Treatment as Prevention

HAART Expansion - A Powerful Strategy to Reduce AIDS Morbidity and Mortality and HIV Incidence

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President, International AIDS Society

Gary S. Teiter Andrew Kaplan Memorial Lecture
IAPAC Treatment Adherence Conference

British Columbia Centre for Excellence in HIV/AIDS
St. Paul’s Hospital
The case for expanding access to highly active antiretroviral therapy to curb the growth of the HIV epidemic

Julio S G Montaner, Robert Hogg, Evan Wood, Thomas Kerr, Mark Tyndall, Adrian R Levy, P Richard Harrigan

“The upshot of this widespread failure to recognize that AIDS is an exceptional crisis and threat is that the response to the pandemic is not made commensurate to the challenges—and so the epidemic escalates even while it erodes our capacities to check it.”

Dr Peter Piot, UNAIDS Executive Director

International AIDS Society
Stronger Together

AIDS 2006
XVI International AIDS Conference
Time to Deliver
HAART Can Reduce HIV Transmission

HAART stops HIV replication

↓

HIV levels fall to undetectable in blood as well as in sexual fluids

↓

Sharp reduction in HIV transmission
Prevention Strategies

- Education
- Change in behaviour
- Harm reduction
- New strategies/technology
- Vaccines

Existing strategies have failed to contain the global HIV pandemic
Canada: Infants Exposed to HIV and Born HIV Positive

- **Number of infants exposed to HIV mothers**
- **Number of infants born HIV positive**

B&MGF: Heterosexual HIV Transmission Dramatically Decreased by HAART

- 3408 heterosexual HIV discordant couples from 7 African countries
- 349 (10%) HIV partners started therapy
- Followed for up to 24 months
- 92% reduction in HIV transmission

<table>
<thead>
<tr>
<th></th>
<th>Transmissions</th>
<th>Person-Years</th>
<th>HIV Sero-Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post ART</td>
<td>1*</td>
<td>256</td>
<td>0.4 (95% CI 0.09-2.18)</td>
</tr>
<tr>
<td>No ART</td>
<td>102</td>
<td>4851</td>
<td>2.2 (95% CI 1.84-2.70)</td>
</tr>
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The single transmission occurred in the partner of a man on HAART for only 18 days prior to partner’s first HIV+ test (HIV- 90 days earlier).

Longitudinal community plasma HIV-1 RNA concentrations and incidence of HIV-1 among injecting drug users: prospective cohort study

Evan Wood,\(^1\) Thomas Kerr,\(^1\) Brandon D L Marshall,\(^2\) Kathy Li,\(^1\) Ruth Zhang,\(^1\) Robert S Hogg,\(^1\) P Richard Harrigan,\(^1\) Julio S G Montaner,\(^3\)
Longitudinal community plasma HIV-1 RNA concentrations and incidence of HIV-1 among injecting drug users: prospective cohort study

Whiskers represent 95% confidence intervals.

- Median Viral Load (10,000 copies per mL)
- HIV Incidence Rate (per 100 person years)
Cox proportional hazards regression of time to HIV infection among 1429 HIV negative injecting drug users followed from 1 May 1996 to 30 June 2007

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Relative hazard (95% CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plasma HIV RNA (per log&lt;sub&gt;10&lt;/sub&gt; increase)*</td>
<td>3.32 (1.82 to 6.08)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Unsafe sex† (yes v no)‡</td>
<td>1.09 (0.77 to 1.54)</td>
<td>0.619</td>
</tr>
<tr>
<td>Used syringe sharing (yes v no)</td>
<td>1.45 (0.99 to 2.12)</td>
<td>0.058</td>
</tr>
<tr>
<td>Ethnicity (white v other)</td>
<td>0.65 (0.47 to 0.91)</td>
<td>0.011</td>
</tr>
<tr>
<td>Heroin injection (≥daily v &lt;daily)‡</td>
<td>1.35 (0.97 to 1.90)</td>
<td>0.079</td>
</tr>
<tr>
<td>Cocaine injection (≥daily v &lt;daily)‡</td>
<td>2.50 (1.76 to 3.54)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Unstable housing (yes v no)§</td>
<td>1.41 (1.00 to 1.98)</td>
<td>0.049</td>
</tr>
</tbody>
</table>

Among those receiving antiretroviral drugs, we found that the number using at least three antiretroviral drugs (versus fewer than three drugs) in their antiretroviral regimen increased during the study period from 8.4% in 1996 to 98.8% in 2007 (Mantel test for trend across all 11 years P<0.001).
New HIV and Syphilis in BC

Rate per 100,000 population

HIV

M REKART, BC-CDC, 2006
Cost of Medical Management of 1 HIV infection over a lifetime = $250,000

“HIV deficit” in BC in 2005: 400

Cost-Effectiveness of HAART BC-DTP

Averted lifetime Rx cost up to 2001 US $96.4M

A total of 3,963 pts were on HAART in BC in 2005

Total actual drug cost (using patented drugs) in 2005 $49 million US

800 cases per year

400 cases per year
Cost-Effectiveness of HAART

BC-DTP

“HIV deficit” in BC in 2005: 400

Cost of Medical Management of 1 HIV infection over a
lifetime = $250,000

Averted lifetime Rx cost up to U$A 100M

A total of 3,963 pts were on HAART in BC in 2005
Total actual drug cost (using patented drugs) in 2005

U$A 50M
Summary

HAART is widely regarded as a cost effective, life-saving strategy

↓ Mortality of treated HIV/AIDS patients
↓ Morbidity of treated HIV/AIDS patients
↓ Health Resource utilization
↓ Vertical Transmission of HIV infection

Furthermore, when the impact of HAART on HIV transmission is considered, HAART expansion becomes a **cost-averting** strategy
The British Columbia Approach:
Increasing HAART Coverage within Current Medical Guidelines

Preliminary Results
Number of Active HAART Participants and Number of New HIV+ Diagnoses per Year

- New HIV-positive Diagnoses (All) $p = 0.003$
- Active on HAART $p = 0.002$
- New HIV-positive Diagnoses (ever IDU) $p = 0.954$
- $p < 0.001$

January 2004

Montaner et al, CROI 2010
Improved Virological Outcomes in British Columbia Concomitant with Decreasing Incidence of HIV Type 1 Drug Resistance Detection

Vikram S. Gill,1 Viviane D. Lima,1,2 Wen Zhang,1 Brian Wynhoven,1 Benita Yip,1 Robert S. Hogg,1,3 Julio S. G. Montaner,1,2 and P. Richard Harrigan1,2

CID 2010:50 (1 January) • HIV/AIDS

![Graph showing incidence and viral load trends](image)

- Acquired resistance falling
- Plasma viral load suppression rising
Adherence - BC-CfE (Refill Compliance)
HIV testing in BC, 1985 to 2008

<table>
<thead>
<tr>
<th>Year</th>
<th># of HIV Tests</th>
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<tbody>
<tr>
<td>1994</td>
<td>104,229</td>
</tr>
<tr>
<td>1995</td>
<td>129,941</td>
</tr>
<tr>
<td>1996</td>
<td>137,980</td>
</tr>
<tr>
<td>1997</td>
<td>140,092</td>
</tr>
<tr>
<td>1998</td>
<td>137,352</td>
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<td>1999</td>
<td>134,916</td>
</tr>
<tr>
<td>2000</td>
<td>135,104</td>
</tr>
<tr>
<td>2001</td>
<td>134,902</td>
</tr>
<tr>
<td>2002</td>
<td>145,449</td>
</tr>
<tr>
<td>2003</td>
<td>142,400</td>
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<td>2004</td>
<td>153,635</td>
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<tr>
<td>2005</td>
<td>160,554</td>
</tr>
<tr>
<td>2006</td>
<td>172,058</td>
</tr>
<tr>
<td>2007</td>
<td>176,224</td>
</tr>
<tr>
<td>2008</td>
<td>182,151</td>
</tr>
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BC-CDC Report, 2009
The proportion of HIV infected IDUs engaged in care in BC with plasma viral load >1500 c/mL, as a surrogate for “high” community HIV-1-viral load, decreased from ~50% in 2000-04 to ~20% in 2009 (p<0.001)

Montaner et al, CROI 2010
HAART Expansion to Reduce AIDS Morbidity & Mortality, and HIV Incidence

- HAART has a substantial added preventive value
  - The magnitude of this effect is not yet fully characterized, and may well vary in different settings

- Seek and Treat among those who have a medical indication for HAART cannot wait for the above to be resolved
  - Many lives will be saved and much insight will be gained from closely monitoring a more “aggressive” roll out of HAART within Rx Guidelines

- Seek and Treat outside the range where treatment is medically indicated remains a research question
  - However, Rx Guidelines leave few outside the “treatment envelope”

- TAP should serve to re-energize Universal Access
Combination prevention

HIV Prevention

- Biomedical Interventions
  - HIV testing, linkage to care and expanded HAART coverage
- Structural Interventions
- Community Interventions
- Individual and small group behavioral interventions

Modified from T. Coates
The role of antiretroviral treatment in stopping new infections and how it can be effectively used as part of combination HIV prevention approaches must be further explored, as shown by Dr Julio Montaner, President of the International AIDS Society.
Thank You

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