HIV AND COMORBIDITIES

Mary Anne Hoskins, RN, MPH, MSN
Objectives

• Identify the two main causes of mortality for PLWHIV

• Recognize the modifiable risk factors that compound comorbidities for PLWHIV

• Understand the role of chronic inflammation in morbidity and mortality associated with HIV
<table>
<thead>
<tr>
<th>Age at end of year (yr)</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Rate</td>
<td>No.</td>
<td>Rate</td>
<td>No.</td>
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<td>&lt;13</td>
<td>2,713</td>
<td>5.1</td>
<td>2,594</td>
<td>4.9</td>
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<td>13–14</td>
<td>893</td>
<td>10.8</td>
<td>780</td>
<td>9.3</td>
<td>739</td>
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<td>15–19</td>
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<td>29.5</td>
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<tr>
<td>35–39</td>
<td>83,532</td>
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<td>40–44</td>
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<td>115,986</td>
<td>555.7</td>
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<tr>
<td>45–49</td>
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<td>748.0</td>
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<td>50–54</td>
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<td>664.4</td>
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<td>498.4</td>
<td>112,263</td>
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<td>60–64</td>
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<td>65,295</td>
<td>360.3</td>
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<tr>
<td>≥65</td>
<td>45,040</td>
<td>104.4</td>
<td>52,299</td>
<td>117.1</td>
<td>60,255</td>
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</table>

*Rates are per 100,000 population*
<table>
<thead>
<tr>
<th>Age</th>
<th>2012 No.</th>
<th>2012 Rate</th>
<th>2016 No.</th>
<th>2016 Rate</th>
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<td>664.4</td>
<td>169,919</td>
<td>777.6</td>
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<td>55-59</td>
<td>103,570</td>
<td>498.4</td>
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<td>60-64</td>
<td>58,415</td>
<td>327.8</td>
<td>89,322</td>
<td>458.3</td>
</tr>
<tr>
<td>&gt;65</td>
<td>45,040</td>
<td>104.4</td>
<td>80,102</td>
<td>162.6</td>
</tr>
<tr>
<td>Total</td>
<td>357,097</td>
<td>*</td>
<td>477,886</td>
<td>*</td>
</tr>
<tr>
<td>Total, all age groups</td>
<td>892,235</td>
<td></td>
<td>991,447</td>
<td></td>
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<tr>
<td>Percentage</td>
<td>40%</td>
<td></td>
<td>48%</td>
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</table>
People Living With Diagnosed HIV by Age, 2015, United States

Population Diversity

Elderly patients diagnosed when cART became available

• Long-term effects of the inflammatory process
  • Elite controllers*

• Long-term effects of cART

• Drug holidays

*Krishnan, Wilson et al. (2014)
Population Diversity

• Elderly patients newly diagnosed
  • Delays in diagnosis
  • Poor CD4 recovery
What they have in common

• Interplay of multiple disease processes

• Immunosenescence
  • “Accelerated” vs “accentuated” aging

• Frailty
Cancer Incidence in Patients > 65 years old

### Prevalence of Modifiable Risk Factors

<table>
<thead>
<tr>
<th>Modifiable risk factor</th>
<th>% of cohort living with HIV</th>
<th>% of cohort without HIV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol intake*</td>
<td>35</td>
<td>5-15</td>
</tr>
<tr>
<td>Obesity</td>
<td>17</td>
<td>34</td>
</tr>
<tr>
<td>Smoking</td>
<td>54</td>
<td>23</td>
</tr>
<tr>
<td>Chronic HCV</td>
<td>26</td>
<td>0.9</td>
</tr>
<tr>
<td>HPV*</td>
<td>46 (c); 16 (o); 68(a)</td>
<td>29 (c); 4 (o); 0 (a)</td>
</tr>
<tr>
<td>HBV</td>
<td>5</td>
<td>0.3</td>
</tr>
</tbody>
</table>

C = cervical; o = oral; a = anal. Park et al. (2016)
Lung Cancer

Higher rate of smoking—42.4% vs 20.6% ¹

Prior lung damage by HIV ²
   (PCP and other pneumonia)

HIV-related inflammation ², ³

Screening for Lung Cancer

• Annual screening with low-dose computed tomography (LDCT) in adults aged 55 to 80 years who have a 30 pack-year smoking history and currently smoke or have quit within the past 15 years.

Cervical and Anal Cancers

ACS 2019 estimates:

• Anal cancer
  \[ \approx 8,300 \text{ new cases (5,530 in women; 2,770 in men)} \]
  \[ \approx 1,280 \text{ deaths (760 in women; 520 in men)} \]

• Cervical cancer
  \[ \approx 13,170 \text{ new cases} \]
  \[ \approx 4,250 \text{ deaths} \]
• HPV 16, 18

• Gardasil
  • FDA approved up to age 45

• Screening
  • ANCHOR
  • SPANC
Abbreviations: APT=anal Papanicolaou test; ASC-US=atypical squamous cells of undetermined significance; SIL=squamous intraepithelial lesion.
Cervical Cancer Screening

• Use of both cytology and HPV testing every five years is preferred for healthy women 30 to 65 years of age. (ACS, USPSTF, ACOG)

• Women with human immunodeficiency virus infection should be screened with cytology twice in the year after diagnosis, even if younger than 21 years, and annually thereafter.
Liver Cancer/Other Liver Diseases

• Hepatocellular carcinoma
Liver disease

- Hepatitis C
  - 2.3 million estimated worldwide
  - In the US, 25% of PLWHA

- Nearly 75% of people with HIV who inject drugs also are infected with HCV.

- More than triples the risk for liver disease, liver failure, and liver-related death.
Hepatitis C

• Cirrhosis

• Immune function

• Reinfection
Hepatitis B

- A person in the acute phase could be asymptomatic or could experience
  - Fatigue
  - Jaundice
  - Dark urine

- The virus may resolve on its own or it may progress to chronic hepatitis, cirrhosis or hepatocellular carcinoma

- Reactivation
Hepatitis B—Prevention

• Postvaccination serologic testing 1–2 months after the final dose

• Immune memory?

HBV Treatment

• Peg IFN
• Entecavir
• TDF/TAF
Cardiovascular Disease

Figure 10 - Risk of Acute Myocardial Infarction Based on HIV Status and Age
This graph is based on data from 82,459 participants in the Veterans Aging Cohort Study (Virtual Cohort) from April 1, 2003 through December 31, 2009. Persons with HIV clearly had a higher risk of developing acute myocardial infarction and this risk was seen across multiple decades of age.

Risk Factors

• Increased duration of ART
• HIV immune activation/inflammation
  • Intestinal bacterial translocation
  • Concurrent viral infections (CMV, HBV, HCV, HSV)
• Residual HIV viremia or HIV proliferation
Risk Factors

• Hypertension
• Diabetes
• Dyslipidemia
• Smoking
• Metabolic Syndrome
• Hypogonadism

Focus on risk factors the patient can control
Predictors of chronic kidney disease in adults with HIV

- Older age
- Use of TDF
- Female sex
- Diabetes
- Hypertension
- Hepatitis C infection
- Injection drug use
- History of acute kidney injury
- Lower CD4 cell count
- Higher HIV RNA levels
Diabetes

- Protease Inhibitors (LPV/r, FPV/r)
- Lifestyle/Family history/Age
Bone density issues

- lower body weight, smoking, and vitamin D deficiency
- use of tenofovir DF
Tuberculosis

• The risk of developing TB is estimated to be between 16-27 times greater in people living with HIV
Concomitant medication use in HIV-positive patients and general population, aged 50–64 years.

Notes: (A) Males, (B) females. Use of 0, 1–4, and ≥5 prescribed concomitant medications (excluding antiretrovirals) was calculated according to 1) drugs with a DDD >1; 2) drugs with a DDD >90 (treatments lasting >90 days); and 3) drugs with a DDD >180 (treatments lasting >180 days).

Abbreviations: DDD, defined daily dose; HIV, human immunodeficiency virus.
Polypharmacy

- Impaired renal and hepatic function

- Cytochrome p450
  - 3A4
  - 2C8
  - 2C9
Polypharmacy

- Calcium-containing antacids may impair absorption
  - Atazanavir
  - Rilpivirine
  - Integrase inhibitors
  - Raltegravir 1200 mg QD
Polypharmacy

• TB medications

• Statins†

• Inhaled corticosteroids†

• Boosted PIs†

† Nunez-Nunez, M. et al.
Resources

• The American Academy of HIV Medicine
  • The HIV & Aging Consensus Project
• Liverpool HIV iChart
References


• https://www.cdc.gov/hiv/group/age/olderamericans/index.html


• Demir, Ozan M., Candilio, L., Fuster, D., Muga, R., Azzalini, L. Cardiovascular disease burden among human immunodeficiency virus-infected individuals International Journal of Cardiology, Volume 265, 15 August 2018, Pages 195-203.


• Guaraldi, Giovanni, Zona, Stefano, Silva, Ana Rita, Menozzi, Marianna, Dolci, Giovanni, Milic, Jovana, Carli, Federica, Mussini, Cristina The dynamic association between Frailty, CD4 and CD4/CD8 ratio in people aging with HIV. By:, PLoS ONE, 19326203, 2/14/2019, Vol. 14, Issue 2


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• https://www.cancer.org/cancer/anal-cancer/about/what-is-key-statistics.html
