HIV/AIDS

Madhukar Pai
Director, Global Health Programs
HIV (yellow) infecting a human immune cell (blue). Credit: NIH/SPL
HIV jumped to humans from non-human primates

Likely in the early 1900s, in Africa

But HIV was clinically described only in the early 1980s
**Key Points**

- HIV gradually destroys the immune system by attacking and destroying a type of white blood cell called a CD4 cell. CD4 cells play a major role in protecting the body from infection.
- HIV uses the machinery of the CD4 cells to multiply and spread throughout the body. This process, which is carried out in seven steps or stages, is called the HIV life cycle. HIV medicines protect the immune system by blocking HIV at different stages of the HIV life cycle.
- Antiretroviral therapy (ART) is the use of HIV medicines to treat HIV infection. People on ART take a combination of HIV medicines from at least two different HIV drug classes every day. Because each class of drugs is designed to target a specific step in the HIV life cycle, ART is very effective at preventing HIV from multiplying.

[https://aidsinfo.nih.gov/understanding-hiv-aids/fact-sheets/19/73/the-hiv-life-cycle](https://aidsinfo.nih.gov/understanding-hiv-aids/fact-sheets/19/73/the-hiv-life-cycle)
Opportunistic infections associated with advanced human immunodeficiency virus disease [adapted from http://www.microbiologybook.org/lecture/images/natural-history.gif]
https://timeline.avert.org/
Global HIV epidemic – people living with HIV

2018
Globally
37.9 million
People living with HIV

+20%
Relative to 2010

Source: UNAIDS/WHO estimates
## Summary of the global HIV epidemic (2018)

<table>
<thead>
<tr>
<th></th>
<th>People living with HIV in 2018</th>
<th>People newly infected with HIV in 2018</th>
<th>HIV-related deaths 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>37.9 million [32.7 million – 44.0 million]</td>
<td>1.7 million [1.4 million – 2.3 million]</td>
<td>770 000 [570 000 – 1.1 million]</td>
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<tr>
<td><strong>Adults</strong></td>
<td>36.2 million [31.3 million – 42.0 million]</td>
<td>1.6 million [1.2 million – 2.1 million]</td>
<td>670 000 [500 000 – 920 000]</td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td>18.8 million [16.4 million – 21.7 million]</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Men</strong></td>
<td>17.4 million [14.8 million – 20.5 million]</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Children (&lt;15 years)</strong></td>
<td>1.7 million [1.3 million – 2.2 million]</td>
<td>160 000 [110 000 – 260 000]</td>
<td>100 000 [64 000 – 160 000]</td>
</tr>
</tbody>
</table>

Source: UNAIDS/WHO estimates
Summary of the global HIV epidemic (2018)

- **37.9 million** people living with HIV
  [32.7 million – 44.0 million]

- **1.7 million** people newly infected
  [1.4 million – 2.3 million]

- **0.8 million** HIV-related deaths
  [0.6 million – 1.1 million]

Source: UNAIDS/WHO estimates
Global HIV epidemic – incidence and mortality since 2010

Source: UNAIDS/WHO estimates
Global HIV epidemic – incidence and mortality since 2000

2018
Globally
37.9 million
People living with HIV

- 37%
New diagnoses annually relative to 2000

- 45%
Deaths annually relative to 2000

Source: UNAIDS/WHO estimates
Decline in HIV incidence and mortality over time

Source: UNAIDS/WHO estimates
TRENDS IN LIFE EXPECTANCY DURING THE AIDS EPIDEMIC

People living with HIV by WHO region (2018)

37.9 million people living with HIV globally

- Africa: 25.7 million
- America: 3.5 million
- South-East Asia: 3.8 million
- Europe: 2.5 million
- Eastern Mediterranean: 400,000
- Western Pacific: 1.9 million

Source: UNAIDS/WHO estimates
Distribution of new HIV infections by key population, global (2018)

- Sex workers: 6%
- People who inject drugs: 12%
- Gay men and other men who have sex with men: 17%
- Transgender women: 1%
- Clients of sex workers and sex partners of other key populations: 18%
- Remaining population: 46%

Source: UNAIDS special analysis, 2019
Increased risk of acquiring HIV among key populations, global (2018)

- Among men who have sex with men (22 times)
- Among people who inject drugs (22 times)
- For sex workers (21 times)
- For transgender people (12 times)

Source: UNAIDS special analysis, 2019
Key populations and their sexual partners account for:

99% of new HIV infections in Eastern Europe and Central Asia
95% of new HIV infections in Middle East and North Africa
25% of new HIV infections in Eastern and Southern Africa

Globally (2018)

Source: UNAIDS special analysis, 2019
Global number of people newly infected with HIV

- 2000: 2.8 million
- 2018: 1.7 million
- Target 2020: < 500,000
- Target 2030: < 200,000

Source: UNAIDS/WHO estimates
Global number of HIV-related deaths

Source: UNAIDS/WHO estimates

2000: 1.4 million
2018: 770,000
2020: < 500,000
2030: < 400,000

Target
90–90–90 - An ambitious treatment target to help end the AIDS epidemic

By 2020, 90% of all people living with HIV will know their HIV status. By 2020, 90% of all people with diagnosed HIV infection will receive sustained antiretroviral therapy. By 2020, 90% of all people receiving antiretroviral therapy will have viral suppression.
HIV testing and care continuum, global (2018)

- People living with HIV: 40 million, 90% aware of HIV status
- Aware of HIV status: 30 million, 62% on treatment
- On treatment: 20 million, 53% with viral load suppression

Source: UNAIDS/WHO estimates
Canada has committed to meet global targets for HIV testing and treatment by 2020. 90% of people living with HIV diagnosed | 90% of people diagnosed starting treatment | 90% of people on treatment achieving viral suppression.

It is projected that meeting these targets will end AIDS as a public health threat by 2030. This was the state of our progress at the end of 2016:

- **Canadians are living with HIV.**
  - **63,110**
  - New HIV infections have increased slightly in Canada over the past several years.

- **Have been diagnosed.**
  - **54,020**
  - People living with HIV have a lower risk of illness and death if they are diagnosed early.

- **Have started treatment.**
  - **43,680**
  - With prompt and effective treatment, HIV-positive people in Canada have life expectancies similar to their HIV-negative peers.

- **Have achieved viral suppression.**
  - **39,960**
  - Maintaining an undetectable viral load through treatment and care prevents the sexual transmission of HIV.

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1. Estimate from the Public Health Agency of Canada.
3. Sabin, B. People with HIV infection have survival life expectancy similar to the era of combination antiretroviral therapy. BMC Medicine. 2015.

Production of this document has been made possible through a contribution from the Public Health Agency of Canada. The views do not necessarily represent the views of the Public Health Agency of Canada.
Global number of people receiving antiretroviral treatment

Source: UNAIDS/WHO estimates
Global ART coverage over time

Source: UNAIDS/WHO estimates
Countries with size proportional to people on ART, 2000-2018

Cartogram of the Total number receiving ART

Scale by Total number receiving ART (2000) calculated in 0.4 seconds

World Health Organization
HIV/AIDS ADVOCACY AS A MODEL FOR CATALYZING CHANGE

“What makes activism work is [patients’] anger and fear...somehow you have to be able to capture that, put it in a bottle and bottle it and use it.” – Larry Kramer

The following comes from a report produced by HCM strategists, a public policy advocacy consulting firm: “Back to Basics: HIV/AIDS as a Model for Catalyzing Change.”
On September 14, 1989, seven ACT UP members infiltrated the New York Stock Exchange and chained themselves to the VIP balcony to protest the high price of the only approved AIDS drug, AZT. The group displayed a banner that read, “SELL WELLCOME” referring to the pharmaceutical sponsor of AZT, Burroughs Wellcome, which had set a price of approximately $10,000 per patient per year for the drug, well out of reach of nearly all HIV positive persons. Several days following this demonstration, Burroughs Wellcome lowered the price of AZT to $6,400 per patient per year.

Slide courtesy: Erica Lessem, TAG
HIV Advocacy: Driving Funding and Health Impact

Total resources for HIV/AIDS in low- and middle-income countries, 2000-2015


Slide courtesy: Erika Arthun, Bill & Melinda Gates Foundation
<table>
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<th>HIV Advocates/Champions</th>
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<tr>
<td>Elton John</td>
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<td>Bill Clinton</td>
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<td>Annie Lennox</td>
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<td>Sharon Stone</td>
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<td>Nelson Mandela</td>
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<tr>
<td>Bono</td>
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<tr>
<td>Sting</td>
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<tr>
<td>Ellen DeGeneres</td>
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<tr>
<td>George Clooney</td>
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<td>Magic Johnson</td>
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HIV IN SOUTH AFRICA

The country has made huge progress in fighting HIV; access to antiretroviral drugs has soared and life expectancy has risen. But South Africa still has the largest HIV epidemic in the world.
Mbeki AIDS denial 'caused 300,000 deaths'

South African president's refusal to accept medical evidence of virus was major obstacle to providing medicine, say Harvard researchers

Sarah Boseley, health editor
Wed 26 Nov 2008 15.33 GMT

Thabo Mbeki. Photograph: Jon Hrusa/EPA
SOUTH AFRICA  
Progress towards 90 90 90 targets (all ages)

- 90% Aware of their HIV status
- 68% On HIV treatment
  - 62% of all people living with HIV
- 87% Virally suppressed
  - 54% of all people living with HIV

Source: UNAIDS Data 2019

Avert  www.avert.org
HIV Scientists Have Failed to Protect the World's Most At-Risk Women

PrEP drugs like Truvada can drastically lower the risk of HIV transmission. But young women in South Africa are pushing for a different kind of change.

Tools to end the HIV/AIDS Epidemic

1. Medical Circumcision
2. HIV Self testing
3. Treatment as prevention
4. Pre-exposure Prophylaxis
Male circumcision for HIV prevention

There is compelling evidence that male circumcision reduces the risk of heterosexually acquired HIV infection in men by approximately 60%. Three randomized controlled trials have shown that male circumcision provided by well trained health professionals in properly equipped settings is safe. WHO/UNAIDS recommendations emphasize that male circumcision should be considered an efficacious intervention for HIV prevention in countries and regions with heterosexual epidemics, high HIV and low male circumcision prevalence.

Male circumcision provides only partial protection, and therefore should be only one element of a comprehensive HIV prevention package which includes: the provision of HIV testing and counseling services; treatment for sexually transmitted infections; the promotion of safer sex practices; the provision of male and female condoms and promotion of their correct and consistent use.

https://www.who.int/hiv/topics/malecircumcision/en/
Figure 3: Treatment as prevention and pre-exposure prophylaxis

(A) Treatment as prevention involves treating HIV seropositive individuals with suppressive antiretroviral therapy to protect their HIV seronegative sexual partners from acquiring HIV infection. (B) Pre-exposure antiretroviral-based prophylaxis is given to HIV seronegative individuals to prevent viral acquisition from HIV seropositive sexual partners.
“The world can’t afford to backslide on investment in the AIDS response,” said Gunilla Carlsson, UNAIDS Executive Director, a.i. “Countries must honour their pledge to steadily increase their investment in the response to HIV if the world is to meet its obligations to the most vulnerable and disadvantaged.”

“THERE IS A WINDOW OF OPPORTUNITY BEFORE US
- a window through which we can very clearly see the end of AIDS
- within my lifetime. We cannot afford to let that window close.”

- Elton John
  to Congress, May 2015
THE WISDOM OF WHORES
BUREAUCRATS, BROTHELS, AND THE BUSINESS OF AIDS
ELIZABETH PISANI

AND THE BAND PLAYED ON
POLITICS PEOPLE AND THE AIDS EPIDEMIC
RANDY SHILTS

JACQUES PEPIN

The Origins of AIDS

AIDS & ACCUSATION
HAITI AND THE GEOGRAPHY OF BLAME
PAUL FARMER

*This is an entirely fascinating book... It should be mandatory reading.*
-
-Stephen Lewis,
Former UN envoy on AIDS in Africa, The Globe and Mail