NIH Commemorates World AIDS Day and Looks to the Future

As we pursue research toward an HIV vaccine and a cure, we need to get safe and effective interventions to the people who need them now.

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Together with our partners, the National Institutes of Health (NIH) commemorates World AIDS Day and affirms our commitment to bolstering the extraordinary gains achieved in HIV science and to persevering until we end HIV-related illness and stigma. As we mark this observance, we celebrate the people who enable scientific progress, honor the loved ones and leaders we have lost, and reflect on the work that remains to ensure the health and life quality of all people affected by, and living with, HIV.

The U.S. government theme for World AIDS Day 2024 is “Collective Action: Sustain and Accelerate HIV Progress.” The American people serve a fundamental role in the multisectoral response to the global HIV pandemic. Our shared accomplishments have been possible because of the steadfast accountability of institutional leaders and the vision and persistence of civil society members. NIH is grateful to our partners worldwide helping to answer scientific questions that inform HIV policy and service delivery.

We value the ingenuity and resolve of the intramural and extramural NIH communities—scientists, research teams, administrators, community partners, and other essential collaborators—who model and demand the scientific excellence required to propel groundbreaking HIV science. Above all, we thank the clinical trial participants who allow their individual health experiences to become evidence that improves the lives of others.

The latest HIV statistics pair unprecedented progress with an alarming epidemiological shift. In 2023, an estimated 1.3 million people worldwide were newly diagnosed with HIV, and 630,000 people died of AIDS-related illness, according to the Joint United Nations Programme on HIV/AIDS (UNAIDS). These numbers fall short of UNAIDS targets for ending the HIV pandemic by 2030. More than 39 million people globally are living with HIV, but only 77% of them are on lifesaving antiretroviral therapy (ART). At a regional level, the incidence data tell an important

story: for the first time in the history of the HIV pandemic, in 2023, more people were newly diagnosed with HIV outside sub-Saharan Africa than in sub-Saharan Africa. These statistics indicate that HIV prevention efforts in sub-Saharan African countries are generating results, but that epidemics need rapid attention in the Middle East and North Africa, Eastern Europe, Central Asia, and Latin America.

Between 2018 and 2022, U.S. HIV incidence among people ages 13 and older decreased 12% overall and 21% in jurisdictions receiving Ending the HIV Epidemic in the U.S. (EHE) initiative funding. According to the Centers for Disease Control and Prevention, people in the South, Black cisgender women, transgender women of all races and ethnicities, and Hispanic or Latino gay, bisexual, and other men who have sex with men were overrepresented in new HIV diagnoses in the United States relative to their population size. Changing HIV epidemiology and persistent health disparities must guide HIV science to ensure that interventions respond to the current biological, ecological and social features of HIV transmission.

NIH institutes, centers, and offices support basic, preclinical, and clinical research to discover, develop, and test biomedical and behavioral interventions. They also design and evaluate evidence-based implementation approaches so that everyone can access and use HIV testing, preventive and therapeutic options that meet their unique needs and align with their daily lives. In the past year, NIH-supported science elucidated barriers and facilitators of the uptake and adoption of HIV treatment and prevention innovations, providing direction for more effective implementation strategies to reach the people who stand to benefit most. Likewise, HIV discovery and translational findings enriched the evidence base of existing technologies, including long-acting antiretroviral drug (ARV) formulations. While further extending the durability of ARVs for treatment and prevention is feasible, we will reach the limit of what long-acting molecules can do which underscores the need for a preventive vaccine and an HIV cure.

Recent HIV cure research has increased our understanding of factors influencing the size and distribution of HIV reservoirs, where HIV persists in the body, even when a person is on ART. A landmark clinical study reported that multiple children who acquired HIV before birth and started ART in the first days of life remained free of detectable HIV for more than one year after their treatment was paused, proving a concept for further study with more advanced therapeutics. Research on HIV broadly neutralizing antibodies (bNAbs) is examining whether bNAbs can influence clearance of HIV from the body. Key research priorities for current and future cure studies are to identify a strategy to reduce, inactivate, or eliminate cells with HIV and prevent possible HIV re-acquisition, and to do so in a manner that is safe, effective, and equitably scalable.

Until we find a cure, advances in HIV therapeutics continue to move towards optimized care. Fixed-dose pills and long-acting injectables are safe and highly effective, enabling people to take medicine more conveniently and discreetly than ever before. New findings are helping to overcome barriers to viral suppression and also highlighting opportunities to improve the overall health and quality of life of people with HIV as they age. In this regard, long-acting injectable ART was found to be superior to daily oral ART in suppressing HIV replication among people who had

been unable to maintain viral suppression with daily pills. New evidence highlighted opportunities to better manage cardiovascular disease risk, chronic liver disease, and mental health in people with HIV. A multicenter observational study found that kidney transplantation from deceased donors with HIV to recipients with HIV was safe and comparable to kidney transplantation from donors without HIV. The practice is now being considered for expansion outside of research settings to offer a survival benefit to people with HIV and end-stage kidney disease.

Antiretroviral drug-based prevention is becoming more durable and diverse, and the evidence base is growing to inform HIV prevention choices in the context of pregnancy and contraception. The world recently celebrated the news of the first safe and effective twice-yearly injectable pre-exposure prophylaxis (PrEP) regimen using a drug, lenacapavir, developed with foundational science discoveries of NIH-supported investigators in partnership with industry scientists. NIH-supported studies are further examining the experience of twice-yearly PrEP in two priority U.S. populations. Evidence is mounting to reinforce the safety of oral, ,aginal ring, and long-acting injectable PrEP formulations in pregnancy. Recent findings also showed that long-acting injectable cabotegravir PrEP did not interact with long-acting reversible contraceptive drugs. A rectal microbicide is in an early-stage trial, and animal and laboratory studies are exploring other PrEP forms to help close gaps in HIV prevention uptake among people experiencing stigma, healthcare resource shortages and other barriers to using currently licensed methods.

Vaccine-based HIV prevention has been a pillar of NIAID's scientific mission since the beginning of the HIV pandemic. HIV presents many challenges to vaccine developers; however scientists are generating groundbreaking evidence on the virus' areas of vulnerability and the human immune processes that hold the most promise for preventing HIV. In the past year, a study showed that immune cells called CD8+ T cells may need to be amplified to protect people from acquiring HIV. Scientists are learning how to stimulate the immune system to generate its own bNAbs to prevent HIV and reported that an HIV vaccine candidate elicited trace levels of bNAbs and high levels of other key immune cells in an early-stage clinical trial. Other studies in animals are also showing promising signals toward generating bNAbs that bind to different sites on HIV that remain relatively stable even if the virus mutates. HIV vaccine research findings continue to offer valuable insights that apply to other areas, including non-vaccine HIV prevention and cure research, and broader medical countermeasure development for infectious diseases.

As we continue to pursue research toward an HIV vaccine and a cure, NIH recognizes the need to get safe and effective interventions to the people who need them now. We have built an expansive toolbox of HIV prevention and treatment strategies that can eliminate transmission and allow people with HIV to live long and healthy lives. Implementation science has generated essential guidance to improve access, acceptability, feasibility, and sustainability of interventions and help close the gap between discovery and uptake. NIH EHE projects are rapidly and rigorously informing the unified domestic HIV response by agencies in the Department of Health and Human Services. A key focus of NIH research supported by EHE is exploring the potential of pharmacies to increase access to HIV testing and PrEP among people who are not accessing traditional health facilities.

Looking to the future, we can envision ending HIV as a health threat. There is more evidence than ever before that a vaccine and cure are possible. Yet, it is essential that HIV research dovetail with expanded access and acceptability for people who historically have benefited less from HIV research advances and remain overrepresented in the pandemic. Furthermore, we must address HIV-related coinfections and conditions that disproportionately affect people with HIV, especially as they age, including tuberculosis, sexually transmitted infections, viral hepatitis and mpox. To bring these priorities to fruition in the coming years, we need to support early stage investigators into the complex and competitive field of HIV science and provide necessary support; keep community voices centered in our planning, implementation, and reporting of studies; address social and structural determinants of health; and strengthen effective and efficient resource-sharing and cooperation with our scientific partners until we reach our common goal of ending the HIV pandemic.

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