Epidemiology of HIV

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• No conflicts of interest to disclose
Learning Objectives

At the end of this presentation, learners should be better able to:

• Describe the epidemiology of HIV in the US
• Identify available epidemiology tools which may be used to enhance your practice
Outline

• Introduction: HIV around the world
• The US epidemic
• Know your epidemic: online resources
• Public health strategies to reduce HIV incidence
• Conclusions
UNAIDS. AIDS by the numbers. 2016
Distribution of new adult HIV infections and population by age and sex, global and in sub-Saharan Africa, 2015

NEW HIV INFECTIONS AMONG ADULTS, BY AGE AND SEX, GLOBAL, 2015

- 27% 25+ years old
- 20% 15-24 years old
- 14% 15-24 years old

ADULT POPULATION, BY AGE AND SEX, GLOBAL, 2015

- 39% 25+ years old
- 39% 25+ years old

NEW HIV INFECTIONS AMONG ADULTS, BY AGE AND SEX, SUB-SAHARAN AFRICA, 2015

- 31% 25+ years old
- 25% 15-24 years old
- 12% 15-24 years old

ADULT POPULATION, BY AGE AND SEX, SUB-SAHARAN AFRICA, 2015

- 33% 25+ years old
- 17% 15-24 years old

Source: UNAIDS 2016 estimates.
Rates of persons living with HIV, 2013

https://aidsvu.org/map/
Diagnoses of HIV Infection among Adults and Adolescents, by Sex 2010–2014—United States and 6 Dependent Areas

Note. Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis.
Adults and Adolescents Living with Diagnosed HIV Infection, by Sex and Race/Ethnicity, Year-end 2014—United States and 6 Dependent Areas

Note. Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis. 
a Includes Asian/Pacific Islander legacy cases. 

Hispanics/Latinos can be of any race.

Estimated HIV Incidence Among Persons Aged ≥13 Years, by Transmission Category, United States, 2008-2014

Note: Data include persons with diagnosis of HIV infection regardless of stage of disease at diagnosis.
a. Adjusted for missing risk factor information. Heterosexual contact with a person known to have, or to be at high risk for, HIV infection.
b. Estimated annual percentage change is different from zero at the 5% significant level.


Estimated HIV Incidence Among Men Who Have Sex with Men\textsuperscript{a}, Aged ≥13 Years, by Race/Ethnicity\textsuperscript{b}, United States, 2008-2014

Note: Data include persons with diagnosis of HIV infection regardless of stage of disease at diagnosis.
\textsuperscript{a} Adjusted for missing risk factor information.
\textsuperscript{b} Hispanics/Latinos can be of any race.
\textsuperscript{c} Estimated annual percentage change is different from zero at the 5% significant level.

HIV Diagnoses Among Men Who Have Sex With Men, by Race/Ethnicity and Age at Diagnosis, 2015 -- United States

Estimated HIV Incidence Among Men Who Have Sex with Men\textsuperscript{a}, Aged ≥13 Years, by Age, United States, 2008-2014

Note: Data include persons with diagnosis of HIV infection regardless of stage of disease at diagnosis. Age is in years.
\textsuperscript{a} Adjusted for missing risk factor information.
\textsuperscript{b} Estimated annual percentage change is different from zero at the 5% significant level.

FIGURE. Estimated number of AIDS diagnoses and deaths and estimated number of persons living with AIDS diagnosis and living with diagnosed or undiagnosed HIV infection among persons aged ≥13 years — United States, 1981–2008

Estimated number of persons aged ≥13 years living with diagnosed and undiagnosed HIV infection* and percentage with undiagnosed HIV infection, 1985-2008

Chen M et al. MMWR 2012 (61): 57-64
Trends in premature mortality in the USA by sex, race, and ethnicity from 1999 to 2014: an analysis of death certificate data

Shiels MS et al. The Lancet 2017; 389: 1043–1054
Trends in premature mortality in the USA by sex, race, and ethnicity from 1999 to 2014: an analysis of death certificate data

Shiels MS et al. The Lancet 2017; 389: 1043–1054
Question #1

• You are trying to maximize resources and would like to know where to prioritize HIV testing and PrEP services. What measure of disease frequency would you use to identify optimal target areas?

a) Incidence rate
b) Prevalence
c) Total number of HIV cases per year
d) Morbidity due to AIDS
Understanding HIV where you live.

You're in Chicago
There are approximately 21,602 people living with diagnosed HIV in Chicago.

Not your city?

View our interactive maps to see
Find local HIV testing, care and
Discover how you can use our maps
Illinois Highlights

Prevalence

- Number of people living with diagnosed HIV in 2013: 34,681
- Rate of people living with diagnosed HIV in 2013 per 100,000 people: 323
- 79% of people living with diagnosed HIV in 2013 were men, and 21% were women.
- 47% of people living with diagnosed HIV in 2013 were black, 18% Hispanic/Latino, and 29% white.

New Diagnoses

- Number of new HIV diagnoses in 2014: 1,728
- Rate of new HIV diagnoses in 2014 per 100,000 people: 16

Mortality

- Number of deaths of people with diagnosed HIV in 2013: 676
- Rate of deaths of people with diagnosed HIV per 100,000 people: 6

Rate per 100,000 people
Chicago, ZIP Code 60629

In 2013, 413 people were living with diagnosed HIV.
Chicago, ZIP Code 60629

From 2010-2014, 139 people were newly diagnosed with HIV.
Service Locators

Testing Sites

PrEP (Pre-Exposure Prophylaxis) Services

Care Services

LEARN & SHARE

LATEST NEWS

National Women and Girls HIV/AIDS Awareness Day

By: Rep. Barbara Lee Today we welcome a guest blog post by...

Join Us

Get involved & receive updates
PrEP (Pre-Exposure Prophylaxis) Services

**UIC Family Center for Immune Deficiency & Infectious Diseases**
1801 Taylor Street
Suite 3
Chicago, IL 60612
312-996-8537
0.46 miles

**Rush University Medical Center Infectious Diseases**
600 S. Paulina Street
Suite 140
Chicago, IL 60612
312-942-5865
0.21 miles

**Fantus Health Center Adolescent and Young Adult Medicine (AYAC)**
1901 W. Harrison Street
3rd Floor
Chicago, IL 60612
312-864-0200
0.22 miles

**EPIC: Enhancing PrEP in Communities**
2020 W. Harrison St.
2nd Floor Research Department
Chicago, IL 60612
708-685-9415
Web Resources

1. www.AIDS.gov
   HIV/AIDS information from the federal government about prevention, testing, treatment, research, and using new media in response to the HIV/AIDS epidemic in the U.S.

2. www.thebody.com
   Information about HIV/AIDS, including FAQs and an “ask the experts” feature.

3. www.cdc.gov/hiv/
   CDC’s comprehensive resources for HIV/AIDS information.

4. www.greaterthan.org
   Information about HIV/AIDS including HIV/AIDS facts, talking tips, protection, testing, and getting involved locally.

5. www.hivtest.cdc.gov
   FAQs about HIV/AIDS and a search tool for finding local testing locations. Sponsored by the CDC.

6. www.kff.org/hivaids/
   Kaiser Family Foundation site that provides data and information on the HIV/AIDS epidemic in the U.S. and around the world, including policy reports, fact sheets, and survey data, and information on media partnerships, journalist training programs, and HIV/AIDS initiatives in South Africa.

7. www.nastad.org
   Online resource for the National Alliance of State and Territorial AIDS Directors (NASTAD), which represents the nation’s chief state health agency staff who have programmatic responsibility for administering HIV/AIDS healthcare, prevention, education, and supportive service programs funded by state and federal governments.

8. www.whitehouse.gov/administration/eop/onap/nhas

   A searchable database of federally and privately supported clinical trials conducted in the United States and around the world, including trials of HIV prevention and treatment.
Vital Statistics
IDPH each year records about a half million vital record events as mandated by state statutes and federal uniform data collection requirements.

IL Health Data Portal (Open Data)
Data IL Illinois.gov is an open data portal that provides ready access to public datasets. Click here to obtain the latest IDPH and other State Agency.

Database & Datafile Resources Guide
A compendium of databases and datafiles used within IDPH which lists variables collected, contacts, limitations on data use and other information.
HIV Surveillance in Adolescents and Young Adults (through 2015)

This slide set lists diagnoses of HIV among adolescents and young adults aged 13-24 years, by race/ethnicity, 2010-2015 in the US and six dependent areas.

Download the complete Slide Set:

21 Slides in Adobe PDF Format — [1.91 MB]
21 Slides in PowerPoint PPT Format — [4.00 MB]

HIV Surveillance—Epidemiology of HIV Infection (through 2015)

This slide set explains trends in HIV diagnoses in the US.

Download the complete Slide Set:

35 Slides in Adobe PDF Format — [5.4 MB]
35 Slides in PowerPoint PPT Format — [6.8 MB]

HIV Surveillance—Men Who Have Sex with Men (MSM) (through 2015)

Download the complete Slide Set:

20 Slides in Adobe PDF Format
20 Slides in PowerPoint PPT Format
Customize your content
Know the HIV Risk
What is HIV?
How do I know if I have HIV?
Can I get or transmit HIV from...?
What can increase HIV risk?
What can decrease HIV risk?
What are the best ways to decrease my chances of getting or transmitting HIV?

Find free, fast, & confidential HIV testing near you

Enter ZIP  GO >>

What do you want to do?

Locate a particular topic...
This tool contains messages divided into five questions. Click one of the topic areas to see the messages.

What is HIV?
How do I know if I have HIV?
Can I get or transmit HIV from...?
What can increase HIV risk?
What can decrease HIV risk?
Strategies to Reduce the Risk of Acquiring or Transmitting HIV

- Treatment of HIV positive persons
- Pre-exposure prophylaxis (PrEP) for HIV negatives
- Male condoms
- Serosorting of HIV negative individuals
- Male circumcision
Figure 2. Kaplan–Meier Estimates for Partner-Linked and Any HIV-1 Transmission and for Clinical and Composite Monitoring Events.
### Table 2. Incidence of Partner-Linked and Any HIV-1 Transmission and Clinical and Composite Events.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Early Therapy</th>
<th></th>
<th>Delayed Therapy</th>
<th></th>
<th>Hazard or Rate Ratio (95% CI)²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Events Person-yr</td>
<td>Rate (95% CI)</td>
<td>Events Person-yr</td>
<td>Rate (95% CI)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>no. %</td>
<td></td>
<td>no. %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linked transmission</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>1585.3 0.1 (0.0–0.4)</td>
<td>27</td>
<td>1567.3 1.7 (1.1–2.5)</td>
<td>0.04 (0.01–0.27)</td>
</tr>
<tr>
<td>1 yr</td>
<td>1</td>
<td>819.0   0.1 (0.0–0.7)</td>
<td>16</td>
<td>813.3 2.0 (1.1–3.2)</td>
<td>0.06 (0.00–0.40)</td>
</tr>
<tr>
<td>2–3 yr</td>
<td>0</td>
<td>686.5   0.0 (0.0–0.5)</td>
<td>9</td>
<td>682.8 1.3 (0.6–2.5)</td>
<td>0.00 (0.00–0.50)</td>
</tr>
<tr>
<td>&gt;3 yr</td>
<td>0</td>
<td>79.9    0.0 (0.0–4.6)</td>
<td>2</td>
<td>71.2 2.8 (0.3–10.1)</td>
<td>0.00 (0.00–4.75)</td>
</tr>
<tr>
<td>Any transmission†</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>1585.3 0.3 (0.1–0.6)</td>
<td>35</td>
<td>1567.3 2.2 (1.6–3.1)</td>
<td>0.11 (0.04–0.32)</td>
</tr>
<tr>
<td>1 yr</td>
<td>2</td>
<td>819.0   0.2 (0.0–0.9)</td>
<td>18</td>
<td>813.3 2.2 (1.3–3.5)</td>
<td>0.11 (0.01–0.46)</td>
</tr>
<tr>
<td>2–3 yr</td>
<td>2</td>
<td>686.5   0.3 (0.0–1.1)</td>
<td>14</td>
<td>682.8 2.1 (1.1–3.4)</td>
<td>0.14 (0.02–0.62)</td>
</tr>
<tr>
<td>&gt;3 yr</td>
<td>0</td>
<td>79.9    0.0 (0.0–4.6)</td>
<td>3</td>
<td>71.2 4.2 (0.9–12.3)</td>
<td>0.00 (0.00–2.16)</td>
</tr>
<tr>
<td>Clinical events‡</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>1661.9 2.4 (1.7–3.3)</td>
<td>65</td>
<td>1641.8 4.0 (3.1–5.0)</td>
<td>0.59 (0.40–0.88)</td>
</tr>
<tr>
<td>1 yr</td>
<td>29</td>
<td>831.0   3.5 (2.3–5.0)</td>
<td>39</td>
<td>832.6 4.7 (3.3–6.4)</td>
<td>0.75 (0.44–1.24)</td>
</tr>
<tr>
<td>2–3 yr</td>
<td>9</td>
<td>739.8   1.2 (0.6–2.3)</td>
<td>21</td>
<td>725.7 2.9 (1.8–4.4)</td>
<td>0.42 (0.17–0.96)</td>
</tr>
<tr>
<td>&gt;3 yr</td>
<td>2</td>
<td>91.1    2.2 (0.3–7.9)</td>
<td>5</td>
<td>83.6 6.0 (1.9–14.0)</td>
<td>0.37 (0.04–2.24)</td>
</tr>
<tr>
<td>Composite events§</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>1700.1 1.4 (0.9–2.0)</td>
<td>79</td>
<td>1642.0 4.8 (3.8–6.0)</td>
<td>0.28 (0.18–0.45)</td>
</tr>
<tr>
<td>1 yr</td>
<td>13</td>
<td>843.7   1.5 (0.8–2.6)</td>
<td>47</td>
<td>833.9 5.6 (4.1–7.5)</td>
<td>0.27 (0.14–0.51)</td>
</tr>
<tr>
<td>2–3 yr</td>
<td>8</td>
<td>763.8   1.0 (0.5–2.1)</td>
<td>26</td>
<td>732.5 3.5 (2.3–5.2)</td>
<td>0.30 (0.12–0.67)</td>
</tr>
<tr>
<td>&gt;3 yr</td>
<td>2</td>
<td>92.6    2.2 (0.3–7.8)</td>
<td>6</td>
<td>75.5 7.9 (2.9–17.3)</td>
<td>0.27 (0.03–1.52)</td>
</tr>
</tbody>
</table>
Pre-exposure prophylaxis

Figure 2. Kaplan–Meier Estimates of Time to HIV Infection (Modified Intention-to-Treat Population).

Question #2

• Male Circumcision reduces the risk of HIV infection by:
  a) 10%
  b) 25%
  c) 60%
  d) 85%
Circoncisione di Gesù Cristo
Guido Reni
Chiesa di San Martino
Siena, Italy
Randomized Clinical Trials

• Rakai, Uganda
  • 4996 men ages 15-49
    – 2474 immediate MC
    – 2522 delayed MC

• Primary outcome: HIV incidence

• Kisumu, Kenya
  • 2784 men ages 18-24
    – 1391 MC
    – 1393 delayed MC

• Primary outcome: HIV incidence
<table>
<thead>
<tr>
<th>Location</th>
<th>Risk Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observational</td>
<td>0.42 (0.34, 0.52)</td>
</tr>
<tr>
<td>South Africa</td>
<td>0.40 (0.24, 0.68)</td>
</tr>
<tr>
<td>Kenya</td>
<td>0.41 (0.24, 0.70)</td>
</tr>
<tr>
<td>Uganda</td>
<td>0.49 (0.2, 0.84)</td>
</tr>
<tr>
<td>Summary RCTs</td>
<td>0.43 (0.32, 0.58)</td>
</tr>
</tbody>
</table>

Slide courtesy of Robert C. Bailey, PhD, MPH
Conclusions

• The US HIV epidemic disproportionately affects men

• Young African American MSM have the highest incidence of the disease

• The introduction of potent ARV therapy substantially decreased mortality

• PrEP, TasP, and Male Circumcision are proven strategies to reduce the risk of HIV infection
Thank you!
mbrito@uic.edu
ACTHIV 2017: A State-of-the-Science Conference for Frontline Health Professionals