Interactions: How Street Drugs Impact HIV Transmission and Treatments

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Goals for This Workshop

- This workshop will present important discoveries about substance use and HIV transmission and treatment.
- By the end of the session, participants will be able to:
  1. Identify at least one myth about street drug use as it relates to HIV transmission or treatment.
  2. List two reasons why street drug use may interfere with HIV treatment adherence.
  3. Explain why boosted HIV treatments can inadvertently contribute to street drug overdose.

Drugs as a Coping Tool

- UCLA study: rejection is processed by brain as physical pains.
- Solitary men: ↑ levels inflammatory chemical markers (C-reactive protein, interleukin-6, and fibrinogen) which → excess drug, tobacco or alcohol use.
- “I get overwhelmed sometimes by the sense of being so alone in the world … and drugs and any kind of mind-altering substance can kind of take that sense away … when I am on the drug it’s easier for me to reach out and just pull somebody into my home, and they’ll spend the night.”

Exposure Routes: New HIV/AIDS

| Male-to-male sexual contact | 22,472 |
| Injection drug use          | 3,133 (9.9%) |
| Male-to-male & IDU          | 1,260 (4.0%) |
| High-risk heterosexual contact | 4,551 |
| Other                       | 102 |
| **Subtotal Male**           | 31,518 |

| Injection drug use          | 1,806 (16.5%) |
| High-risk heterosexual contact | 9,076 |
| Other                       | 96 |
| **Subtotal Female**         | 10,978 |

The Other Drug: Alcohol

- Alcohol myopia theory: intoxication need not be fall-down drunk. A scale of reduced alertness to "cues." Only loudest ones heard.
- Loud = intimacy and the immediate pleasure of the sexual contact.
- More abstract, "distal" cues require additional resources to process, so don’t get through.
- i.e. suspicion that partner could be HIV infected, or a TV PSA.

Steele CM, Josephs RA. “Alcohol myopia: Its prized and dangerous effects.” American Psychologist 1990;45:921–933

- Alternatively, many studies suggest drinking is used preemptively, allows behaviors.


Alcohol as Aphrodisiac

- Alcohol can erase inhibitions … and judgment?
- Yet in some countries, alcohol use does not correlate with increased sexual practice, as is commonly perceived here.
- May be more an “expectancy effect” also called the “time out” model.


PnP Amplifies Risks

- Large, 4 city telephone sample of urban MSMs: 52% have used club drugs (MDMA, ketamine, gammahydroxybutyrate).
- NYC survey found 14% of MSMs used MDMA past 6 months, (avg ~1x/mos).
- Compared with non-users, had > male partners, > one-night stands with men, and > u/p anal sex.


The Scariest One: Crystal

- New York City doctors report observationally that crystal meth plays a role in 50% to 75% of new HIV cases.

- 60% of gay men seeking rehab for crystal in Los Angeles and Seattle have already become HIV infected.

“Methamphetamine Use Is Heightening Risks Among Gay Youth.” AIDS Alert, October 1, 2002.
- Of 1,263 San Francisco gay men visiting city’s STD clinic, 17.4% had used crystal in month prior to their visit.

Crystal Bottoms, Viagra Tops (cont’d)

- Users were > 2x as likely to have HIV, 4.9x as likely to diagnosed syphilis, and 1.7x as likely to have gonorrhea.
- Previous CDC study of 388 MSM (Mansergh): 16% percent had used crystal the last time they had anal sex. Users were 2x as likely to have u/p receptive anal sex.
- In last anal sex encounter, 6% had used Viagra. They were 6.5x more likely to have had u/p insertive anal sex.


How Risky Are IV Needles?

- Small amounts of blood can remain in a used syringe.
- Odds from 1 needle exposure: 0.67% for IVDU, or 0.4% of percutaneous (accidental stick).


- Of 119 drug use items collected, only 3 needles had enough HIV to transmit. But cookers and cottons had VL up to 600,000/ml.
- Only 4 of 74 needles (some rinsed) had any HIV--very low levels.
- Other paraphernalia--cookers and cottons--had very high levels of HIV, to 600,000/ml.

Interactions: Drug Use and HIV Transmission and Treatment

National Drug Threat Survey 2008

Protecting IVDUs from …?
- 1,800 IVDUs followed for 10 years in Baltimore; IVDU often overlaps with sexual risk behaviors.
- “Among women, factors consistent with high-risk heterosexual activity were more significant than drug-related risks.
- “Men who reported recently engaging in homosexual activity were 4 times more likely to become infected with HIV.”
- “Among female IDUs, HIV incidence was more than double among those who reported recently having sex with another IDU.”
- Why? Last thing in needle is first out.

Intermission for My Soapbox
- Risk exposure is recorded according to the riskiest behavior reported.
- IVDU may have lifestyle risks that surpass direct syringe risk.
- Hypothesis: the most effective prevention program for IVDUs might be one that focuses primarily on sexual risks.
- For drug-related risk reduction, a focus on safer methods for handling paraphernalia may be as important as needle cleaning/exchange.

The Big Surprise
- Unprotected sex accounts for 77% of all new U.S. HIV infections and AIDS cases.
- Receptive partners (heterosexual women, passive partner in gay male sex) face highest risks in each episode.
- Women suffer 62% of sex-related deaths/health problems in U.S.
- Most female deaths were from cervical cancer (HPV) and HIV.

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HIV’s Contagion Curve

- Acute infection: high VL = 20x higher transmission odds.
- Newer field study 235 monogamous Ugandan serodivergent heterosexual couples.
- Transmission to partner 12x ↑ @ 2.5 mos than > setpoint (1.2 per 1,000).
  Wawer M. Journal of Infectious Diseases, May 1, 2005;191:1391-1393,1403-1409.

Cocaine: Accelerator on HIV

- 35M in U.S. have tried cocaine.
- Cocaine use is an independent predictor of progression to AIDS.
- Cocaine “downregulates” HIV-1-suppressing chemokines RANTES (regulated-upon-activation T expressed and secreted), macrophage inflammatory protein 1 (MIP-1α) and MIP-8) and “upregulates” HIV-1 entry coreceptors (CCRs).

Cocaine: Accelerator on HIV (cont’d)

- Net result? Cocaine “significantly upregulates HIV-1 infection.”
- Not only total viral population increases, but cocaine use changes 22 proteins “which directly or indirectly play a supportive role in the neuropathogenesis of HIV-1 infection.”
- Some studies suggest this may be a stimulant class effect not unique to cocaine.
- Methamphetamines causing similar results?
The Two Faces of Ritonavir

- Norvir in full dose very rare these days. But very common as a small “boosting” dose.
- Its benefit--it inhibits CYP 3A4 and CYP 2D6 in the P450 cytochrome.
- What does that mean? Norvir prevents the liver from flushing out other drugs (protease inhibitors, one new integrase inhibitor). It lets them trickle into the bloodstream at a steady rate.
- Benefits: Kaletra (LPV/r) has an IQ 80x higher than full-dose Norvir alone.

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The Two Faces of Ritonavir (cont’d)

- Problem? It can also cause illicit substances to get “clogged” in the liver, and invite overdose.
- Reported fatality: Crystal + 3TC/ SQV/r Hales Antivir Ther 2000;5:19
- Two reported fatalities with Ecstasy + r Henry Lancet 1998;332: 1751-2
- Wild card to predict: makes Ecstasy levels 5x-10x higher in bloodstream for most; but can cause methadone to “wash out.”
- Many prescription meds are “contraindicated” for patients taking anti-HIV medicines, i.e. sedatives, barbiturates, antacids, etc.

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Drug Use and Adherence

- Few studies on impact of ongoing drug use & HIV treatment adherence.
- First one to use MEMS: followed 85 HIV-infected current / former drug users.
- Predictors of low adherence: active cocaine use, female, not receiving SS benefits, not married, depression, & using alcohol or drugs to cope with stress.
- Strongest predictor: active cocaine use (27%, vs. 68% among those with no cocaine use during the 6-month study period).

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Drug Use & Adherence (cont’d)

- HAART often withheld from IDUs LWH based on belief “that their unstable lifestyles may predetermine a markedly inferior outcome with HAART.”
- Studied 3,116 PLWH in British Columbia on first regimen August 1996 and June 2006, including whom 915 IDUs.
- After adjustments for age, sex, baseline AIDS diagnosis and other factors, no significantly greater risk of death for IDUs. *Highly Active Antiretroviral Therapy and Survival in HIV-Infected Injection Drug Users,* JAMA 2008;300(5):550-554.

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Drug Use & Adherence (cont’d)

- 150 diverse, drug using PLWH in LA recruited via flyers soliciting.
- 102 active substance use per urinalysis.
- Adherence tracked 6 months; on MEMS.
- Active users’ adhere 63% vs. 79% for non.
- Meth use = lowest adherence. Ex: cocaine use → low adherence, but cocaine + meth → even lower (54%).
- “(Low adherence) appears to be more a function of state rather than trait. … the acute effects of intoxication, rather than stable features … of the drug-using populace …”


Costs of Non-Adherence

- Reducing viral load does seem to lower--but not remove--chances of passing HIV.


- Odds reduced +/- 53%, 60%, or 81%.


- UDVL not a guarantee of safety, but non-adherence → viral breakthrough would → infectivity.

- Partners of non-adherent are at greater risk.

HIV’s Strategy: Resistance

- HIV reproduces average 10 billion particles every day; most are cleared.


- Average 1 new mutation in each new virus genome, untreated PLWH.


- An infected cell makes 50,000 viruses.


- 1- in -5 newly infected U.S. teens acquired drug resistant virus.

Don’t Drop the Ball: Adhere

• Meds don’t cause resistance. Mutations → selective pressure.
• Resistance is the #1 cause of treatment failure. (p=0.004).
• Checked adherence (pill counts and prescription refills); followed up in 2000.
• Patients who had taken > 75% of their meds during their 1st year were 2.97x MORE likely to live at follow up.
  Hogg R, “Intermittent Use of Triple-Combination Therapy is Predictive of Mortality at Baseline and After 1 Year of Follow-Up.” AIDS 2003; 17(18s):S128-S130. (c) 2009 Stephen Fallon, Skills4

What You Can Do

1. Substance use harm reduction is HIV prevention.
2. Drug use means anything that can either cloud decision making or require sex for substance trades.
3. Use is reinforcing. Many infected turn to drugs and alcohol out of shame, guilt.
4. Substance use history or susceptibility is secondary to current active use in predicting adherence challenges.
5. Non-adherence is the #1 reason for treatment failure. Failure, in turn, raises contagion.
6. Non-judgmental outreach is life saving.

Better High: Love

• Why does food taste better, sky look brighter, smile last longer?
  • Don’t have it? Hypopituitarism (pituitary gland malfunctions during infancy) lack normal hormone production → “love blind.”
  • Rhesus monkeys, and mice given PEA (phenyl ethyl amine) show “popcorn behavior.” Courtship gestures, even if alone.
  • Baboons pressed PEA supplement levers 160x over 3 hours.
  • Levels ↑ skydiving, concluding divorce; just < divorce.
  • Humans mate > rope bridge risks, but not if experienced alone.
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Thank You for Making a Difference!

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