Managing HIV: The Future

David Rimland, M.D.
Chief, Infectious Diseases
VA Medical Center- Atlanta
Professor of Medicine
Emory University School of Medicine
Learning Objectives

Upon completion of this presentation, learners should be better able to:

• Identify the future trends of HIV disease and treatment
• Consider upcoming changes influencing choices of treatment
• Explore the developing comorbidities in HIV disease
Faculty and Planning Committee Disclosures
Please consult your program book.

Off-Label Disclosure
There will be off-label/investigational uses discussed in this presentation.
Caveats

• My experience with the VA system will influence my predictions
• I will be discussing only the United States
• “Never make predictions, especially about the future”.
  
  Casey Stengel

• “You can make predictions, and a year later people won't remember them.
  
  Daniel Kahneman
The number of persons living with HIV infection in the United States has been decreasing in the last 5 years

1. True
2. False
The main causes of hospitalizations for HIV infected persons are related to immunosuppression

1. True
2. False
A cure for HIV will be available in the next 5 years

1. True
2. False
Defining Priorities for NIH

Walensky et al, CID 2015; 60-937-40

• Prevention, including vaccine
• Treatment
• Care continuum
• Cure
• Comorbidities, co-infections, complications
• Training and infrastructure
The Prevention Bundle: No Single Silver Bullet

- Condoms: variable use
- Circumcision: common in U.S.
- MTCT with ART plus: very effective
- Needle exchange: works
- PrEP: can it be implemented widely?
- Treatment as prevention: works
Do Financial Incentives Work?

• Works for previous chronic diseases tested: INR, smoking, obesity, hypertension, diabetes

• Modest effect in HIV care- HPTN 065
  – El-Sadr et al, CROI 2015
Laboratory Testing

• Current
  – Rapid tests
  – Ag/Ab combination tests

• Future
  – Discontinue CD4 testing if stable
  – Easier, faster, cheaper
  – Point of care viral load
  – Lab on a chip (nanotech, smartphone)
Laboratory Testing for the Diagnosis of HIV Infection

Updated Recommendations

Box 1. Recommended Laboratory HIV Testing Algorithm for Serum or Plasma Specimens

HIV-1/2 antigen/antibody combination immunoassay

(+)  
Negative for HIV-1 and HIV-2 antibodies and p24 Ag

HIV-1/HIV-2 antibody differentiation immunoassay

HIV-1 (+)  
HIV-2 (-)  
HIV-1 antibodies detected

HIV-1 (-)  
HIV-2 (+)  
HIV-2 antibodies detected

HIV-1 (+)  
HIV-2 (+)  
HIV antibodies detected

HIV-1 (-) or indeterminate  
HIV-2 (-)  

HIV-1 NAT (+)  
Acute HIV-1 infection

HIV-1 NAT (-)  
Negative for HIV-1

(+) indicates reactive test result  
(-) indicates nonreactive test result  
NAT: nucleic acid test
HIV Antibody Tests
Atlanta VAMC

Year

% Positive

Number of Tests


0 5,000 10,000 15,000 20,000 25,000 30,000 35,000 40,000 45,000 50,000 55,000 60,000 65,000 70,000

0 10 20 30 40 50 60 70
Percent of Diagnosed Patients
United States

Adapted from CDC slide set:
Epidemiology of HIV Infection, 2012
Annual HIV Workload at the Atlanta VAMC

![Graph showing the annual HIV workload at the Atlanta VAMC from 1994 to 2015. The workload has been increasing over the years.](image)
Adults Living with AIDS by Sex, 1993–2012 United States

Adapted from CDC slide set: Epidemiology of HIV Infection, 2012
Classifications and Deaths of Persons with HIV Infection Ever Classified as Stage 3 (AIDS), among Adults and Adolescents, 1985–2012—United States

Adapted from CDC slide set: Epidemiology of HIV Infection, 2012
Diagnoses of HIV Infection among Adults and Adolescents, by Sex, 2009–2013—United States and 6 Dependent Areas

Note. Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis. All displayed data have been statistically adjusted to account for reporting delays, but not for incomplete reporting.

Adapted from CDC slide set: Epidemiology of HIV Infection, 2012
Use of Antiretroviral Therapy by Year
Atlanta VAMC, 1994-2014

ACTHIV 2015: A State-of-the-Science Conference for Frontline Health Professionals
New Antiretroviral Agents

- Tenofovir alefenamide (TAF)
  - Equivalent virologic response to TDF
  - Less bone and renal toxicity than TDF
- Cabotegravir
- Maturation inhibitor
- Long acting injectable agents
HIV RNA Results at the VAMC
Patients on ARV

Percent of all RNA results


0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

<20 <50/<48 51-400 401-10,000
CD4 Distribution by Year
Patients on Therapy - VAMC

Percent of all CD4 results

Year


0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

>500 201-500 51-200 <50
Hospitalization Rates among Veterans

Rentsch et al, AIDS and Behavior, Online 2/26/2015

![Hospitalization Rates Graph]

Rate per 1000 patients

- HIV+: 304, 212, 206
- Uninfected: 212, 167

## Causes of Hospitalization among Veterans, 1997-2011

<table>
<thead>
<tr>
<th>Primary Admission Diagnosis Category</th>
<th>HIV Infected</th>
<th>HIV Uninfected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychiatric</td>
<td>13.1%</td>
<td></td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>12.1</td>
<td></td>
</tr>
<tr>
<td>Other infection</td>
<td>10.2</td>
<td></td>
</tr>
<tr>
<td>Drug-related</td>
<td>8.7</td>
<td></td>
</tr>
<tr>
<td>Respiratory</td>
<td>8.5</td>
<td></td>
</tr>
<tr>
<td>GI and Liver</td>
<td>8.4</td>
<td></td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>7.8</td>
<td></td>
</tr>
<tr>
<td>Alcohol related</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>Neurologic</td>
<td>5.8</td>
<td></td>
</tr>
<tr>
<td>Renal insufficiency</td>
<td>3.1</td>
<td></td>
</tr>
<tr>
<td>Endocrine</td>
<td>2.9</td>
<td></td>
</tr>
<tr>
<td>Non-AIDS malignancy</td>
<td>2.7</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>10.7</td>
<td></td>
</tr>
</tbody>
</table>

Rentsch et al, AIDS and Behavior, Online 2/26/2015
Causes of Hospitalization among Veterans, 1997-2011

<table>
<thead>
<tr>
<th>Admission Diagnosis</th>
<th>HIV Infected</th>
<th>HIV Uninfected (matched)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychiatric</td>
<td>13.1%</td>
<td>19.9</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>12.1</td>
<td>--</td>
</tr>
<tr>
<td>Other infection</td>
<td>10.2</td>
<td>5.8</td>
</tr>
<tr>
<td>Drug-related</td>
<td>8.7</td>
<td>7.3</td>
</tr>
<tr>
<td>Respiratory</td>
<td>8.5</td>
<td>6.4</td>
</tr>
<tr>
<td>GI and Liver</td>
<td>8.4</td>
<td>8.3</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>7.8</td>
<td>13.5</td>
</tr>
<tr>
<td>Alcohol related</td>
<td>6.0</td>
<td>9.3</td>
</tr>
<tr>
<td>Neurologic</td>
<td>5.8</td>
<td>7.6</td>
</tr>
<tr>
<td>Renal insufficiency</td>
<td>3.1</td>
<td>3.0</td>
</tr>
<tr>
<td>Endocrine</td>
<td>2.9</td>
<td>3.7</td>
</tr>
<tr>
<td>Non-AIDS malignancy</td>
<td>2.7</td>
<td>3.1</td>
</tr>
<tr>
<td>Other</td>
<td>10.7</td>
<td>12.1</td>
</tr>
</tbody>
</table>

Rentsch et al, AIDS and Behavior, Online 2/26/2015
Projected Proportion of those Living With HIV in United States 50+ Years*
2001-2017

HIV Mortality at Atlanta VAMC
Annual Rate per 100 Patients Seen
Continuum of Care

Slide courtesy of Michael Mugavero


ACTHIV 2015: A State-of-the-Science Conference for Frontline Health Professionals
Challenges in HIV Care

• Only 28% of HIV infected patients in the U.S. have HIV viral load <50
• The number of new HIV infections in the U.S. has been 50,000-55,000 every year since 1990
• Current HIV therapy is lifelong and demanding
• HIV disease is expensive- $28,000 per year and $1,000,000 lifelong
<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFECTED:</td>
<td>34,358,671</td>
</tr>
<tr>
<td>LIVES LOST:</td>
<td>25,376,792</td>
</tr>
<tr>
<td>CURED:</td>
<td>0,000,000,001</td>
</tr>
</tbody>
</table>

It's time to **CHANGE THE SCORE.**

**IT'S TIME TO END THIS DISEASE.**

amfAR
MAKING AIDS HISTORY

www.amfar.org
Timothy Brown: The Only AIDS Cure
The end of AIDS?

How 5 million lives have been saved, and a plague could now be defeated.
Should a vaccine and cure be the top priorities?

• Only one patient has been cured, with complex and not generalizable approaches
• Vaccine trials have been disappointing
• The cost for these approaches are huge
• We have many other issues:
  – Diagnosing, retaining, treating
  – Future economics and workforce
Figure 2: Federal Funding for HIV/AIDS by Category, FY 2015 Budget Request (US$ Billions)

- **Domestic Care & Treatment**
  - $17.5
  - 57%
- **Global**
  - $6.2
  - 20%
- **Domestic Cash & Housing Assistance**
  - $3.1
  - 10%
- **Domestic Research**
  - $2.8
  - 9%
- **Domestic Prevention**
  - $0.9
  - 3%

Total: $30.4 Billion

NOTES: Categories may include funding across multiple agencies/programs; global category includes international HIV research at NIH.
Cost of Care

• Most of the cost is related to drugs
• Upcoming impact of generic drugs
• Cost vs. convenience/adherence
• Payers decisions are based on:
  – Cost
  – Guidelines
  – Variability by state and plan
• Future of ADAP and Ryan White is unclear
The Future of HIV Related to:

- **Testing:** will increase, but slowly
- **Linkage to care/**engagement/**retention/re-engagement:** complicated, requires multiple approaches
- **Treatment:** few new drugs, generics
- **Comorbid conditions:** mental health, drug abuse
- **Outcomes:** malignancies, cardiovascular disease
- **Financing:** ACA
- **Workforce:** decreasing Infectious Diseases personnel