hours. This allows treatment to be more consistently initiated before the immune systems of infected infants weaken. In Mozambique, 89.7% of infants living with HIV who were diagnosed with point-of-care assays initiated antiretroviral therapy within 60 days of sample collection, compared to 12.8% of children who received standard early infant diagnosis (Figure 8) (22).

Figure 8. Dramatic gains through point-of-care early infant diagnosis

Percentage of HIV test results returned to a caregiver within 30 days and percentage of newly diagnosed infants initiated on treatment within 60 days, select health facilities, Malawi and Mozambique, 2015–2018



Source: Jani IV, Meggi B, Loquiha O, Tobaiwa O, Mudenyanga C, Zitha A et al. Effect of point-of-care early infant diagnosis on antiretroviral therapy initiation and retention of patients. *AIDS*. 2018;32(11):1453–63; Mwenda R, Fong Y, Magombo T, Saka E, Midiani D, Mwase C et al. Significant patient impact observed upon implementation of point-of-care early infant diagnosis technologies in an observational study in Malawi. *Clin Infect Dis*. 2018;67(5):701–7; and Elizabeth Glaser Pediatric AIDS Foundation, UNITAID. Issue brief: point-of-care early infant HIV diagnosis. In: Elizabeth Glaser Pediatric AIDS Foundation [website]. Washington (DC): Elisabeth Pediatric AIDS Foundation; 2018 (http://www.pedaids.org/wp-content/uploads/2018/07/2018_POCEID_DoingMoreFaster_digital.pdf, accessed 11 November 2018).

Community-based testing using rapid test kits can overcome many of the logistical, structural and social barriers to HIV testing. It can reach people who live far away from a health facility, provide services at times that suit people at high risk of HIV infection, and mitigate the stigma and discrimination that can accompany HIV testing and a positive diagnosis. The PopART (HPTN 071) trial achieved the first and second 90s within urban communities in South Africa and Zambia in just three years by offering a combination of services that included home-based voluntary HIV testing and counselling (23).

HIV testing delivered through peers is increasing the reach, uptake and acceptability of testing. Engaging adolescents and key populations living with HIV as outreach workers is proving particularly successful for diagnosing and initiating treatment among HIV-positive peers. Similarly, testing the sexual partners, children and other household and family members of people living with HIV—an approach known as index testing—has been shown to be a particularly effective way to reach people who are less likely to seek voluntary counselling and testing (such as men and children). Partner notification and network tracing are two forms of index testing that have increased the yield of HIV testing efforts. The potential for intimate partner violence or social harm following partner notification or network tracing remains a concern, but thus far, reports of adverse events have been low.

The increasing availability of HIV self-test kits is boosting several HIV testing modalities and improving HIV testing among young people, men and key populations. Concerns about linkages to confirmatory diagnosis and treatment initiation after a reactive self-test are being addressed through peer-assisted self-testing in a wide range of settings, including megacities in Asia and rural communities of southern Africa.

Key populations living with HIV find more new cases in Haiti

In Haiti, analysis of LINKAGES project data found that HIV-positive peer mobilizers were far more likely to identify previously undiagnosed people living with HIV for testing. Among female sex workers, testing yield from HIV-negative peer mobilizers was 19%, compared to 34% for peer mobilizers living with HIV. HIV-positive gay men and other men who have sex with men were 40% more likely to recruit an undiagnosed peer (Figure 9) (24). This observation led to the recruitment of more people living with HIV as mobilizers.

Figure 9. The power of positive peers
HIV testing yield from HIV-positive and HIV-negative peer mobilizers, Haiti, April–June 2018



Source: USAID, FHI360, PEPFAR. LINKAGES project, October 2018.



An integrated HIV testing approach

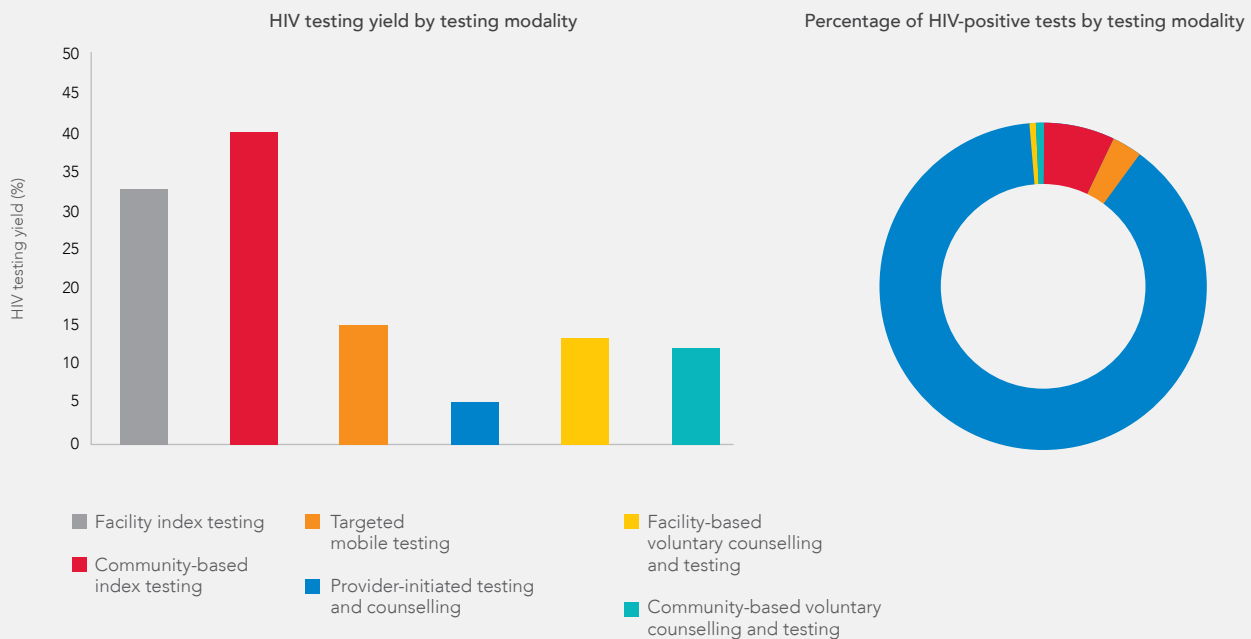
Achieving high rates of knowledge of status requires a mixture of testing modalities appropriate to the local context. In Zimbabwe, for example, epidemiological surveillance data and treatment programme data have been used to divide districts supported by PEPFAR into three categories—high treatment gap, low treatment gap and no treatment gap—based on the estimated number of people living with HIV who are not accessing antiretroviral therapy (25).

An integrated HIV testing approach is used to tailor a mixture of testing modalities to each district based on the gap category and demographic makeup of the population. Facility-based provider-initiated HIV counselling and testing is intensified in districts with larger treatment gaps, as the volume of diagnoses is higher and the cost of service delivery lower through this modality. Among districts where the gap is smaller, more costly higher yield modalities—such as self-testing, targeted mobile testing and sexual network tracing—are emphasized. Across all districts, index testing for the sexual partners and children of all known people living with HIV is being intensified, reflecting the high positivity yield of this approach (25).

Between October and December 2017, provider-initiated HIV counselling and testing accounted for 89% of all diagnoses in PEPFAR-supported districts, and the yield was 5% (26). By comparison, community-based index testing had a yield of 40%, but it accounted for just 7% of diagnoses (Figure 10). In 2017, an estimated 85% [73– >95%] of people living with HIV in Zimbabwe were aware of their HIV status.

Figure 10. Balancing volume and yield

Percentage yield and percentage of HIV-positive tests, by modality, Zimbabwe, October–December 2017



Source: Timberlake J. COP 2018 agency oversight and SGAC approval meeting, Zimbabwe. Presentation prepared prior to COP 2018 approval. PEPFAR; 18 April 2018.

The economic case for optimized HIV testing

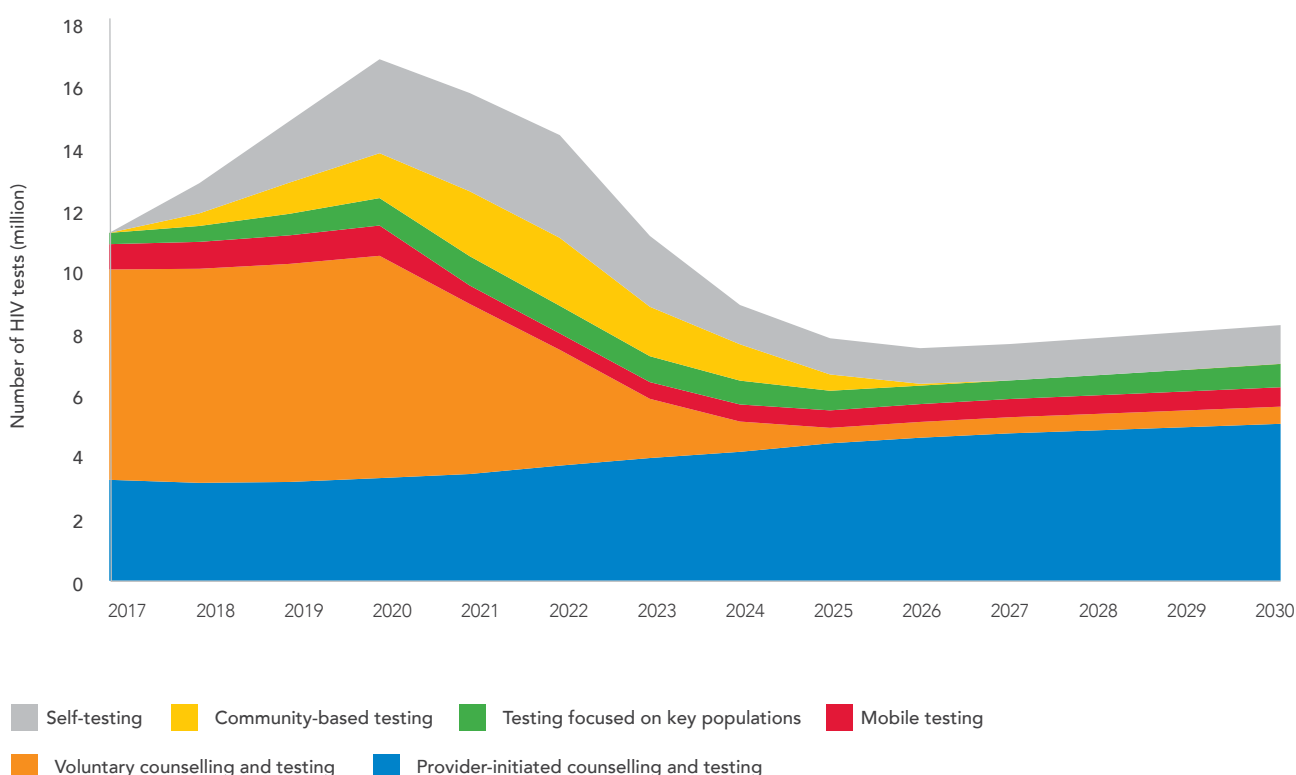
A special analysis by Avenir Health and UNAIDS provides a compelling economic case for countries to optimize their HIV testing programmes to reach the first 90 by 2020 by using a mixture of modalities that make an HIV test more accessible and acceptable to the people most at risk of HIV acquisition. The analysis focused on a hypothetical country with a generalized epidemic, where 80% of people living with HIV were aware of their status at the end of 2017. In the optimized strategy, community-based testing and self-testing are introduced and rapidly scaled up, while voluntary counselling and testing is scaled down. Compared to a scenario where the testing strategies and budget are kept constant from 2017, front-loading resources for the expansion of HIV self-testing and community-based testing (Figure 11) could avert almost 200 000 additional deaths between 2018 and 2030. The optimized strategy also greatly reduces the number of tests needed to maintain the first 90 after 2020, which translates to significant cost savings and higher economic return for the national HIV testing programme. Using the full-income approach, which values changes in both income and better health, each US dollar invested in optimized testing and linkage to antiretroviral therapy would bring an economic return of US\$ 3.40 during the period 2018–2030.

Expanding access to viral load testing

Viral load testing among people on treatment is increasing. Among the 63 countries that reported data to UNAIDS in both 2016 and 2017, about one quarter reported increases in viral load testing coverage. In some high-prevalence countries, the pace of scale-up has been extraordinary. In Uganda, for example, the number of districts with 90% or greater coverage of viral load testing increased from 29 to 70 in a single year, and the number of districts with less than 80% coverage decreased from 53 to 22 (Figure 12).

Figure 11. An optimized testing scenario

Projected number of HIV tests in an optimized HIV testing strategy, by testing modality, hypothetical country with a generalized epidemic, 2017–2030



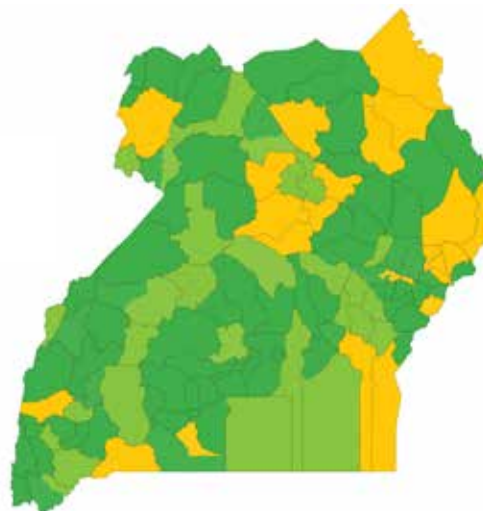
Source: Avenir Health and UNAIDS, special analysis, 2018.

Figure 12. Remarkable viral load testing scale-up
Coverage of viral load testing, by district, Uganda, July 2016–June 2018

July 2016 to June 2017



July 2017 to June 2018



■ Less than 80% ■ 80–89% ■ 90% or higher

Source: Uganda Viral Load Dashboard, Central Public Health Laboratories, Ministry of Health.

In Kenya, a national free-of-charge viral load testing programme was first established in 2012. It initially prioritized patients with suspected virologic failure, and routine testing of all patients was recommended in 2014. The programme includes an electronic data management system for patient monitoring, tracking scale-up and monitoring problem areas. The average number of viral load tests conducted per month increased from 1191 in 722 facilities in 2012 to more than 40 000 in about 2000 facilities by early 2016. The number of laboratories conducting testing increased from five in 2012 to nine by 2015. Lab turnaround times increased in 2014 as the programme was dramatically scaled up, but by 2016, the median time from sample collection to results dispatch from the laboratory had decreased to 21 days (27).

An evaluation of Kenya's viral load testing scale-up found that viral load test processing turnaround times may be further decreased through review of laboratory workflow, identification of inefficiencies and introduction of point-of-care testing. The analysis also stressed the need for strong adherence counselling programmes and patient support programmes to reduce loss to follow-up, and for strong patient tracking and failure management programmes to ensure that viral load tests are used effectively and that patients are placed on the best possible treatment (27).

Point-of-care viral load testing

Point-of-care technologies, such as the GeneXpert platform, may be particularly useful for providing viral load testing to hard-to-reach populations, as the relative portability of the systems enables use in community outreach services, such as for people who inject drugs or rural populations. It reduces the number of times a stable patient must

visit a health facility, which is more convenient for the patient and allows the health-care system to spend more time with patients who are struggling to suppress their viral loads. In addition, faster identification and management of virological failure in pregnant and breastfeeding women through point-of-care testing may contribute to the prevention of mother-to-child transmission (28). The cost of point-of-care viral load testing remains high, and implementation research—coupled with cost-effectiveness studies—are needed to integrate the technology into differentiated care models in an efficient way (28, 29).

Getting more out of point-of-care diagnostic platforms

Fully automated multidisease testing platforms can be used at lower levels of health systems thanks to minimal biosafety and training requirements (30). With support from the Clinton Health Access Initiative (CHAI) and the United Nations Children’s Fund (UNICEF), the Ministries of Health in Malawi and Zimbabwe determined that at least 50% of existing multidisease testing devices had sufficient excess capacity to offer integrated tuberculosis–HIV testing (31). Pilots in both countries enabled increased use of these instruments without compromising tuberculosis services, while also improving turnaround time of early infant diagnosis. In Malawi, where 75 of the 90 devices dedicated to tuberculosis testing had sufficient capacity to handle viral load and early infant diagnosis testing, the time between sample collection and receipt of result was reduced from a median of 20 days using the centralized system to just three days (31, 32). In Zimbabwe, integrated testing increased the utilization rate of existing multidisease testing devices from 38% to 63%, and 78% of patients with elevated viral load received a clinical response to support resuppression within a week (compared to less than 5% when using centralized testing) (32). Turnaround times to receipt of result in Zimbabwe were reduced from a median of 14 days to one day, while the turnaround time between sample collection and treatment initiation for infants living with HIV was reduced from a median of 41 days to two days (31).

Integrating testing services offers significant potential cost savings. According to a CHAI analysis, a country hypothetically adding tests from another disease programme on 200 multidisease testing devices used by the tuberculosis programme would result in a total savings of US\$ 8.75 million over five years (compared to operating separate programmes of the same size). If all of the ongoing costs of equipment, service and maintenance, connectivity, human resources, and mentoring and supervision for laboratory technicians were split evenly between single-disease programmes, the tuberculosis programme would realize savings of US\$ 2.61 million, and the other programme would achieve savings of US\$ 2.13 million (33).

Multidisease approaches

AIDS does not exist in isolation. The nature of HIV—both the way it is transmitted and how it attacks the immune system—makes the response to HIV a holistic effort to reduce risk from multiple health and social issues, and to address multiple medical conditions faced by people living with HIV. Multidisease approaches also are a key component of universal health coverage, which aims to ensure that all people have access to the health services they need without the risk of financial hardship when paying for them (34).

Multidisease services can overcome barriers to HIV service uptake, such as stigma and discrimination, because visiting an integrated-service facility may make it harder for others to guess an individual's HIV status (35, 36). "One-stop shop" multidisease services can also encourage routine HIV testing as just another part of a health check-up, and they can increase the efficiency of health care provision by reducing the need for the multiplication of staff, infrastructure and other resources. Developments in molecular technologies mean that it is increasingly possible to diagnose different diseases rapidly using single platforms. These offer technical and financial efficiencies for national health systems, while expanding access to care and saving lives (30, 37).

Improving knowledge of HIV status and viral suppression for individuals and society

Global efforts to set and meet bold targets like 90–90–90 reflect the societal importance of a robust HIV response. Achieving knowledge of status and viral suppression among the maximum percentage of people living with HIV will minimize AIDS-related morbidity and mortality, and it will contribute to the prevention of new HIV infections. In concert with efforts to achieve all of the commitments made by the United Nations General Assembly at the 2016 High-Level Meeting on Ending AIDS, this can put the end of the AIDS epidemic within reach.

This report has examined the HIV testing and treatment data that countries report to UNAIDS, as well as data and experiences from large-scale programmes, small-scale projects and cutting-edge research across dozens of countries and a variety of epidemic settings. These data reveal gaps and barriers, as well as innovative ways to overcome barriers and fill coverage gaps. This body of information also shows that the HIV response is first and foremost about people. Behind every gap in knowledge of HIV status or viral suppression are millions of people. They are not being reached by services delivered using status-quo methods.

A diversity of approaches is needed to reach the diversity of people in need.

Leading by example

In 2017, the President of France, Emmanuel Macron, led by example by taking an HIV test. Mr Macron and the First Lady of France, Brigitte Macron, visited a hospital in Saint Denis in northern Paris that caters to people in vulnerable situations, including migrants. In France, one in five people living with HIV do not know their HIV status. The majority of new HIV infections in the country occur among gay men and other men who have sex with men.

“We have not won the battle against AIDS. We need to protect ourselves, get tested, get treated and accept those in society who have HIV.”

Emmanuel Macron, President of France



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