History of HIV and UNAIDS Goals

Good day! My name is Dr Simji Samuel Gomerep. I'm a Senior Lecturer and Chief Consultant Physician and Infectious Diseases Specialist at the University of Jos and Jos University Teaching hospital, Jos. Nigeria

I'm going to be discussing some of the major events in the history of HIV and the current UNAIDS targets.

Timeline

Although the world became aware of HIV in the 1980s, the disease itself predates this by at least several decades.[1] Looking back before the 1980s we will be dealing with the origins of HIV and the silent epidemic. The period from the 1980s to date showed resilience of humanity and advances in the control of the HIV epidemic, although of course much work still remains to be done.

Pre-1980

Let's begin by focusing on pre-1980.

Around 1920, SIV (simian immunodeficiency virus), a virus closely related to HIV, was thought to cross species from chimpanzees to humans, giving rise to HIV-1. And similarly, SIV jumped from sooty mangabeys to humans, giving rise to HIV-2. This cross-species jump and subsequent emergence of HIV as a human pathogen is thought to have its origin in the area around what is now Kinshasa in the Democratic Republic of Congo, where these animals are hunted and eaten by people living in the area. Kinshasa has the most genetic diversity in HIV strains in the world, reflecting the number of different times SIV was passed to humans. Many of the first cases of AIDS were recorded there too.

However, up until the 1980s, we do not know how many people were infected with HIV or developed AIDS. The first verified case of HIV was retrospectively diagnosed from a blood sample taken in 1959 from a man living in Kinshasa. There are numerous earlier cases where patterns of deaths from common opportunistic infections, now known to be AIDS-defining, suggest that HIV was the cause, but this is the earliest incident where a blood sample can verify infection.

While sporadic cases of AIDS were documented prior to 1970, available data suggests that the current epidemic started in the mid- to late 1970s. By 1980, HIV may have already spread to five continents (North America, South America, Europe, Africa and Australia). In this period, between 100,000 and 300,000 people could have already been infected.

Discovery of HIV

Now we'll move on to the 1980s, and the discovery of HIV as a pathogenic retrovirus causing infection and disease in humans.

By 1981, case reports of severe opportunistic infections and unusually aggressive malignancies heralded the beginning of the HIV pandemic. In June 1981, cases of a rare lung infection called Pneumocystis carinii pneumonia (PCP) were found in five young, previously healthy gay men in Los Angeles[2]. At the same time, there were reports of men in New York and California with an unusually aggressive Kaposi's sarcoma.[3,4] In December 1981, the first cluster of suspicious PCP cases was reported in people who inject drugs.[5] By the end of the year, there were 270 reported cases of severe immune deficiency among gay men - 121 of them had died.[6]

In September 1982, the CDC used the term 'AIDS' (acquired immune deficiency syndrome) for the first time, describing it as "A disease at least moderately predictive of a defect in cell mediated immunity, occurring in a person with no known case for diminished resistance to that disease".[7]

Identification and Naming of the Virus Responsible for Causing AIDS

Let's discuss identification and naming of the virus responsible for causing AIDS.

In May 1983, Dr. Françoise Barré-Sinoussi and her colleagues at the Pasteur Institute in France reported the discovery of a new retrovirus that they called Lymphadenopathy-Associated Virus (or LAV) that could be the cause of AIDS. In 2008, she will share the Nobel Prize in Medicine for this discovery with her colleague, Dr. Luc Montagnier.

In April 1984, the National Cancer Institute announced that Robert Gallo and his colleagues had found the cause of AIDS, a new retrovirus that they named HTLV-III. In a joint conference with the Pasteur Institute they announced that LAV and HTLV-III are identical and the likely cause of AIDS.[8]

This same year the first blood test was developed to screen for the virus. This was followed in March 1985 by the U.S. FDA's approval and licensing of the first commercial blood test for what eventually became known as HIV – an ELISA assay detecting antibodies to the virus – that could be used by blood banks to begin screening the blood supply. There was initially hope that a vaccine would be developed in two years…

In May 1986, the International Committee on the Taxonomy of Viruses officially named the virus that causes AIDS as HIV (human immunodeficiency virus) instead of HTLV-III/LAV.

Early Milestones in HIV Treatment

Let's move on to early milestones in HIV treatment.

In March 1987, the FDA approved the first antiretroviral drug, Zidovudine (AZT), as treatment for HIV. This marked the beginning of antiretroviral therapy for HIV.

AZT and other early HIV drugs in this class were originally being developed as anti-cancer agents when it was discovered they had antiretroviral activity and could be used in treating HIV infection.[9] Unfortunately, single drug therapy with AZT was limited by rapid resistance development and failed to provide a sustained treatment response. It would not be until almost a decade later that the first combination ART regimens were developed that could achieve long-term viral suppression.

AZT was also the first drug treatment found to be effective for HIV prevention, specifically in the context of preventing mother-to-child HIV transmission; in 1994 it was approved by the US Public Health Service for this indication.

Meanwhile, by the late 1980s, HIV/AIDS was increasingly recognized as an expanding global public health crisis.[10] In 1988, the WHO declared 1st December as the first World AIDS Day. The groundwork was laid for a nationwide HIV and AIDS care system in the USA that was later funded by the Ryan White CARE Act. The Red Ribbon Project was launched in 1991 by the Visual AIDS Artists Caucus to create a symbol of compassion for people living with HIV and their caregivers. The red ribbon became an international symbol of AIDS awareness.

In June 1995, the FDA approved the first protease inhibitor, beginning a new era of 'highly active antiretroviral treatment' (HAART) after it was found that sustained viral suppression could be achieved with combination antiretroviral regimens containing multiple active drugs. HAART brought about an immediate decline of between 60% and 80% in rates of AIDS-related deaths and hospitalization in those countries which could afford it.

The Joint United Nations Programme on AIDS (UNAIDS) was established in 1996, to advocate for global action on the epidemic and coordinate the response to HIV and AIDS across the UN. Shown here is the UNAIDS building in Geneva.[11]

In 1997, the FDA approved nevirapine, the first drug in a new class of antiretroviral agents, the non-nucleoside reverse transcriptase inhibitors (or NNRTIs). In July 2000, UNAIDS negotiated with five pharmaceutical companies to reduce antiretroviral drug prices for developing countries. And later that year, the United Nations adopted the Millennium Development Goals which included a specific goal to reverse the spread of HIV, malaria and TB.

In November 2001, the World Trade Organization (WTO) announced the Doha Declaration which allowed developing countries to manufacture generic medications to combat public health crises like HIV.

In June 2001, the United Nations (UN) General Assembly called for the creation of a "global fund" to support efforts by countries and organizations to combat the spread of HIV through prevention, treatment and care including buying medication. The following year Global Fund approved its first round of grants totaling $600 million.

In January 2003, President George W. Bush announced the creation of the United States President's Emergency Plan for AIDS Relief (PEPFAR), a $15 billion, five-year plan to combat AIDS, primarily in countries with a high number of HIV infections. In December, the WHO announced the "3 by 5" initiative to bring HIV treatment to 3 million people by 2005. These events helped to catalyze the scale-up of access to HIV treatment, which was urgently needed around the world, and especially in low- and middle-income countries where the prohibitively high price of antiretroviral drugs severely limited access to treatment in the very places that most needed it.

Starting in the 1980s and continuing over the next decades, activist groups[12] – both in the US and throughout the world[13] – have also played an important role in demanding more robust government responses addressing the HIV epidemic,[14] as well as advocating for greater access to HIV treatments.[15]

Key Innovations

Along with the greater focus and coordinated international efforts aimed at scaling up ART access that began in the early/mid-2000s, the next decade would bring several key innovations in biomedical HIV prevention.

In 2006, male circumcision was found to reduce the risk of female-to-male HIV transmission by 60%.[16] Consequently, WHO and UNAIDS emphasized that male circumcision should be considered in areas with high HIV and low male circumcision prevalence.[17] In July, the CAPRISA 004 microbicide trial was hailed a success after results showed that the microbicide gel reduces the risk of HIV infection in women by 40%.[18] And results from the iPrEx trial showed a reduction in HIV acquisition of 44% among men who have sex with men and transgender women who took pre-exposure prophylaxis (PrEP) with the once daily antiretroviral pill, Truvada.[19]

In 2011, results from the HPTN 052 trial showed that early initiation of antiretroviral treatment reduced the risk of HIV transmission by 96% among serodiscordant couples[20] – a landmark finding that showed definitively for the first time that "treatment is prevention".

Following the landmark studies of iPrEx and HPTN 052, in July 2012, the FDA approved once daily TDF/FTC (Truvada) as PrEP for HIV-negative people to prevent the sexual transmission of HIV. Also in this same year, for the first time the majority of people globally eligible for treatment were receiving it (54%), a sign of the ongoing efforts at ART scale-up. Here you can see the magnitude of ART scale-up that really took off in the decade prior to 2012.[21]

In September 2014, new UNAIDS "Fast Track" targets called for the dramatic scaling-up of HIV prevention and treatment programmes to avert 28 million new infections and end the epidemic as a public health issue by 2030. UNAIDS also launched the ambitious 90-90-90 targets, which aim for 90% of people living with HIV to be diagnosed, 90% of those diagnosed to be accessing antiretroviral treatment, and 90% of those accessing treatment to achieve viral suppression by 2020[22].

In September 2015, the WHO launched new treatment guidelines recommending that all people living with HIV should receive antiretroviral treatment, regardless of their CD4 count, and as soon as possible after their diagnosis.[23]

In January 2019, Robert F. Siliciano and colleagues, at Johns Hopkins University School of Medicine developed a new tool to measure the success of HIV cure strategies. The tool accurately and easily counts the cells that make up the HIV reservoir, the stubborn obstacle to an HIV cure. This advance will enable researchers who are trying to eliminate the HIV reservoir to clearly understand whether their strategies are working.

At the 2019 Conference on Retroviruses and Opportunistic Infections (CROI), researchers announce the second cure of a person with HIV. Like the 2007 case of the "Berlin Patient " (the first person to be cured of HIV), the "London Patient" has no detectable HIV infection three years after he received a bone marrow transplant from a donor who is genetically immune to HIV, despite having been off antiretroviral therapy (ART) for 18 months. Both patients received bone marrow transplants to treat cancer. While the treatment is too dangerous and costly for widespread use, researchers hail the news as further proof that HIV can be cured.

Current Decade

2021 marked the 40th anniversary of the first officially reported cases of what later became known as AIDS.

Now in the 5th decade of the HIV pandemic, the current decade has thus far been notable for the emergence of long-acting injectable therapies. In January 2021 the US FDA approved Cabotegravir and Rilpivirine, given as an IM injection every 1 to 2 months. And in December of 2021, IM injection of cabotegravir by itself was also approved for HIV prevention after clinical trial results (the HPTN 083 and 084 studies) found it to be at least as effective as currently available oral PrEP options at preventing HIV acquisition when taken by HIV-negative persons.

On the horizon, currently the HIV prevention research and development pipeline includes multiple other modalities, including the vaginal ring, drug-releasing implants, other injectables, and even monoclonal antibody preparations.[24]

UNAIDS Targets

We are now going to discuss briefly the UNAIDS targets.

The 'Fast-Track' era ran from 2014 until December 2020, when they were replaced by the 'Global AIDS Targets 2025'. While there were some notable successes, particularly in East and Southern Africa, uneven progress elsewhere meant that, collectively, the world was off-track. Fast-Track critics pointed to an overemphasis of the 90-90-90 targets, which came to mean 'Fast-Track'.[22]

The new 2025 targets, emphasize comprehensive, rights-based and people-centred HIV responses. 2025 targets focus on three interlinked areas – The enabling environment (known as 'the 10s'), Service access ('the 95s'), Service integration – with at-risk communities and people living with HIV at the centre.

The 10s' call for the removal of societal and legal barriers to HIV services. By 2025, it is expected that less than 10% of countries should have punitive laws and policies in place that target people living with HIV, or marginalized populations; less than 10% of people experience stigma and discrimination, and less than 10% of people experience gender inequality or violence.

The 95s' call for 95% testing, treatment, and viral suppression targets. As well as 95% access to combination prevention services; 95% access to sexual reproductive health services; and 95% coverage of prevention of mother-to-child transmission services.

The integration target calls for 90% of people living with HIV, and people at heightened risk of HIV, being linked to services important for their overall health. These include mental health, preventing and addressing gender-based violence, sexual reproductive health and rights, communicable and non-communicable disease services.

Summary

Let's now look at the summary of this presentation.

- During the first decade of HIV epidemic (1980s) advances made include: Discovery of HIV, Development of test kits, and the beginning of ART.
- Second decade advances in the 1990s include: Development of Highly Active Antiretroviral Therapies as new antiretroviral drugs became available.
- Third decade advances in the 2000s include: Access to ART for LMIC; greater global coordination and resources for the HIV/AIDS response (PEPFAR, 3 by 5, Global fund).
- Fourth decade advances in the 2010s include: Wider Access to ART, evaluation and eventual adoption of widespread universal 'Test and Treat' recommendations, U=U and newer preventive strategies; emergence of PrEP and other effective biomedical prevention tools.
- And we are now in the 5th decade of the HIV pandemic: since 2020 we have thus far seen the first long-acting injectable ARVs approved for both treatment and PrEP; greater emphasis in being placed on differentiated service delivery (DSD) models to further improve the effectiveness of global and local HIV responses.
- The new 2025 targets from UNAIDS emphasize comprehensive, rights-based and people-centred HIV responses which are focused on three interlinked areas – the enabling environment (the 10s), service access (the 95s), and service integration – with at-risk communities and people living with HIV at the centre.

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