

POLICY BRIEFS ON

# ECONOMIC IMPACT OF HIV



1.

## THE STATE OF PROGRAMME IMPLEMENTATION TO REDUCE HIV TRANSMISSION & AIDS-RELATED MORTALITY

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## THE STATE OF PROGRAMME IMPLEMENTATION TO REDUCE HIV TRANSMISSION & AIDS-RELATED MORTALITY

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### KEY POINTS

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- HIV transmission and AIDS-related mortality have been declining steeply and steadily around the world. However, because of the interplay of longer survival and lower HIV transmission, the number of people living with HIV continues to increase, and progress lags behind the targets set out in the UNAIDS strategy towards “ending AIDS” by 2030 (even before the disruptions caused by Covid-19 are factored in).
- Progress in reducing HIV transmission and AIDS-related mortality has tended to be faster in countries with high HIV prevalence, and has been fairly even across countries with different levels of economic development.
- Large discrepancies in HIV programme achievements persist across countries. If all countries had caught up with or come close to the countries with the most successful HIV programmes to date, then over one-third of AIDS-related deaths and adult HIV infections, and about 60 percent of infections through mother-to-child transmission of HIV, could have been averted in 2019.

Progress in controlling the HIV pandemic has been remarkable, in terms both of extending the lives of people living with HIV (PLHIV) and reducing HIV incidence among adults, or through mother-to-child transmission. However, the number of PLHIV continues to increase globally as a

result of reduced mortality and continuing transmission. Differences in HIV outcomes across countries suggest that a large share of AIDS-related deaths and of HIV infections occur because of a continuing lack of access to effective health and prevention services.

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### Increased treatment coverage and declining mortality

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Expanding access to treatment is at the heart of the UNAIDS strategy to “end AIDS” as a public health threat (UNAIDS, 2015) by improving the health outlook of people living with HIV and as a key contributor to reducing HIV transmission through viral suppression.

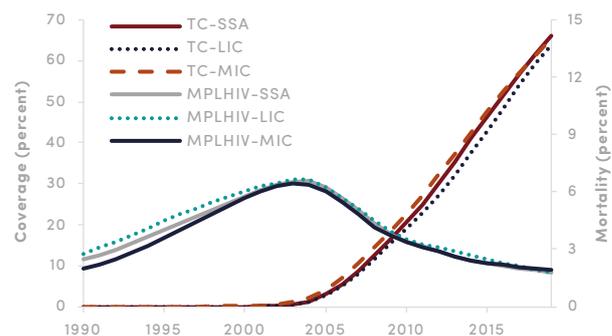
The life prospects of PLHIV have been dramatically transformed by the global effort to expand access to treatment. Remarkably, this progress has been achieved

irrespective of economic context, health-systems barriers, or the burden of HIV – average rates of treatment coverage across low- and middle-income countries and for sub-Saharan Africa (the region facing the highest burden of HIV) have increased very similarly (Figure 1.1), and as of 2019 coverage reached about 65 percent of adults living with HIV.

The most direct effect of this improved treatment coverage is reduced AIDS-related mortality among PLHIV. Indeed, provided that treatment is initiated sufficiently early, PLHIV can have a near-normal life expectancy (Johnson et al., 2013). The effects are visible in the summary data across countries – annual AIDS-related mortality among adults living with HIV declined from close to 7 percent in 2004 to 2 percent in 2018 across low-income countries and sub-Saharan Africa (Figure 1.1).

The cascade of care offers a clearer picture of barriers to access and the effectiveness of treatment (Figure 1.2). In addition to treatment coverage, it includes the proportion of PLHIV who have been diagnosed (a precondition for and potential barrier to treatment access), and the proportion of people on treatment who are virally suppressed and hence unlikely to pass on HIV. The cascade of care is at the core of the strategy of “ending AIDS” by 2030 (UNAIDS, 2015) and of the intermediate 90-90-90 goals by 2020, whereby 90 percent of PLHIV are diagnosed, 90 percent of those diagnosed receive treatment, and 90 percent of those on treatment achieve viral suppression, meaning that they

**Figure 1.1: Treatment coverage and mortality among PLHIV, ages 15+, 1990-2019**



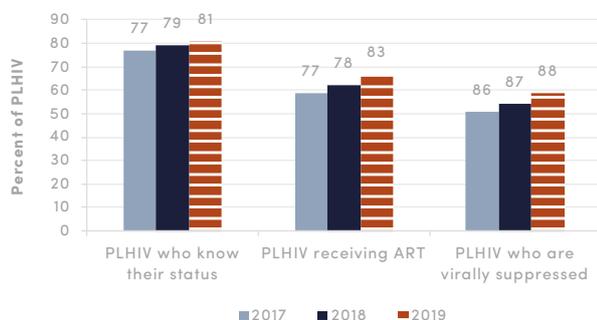
Source: UNAIDS, 2020.

Note: TC=treatment coverage, MPLHIV=annual AIDS-related mortality among people living with HIV. LIC=low-income countries, MIC=middle-income countries, SSA=sub-Saharan Africa. Country groupings follow World Bank, 2020.

cannot pass the virus on to others. Taken together, these targets are consistent with reaching a rate of 73 percent (i.e., 90% out of 90% out of 90%) of PLHIV who are diagnosed, receive treatment, and achieve viral suppression.

**Figure 1.2: Cascade of care, 2017-2019**

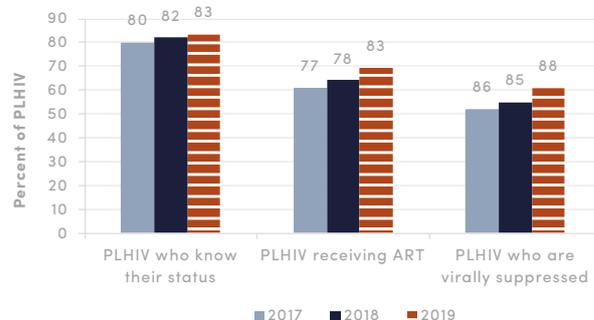
Figure 1.2.1: Global



Source: UNAIDS, 2020. Note: ART=antiretroviral therapy.

Note: Height of bars shows values in percent of total population living with HIV. Numbers on base of bars show values in percent of the preceding category (the one to the left), consistent with the definition of the 90-90-90 targets.

Figure 1.2.2: Sub-Saharan Africa



Globally, there have been improvements at all stages of the cascade. Diagnosis rates improved by 3 percentage points annually (among PLHIV) between 2015 and 2019, as a result of testing but also reflecting declining incidence (resulting in fewer newly infected and undiagnosed people). Treatment access improved by 3 percentage points annually (among PLHIV who have been diagnosed), and the rate of those on treatment who achieve viral suppression increased by 1 percentage point annually (among people receiving treatment). Nonetheless, these data suggest that the global 90-90-90 targets for 2020 were missed. Extrapolation from the data through 2019 suggests that only about 65 percent

of PLHIV achieved viral suppression by 2020 (against the target of 73 percent), reflecting mainly lower diagnosis rates than anticipated (accounting for more than one-half of the gap). As a consequence, UNAIDS (2020b) estimates that “accumulated from 2015 to 2020, there were 3.5 million more HIV infections and 820,000 more AIDS-related deaths than if the world was on track to meet its 2020 targets.”

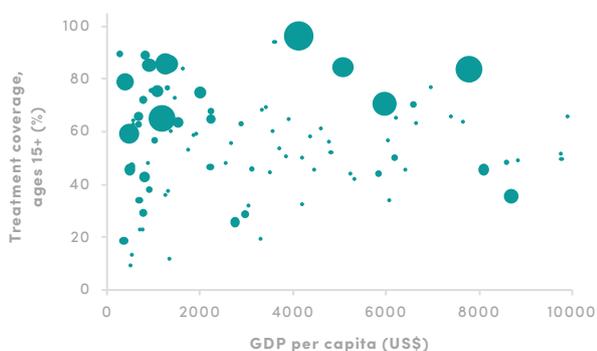
While the global picture suggests qualified success – steady and steep increases in treatment coverage and declining mortality among PLHIV since 2003, though progress in recent years has been slower than what was deemed feasible under the 90-90-90 targets – there is large

variation in treatment coverage across countries, ranging from less than 10 percent to close to 100 percent of adults living with HIV (Figure 1.3). As a consequence, annual AIDS-related mortality among PLHIV also remains highly unequal across countries, ranging from less than 1 percent to over 5 percent (Figure 1.4). Treatment coverage varies little with the level of economic development (represented by GDP per capita in Figure 1.3). Treatment coverage in countries with high HIV prevalence (i.e., exceeding 12 percent of the adult population) tends to be higher, ranging from about 50 percent to nearly 90 percent.

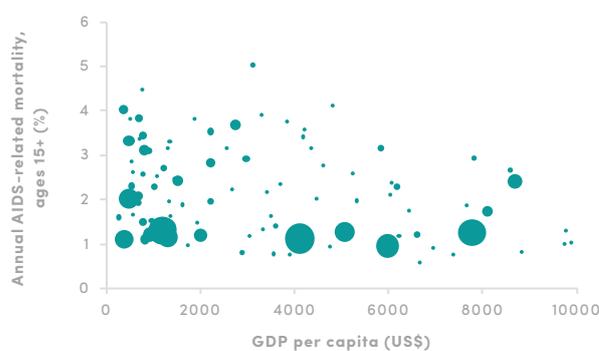
These numbers imply that in many countries, the majority of AIDS-related deaths occur as a consequence of delays in extending access to treatment, compared with the achievements of countries with similar economic capacities.

The extent to which some countries lag behind in terms of extending treatment access and reducing mortality is a significant aspect of the global picture on “ending AIDS.” If all low- and middle-income countries had succeeded in bringing down annual AIDS-related mortality among PLHIV to at most 1 percent (the rate achieved in the most successful countries, see Figure 1.4), over one-third of AIDS-related deaths in 2019 across the low- and middle-income countries covered in Figures 1.3 and 1.4 would have been avoided. Looking ahead, it is important to take into account that much of this unmet need is located in countries with relatively low HIV prevalence – barriers to extending access to treatment are different from during the early stages of the global effort to extend treatment access, which focused on countries and populations with relatively high HIV prevalence.

**Figure 1.3: Treatment coverage, ages 15+, and GDP per capita, 2019**



**Figure 1.4: Annual AIDS-related mortality, ages 15+, and GDP per capita, 2019**



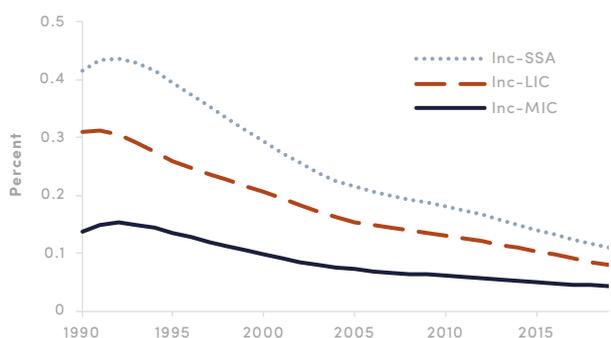
Source: UNAIDS, 2020 and IMF, 2020 for GDP per capita. Bubble size (area) is proportional to HIV prevalence

## HIV transmission among adults

Alongside extending the life prospects of PLHIV, reduced HIV transmission has been a cornerstone of the efforts to “end AIDS” – the 2016–2021 UNAIDS strategy envisaged a global decline in the number of new HIV infections of nearly 90 percent by 2030, relative to 2010 (UNAIDS, 2015). While the dynamics of HIV incidence have been insufficient to achieve this target, incidence has declined steeply over the last years, e.g., from a peak of 0.42 percent annually across sub-Saharan Africa in 1991 to 0.11 percent by 2018 (Figure 1.5). This pattern of decline is consistent across major regions over the last two decades. To assess the effectiveness of HIV prevention efforts, however, it is usually more informative to look at the rate of transmission (the ratio of new infections to people already living with HIV), which controls for HIV prevalence and measures how fast HIV is transmitted onward. This gives clues to the implications for epidemic

control measures. According to this metric, transmission of HIV has declined steadily across countries, e.g., from 0.22 in 1990 to 0.04 by 2018 across sub-Saharan Africa, and similarly across low- and middle-income countries (Figure 1.6). The decline in HIV transmission achieved so far, though, is insufficient to put HIV on a path to elimination (i.e., a trajectory where the number of PLHIV is shrinking at a rate and to a point where it no longer poses a significant health challenge). In 2000, with survival of PLHIV (without treatment) of around 10 years from the time of infection, a rate of transmission of 0.1 would have meant that an HIV epidemic was stable – i.e., the number of new infections was similar to the number of deaths among PLHIV, and the total number of PLHIV remained constant. However, with annual mortality (AIDS-related and otherwise) among PLHIV now around 3 percent due to treatment, a rate of transmission of 0.04 means that the number of PLHIV continues to increase.

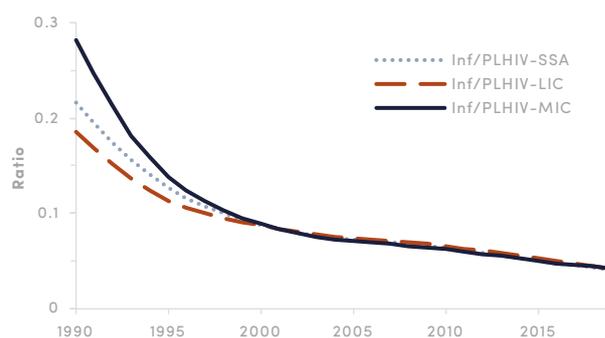
**Figure 1.5: HIV incidence, ages 15+, 1990–2019 (percent)**



Source: UNAIDS country data files (see annex).

Note: Inc=incidence, Inf=number of new infections, LIC=low-income countries, MIC=middle-income countries, SSA=sub-Saharan Africa. Country groupings follow World Bank, 2020.

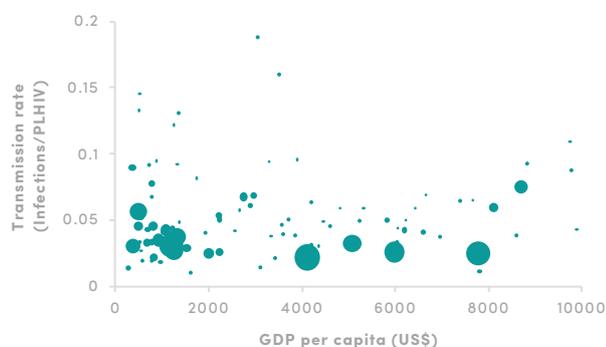
**Figure 1.6: Ratio of HIV infections to people living with HIV, ages 15+, 1990–2019**



As for treatment access and mortality, the rate of transmission differs substantially across individual countries (Figure 1.7). Indeed, HIV transmission and treatment coverage are highly correlated, and treatment coverage statistically explains nearly one-half of the variation in HIV transmission across countries in the data shown in Figure 1.8. This association mirrors the central role of treatment in HIV prevention, including its direct effect through viral

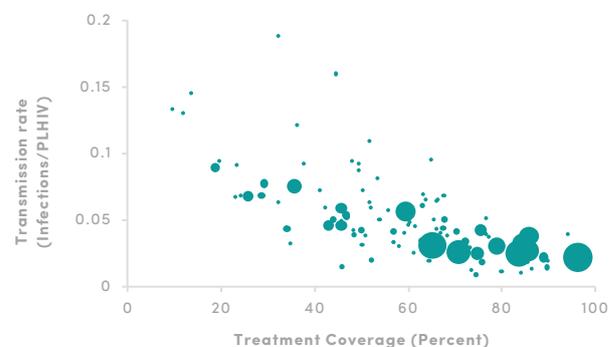
suppression (though it could also reflect that both treatment and prevention programmes are more effective in some countries than in others). Nevertheless, there are substantial differences in HIV transmission across countries even after controlling for treatment coverage, suggesting large gains that could be attained by aligning HIV prevention policies with best practice.

**Figure 1.7: Annual HIV transmission, ages 15+, and GDP per capita, 2019**



Source: UNAIDS, 2020 and IMF, 2020 for GDP per capita. Bubble size (area) is proportional to HIV prevalence.

**Figure 1.8: Annual HIV transmission and treatment coverage, ages 15+, 2019**



The high dispersion in the rate of transmission across countries suggests that a large share of HIV infections occurring today is avoidable, not only relative to some technically achievable ideal circumstances, but also when controlling for current country context. For example, the most successful low- and middle-income countries shown in Figure 1.7 attain a transmission rate of around 2.5 percent,

with very few of them at an even lower rate. If the low- and middle-income countries captured in Figure 1.7 had all been successful in reducing the rate of HIV transmission to at most 2.5 percent (and preserving gains if the rate is already lower), then 34 percent of all new HIV infections in 2019 would have been averted.

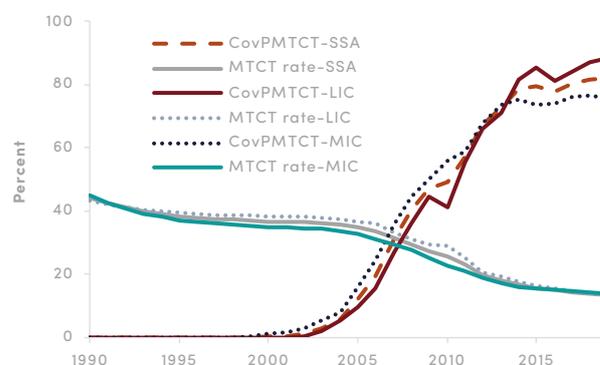
## Prevention of mother-to-child transmission of HIV and child treatment

Mother-to-child transmission (MTCT) of HIV accounts for a substantial proportion of HIV infections overall. Across low- and middle-income countries where such data were available from UNAIDS (2020c), about one-quarter of all HIV infections occurred through MTCT in 2005. Prevention of mother-to-child transmission (PMTCT) of HIV has been relatively successful – the share of MTCT in overall HIV infections declined steadily to 12 percent as of 2019.

Prenatal health services also contribute to early diagnosis of women living with HIV, counselling and testing, and access to care and treatment. For this reason, diagnosis rates and treatment coverage rates tend to be considerably higher among women than among men. For example, in Eastern and Southern Africa, an estimated 91 percent of women living with HIV knew their status as of 2019 (compared with 84 percent for men), and treatment coverage stood at 78 percent for women and 64 percent for men (UNAIDS, 2020 and 2020b). The extent and impact of PMTCT are apparent from data on the scaling-up of PMTCT and the concurrent declines in the rate of MTCT (Figure 1.9). As coverage increased steeply from the early 2000s, the average rate of MTCT declined from over 30 percent of births from HIV-positive mothers in 2005 to little more than 10 percent as of 2019. Beyond these changes, there have been considerable shifts in the content and quality of PMTCT. Whereas around 2010 PMTCT typically took the form of temporary treatment during pregnancy and until the end of breastfeeding (Option A under the 2010 WHO Guidelines), most countries now endorse initiation of lifelong treatment for pregnant mothers (who are not already receiving it), and temporary treatment for infants (Option B+ under the 2013 WHO Guidelines). In 2019, an estimated 85% of 1.3 million pregnant women living with HIV globally received antiretroviral drugs for PMTCT of HIV.

As for adult treatment and incidence, the broad trends mask steep differences in rates of MTCT and access to PMTCT across countries. While in some countries nearly all mothers requiring PMTCT receive it (including most countries with

**Figure 1.9: PMTCT coverage and MTCT rates, 1990–2019**

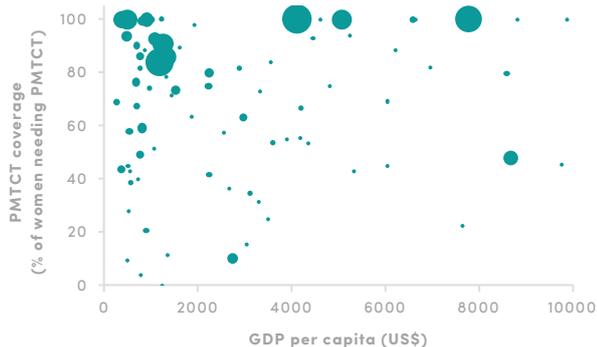


Source: UNAIDS, 2020.

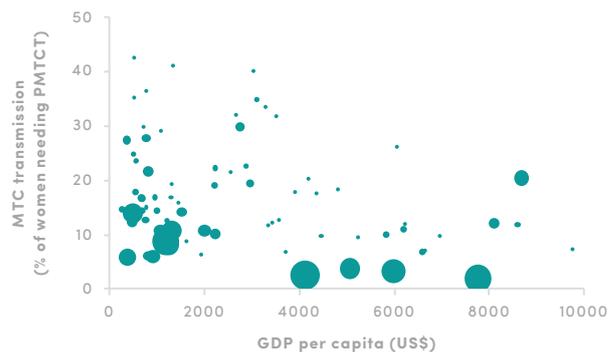
Legend: CovPMTCT=coverage of PMTCT. LIC=low-income countries, MIC=middle-income countries, SSA=sub-Saharan Africa. Country groupings follow World Bank, 2020.

high HIV prevalence), many other countries – especially low-income ones – lag far behind (Figure 1.10). Moreover, these estimates may understate differences in access to PMTCT across countries, as they do not capture factors like successful referral to and retention in care, or loss to follow-up (Gumede-Moyo et al., 2017). As a consequence, while some low- and middle-income countries reach MTCT rates similar to those in the most advanced countries, the outcomes in many countries lag far behind (Figure 1.11). This means that the majority of HIV infections through MTCT in low- and middle-income countries reflect lack of effective PMTCT services. If the MTCT rate were brought down to at most 5 percent for those countries where it remains above this level (let alone to the lower levels of 2–3 percent attained in some middle-income countries), over 60 percent of HIV infections among infants in 2019 could have been avoided. This gap is much larger than those coming out of the comparisons of AIDS-related mortality or HIV transmission across countries, above.

**Figure 1.10: Coverage of PMTCT and GDP per capita, 2019**



**Figure 1.11: MTC transmission and GDP per capita, 2019**

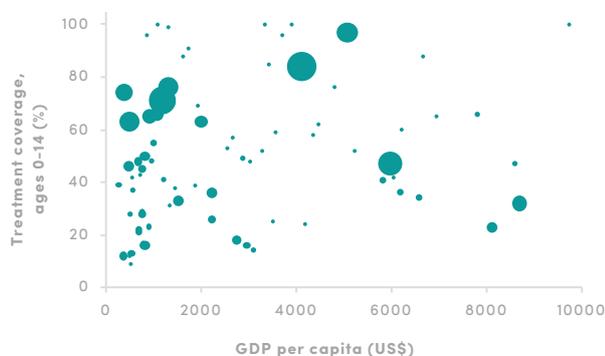


Source: UNAIDS (2020) and IMF (2020) for GDP per capita. Bubble size (area) is proportional to HIV prevalence.

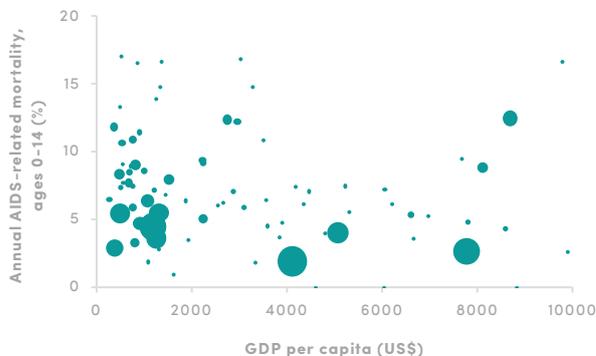
Data on treatment coverage and AIDS-related mortality among children are difficult to interpret, because deaths – in the absence of treatment – often occur early. For example, low access to treatment and high *early* mortality could be consistent with relatively high treatment coverage and low AIDS-related mortality among *surviving* children living with HIV. Across countries, outcomes on extending

access to treatment to children (Figure 1.12) are more varied than for adults (Figure 1.3), and treatment coverage is about 10 percentage points lower for children than for adults on average (population-weighted). AIDS-related mortality among children living with HIV remains high (6 percent on average, population-weighted; Figure 1.13), and much higher than for adults (average: 2 percent).

**Figure 1.12: Treatment coverage, ages 0-14, and GDP per capita, 2019**



**Figure 1.13: Annual AIDS-related mortality, ages 0-14, and GDP per capita, 2019**



Source: UNAIDS (2020) and IMF (2020) for GDP per capita. Bubble size (area) is proportional to HIV prevalence.

Because of the lag in scaling up treatment for children, relative to adults, people who got infected through MTCT have not benefited equally from improved treatment access. Only about one-quarter of children born in sub-Saharan Africa in 2004 – before treatment took off – and infected through MTCT of HIV are estimated to have survived to reach age 15 in 2019. Projections for infants who become infected now are unavailable, but these cohorts

benefit from improved early infant diagnosis rates (up from 34 percent in 2010 to 60 percent in 2019 globally, according to UNAIDS (2020)) and the improved access to treatment (for countries where estimates are available, treatment coverage among surviving children has more than doubled between 2010 and 2019, from 26 percent to 52 percent, according to UNAIDS, 2020c).

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