Substance use in the WA HIV Cohort Study

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Introduction

• Introduction to HIV/AIDS
• Why is substance use important in this context?
• Research in the WA HIV Cohort Study
HIV/AIDS

- Infection with the human immunodeficiency virus - HIV - is the precondition for developing acquired immunodeficiency syndrome or AIDS.

- AIDS is the result of damage to the immune system – CD4 T-cells infected with HIV and one or more clinical problems may occur – therefore it is referred to as a syndrome.

- Clinical problems are called AIDS defining because they occur at a particular stage of immune deficiency.

- Immune deficiency results in: vulnerability to infection including to oncogenic viruses; and premature senescence of the immune system.

- Transmission of HIV occurs in a social and frequently ‘emotional’ context.

Reference: nam www.aidsmap.com
HIV - a retrovirus was originally isolated by Dr Luc Montagnier and his colleagues in Paris in 1983.

RNA viruses have a high mutation rate, in the absence of drug therapy every possible mutation in the virus would occur once a day.

The prevention of drug resistance is a constant issue and near perfect adherence to medication is needed for treatment to remain effective in the long term.

Reference: nam www.aidsmap.com
Reverse transcriptase

Integrase

Protease
25 years of AIDS

1. First cases of unusual immune deficiency are identified among gay men in USA, and a new deadly disease noticed.
2. Acquired Immune Deficiency Syndrome (AIDS) is defined for the first time.
3. The Human Immunodeficiency Virus (HIV) is identified as the cause of AIDS.
4. In Africa, a heterosexual AIDS epidemic is revealed.
5. The first HIV antibody test becomes available.
6. The World Health Organisation launches the Global Programme on AIDS.
7. The first therapy for AIDS – zidovudine, or AZT -- is approved for use in the USA.
8. Highly Active Antiretroviral Treatment launched.
9. Scientists develop the first treatment regimen to reduce mother-to-child transmission of HIV.
10. UNAIDS is created.
11. The UN General Assembly Special Session on HIV/AIDS. Global Fund to fight AIDS, Tuberculosis and Malaria launched.
12. The 3 x 5 initiative with the goal of reaching 3 million people in developing world with ART by 2005.
~11.6 million IDUs worldwide, 80% living in developing countries
IVDU drives the HIV epidemic in Eastern Europe, Central and SE Asia
Australia

Reference:
2009
Annual Surveillance Report
HIV/AIDS, viral hepatitis and sexually transmitted infections in Australia
~50% of new HIV cases in WA since 2007 are overseas acquired

85% of female cases, 73% of heterosexual male cases, 24% other male cases

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Overseas</th>
<th>Male</th>
<th>Female</th>
<th>Non-hetero</th>
<th>Vertical</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>75</td>
<td>39</td>
<td>16</td>
<td>14</td>
<td>8</td>
<td>31%</td>
</tr>
<tr>
<td>2008</td>
<td>74</td>
<td>37</td>
<td>13</td>
<td>15</td>
<td>9</td>
<td>31%</td>
</tr>
<tr>
<td>2009</td>
<td>90</td>
<td>46</td>
<td>21</td>
<td>16</td>
<td>6</td>
<td>31%</td>
</tr>
</tbody>
</table>

31% of new HIV cases in WA since 2007 are overseas acquired.

85% of female cases, 73% of heterosexual male cases, 24% other male cases.

2007: 75 cases
- 39 acquired overseas (52%)
- 16/21 male hetero (76%)
- 14/16 female (88%)
- 8/36 male non-hetero (22%)

2008: 74 cases
- 37 acquired overseas (50%)
- 13/19 male hetero (68%)
- 15/17 female (88%)
- 9/31 male non-hetero (29%)

2009: 90 cases
- 46 acquired overseas (51%)
- 21/27 male hetero (78%)
- 16/20 female (80%)
- 6/34 male non-hetero (18%)
- 3 vertical transmissions (100%)

Slide courtesy of Dr David Nolan
# Visa Category 457

## Table 1.04 Number of applications granted in 2008-09 to 30 June 2009 by nominated position location and applicant type

<table>
<thead>
<tr>
<th>Nominated Position Location</th>
<th>Primary Applications</th>
<th>% of Primary Applications</th>
<th>Secondary Applications</th>
<th>% of Secondary Applications</th>
<th>Total Applications</th>
<th>% of Total Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian Capital Territory</td>
<td>890</td>
<td>1.4%</td>
<td>740</td>
<td>1.5%</td>
<td>1430</td>
<td>1.4%</td>
</tr>
<tr>
<td>New South Wales</td>
<td>15,510</td>
<td>30.6%</td>
<td>12,630</td>
<td>25.0%</td>
<td>28,140</td>
<td>27.8%</td>
</tr>
<tr>
<td>Northern Territory</td>
<td>1,000</td>
<td>2.0%</td>
<td>960</td>
<td>1.9%</td>
<td>1,970</td>
<td>1.9%</td>
</tr>
<tr>
<td>Queensland</td>
<td>9,080</td>
<td>17.9%</td>
<td>10,730</td>
<td>21.2%</td>
<td>19,800</td>
<td>19.6%</td>
</tr>
<tr>
<td>South Australia</td>
<td>2,190</td>
<td>4.3%</td>
<td>2,490</td>
<td>4.9%</td>
<td>4,670</td>
<td>4.6%</td>
</tr>
<tr>
<td>Tasmania</td>
<td>460</td>
<td>0.9%</td>
<td>540</td>
<td>1.1%</td>
<td>1,000</td>
<td>1.0%</td>
</tr>
<tr>
<td>Victoria</td>
<td>10,920</td>
<td>21.5%</td>
<td>9,800</td>
<td>19.4%</td>
<td>20,720</td>
<td>20.5%</td>
</tr>
<tr>
<td>Western Australia</td>
<td>10,690</td>
<td>21.1%</td>
<td>12,270</td>
<td>24.2%</td>
<td>22,960</td>
<td>22.7%</td>
</tr>
<tr>
<td>Not Recorded</td>
<td>140</td>
<td>0.3%</td>
<td>480</td>
<td>0.9%</td>
<td>620</td>
<td>0.6%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>50,660</td>
<td>100.0%</td>
<td>50,620</td>
<td>100.0%</td>
<td>101,280</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Current 457 visa holders in WA = 16,380

Medicare-ineligible Not HIV screened

Reference: Australian Government
## Migration Wave

*Where WA immigrants will come from in the next ten years*

<table>
<thead>
<tr>
<th>Region</th>
<th>Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Asia</td>
<td>78,161</td>
</tr>
<tr>
<td>New Zealand</td>
<td>76,712</td>
</tr>
<tr>
<td>Other Australian States</td>
<td>46,841</td>
</tr>
<tr>
<td>North Asia</td>
<td>65,204</td>
</tr>
<tr>
<td>South East Asia</td>
<td>65,021</td>
</tr>
<tr>
<td>Britain</td>
<td>64,616</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>33,134</td>
</tr>
<tr>
<td>North Africa</td>
<td>5,650</td>
</tr>
<tr>
<td>Other</td>
<td>26,827</td>
</tr>
<tr>
<td>Middle East</td>
<td>23,582</td>
</tr>
<tr>
<td>Europe</td>
<td>16,867</td>
</tr>
<tr>
<td>Oceania</td>
<td>8,910</td>
</tr>
<tr>
<td>North America</td>
<td>6,741</td>
</tr>
</tbody>
</table>
Why is substance use important in HIV?

Social driver of transmission and acquisition

Interferes with clinical management
"Slowed right down": Insights into the use of alcohol from research with Aboriginal Australians living with HIV.
Thompson et al 2009

Drinking emerged as a key theme in their dialogue with participants in their study.

• “Alcohol had a major role in disinhibition and risk-taking behaviour of both the participants and those they socialized with. It was perceived as a commodity, a way of altering reality, and a pathway through which social connection was maintained and was central to the common narratives of loss, chaos and transformation”.
Why is substance use important in HIV/AIDS?

Heavy use of alcohol and other drugs is more common in people with HIV and associated independently with:

- Increased rates of disease transmission
- Poor medication adherence
- Unprotected sex
- Non-AIDS mortality

Increased longevity, consequent exposure to carcinogens; premature senescence of immune system and co-infections eg hepatitis C, leads to risk of non AIDS defining cancers

Cigarette smoking has been linked with

- Poor medication adherence
- Increased depressive and treatment-related symptoms

- Use of nicotine and marijuana may lower serum concentrations of commonly used antiretroviral drugs leading to sub-optimal drug levels

Western Australian HIV Cohort Study

Observational Cohort Study since 1983 – underpins clinical care, clinical audits and scientific research

Current patients ~ 730, 80% men, median age + 50 years

Just over 200 of these are registered with the RPH Rural and Remote Outreach Service

Ascertainment has been influenced by geographical and historical factors
Adherence to Antiretroviral Therapy in the WA HIV Cohort 2002

Self-report questionnaires (n=215)

**Alcohol intake**: use in the last 30 days; number of drinks/day and number of drinks in a row;

**Drug use ever and in last 6 months**: marijuana, cocaine, heroin, amphetamines and ecstasy

*(References: Chesney et al 2000, Herrmann et al, 2008)*
Evidence-based, multifactorial approach to addressing non-adherence to antiretroviral therapy and improving standards of care

S. Herrmann,1 E. McKinnon,1 M. John,1,2 N. Hyland,2,3 O. P. Martinez,2,4,5 A. Cain,2 K. Turner,6 A. Coombs,6 C. Manolikos2 and S. Mallal1,2

Table 2 Baseline survey data: incidence of non-adherence according to circumstance and other influential factors

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Reason for missing medication at least once within past month (% of those patients who missed medication)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>74.2 (away from home: 51.7; slept through dose time: 40.4; ran out of pills: 30.3)</td>
</tr>
<tr>
<td>Total</td>
<td>89</td>
<td>79.8 (simply forgot: 67.4; busy: 57.1; change in routine: 46.1)</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20–36</td>
<td>29</td>
<td>82.8</td>
</tr>
<tr>
<td>37–43</td>
<td>29</td>
<td>75.9</td>
</tr>
<tr>
<td>44–62</td>
<td>31</td>
<td>81.6</td>
</tr>
<tr>
<td>Alcohol consumption (&gt;5 drinks in a row within past month)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>26</td>
<td>69.2</td>
</tr>
<tr>
<td>&gt;1/month</td>
<td>18</td>
<td>88.9</td>
</tr>
<tr>
<td>&gt;1/month</td>
<td>29</td>
<td>82.8</td>
</tr>
<tr>
<td>Amphetamines/ecstasy (used in past month)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>70</td>
<td>78.6</td>
</tr>
<tr>
<td>Yes</td>
<td>19</td>
<td>84.2</td>
</tr>
<tr>
<td>Perceived stress scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–13</td>
<td>29</td>
<td>69.0</td>
</tr>
<tr>
<td>14–19</td>
<td>28</td>
<td>82.1</td>
</tr>
<tr>
<td>20–32</td>
<td>30</td>
<td>86.7</td>
</tr>
<tr>
<td>CES-D scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–4</td>
<td>33</td>
<td>66.7</td>
</tr>
<tr>
<td>5–9</td>
<td>28</td>
<td>85.7</td>
</tr>
<tr>
<td>10–17</td>
<td>28</td>
<td>89.3</td>
</tr>
</tbody>
</table>

Significance denoted by *0.05 < P ≤ 0.1, **0.01 < P ≤ 0.05, ***0.001 < P ≤ 0.01, ****P ≤ 0.001.

CES-D, Center for Epidemiological Studies Depression.
<table>
<thead>
<tr>
<th>Variable</th>
<th>West Australia</th>
<th>All countries N = 692</th>
<th>P - value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N = 102</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>24% (24)</td>
<td>10% (67)</td>
<td>0.037</td>
</tr>
<tr>
<td>Psychiatric disorder</td>
<td>5% (5)</td>
<td>6% (41)</td>
<td>NS</td>
</tr>
<tr>
<td>Hepatitis C</td>
<td>17% (17)</td>
<td>12% (72)</td>
<td>NS</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>2% (2)</td>
<td>6% (36)</td>
<td>NS</td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td>3% (3)</td>
<td>11% (69)</td>
<td>NS</td>
</tr>
<tr>
<td>Alcohol (&gt;2/day)</td>
<td>15% (15)</td>
<td>8% (47)</td>
<td>0.027</td>
</tr>
<tr>
<td>Tobacco (&gt;2/day)</td>
<td>40% (41)</td>
<td>28% (163)</td>
<td>0.008</td>
</tr>
</tbody>
</table>

Unpublished data: M. Duracinsky, S. Herrmann, Christophe Lalanne
Objective: To establish the prevalence of alcohol, drug and nicotine use in the Western Australian HIV Cohort Study and inform clinical outpatient care.

Methods:

- Cross sectional survey
- Royal Perth Hospital Immunology Outpatient Clinic.
- Self-report questionnaires on (1) alcohol and non-prescribed drug use (N=152) and (2) smoking habits (N=186)
- 81 patients completed both surveys.
Questionnaires

- A self-report questionnaire (Q) on: **alcohol intake**: use in the last 30 days; number of drinks/day and number of drinks in a row; **drug use**: marijuana, cocaine, heroin, amphetamines, and benzodiazepines. *(Chesney et al 2000)*

- Drinking patterns over the last month as: abstinent (no drinks in the last month); light (1-2 drinks/week); moderate (3-14 drinks/week); heavy consumption (> 14 drinks/week); and *sessional* drinking (>=5 drinks within a 2-4 hour period). *(NHMRC Guidelines, 2009)*

- A self-report questionnaire on **smoking status**, number of cigarettes/day, history of stopping and whether patients had sought or would seek **advice** about quitting from a health professional.
Results

- Patterns of alcohol consumption and drug use were similar between the 2002 and 2008 surveys ($p>0.3$).
- In those that responded to both surveys ($n=60$) there was a **marginal reduction** in heavy alcohol consumption ($p=0.06$).
- *Sessional* drinking was associated with **younger age** ($p=0.004$, 2002; $p=0.01$, 2008) but not with gender.
### Other drug use

**Results of**
(1) alcohol & drug survey
(2) subgroup of 81 smoking survey

<table>
<thead>
<tr>
<th></th>
<th>Alcohol and Drug survey N = 152</th>
<th>Smoking survey</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>*Currently Smoking N = 39</td>
<td>*Not currently Smoking N = 42</td>
</tr>
<tr>
<td>History of drug usage [n/N* (%)]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever used</td>
<td></td>
<td></td>
</tr>
<tr>
<td>marijuana</td>
<td>90/151 (59.6%)</td>
<td>29/39 (74.4%)</td>
</tr>
<tr>
<td>cocaine</td>
<td>29/149 (19.5%)</td>
<td>11/38 (28.9%)</td>
</tr>
<tr>
<td>heroin</td>
<td>22/149 (14.8%)</td>
<td>12/38 (31.6%)</td>
</tr>
<tr>
<td>amphetamines</td>
<td>54/150 (36.0%)</td>
<td>21/39 (53.8%)</td>
</tr>
<tr>
<td>benzodiazepine</td>
<td>52/144 (36.1%)</td>
<td>17/36 (47.2%)</td>
</tr>
<tr>
<td>Used within past 6 months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>marijuana</td>
<td>34/141 (24.1%)</td>
<td><strong>16/37 (43.2%)</strong></td>
</tr>
<tr>
<td>cocaine</td>
<td>1/149 (0.7%)</td>
<td>1/39 (2.6%)</td>
</tr>
<tr>
<td>heroin</td>
<td>2/150 (1.3%)</td>
<td>1/39 (2.6%)</td>
</tr>
<tr>
<td>amphetamines</td>
<td>12/149 (8.1%)</td>
<td>3/39 (7.7%)</td>
</tr>
<tr>
<td>benzodiazepine</td>
<td>22/143 (15.4%)</td>
<td><strong>10/36 (27.8%)</strong></td>
</tr>
</tbody>
</table>

*Abbreviation: N* = number of respondents who answered question.

(*>=3 drinks/wk: 77% vs 45%, p=0.006)
Amongst sessional drinkers (22% vs 12%; p=0.02) recent amphetamine use was more prevalent, and compared with lighter and heavier alcohol consumers, moderate drinkers used marijuana (p=0.05) and benzodiazepines more recently (p=0.03).
Results: Smoking Survey

N = 187 (83% men) completed the survey

- never smoked = 51 (28%)
- current smoker = 98 (52%)  mean= 10-25 cigarettes/day (age r=0.30, p=0.004)
- ex-smokers = 37 (20%)

Twelve respondents had hepatitis C/HIV coinfection
- eleven were current smokers

Being a current smoker was associated with:

- IVDU transmission (p = 0.006)
- Male gender (p = 0.05)
n = 81 completed A & D, smoking survey

Current smokers (n=39)

• Greater alcohol consumption than non-smokers (>=3 drinks/wk: 77% vs 45%, p=0.006)

• More likely to have engaged in sessional drinking (54% vs 22%, p=0.003) and recently used marijuana (43% vs 9%, p=0.0006) and benzodiazepines (28% vs 7%, p=0.02).

• Being a current smoker (52%) was associated with male gender (p=0.004) and recent drug use (p=0.05) and greater alcohol consumption (p=0.0005).
Results Smoking Survey

Age correlated with no of cigarettes per/day ($r = 0.03$, $p = 0.004$)

No difference in likelihood of detectable virus or CD4 T-cell counts between smokers and non-smokers

8% of respondents had CD4 counts <200 and 21% in the range of 200-400 - half of these were smokers
Results: Smoking survey

- 90 patients had tried to quit
- 25 wanted to keep smoking
- 13 were thinking about it
- 59 patients expressed interest in smoking cessation strategies and/or how to implement lifestyle changes
Summary

In the WA HIV Cohort:

- High rates of alcohol & other drugs, including nicotine with no diminution over last 5 - 6 years
- A pattern of high risk drinking in ‘moderate’ drinkers that may go unnoticed without diligent inquiry
- The legacy of intravenous drug use in those with Hep C/HIV co-infection and ongoing multi-substance use
- An indication that uptake of lifestyle education and smoking cessation programmes may be welcomed by patients in this setting.
Recommendations

• Diligent substance use assessments – including pattern of usage, context of use and motivation towards use

• Combining assessments with medication counseling and adherence monitoring

• Strengthen the multidisciplinary team and approach patient care with a renewed focus on lifestyle factors that will influence overall health outcomes.

• Train staff (motivational interviewing) to implement and support substance use interventions – stepped care model. Ensure continuity of care

• Establish links and rapport with community services acknowledging fears about disclosure of HIV status

• Develop algorithm to establish the relative contribution of substances to an overall risk of cancer and CVD.
Acknowledgements

Participants in the
WA HIV Cohort Study

Nursing, Medical and Allied Health
Ambulatory HIV Service
Royal Perth Hospital

The Centre for Clinical Immunology & Biomedical Statistics

The Department of Immunology & Immunogenetics

The National Health & Medical Research Council
Proportion of non-Aboriginal heterosexually acquired HIV male cases by place of acquisition, Western Australia 2002-2006.

HP = high HIV prevalence, LP = low HIV prevalence
LP Other = Fiji, India, European countries, North and South American Countries.
HP Other = Includes only Papua New Guinea.
HP-South East Asia = includes Myanmar, Cambodia, and Thailand.
LP-South East Asia = includes Indonesia and Vietnam.

Reference: Combs, B & Giele, C. Sexual Health, 2009
Proportion of non-Aboriginal heterosexually acquired HIV female cases by place of acquisition, Western Australia  2002-2006.

HP = high HIV prevalence, LP = low HIV prevalence
LP-Other = includes European countries, North and South American countries.
HP-South East Asia = includes Thailand and Burma.
LP South East Asia = includes only Indonesia.

Reference: Combs, B & Giele, C. Sexual Health, 2009
The virus

• HIV - a retrovirus was originally isolated by Dr Luc Montagnier and his colleagues in Paris in 1983

• RNA viruses use an enzyme called reverse transcriptase to copy the RNA into a DNA copy of themselves

• It is then capable of integrating into the host DNA

• RNA viruses have a high mutation rate

• Naturally occurring strains of HIV are called the ‘wild type’ virus – this reproduces itself best

• In the absence of drug therapy every possible mutation in the wild type virus would occur once a day

• Sometimes the mutated virus is less ‘fit’ Other genetic changes can occur in the virus and these are called polymorphisms

Reference: nam www.aidsmap.com
25 years of AIDS

1. First cases of unusual immune deficiency are identified among gay men in USA, and a new deadly disease noticed.
2. Acquired Immune Deficiency Syndrome (AIDS) is defined for the first time.
3. The Human Immunodeficiency Virus (HIV) is identified as the cause of AIDS.
4. In Africa, a heterosexual AIDS epidemic is revealed.
5. The first HIV antibody test becomes available.
6. The World Health Organisation launches the Global Programme on AIDS.
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8. Highly Active Antiretroviral Treatment launched.
9. Scientists develop the first treatment regimen to reduce mother-to-child transmission of HIV.
10. UNAIDS is created.
11. The UN General Assembly Special Session on HIV/AIDS. Global Fund to fight AIDS, Tuberculosis and Malaria launched.
12. WHO and UNAIDS launch the "3 x 5" initiative with the goal of reaching 3 million people in developing world with ART by 2005.

People living with HIV

Children orphaned by AIDS in sub-Saharan Africa