Improvements in medication adherence and healthcare utilization as evidenced from a pilot intervention combining contingency management and behavioral activation to reduce stimulant use among HIV-Infected individuals

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Stimulant use in HIV infected individuals is high and can have deleterious effects

• While survival rates of HIV-infection have significantly improved over the last two decades stimulant use has been associated with:
  • Decreased utilization of medical care for HIV infection
  • Reduced access to antiretroviral medications (ARVs)
  • Poor adherence to ARVs
  • Increased rates of malnourishment

• HIV-infected stimulant users have increased high risk behaviors
  • They are less likely to use condoms compared to those who do not use these drugs
  • They have an increased number of sex partners

Increased focus on treatment as prevention
Need to minimize barriers to ART

- Updated guidelines March 2012:
  - ART should be offered to patients who are at risk of transmitting HIV to sexual partners

- Patients starting ART should be willing and able to commit to treatment and should understand the benefits and risks of therapy and the importance of adherence

How do we put this together?

- Population
  - High risk of poor HIV outcomes
  - High risk for transmitting HIV to sexual or injecting partners
  - May have difficulty adopting new recommendations regarding antiretroviral therapy
- These challenges are in part mediated by substance use

**Hypothesis**
By decreasing substance use we can improve access to and utilization of HIV treatment
Limited Existing Effective Treatments for Stimulant Use

• There are no FDA-approved pharmacological treatments for stimulant use despite the wide range of medications tested for this type of dependence.

• Cognitive behavioral therapy (CBT)
  • Provides skills that are used to help people gain and sustain abstinence from drugs

• Contingency Management (CM)
  • Provides positive reinforcement for desired behaviors (e.g., abstinence from stimulant use)
  • Escalating monetary vouchers or “fish bowl”

Knapp 2007; Lee 2008
A comparison of contingency management and cognitive-behavioral approaches for stimulant-dependent individuals

![Graph comparing mean number of stimulant-free urine samples across different treatments.](image)

Group ($F = 10.0, df = 2, 176, P < 0.0001$)
A comparison of contingency management and cognitive-behavioral approaches for stimulant-dependent individuals (cont’d)
Behavioral Activation Therapy (BA)

- BA is an evidenced-based approach in the treatment of depressed mood, and may be a useful supplement to CM
  - Helps patients gradually increase rewarding and pleasurable activities
- May be ideally suited to complement CM as the vouchers from CM can be used to support re-engagement into positive life activities

Dimidjian S, Hollon SD, Dobson KS, et al., 2006
Pilot Study
Combining BA and CM

Research Evaluating Contingency Management with Behavioral Activation to Reduce Stimulant Drug Use: Project REWARD

Funded by the Harvard University CFAR, 2010
Study Aims

1. Develop and implement a combined CM and BA intervention to HIV-infected-individuals who are engaged in HIV care and currently using crack, cocaine or methamphetamines.

2. Evaluate the acceptability/feasibility of the intervention by assessing barriers to enrollment and retention.

3. Evaluate the impact of the combined intervention on:
   - Reductions in stimulant use as measured by toxicology screens
   - Self-reported stimulant use, follow-up with HIV care, medication adherence, depression, high risk sexual behaviors.
Methods

Study Objective
We tested a novel combined contingency management (CM) and behavioral activation (BA) intervention for HIV-infected men and women who are dependent on stimulants: crack/cocaine or methamphetamines.
Participants

• Recruited from outpatient primary care and infectious disease clinic visits at a hospital in Boston and community-based AIDS service organizations in the area

• Eligibility criteria:
  • Age 18 years or older
  • HIV-infected
  • Meets DSM-IV diagnostic criteria for stimulant dependence/abuse
  • Active stimulant use (past 3 months)
    • Positive toxicology screen
    • Documentation of recent rehabilitation for stimulants
    • Documentation of stimulant use in the medical record
**Behavioral activation**
- 10-16 weekly sessions delivered by at least a master’s-level interventionist

**Contingency management**
- Saliva toxicology tests 3 times/week for 12 consecutive weeks
- Escalating monetary vouchers for negative toxicology results

**Assessments**
- Self- and clinician-administered assessments
- Conducted at Baseline, 3-, and 6-months
- Exit interviews conducted after intervention completion

**Follow-up toxicology tests**
- Twice weekly toxicology tests repeated in the 4 weeks preceding 6-month assessment
Data Analysis

- SPSS software (v.18)
- Estimated differences in outcomes pre-/post-treatment:
  - Within-person mean change: paired t-tests
  - Percent change: \[
  \frac{(\text{pre} - \text{post})}{\text{pre}}\times 100
  \]

<table>
<thead>
<tr>
<th>Primary outcome</th>
<th>Toxicology test results for stimulant use</th>
</tr>
</thead>
</table>
| Secondary outcomes | Self-reported stimulant use  
 | Follow-up with HIV care |
| Exploratory variables | Medication Adherence  
 | High risk behaviors  
 | Depression |
Contingency Management

- Protocol was based on the work of S. Shoptaw who served as a consultant on our initial grant

- Participants met with an RA 3/week for 12 weeks in a private setting

- iScreen OFD™ saliva-based toxicology test for methamphetamine and crack/cocaine

- Participants with negative test results received escalating monetary vouchers which they could redeem at any time

- Positive results
  - No voucher was earned for the day.
  - Participant encouraged to continue goal of abstinence

¹Shoptaw S, Klausner JD, Reback CJ et al. (2006)
# Escalating monetary vouchers

## Schedule of incentives

<table>
<thead>
<tr>
<th></th>
<th>Monday</th>
<th>Wednesday</th>
<th>Friday</th>
<th>Bonus</th>
<th>Weekly Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>$2.50</td>
<td>$3.75</td>
<td>$5.00</td>
<td>$10.00</td>
<td>$21.25</td>
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<tr>
<td>Week 2</td>
<td>$6.25</td>
<td>$7.50</td>
<td>$8.75</td>
<td>$10.00</td>
<td>$32.50</td>
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<tr>
<td>Week 3</td>
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<td>$40.00</td>
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<td>$10.00</td>
<td>$40.00</td>
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<td>Week 5</td>
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<td>$10.00</td>
<td>$10.00</td>
<td>$40.00</td>
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<td>Week 6</td>
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<td>$10.00</td>
<td>$10.00</td>
<td>$40.00</td>
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<tr>
<td>Week 7</td>
<td>$10.00</td>
<td>$10.00</td>
<td>$10.00</td>
<td>$10.00</td>
<td>$40.00</td>
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<tr>
<td>Week 8</td>
<td>$10.00</td>
<td>$10.00</td>
<td>$10.00</td>
<td>$10.00</td>
<td>$40.00</td>
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<td>Week 9</td>
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<td>$10.00</td>
<td>$10.00</td>
<td>$10.00</td>
<td>$40.00</td>
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<tr>
<td>Week 10</td>
<td>$10.00</td>
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<td>$10.00</td>
<td>$10.00</td>
<td>$40.00</td>
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<tr>
<td>Week 11</td>
<td>$10.00</td>
<td>$10.00</td>
<td>$10.00</td>
<td>$10.00</td>
<td>$40.00</td>
</tr>
<tr>
<td>Week 12</td>
<td>$10.00</td>
<td>$10.00</td>
<td>$10.00</td>
<td>$10.00</td>
<td>$40.00</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>$453.75</strong></td>
</tr>
</tbody>
</table>
Behavioral Activation

- Re-learn how to engage in life activities by pursuing pleasurable events
- Decrease substance use during 12 week CM intervention
- Sustain the effects of abstinence after the CM is discontinued
- Use the contingencies earned from CM in a way that supports the goals of BA
Results

- Participants were enrolled between January and July, 2011
- 11 participants enrolled
- 7 participant completed
  - Study retention was 63% and was negatively impacted by incarceration, continued scheduling conflicts, and lost to follow-up
Baseline demographic characteristics of participant completers ($n=7$)

<table>
<thead>
<tr>
<th>Age</th>
<th>Mean 46, (36 - 51) SD = 5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>100%</td>
</tr>
</tbody>
</table>

Engagement in HIV Care

<table>
<thead>
<tr>
<th>Currently taking ART</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saw a regular medical provider in the past year</td>
<td>100%</td>
</tr>
</tbody>
</table>

Number of visits in past year: Mean 7.6 (3-20) SD=6.3

Socioeconomic Status

<table>
<thead>
<tr>
<th>College degree or higher</th>
<th>43%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earn &lt; $12,000 annually</td>
<td>43%</td>
</tr>
<tr>
<td>Health insurance</td>
<td>100%</td>
</tr>
</tbody>
</table>
### Sexual Orientation

- **Homosexual or 'gay'**: 71%
- **Bi-sexual**: 29%
- **Heterosexual or 'Straight'**: 0%

### Race and Ethnicity

- **White**: 86%
- **Black**: 14%
- **Hispanic/Latino**: 0%
Stimulant use by type at baseline
Saliva-based toxicology results and self-report

- **57%**: Poly stimulant use
- **29%**: Crack/cocaine
- **14%**: Crystal meth
Mean percent of positive toxicology results for stimulants

Within-person change = -25.4 (SD = 16.3)

$t(6) = 1.77$ $p = 0.13$; Cohen's $d = .58$
Mean self-reported depressive symptoms (CES-D)

Within-person change = -8.6 (SD = 10.4)
\[ t(6) = 2.19, p = 0.07; \text{Cohen's } d = 0.70 \]
Mean self-reported percent of missed doses in the past 7 days

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>3 months</th>
<th>6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>10% (SD=13.8)</td>
<td>8% (SD=11.3)</td>
<td>2% (SD=5.3)</td>
</tr>
</tbody>
</table>

Within-person change = -8.3 (SD=16.3)
t(6) = 1.35, p = 0.23; Cohen's $d = 0.76$
Mean self-reported percent of doses of ART taken as prescribed in the past 30 days

Baseline

- 90% doses taken
- 10% doses missed

6 months

- 96% doses taken
- 4% doses missed
Self-perceived effects of stimulant use on health care utilization

Has your stimulant use impacted your ability to follow-up with medical care in past 3 months?

Has your substance use impacted ability to take ART as prescribed in the past 3 months?
### Mean number of appointments with a PCP in past 3 months

<table>
<thead>
<tr>
<th></th>
<th>Mean Value</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>3.5</td>
<td>2.97</td>
</tr>
<tr>
<td>3-months</td>
<td>1.9</td>
<td>2.53</td>
</tr>
<tr>
<td>6-months</td>
<td>1.7</td>
<td>1.75</td>
</tr>
</tbody>
</table>
Findings suggest that including ART adherence in interventions aimed at decreasing stimulant use may be particularly useful for this population.

“Having awareness helps with adherence, helps with being mindful to do the right thing... so I think that it would be helpful to know your cravings, the amount of use, and to know right beside it (if) it affected your adherence and your HIV meds. Because I will tell you, in my heavy addiction when I was using the most, I was adhering the least”.

- Excerpt from exit interview
Conclusions

• Combining CM and BA appears to be an acceptable and feasible intervention for stimulant dependent HIV-infected patients.

• Given the increased focus on treatment as prevention, interventions which decrease barriers to care are of great importance.

• This combined, novel intervention should be further investigated through efficacy testing, and if successful, adopted into HIV clinical care settings.
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  ▫ David Pantalone, PhD (Interventionist)
  ▫ S. Wade Taylor, PhD (Interventionist)
  ▫ Michael Garber, MSW, LICSW (Interventionist)

• Community partners:
  ▫ Beth Israel Deaconess Medical Center
  ▫ The Boston Living Center
  ▫ AIDS Action Committee of Massachusetts