Illicit Drugs, Alcohol & Addiction in HIV
Lynn Community Health Center
March 17, 2015

Jeffrey H. Samet, MD, MA, MPH
Chief, Section of General Internal Medicine
Boston Medical Center
Professor of Medicine and Community Health Sciences
Boston University Schools of Medicine and Public Health
Case Presentation

“Oriental Poppies”, Georgia O'Keeffe
Case Presentation

• Mr. CB, 42 y/o male, presented to ED with chief complaint “belly pain”.

• Moderately severe mid-abdominal pain increasing over 3 weeks
Previous Hospitalization
(1 month ago)
ED Presentation with Fever (101°F)

- 42 y/o male
- c/c “abd pain”

- Addiction
  - Injection drug use (IDU) for 10 years
  - Heroin withdrawal symptoms
  - Vague alcohol use
  - Occasional cocaine use

- Endocarditis
  - LVEF 75%, mitral valve vegetation
  - Antibiotics for 6 weeks

- Abdominal pain onset during hospitalization
  - CT abd & KUB unremarkable
  - Dx: constipation
  - Rx: laxatives & manual disimpaction
Current Admission

- 42 y/o male
- C/c “abd pain”
- Past endocarditis
- LVEF 75%

- “Cramping” pain, constipation, poor PO intake
- Past 10 day intranasal heroin use “to treat abdominal pain”
- No recent IDU
- Smoked 10 cigarettes/day
Physical Exam

- 42 y/o male
- c/c “abd pain”
- past endocarditis
- LVEF 75%

• Pleasant male NAD
• P: 95, R: 18, weight: 120 lbs, afebrile
• Nodes: bilateral cervical and axillary adenopathy
• CV: III/VI holosystolic murmur RUSB radiating to axilla
• Abd: tender RLQ and LLQ without rebound
• Rectal: no focal tenderness; stool brown guaiac negative
• WBC: 5.1, Hct: 26, Plts: 267K
Day 2 — Hospitalization

- 42 y/o male
- c/c “abd pain”
- past endocarditis
- LVEF 75%

- Blood cultures negative
- Methadone
- Pain medications
Week 1 — Hospitalization

- 42 y/o male
- c/c “abd pain”
- past endocarditis
- LVEF 75%
- culture negative
- inpatient Methadone

- Abd w/ surg consult, imaging studies UGI SBFT
  - “Focal area of small bowel dilatation and loss of mucosal folds within the mid to distal ileum.”

- Cardiac Echo
  - LVEF 70%
  - Vegetation no longer visible
Week 2—Hospitalization

- 42 y/o male
- c/c “abd pain”
- past endocarditis
- LVEF 75%
- culture negative
- inpatient Methadone
- UGI abnormal

- Abd pain and poor PO intake persist
- HBSAg-, HCV Ab+
- HIV+, CD4 503, HVL 15,085
Mr. CB

- What is your leading diagnosis?
- What is your next diagnostic test?

- 42 y/o male
- c/c “abd pain”
- past endocarditis
- LVEF 75%
- culture negative
- inpatient Methadone
- UGI abnormal
- HIV+, HCV+ CD4 503
Week 2—Hospitalization

- 42 y/o male
- past endocarditis
- LVEF 75%
- inpatient Methadone
- HIV+, HCV+
- CD4 503

- CT with angiogram
  - Superior Mesenteric Artery (SMA) occlusion possibly secondary to mitral valve vegetation embolus
  - Dx: ischemic colitis
  - Transferred to surgery for partial colectomy
Week 4—Treatment

- Small bowel resection successful
- Transferred to med, endocarditis secondary to central line infection
- Total parenteral nutrition (TPN)
- Cardiac Echo LVEF ↓ 40%
- Evaluated by CT surgery

- 42 y/o male
- past endocarditis
- inpatient Methadone
- HIV+, HCV+
  CD4 503
- SMA thrombosis, small bowel resection
Illicit Drugs, Alcohol & Addiction in HIV

- Addiction Treatment
- HCV Co-Infection
- Liver Damage
- HIV Disease Progression
- Depression
- HIV Treatment & Prevention
- IDU & Sex Risk
- Epidemiology
IDU and HIV in USA

• Worldwide, estimated 3 million infected via IDU*

• In USA, IDU accounted for*
  – 9% of new HIV infections (2010)
  – 17% of people living with HIV (2010)

• In Massachusetts, IDU accounted for†
  – 20% of adult HIV/AIDS cases (2012)

Global HIV Prevalence Among IDUs

Global HIV Prevalence Among IDUs

Alcohol Problems among HIV-Infected Persons in USA

- 8-36% hazardous drinkers
  - HIV Cost and Services Utilization Study (n=2,864)*
    - 8% current hazardous drinkers
  - Veterans Aging Cohort Study (VACS, n=881)†
    - 36% past-year hazardous drinkers (AUDIT ≥ 8)

Illicit Drugs, Alcohol & Addiction in HIV

- Addiction Treatment
- Epidemiology
- HCV Co-Infection
- Liver Damage
- HIV Disease Progression
- Depression
- IDU & Sex Risk
- HIV Treatment & Prevention
Substance Use and Sex Risk

- Meta-analysis (27 studies, n=10,536) found:* 
  - Unprotected sex among HIV-infected individuals increased with alcohol use (OR 1.6, CI 1.4-1.9)
- Past 30 day cannabis use among sexually active HIV-infected Russian risky drinkers (n=700) associated with:†
  - Needle sharing (AOR 2.23, CI 1.5-3.4)
  - Number of injections (IRR 1.5, CI 1.2-1.9)
  - Multiple sex partners (AOR 1.7, CI 1.2-2.5)

Substance Use and Sex Risk

• Crystal meth among HIV-infected MSM (n=398)*
  – Greater sex risk - unprotected anal sex with possible serodiscordant partner - past 6 months (OR 2.6, CI 1.4-4.8)

• HIV-infected crack cocaine users
  – Binge vs. non-binge users (n=303)†
    • Greater mean # of sex partners - past 6 months (12 vs. 4)
    • More likely never use a condom - past 30 days (OR 2.5, CI 1.1-5.5)

† Harzke, Williams, Bowen. AIDS Behav. 2009;13:1106-1118.
Alcohol and Drug Use and HIV Disclosure

- Primary care patients at two urban hospitals (n=203)*
  - 40% of subjects did not disclose to all sex partners
  - The majority (57%) did not use condoms all the time
  - No association found between addiction and disclosure

- HIV-infected Russian risky drinkers (n=605)†
  - No association between past 30 day risky alcohol use (OR 1.31, CI 0.79-2.17) with recent nondisclosure

- HIV-infected female sex workers (n=211)‡
  - Alcohol use (past 30 days) associated with non-disclosure (OR 2.8, CI 1.5-5.3)

Illicit Drugs, Alcohol & Addiction in HIV

- Addiction Treatment
- Epidemiology
- HCV Co-Infection
- IDU & Sex Risk
- Liver Damage
- HIV Disease Progression
- HIV Treatment & Prevention
- Depression
Depression

• HIV-LIVE (n=400)*
  – Alcohol dependence associated with ↑ depressive symptoms (CES-D mean difference 3.49, CI 1.76-5.22)*

• VACS (n=2,446; 55% HIV-infected)†
  – Hazardous and binge drinking associated with depression (PHQ-9 ≥ 9) (OR 2.53, CI 1.34-4.81)†
  – HIV status did not modify alcohol’s impact on depression (not an effect modifier)

• HERS (n=871)‡
  – Moderate drinking (OR 1.93, p<0.01) and heavy drinking (OR 3.94, p<0.01) associated with increased depressive symptoms (↑CES-D), regardless of ART status in women

Case Presentation
Month 3 – Rehab Hospitalization

- 42 y/o male
- past endocarditis
- HIV+, HCV+
- CD4 503
- SMA thrombosis, small bowel resection
- LVEF 40%

- Wt ↑ 107→125 lbs with TPN
- Smoking continued
- No IDU past 4 months
- CT surgeon: mitral valve replacement planned after patient in community with 6 wks recovery
- Upon discharge from rehab hospital patient linked to
  - Primary care
  - Methadone program
  - 12-Step program
-42 y/o male

- past endocarditis

- HIV\(^+\), HCV\(^+\)

- CD4 503

- SMA thrombosis, small bowel resection

- LVEF 40%

**Problem List**

- HIV (CD4 503, 6 months later - 373)
- HCV\(^+\)
- Heroin dependence
- Alcohol abuse
- Tobacco dependence
- S/P SMA thrombosis with small bowel resection
- Mitral valve insufficiency & CHF s/p endocarditis
- Medications: methadone, lisinopril, furosemide
Month 5 – Mitral Valve Replacement

- 42 y/o male
- Past endocarditis
- HIV+, HCV+
- CD4 373
- SMA thrombosis, small bowel resection
- LVEF 40%
- Outpatient methadone program

- St. Jude’s prosthetic valve
- Surgery successful without complications
11 Months – Primary Care

- 42 y/o male
- Past endocarditis
- HIV+, HCV+, CD4 373
- SMA thrombosis, small bowel resection
- Methadone program
- MVR

- Primary care follow up
- Methadone treatment
- Urine tox screens documented 3-4 months abstinence
- ↑ alcohol use, 5 drinks/day
- Returned to full-time employment
- Weight ↑ 123-134 lbs
16 Months – Primary Care

- 42 y/o male
- Past endocarditis
- HIV+, HCV+, CD4 373
- SMA thrombosis, small bowel resection
- Methadone program
- MVR

- Heavy alcohol use, withdrawal; in clinic - alcohol on breath, “had a nip this morning”
- “Sniffed a bag or so”; no IDU
- Anhedonia; no suicidal ideation
- CD4 313
- Medications: lisinopril, methadone, warfarin
- Dx: depression
- Rx: fluoxetine, psychiatric referral
- ART not prescribed (circa 2003)
Illicit Drugs, Alcohol & Addiction in HIV

- Addiction Treatment
- Epidemiology
- HCV Co-Infection
- IDU & Sex Risk
- Liver Damage
- HIV Disease Progression
- Depression
- HIV Treatment & Prevention
A 1990’s HIV Cascade Perspective

Model of entry into HIV medical care

- Entry into care in two New England clinics, 1994-1996 (n=189)
  - 39% delayed >1 year, 32% >2 years, and 18% >5 years
  - IDU (p<0.001) and history of alcohol problems in men (p=0.03) associated with delay

- Entry into care in 18 states, 2000-2004 (n=3,942)
  - 28% delayed medical care for > 3 months
  - IDU associated with delay (OR 1.4, CI 1.08-1.82)

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‡ Reed, Hanson, McNaghten, et al. AIDS Patient Care STDS. 2009;23:765-773.
HIV Cascade

- HIV-infected persons in USA (n=1,148,200)
  - IDUs comprise 16% of population

<table>
<thead>
<tr>
<th></th>
<th>n (%)</th>
<th>Diagnosed</th>
<th>Linked to Care</th>
<th>Retained in Care</th>
<th>Prescribed ART</th>
<th>Suppressed Viral Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population</td>
<td>1,148,200 (100)</td>
<td>82%</td>
<td>66%</td>
<td>37%</td>
<td>33%</td>
<td>25%</td>
</tr>
<tr>
<td>IDU</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>113,200 (10)</td>
<td>90%</td>
<td>70%</td>
<td>32%</td>
<td>29%</td>
<td>22%</td>
</tr>
<tr>
<td>Women</td>
<td>70,200 (6)</td>
<td>91%</td>
<td>73%</td>
<td>44%</td>
<td>39%</td>
<td>28%</td>
</tr>
</tbody>
</table>

IDUs and HIV Treatment Engagement

- Global review of ART coverage for IDUs
  - In the five countries* with the largest IDU HIV epidemics, IDUs make up 67% of HIV cases, but only 25% of those receiving ART
  - Barriers to HIV Treatment Engagement of IDUs
    - Stigmatization of IDUs in health care settings
    - Separation of addiction and HIV care systems
    - Active IDU is contraindication for ART
    - No HIV treatment for prisoners

* China, Vietnam, Russia, Ukraine, Malaysia
“The doctor said that I had to deal with one thing first, and then the other. Because I had told her straight that I used drugs. So, she said that I had to quit first and then take care of the rest. But how? … I’m actually afraid to discuss this issue of how to combine therapy and drugs. I don’t even want to ask the doctor… The doctor gave me such a look that I understood I’m kind of not entitled to ever feel good if I use drugs. So I made my conclusions. She made it clear to me that I had to deal with one thing first, then with the other.”

- Elena
Alcohol and ART adherence

• Meta-Analysis of 40 studies and over 25,000 participants*
  • Risky or dependent drinkers were less adherent than non-problem drinkers or abstainers
    (OR 0.5, CI 0.4-0.6)

• Study of African-Americans about beliefs of alcohol and ART (n=82)†
  – “Alcohol and ART do not mix.” (85%)
  – “I will not take my meds if I have been drinking.” (51%)

• Study of HIV-infected drinkers (n=178) showed that participants who endorse toxicity beliefs are:‡
  – More likely to miss medications on drinking days (OR 2.90, CI 1.09-7.68)
  – More likely to have VL>75 copies/mL (50% vs. 33%, p=0.02)

Efforts to Improve ART Adherence

Two RCTs to improve ART adherence among hazardous drinkers with motivational interviewing

• ADHERE (n=151)*
  – 4 session intervention
  – No significant differences in medication adherence, CD4 count, VL, or alcohol consumption

• Hazardous drinkers in New York City (n=143)†
  – 8 session intervention
  – Significant differences in VL, CD4 count at 3 months, but not 6 months

IDUs and ART Adherence

- HIV-infected persons (n=578) first prescribed ART between 1996-2000*
  - Classified as current IDU, former IDU, or non drug user
  - Current IDUs were less likely to suppress their HVL compared to non-drug users
  - Former IDUs were NOT less likely suppress HVL compared to non-drug users

- Similar findings in Swiss Cohort between 1997-2006 (n=8,669)†

- Improvement in 95% adherence among Vancouver IDUs – 19% (1996) vs. 66% (2009)‡

Changes in Sex and Drug Risk Behaviors After ART Initiation

• Community-based cohort study of HIV-infected IDUs (n=362)
  – ART initiation associated with reduction in likelihood of unprotected sex (OR 0.25, CI 0.19-0.32)
  – Odds of any injection drug use reduced (OR 0.62, CI 0.51-0.75)
  – However, needle sharing increased among persistent injectors

Integrated Opioid Agonist Treatment (OAT) & Directly Observed Therapy (DOT)

- RCT compared DOT to standard of care
- 12 methadone OAT clinics in the Bronx (n=77); 24-week follow-up
- DOT group at 24 weeks
  - Better adherence (86% vs. 56%, p<0.0001)
  - More likely to have undetectable viral load (OR 3.1, CI 1.1-5.4)

Pre-Exposure Prophylaxis (PrEP) in IDUs

- RCT of tenofovir in IDUs enrolled in methadone clinics in Thailand (n=2,413) *
- Participants chose either daily DOT or monthly visits and could switch at monthly visits
- Tenofovir significantly associated with reduction in HIV incidence
- WHO has no new recommendations for oral PrEP for people who inject drugs†

<table>
<thead>
<tr>
<th>Infections/person years</th>
<th>Tenofovir</th>
<th>Placebo</th>
<th>% Reduction (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17/4843</td>
<td>33/4823</td>
<td>48.9 (9.6-72.2)</td>
</tr>
</tbody>
</table>

† WHO. Consolidated guidelines on HIV prevention, diagnosis, treatment and care for key populations. 2014;47-49.
Case Presentation
19 Months – Addiction Hospital

- 42 y/o male
- Past endocarditis
- HIV+, HCV+
- CD4 373
- SMA thrombosis, small bowel resection
- Methadone program
- MVR

- 1 pint vodka/day past several months
- Recent IV heroin use
- Symptoms: sweats, nausea, vomiting, diarrhea, abdominal & muscle cramps, body aches, chills, anxiety, depression, sleep disturbance, and visual hallucinations
- Discharge summary:
  - Alcohol and heroin dependence
  - PCP never called
  - No HIV diagnosis
22 Months – Primary Care

- 42 y/o male
- past endocarditis
- HIV⁺, HCV⁺, CD4 313
- SMA thrombosis, small bowel resection
- Methadone program
- MVR
- Addiction treatment

- New sexual partner
  – 100% condom use
- Alcohol use: ½–1 six pack/day
- Administrative taper from methadone program for threatening behavior
- CD4 302, HVL 7000
- No ART
24 Months – Primary Care

-42 y/o male
-endocarditis
-HIV+, HCV+, CD4 313
-SMA thrombosis, small bowel resection
-Methadone program
-MVR
-Addiction treatment

• Recently married
• Not willing to decrease alcohol use
  – Discussed pros and cons
  – Suggested recovery as “wedding present”
• ART deferred pending improvement in alcohol use
3 Years – Primary Care

- 42 y/o male
- past endocarditis
- HIV\(^+\), HCV\(^+\), CD4 313
- SMA thrombosis, small bowel resection
- Methadone program
- MVR
- Addiction treatment

- VA opioid treatment program on medication
- Alcohol: 2-3 days/week with 3 drinks/day
- Court mandated breathalyzers, moderated alcohol use
- Attended AA meetings 4X/week, no sponsor
- Flu shot
- Advised clean needles from NEP, if relapse
Illicit Drugs, Alcohol & Addiction in HIV

- Addiction Treatment
- Epidemiology
- HCV Co-Infection
- IDU & Sex Risk
- Liver Damage
- Depression
- HIV Disease Progression
- HIV Treatment & Prevention
Alcohol and HIV Disease Progression

- Macaques (n=16): IV alcohol vs. sucrose at time of SIV infection
  - Higher viral set point (448 vs. 362 copies/mL; \( p<0.05 \))
  - Shorter time to death (374 vs. 900 days; \( p<0.05 \))
Alcohol and HIV Disease Progression: Pro

• Post-HAART
  – Hopkins* (n=1,711): alcohol associated with
    • Worse ART adherence (AOR 0.46; CI: 0.34-0.63)
    • Less viral suppression (AOR 0.76; CI 0.57-0.99)
  – HIV-LIVE† (n=240): heavy alcohol use associated with lower CD4 cell count in patients NOT on ART
    • Adjusted mean decrease of 49 cells/μl compared with abstinence (p=0.03)
  – Possible mechanism
    • Immune activation, increased GI bacterial translocation, interaction with ART metabolism‡

Alcohol and HIV Disease Progression: Con

• Pre-HAART (MACS): no association found*
• Swiss Cohort Study (2% severe, 4% moderate alcohol use)†
  – Pre-ART: n=2,085
    • No association of alcohol use and CD4
  – Initiating ART: n=2,932
    • No association of alcohol use with CD4 or virologic failure
    • Increased hazard of ART interruption in severe vs. moderate/non-drinkers

Drug Use and HIV Disease Progression

- Hopkins* (n=1,851): Heroin and cocaine use and risk of opportunistic infections (OIs)

<table>
<thead>
<tr>
<th>Drug Use</th>
<th>OR</th>
<th>95% CI</th>
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<tbody>
<tr>
<td>Nonuser</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Intermittent user, abstinent</td>
<td>1.4</td>
<td>1.0-1.9</td>
</tr>
<tr>
<td>Intermittent user, active</td>
<td>2.3</td>
<td>1.5-3.0</td>
</tr>
<tr>
<td>Persistent user</td>
<td>2.1</td>
<td>1.4-3.1</td>
</tr>
</tbody>
</table>

Active drug use associated with HIV disease progression

Cocaine and HIV Disease Progression

- HIV-infected non-injecting drug users (n=222)
- Crack cocaine users (n=110):
  - More likely to have a CD4 ≤ 200 cells/ml (OR 2.14, CI 1.08-4.25)
  - Higher HVL
  - Of those on ART, less likely suppress HVL
  - Of those not on ART (n=53), increased RR of CD4 decline < 200 (HR 3.9, CI 1.1-14.9)

Tobacco and HIV Disease Progression

• HIV-LIVE cohort (n=462)
  – No significant association between CD4 or HVL and smoking status
  – True for the range of tobacco use compared to non-smokers

Mortality and Substance Use

- **HIV-LIVE (n=595)**, short-term mortality associated with:
  - Heroin or cocaine use (HR 2.4, CI 1.1-5.3)
  - Homelessness (HR 2.9, CI 1.3-6.4)
  - No association with heavy alcohol use (HR 0.6, CI 0.2-1.4)

- **Johns Hopkins HIV Clinical Cohort 1997-2006, (n=1,030 women)†**
  - Heavy drinking associated with increased mortality (HR 1.4, CI 1.0-1.97)

- **Antiretroviral Therapy Cohort Collaboration 2001-2008 (n=44,043), §** mortality associated with:
  - IDU (RR 2.08, CI 1.91-2.26)

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Alcohol Use Associated with Significant Liver Disease in HIV-Infected Persons

- Swiss HIV Cohort: Mono-infected patients (n=3,365)*
  - Hazardous alcohol use (>40g/day females; >60g/day males) associated with elevated ALT levels (OR 1.83; CI 1.19-2.80)

- Johns Hopkins HIV Clinical Cohort: Mono-infected patients (n=696)†
  - Hazardous drinking (>14 drinks/wk) associated with significant liver disease – APRI† (adjusted RRR: 3.72; 95% CI: 1.40-9.87)

\[ \text{APRI} = \frac{\text{AST level / upper limit of normal}}{\text{Platelet count (10}^9/\text{L})} \]; APRI >1.5 identifies significant liver disease

Illicit Drugs, Alcohol & Addiction in HIV

- Addiction Treatment
- Epidemiology
- IDU & Sex Risk
- Depression
- Liver Damage
- HCV Co-Infection
- HIV Disease Progression
- HIV Treatment & Prevention
HCV Prevalence in HIV+ IDUs

Alcohol Use and Liver Function in HIV/HCV-infected Persons

• In co-infected persons in HIV-LIVE cohort (n=200), risky drinking was associated with elevated
  – AST (62.2 vs. 51.4 U/L; adjusted ratio of means 1.2, CI [1.07, 1.37], p=0.003)
  – ALT (51.3 vs. 41.6 U/L; adjusted ratio of means 1.2, CI [1.07, 1.42], p=0.004)
• In mono-infected persons (n=197), risky drinking was not associated with elevated AST or ALT levels

Case Presentation
3.5 Years – Emergency Department

- Mr. CB collapsed at home
- Wife performed CPR and called EMS

EMS
  - BP unobtainable
  - Administered naloxone with effect

In Emergency Department
  - Fresh track marks bilateral
  - Alcohol level 188
  - pH 6.88
  - RR 2
  - Hematocrit 21

- 4 hours later pronounced dead
Post-Mortem

• Negative
  – Relapses to substance use despite addiction treatment and medical care
  – Communication between addiction treatment hospital and PC suboptimal

• Positive
  – Effective treatment for complicated medical, surgical, addiction, and psychiatric problems
  – Improved function and quality of life
  – Maintained relationships and responsibilities
  – Collaborative care between medical and methadone providers
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Needle Exchange Program (NEP)

- Review of 42 studies from 1989-1999 among IDUs*
  - Decrease in HIV risk behavior
  - Decrease in HIV seroconversion
- Review of 7 international studies from 1991-2001†
  - Cost-effective
  - Feasible to implement internationally
  - Applicable to special populations

† Wodak, Cooney. Substance Use & Misuse. 2006;41:777-813.
Global HIV Prevalence Among IDUs

Availability of Syringe Distribution and Exchange

• Great Britain and Australia have some of the lowest HIV prevalence rates among IDUs (~2%* and ~1%†)

• Reflects early adoption of harm reduction measures (c. 1986)†
  • Needle exchange programs
  • Opioid agonist treatment

Addiction Pharmacotherapy

• Heroin*
  – Methadone
  – Buprenorphine
  – Injectable naltrexone

• Alcohol*
  – Naltrexone
  – Acamprosate
  – Disulfiram
  – Gabapentin†
    • No FDA approval for this indication

• Cocaine: none

• Methamphetamine: none

Addressing Addiction in HIV Care

• HIV-infected adults (n=951) receiving care at 14 sites*
  – 71% using substances; 24% receiving substance use treatment
  – Less than half reported discussing substance use issues with HIV care provider
• Need for providers to address substance use problems
• Audio-tapes of physician-patient encounters (n=413)†
• Quality of patient-provider communication
  – Good for illicit drug users
  – Worse for those with unhealthy alcohol use (shorter visit length, fewer activating/engaging and psychosocial counseling statements)

OAT & HIV Outcomes

- HIV-infected Vancouver IDUs on ART, 1996-2003 (n=278)*
  - Methadone OAT associated with
    - Good adherence (OR 1.5; 95% CI 1.2-2.0)
    - HIV RNA suppression (OR 1.3, CI 1.0-1.8)
    - CD4 cell count rise (OR 1.6, CI 1.3-2.0)

- Prospective cohort of ART-naïve, HIV-infected IDUs in Vancouver, 1996-2008 (n=231)†
  - Methadone OAT associated with
    - Earlier ART initiation (RH 1.6, CI 1.2-2.3)

OAT and HIV Transmission

- Meta-analysis of studies that assessed methadone OAT and HIV incidence in IDUs (n=9 studies)

  - OAT associated with 54% reduction in risk of acquiring HIV (RR 0.46, CI 0.32-0.67)

  - Methadone detoxification not associated with decrease in risk (RR 1.54, CI 1.05-2.26)

Advantage of buprenorphine OAT*
- Efficacy and retention comparable to methadone
- Milder withdrawal symptoms

Can be effectively delivered in primary care (e.g. a collaborative nurse care-manager model†)

Effective in homeless patients‡

Drug Interactions: ART and Addiction Pharmacotherapy

- IDUs receiving ART and OAT (n=120)*
  - Median methadone dose increase:
    - 20 mg/d (p<0.001) with nevirapine
    - 7.5 mg/d (p=0.004) with efavirenz
  - No significant increase required for patients on ritonavir-boosted lopinavir

- Methadone has no interaction with tenofovir, emtricitabine, or raltegravir

- Buprenorphine had no effect on early and newer protease inhibitors (early PIs n=30†) (newer PIs n=21‡)

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