Aging and HIV Infection: Epidemiology and Clinical Issues

Amy C. Justice, MD, MSCE, PhD
Professor, Yale University School of Medicine
Section Chief, General Internal Medicine, VA Connecticut
October 27, 2010
White House, Eisenhower Executive Office Building
2010 Success

• A single combination pill, taken once daily is well tolerated, and achieves viral suppression in >70%

• In many settings >80% of patients are on this treatment and remain on it for extended periods

• Median CD4 counts are increasing and viral load are declining in most clinics

• AIDS defining events are increasingly rare
## Life Expectancy on HAART

<table>
<thead>
<tr>
<th>At HAART Initiation</th>
<th>CD4 Cell Count (mm$^3$)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;100</td>
<td>100-199</td>
<td>&gt;200</td>
<td></td>
</tr>
<tr>
<td>A 20 yr old will live to (years)</td>
<td>52</td>
<td>62</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>A 35 yr old will live to (years)</td>
<td>62</td>
<td>65</td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>% Remaining Life Lost (all ages)</td>
<td>46%</td>
<td>27%</td>
<td>14%</td>
<td></td>
</tr>
</tbody>
</table>

Adapted from *ART-CC, Lancet 2008;372:293-99*
Epidemiology

Who is living and dying with HIV?
Projected Proportion of those Living With HIV in United States 50+ Years*
2001-2017

Risk Category of Those 50+ Years Diagnosed with HIV in 2007, NY City

Men
- Unknown: 50%
- Heterosexual: 13%
- Men who have sex with men: 24%
- Injection drug use history: 13%

Women
- Unknown: 26%
- Heterosexual: 69%
- Injection drug use history: 5%

As reported to the New York City Department of Health and Mental Hygiene by September 30, 2008.
HIV Among 50+ in NYC 2004-2008

Death Rates\(^4\) by Age and Race/Ethnicity\(^5\)

- Black Non-HIV-related
- Black HIV-related
- Hispanic Non-HIV-related
- Hispanic HIV-related
- White Non-HIV-related
- White HIV-related
- NYC all-cause

HIV Epidemiology & Field Services Semiannual Report, NYCDOH. April 2010
Clinical Issues

New Infections

Timing and Response to HAART

Non AIDS Conditions and Individualized Care
Sex is Not Only for the Young

Proportion reporting sex in last 12 months

- **Men**
  - 57-64: 83.7%
  - 65-74: 67.0%
  - 75-85: 38.5%

- **Women**
  - 57-64: 61.6%
  - 65-74: 39.5%
  - 75-85: 16.7%

---

*Lindau ST. et al. ...Sexuality and Health among Older Adults in the US NEJM 2007 357(8):762–774*
Sexual Risks Specific to Older Adults

• Newly single (widowed/divorced) status
• Ratio of men to women increasingly skewed
• Less likely to use condoms
  – Post menopausal women pregnancy no longer possible
  – Men may have erectile dysfunction complicating condom use
• Lower estrogen lead to vaginal dryness and increased risk of virus entering blood stream
New HIV Diagnoses Over Age 50 Years

Clinical Issues

New Infections
Timing and Response to HAART
Non AIDS Conditions and Individualized Care
Delayed Presentation By Age
(NA ACCORD)

Althoff KN. et al. under review, AIDS Research Therapy, presented HIV and Aging Meeting, Baltimore Oct 5 2010
12 Months after HIV Diagnosis by Age, 2007
(37 states with confidential name-based HIV infection reporting)

HIV surveillance Report, Volume 20, CDC (2010)
Immunity in HIV and Aging

• **Synergistic** effects of HIV and Aging lead to:
  – Reduced naïve T cell numbers
  – Increased levels of “senescent” T cells
  – Reduced naïve CD4 diversity

• These changes accompanied by:
  – Low level immune activation and *inflammation*
  – In gut, loss of mucosal integrity/microbial translocation, contributes to inflammation
CD4 Response to cART by Age

<table>
<thead>
<tr>
<th>Age (yrs)</th>
<th>Adjusted Hazard OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-&lt;30</td>
<td>ref</td>
</tr>
<tr>
<td>30-&lt;40</td>
<td>0.92 (0.85, 1.00)</td>
</tr>
<tr>
<td>40-&lt;50</td>
<td>0.85 (0.78, 0.92)</td>
</tr>
<tr>
<td>50-&lt;60</td>
<td>0.74 (0.65, 0.85)</td>
</tr>
</tbody>
</table>

Althoff KN et al. AIDS 2010 24:2469-2479
Clinical Issues

New Infections
Timing and Response to HAART
Non AIDS Conditions and Individualized Care
Non AIDS Events Are Associated with HIV Disease Progression*

<table>
<thead>
<tr>
<th></th>
<th>Treatment Sparing</th>
<th>Treatment Intensive</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Cause Death</td>
<td>55</td>
<td>30</td>
<td>85</td>
</tr>
<tr>
<td>Serious OI</td>
<td>13</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Nonserious OI</td>
<td>63</td>
<td>18</td>
<td>81</td>
</tr>
<tr>
<td>Major CAD, Renal, or Liver Disease</td>
<td>65</td>
<td>39</td>
<td>104</td>
</tr>
</tbody>
</table>

*More AIDS and “Non-AIDS” Events Among Treatment Sparing Arm (HR 1.7 in SMART) *NEJM* 2006;355:2283-96
HANA Events Among HIV Infected and Demographically Matched Uninfected

Events/10,000 Person Years

Liver Cirrhosis (HCV+): 174

All Non AIDS Cancers: 126

Thrombosis: 84

Stroke: 43

Obstructive Lung Disease: 26

Myocardial Infarction: 22

Fragility Fracture: 18

Renal Dialysis (Black pts): 22

<table>
<thead>
<tr>
<th>Condition</th>
<th>HIV+</th>
<th>HIV-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liver Cirrhosis (HCV+)</td>
<td>174</td>
<td>150</td>
</tr>
<tr>
<td>All Non AIDS Cancers</td>
<td>126</td>
<td>113</td>
</tr>
<tr>
<td>Thrombosis</td>
<td>84</td>
<td>76</td>
</tr>
<tr>
<td>Stroke</td>
<td>43</td>
<td>26</td>
</tr>
<tr>
<td>Obstructive Lung Disease</td>
<td>26</td>
<td>22</td>
</tr>
<tr>
<td>Myocardial Infarction</td>
<td>18</td>
<td>13</td>
</tr>
<tr>
<td>Fragility Fracture</td>
<td>22</td>
<td>16</td>
</tr>
<tr>
<td>Renal Dialysis (Black pts)</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>
Likely To Increase with Aging

• Effects of chronic “inflammation”
  – Liver disease, lung disease, bone marrow suppression
  – Vascular disease, renal disease
  – Cancer

• Multimorbidity
  – Adverse events from poly pharmacy
  – Organ system injury from multiple causes (frailty)
  – Increased demand for supportive care services

• Need to prioritize care based on individual risk, patient preferences, and likely effectiveness
Veterans Aging Cohort Study Risk Index (VACS Index)

- Composed of age and laboratory tests currently recommended for clinical management
  - HIV Biomarkers: HIV-1 RNA, CD4 Count, AIDS defining conditions
  - “non HIV Biomarkers”: Hemoglobin, hepatitis C, composite markers for liver and renal injury

- Developed in US veterans, validated in Europe and North America
VACS Index Highly Predictive of Long Term (5 Year) All Cause Mortality

\[ y = 0.0091x - 0.0318 \]

\[ R^2 = 0.9916 \]

Individual Scores

Aggregated Scores


Clinical Summary

• HIV, age, and substance use increase risk of ‘non AIDS’ conditions

• What is common for those aging with HIV is not identical to uninfected individuals

• Guidelines for aging-related non-AIDS condition require adaptation for those with HIV
  – HANA may justify earlier or more aggressive HAART
  – HAART may cause some conditions, but effects are often less than those of HIV itself
  – Some primary care guidelines may be contra-indicated due to reduced life expectancy and polypharmacy
What Can We Do Now?

• Universal HIV screening and early treatment

• Study joint effects of aging, HIV, substance use to identify ways to intervene
  – Compare effectiveness of intervention on overall risk
  – Tailor HIV treatment and primary care accordingly

• Train those who work with:
  – the aging on special issues surrounding HIV
  – with HIV on special issues surrounding aging
Veterans Aging Cohort Study

- **PI and Co-PI:** AC Justice, DA Fiellin

- **Scientific Officer (NIAAA):** K Bryant

- **Participating VA Medical Centers:** Atlanta (D. Rimland), Baltimore (KA Oursler, R Titanji), Bronx (S Brown, S Garrison), Houston (M Rodriguez-Barradas, N Masozera), Los Angeles (M Goetz, D Leaf), Manhattan-Brooklyn (M Simberkoff, D Blumenthal, H Leaf, J Leung), Pittsburgh (A Butt, E Hoffman), and Washington DC (C Gibert, R Peck)

- **Core Faculty:** K Akgun, S Braithwaite, C Brandt, K Bryant, R Cook, K Crothers, J Chang, S Crystal, N Day, R Dubrow, M Duggal, J Erdos, M Freiberg, M Gaziano, M Gerschenson, A Gordon, J Goulet, N Kim, M Kozal, K Kraemer, V LoRe, S Maisto, K Mattocks, P Miller, P O'Connor, C Parikh, C Rinaldo, J Samet

- **Staff:** H Bathulapalli, T Bohan, D Cohen, A Consorte, P Cunningham, A Dinh, C Frank, K Gordon, J Huston, F Kidwai, F Levin, K McGinnis, L Park, C Rogina, J Rogers, L Sacchetti, M Skanderson, J Tate, E Williams

- **Major Collaborators:** VA Public Health Strategic Healthcare Group, VA Pharmacy Benefits Management, Massachusetts Veterans Epidemiology Research and Information Center (MAVÉRIC), Yale Center for Interdisciplinary Research on AIDS (CIRA), Center for Health Equity Research and Promotion (CHERP), ART-CC, NA-ACCORD, HIV-Causal

- **Major Funding by:** National Institutes of Health: NIAAA (U10-AA13566), NIA (R01-AG029154), NHLBI (R01-HL095136; R01-HL090342; RCI-HL100347), NIAID (U01-A1069918), NIMH (P30-MH062294), and the Veterans Health Administration Office of Research and Development (VA REA 08-266) and Office of Academic Affiliations (Medical Informatics Fellowship).
Other Acknowledgements

AAHIVM: HIV and Aging Panel Members
ACRIA, GMHC, ART-CC, NA-ACCORD
Centers for Disease Control
NY City Department of Public Health
Veterans Healthcare System Public Health
Strategic Healthcare Group
Reference List for bar graphs of HANA incidence rates


Ref Type: Abstract


Ref Type: Abstract

(8) Thorpe J. et al.CROI 2010 absract # 683
