HIV and Women

A Look into the Future

Michael Saag, MD
University of Alabama, Birmingham
Director, Center for AIDS Research
Results from 22 countries

26 million infections averted

New HIV infections (15-49 years)

33%

Number of adults infected (15-49 years)

(K. Case et al, aids2031, 2010)
Source: T. Hallet, Imperial College London
The end of AIDS?

How 5 million lives have been saved, and a plague could now be defeated
“Not so fast my friend....”

Lee Corso, ESPN
8 Year Survival in HAART Era

Survival Distribution Function

Survival Time (Years)

STRATA:
- CD4Grp=<50
- CD4Grp=51-200
- CD4Grp=201-350
- CD4Grp=>350
# CD4 Count at Baseline: ARV Start

<table>
<thead>
<tr>
<th>Median CD4 Count (cells/ul)</th>
<th>Low – Income</th>
<th>Lower-Middle Income</th>
<th>Upper-Middle Income</th>
<th>High-Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>85</td>
<td>121</td>
<td>82</td>
<td>203</td>
</tr>
<tr>
<td>2004</td>
<td>89</td>
<td>107</td>
<td>101</td>
<td>211</td>
</tr>
<tr>
<td>2006</td>
<td>119</td>
<td>133</td>
<td>114</td>
<td>227</td>
</tr>
<tr>
<td>2008</td>
<td>147</td>
<td>148</td>
<td>130</td>
<td>251</td>
</tr>
<tr>
<td>2010</td>
<td>147</td>
<td>167</td>
<td>148</td>
<td>273</td>
</tr>
</tbody>
</table>

Muggin, et al, CROI 2012, Abst # 100
Research Agenda

• Implementation Science
  • Testing / Linkage to Care / Retention in Care
  • Long term outcomes
  • Costs / Health Economics - Policy
HIV Treatment Cascade

21% Undiagnosed

49%

Implementation Science: Increase Use of Cohorts

- **Interval Cohorts:** MACS / WIHS
  - Detailed Assessments
  - HIV-negative controls
  - Specimen Repositories

- **Point of Care Cohorts:** CNICS
  - Increased Use of Technology / Computer Science
  - Patient Reported Outcomes
  - Embed Randomization within Point of Care Service Delivery
  - Specimen Repository
Research Agenda

• Implementation Science
  • Testing / Linkage to Care / Retention in Care
  • Long term outcomes
  • Costs / Health Economics – Policy

• Long Term Adverse Outcomes
  • Renal, Liver, Lung, Cancer, Bone, Neuro, Aging
  • Inflammation (? Common Final Pathway?)
Rx as Prevention
Clinical Trials
Microbicides
Vaccines

Pathogenesis
Drug Discovery
Prevention

Natural History in the Treatment Era

Host Response
Rx Outcomes / Clinical Trials
PrEP
PEP

Comorbid Conditions

Cancer
CV
Liver
Bone
Renal

HCV

TB

Lung

Pain / Palliative Care

Healthcare Economics / Policy

CURE

Testing, Linkage & Retention in Care

Community

Mental Health

Substance Use
Co-morbid conditions common in HIV-infected adults

HIV-infected adults age 50-55 similar to uninfected adults > 65

Schouten J AIDS 2012
# Inflammatory Biomarkers Predict Risk for All-Cause Mortality among Treated Adults

## Table: Inflammatory Biomarkers and Risk Factors

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Design</th>
<th>T cell activation</th>
<th>CRP</th>
<th>IL-6</th>
<th>K/T</th>
<th>Cystatin C</th>
<th>sCD-14</th>
<th>D-dimer</th>
<th>Fibrinogen</th>
<th>Hyaluronic Acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMART ESPRIT</td>
<td>Case-control</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
<td></td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>FRAM</td>
<td>Cohort</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔️</td>
<td></td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>SOCA/SCOPE</td>
<td>Cohort</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>UARTO</td>
<td>Cohort</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>VACS</td>
<td>Cohort</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>FIRST (Pre-ART)</td>
<td>Case-control</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Pfdisas (Pre-ART)</td>
<td>Case-control</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
<td></td>
<td></td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>

**T cells**
- Innate
  - Microbes
    - Fibrosis
      - Coagulation

**SMART ESPRIT**
- Case-control

**FRAM**
- Cohort

**SOCA/SCOPE**
- Cohort

**UARTO**
- Cohort

**VACS**
- Cohort

**FIRST (Pre-ART)**
- Case-control

**Pfdisas (Pre-ART)**
- Case-control
Research Agenda

• Implementation Science
  • Testing / Linkage to Care / Retention in Care
  • Long term outcomes
  • Costs / Health Economics - Policy

• When to Start Therapy?

• Long Term Adverse Outcomes
  • Renal, Liver, Lung, Cancer, Bone, Neuro, Aging
  • Inflammation (? Common Final Pathway?)

• Co-infections: TB / Hep C / Hep B
Therapeutics Research Agenda

• Implementation Science
  • Testing / Linkage to Care / Retention in Care
  • Long term outcomes
  • Costs / Health Economics – Policy

• Long Term Adverse Outcomes
  • Renal, Liver, Lung, Cancer, Bone, Neuro, Aging
  • Inflammation (? Common Final Pathway?)

• Co-infections: TB / Hep C / Hep B

• Co-morbidities: Substance use/Mental Health
Therapeutics Research Agenda

- Implementation Science
  - Testing / Linkage to Care / Retention in Care
  - Long term outcomes
  - Costs / Health Economics - Policy
- When to Start Therapy?
- Long Term Adverse Outcomes
  - Renal, Liver, Lung, Cancer, Bone, Neuro, Aging
  - Inflammation (? Common Final Pathway?)
- Co-infections: TB / Hep C / Hep B
- Co-morbidities: Substance use/Mental Health
- Cure
“Not so fast my friend….”

Lee Corso, ESPN
HIV in Women: The Future

- Increasing emphasis on studies that compare men and women
- Focus on the impact of HIV in the community
- Team Science: Work with other disciplines in meaningful collaborations