Finding the right partners, interventions and implementation science framework

“Putting Implementation Science into Practice”
The New England HIV Implementation Science Network 4th Annual Symposium
Mystic, Connecticut
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Disclosures

No Conflicts of Interest.
Definition of Implementation Research

“Implementation science is the study of methods to improve the uptake, implementation, and translation of research findings into routine and common practices.”

Padian et al., JAIDS, 2011
Purpose of Implementation Research

1. Characterizing **barriers** to implementing interventions;
2. Identifying the major **determinants** of implementing evidence-based interventions;
3. **Adapting** an intervention to a specific health system or setting;
4. Understanding how to achieve a **sustainable** impact in real-world settings;
5. **Evaluation** and monitoring of the process.
Examples of an Implementation Research Question

Epidemiological: *What* is the association of substance use with risk of acquiring HIV?

Clinical efficacy: *What* is the effect of substance use treatment on reducing HIV risk?

Implementation: *How* do we improve uptake of a substance use treatment program?

A focus on the *process*
Common Elements of Implementation Research Frameworks

1. Evidence-based intervention;
2. Cost-effective;
3. Context (local determinants of adoption);
4. Implementation plan (adapting, innovating, disseminating);
5. Sustainability;
6. Monitoring and evaluating;
7. Stakeholder input.

Using a framework will help achieve more relevant and reliable results!
An Implementation Research Framework: RE-AIM

Reach the target population
Effectiveness/efficacy
Adoption in a setting
Implementation, consistency, and costs
Maintenance over time

Glasgow et al., AJPH, 1999
An Implementation Research Framework: RE-AIM

1. Need for improved evaluation of implementation activities in public health.
2. Need to conduct research in a real-world setting versus an ideal research setting.
3. Follows a logical pattern of implementation.
An Implementation Research Framework: RE-AIM

Reach the target population

Number and characteristics of Individuals in a program.

Also based on the “total” population of focus using a valid denominator to assess for representativeness of those in the program.
An Implementation Research Framework: RE-AIM

Reach the target population
Effectiveness/efficacy

Measurement of both positive and negative outcomes (e.g. behavioral, quality of life, acceptability, clinical outcomes).
Implementing successful models for HIV and STD prevention in Rhode Island

An Implementation Research Framework: RE-AIM

Reach the target population
Effectiveness/efficacy
Adoption in a setting

The percentage of settings that adopt a given program. Based on a valid denominator.
An Implementation Research Framework: RE-AIM

Reach the target population
Effectiveness/efficacy
Adoption in a setting
Implementation, consistency, and costs

Extent to which a program is delivered as intended. Fidelity of the intervention.

Efficacy \times \text{Implementation} = \text{Effectiveness}
An Implementation Research Framework: RE-AIM

Reach the target population

Effectiveness/efficacy

Adoption in a setting

Implementation, consistency, and costs

Maintenance over time

Continuation/sustainability of the program.

Long-term impact on outcomes.
PrEP Implementation
Panel recommends approving Truvada to prevent HIV infection

By Saundra Young, CNN
updated 10:45 PM EDT, Thu May 10, 2012

A FDA advisory committee recommended on Thursday approving a new drug, Truvada, for pre-exposure prophylaxis.
Implementing successful models for HIV and STD prevention in Rhode Island

**PrEP IMPLEMENTATION**

**Clinical Trials**

**Demonstration Projects**

**Clinical Programs**

"Efficacy"  

"Feasibility"  

"Real world"

**Major Implementation Questions:**

1. How do we **Reach** and are we reaching the target population (i.e. MSM, substance use populations)?
2. What is the **Effect** on different outcomes (i.e. risk compensation, STDs, adherence, etc.)?
3. Which settings are **Adopting** PrEP (i.e. primary care, ID specialists?)
4. How is PrEP being **Implemented** (i.e. daily versus intermittent) and what are the costs (i.e. to the individual and system)?
5. What is the **Maintenance** and long-term impact of PrEP?
Implementing successful models for HIV and STD prevention in Rhode Island

Figure 1: The PrEP Care Continuum

- Identify Individuals at Highest HIV Risk
- Enhance Self-Perceived HIV Risk Awareness
- Raise PrEP Awareness
- Facilitate PrEP Access
- Link to PrEP Care
- Prescribe PrEP
- Initiate PrEP
- Adhere to PrEP
- Retention in PrEP Care

Awareness

Uptake

Adherence & Retention
The Rhode Island STD Clinic
A collaboration between RIDOH and The Miriam Hospital

HIV and other STDs
(syphilis, gonorrhea, chlamydia)
Wednesday, Thursday, and Friday
12:30-3:30pm
## PrEP Awareness and Racial Disparities

**PrEP awareness and use among MSM visiting the Rhode Island STD Clinic (N=316)**

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>PrEP Awareness</th>
<th>PrEP Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>OR</td>
</tr>
<tr>
<td>Non-Hispanic White (N=203)</td>
<td>51</td>
<td>Ref</td>
</tr>
<tr>
<td>Non-Hispanic Black (N=34)</td>
<td>26</td>
<td>0.35**</td>
</tr>
<tr>
<td>Hispanic/Latino (N=50)</td>
<td>40</td>
<td>0.65</td>
</tr>
<tr>
<td>Other/Unknown (N=29)</td>
<td>58</td>
<td>1.38</td>
</tr>
<tr>
<td><strong>Age group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16-19 (N=17)</td>
<td>18</td>
<td>Ref</td>
</tr>
<tr>
<td>20-24 (N=84)</td>
<td>35</td>
<td>2.46</td>
</tr>
<tr>
<td>25-29 (N= 61)</td>
<td>59</td>
<td>6.72***</td>
</tr>
<tr>
<td>30-34 (N=55)</td>
<td>58</td>
<td>6.49***</td>
</tr>
<tr>
<td>35-44 (N=34)</td>
<td>47</td>
<td>4.15**</td>
</tr>
<tr>
<td>45-54 (N=44)</td>
<td>59</td>
<td>6.74***</td>
</tr>
<tr>
<td>55+ (N=21)</td>
<td>33</td>
<td>2.33</td>
</tr>
</tbody>
</table>

Notes: PrEP use was not great enough to analyze differences in PrEP use by demographic characteristics. **p≤0.05, ***p≤0.01
Implementing successful models for HIV and STD prevention in Rhode Island

The Rhode Island HIV/STD Clinic

Screen for risk behaviors

HIV/STD Testing

Discuss PrEP

Follow-up Appointment

Prescribe PrEP

Q3 Month Follow-ups

Panel recommends approving Truvada to prevent HIV infection

By Saundra Young, CNN

Updated 10:43 PM EDT, Thu May 10, 2012

A FDA advisory committee recommended on Thursday approving a new drug, Truvada, for pre-exposure prophylaxis.
Implementing successful models for HIV and STD prevention in Rhode Island

**Figure 1.** The PrEP implementation cascade among men who have sex with men presenting to the Rhode Island STD Clinic (N=234)
## TABLE 4B. Logistic Regression Results Predicting Being Prescribed PrEP*

<table>
<thead>
<tr>
<th></th>
<th>AOR*</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV risk perception†</td>
<td>2.17$</td>
<td>1.29–3.64</td>
</tr>
<tr>
<td>Any sex with HIV-positive partner‡</td>
<td>7.08‡</td>
<td>2.35–21.34</td>
</tr>
</tbody>
</table>

Model: $\chi^2 = 30.58 \ P = 0.000074$

*Model controls for age, race, and ethnicity. The dependent variable in this analysis is coded so that 0 = not interested in PrEP and 1 = Interested in PrEP.

†Likert scale ranging from 1 (no risk) to 5 (high risk).
‡Reference group = No, AORs displayed for Yes group.
§$P \leq 0.01$.
¶$P \leq 0.001$. 
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**Missouri (N=62)**
- AA/Black (26%)
- Hispanic/Latino (3%)
- MSM (84%)
- Low SES (23%)
- Condomless Sex (75%)

**Rhode Island (N=117)**
- AA/Black (7%)
- Hispanic/Latino (24%)
- MSM (92%)
- Low SES (26%)
- Condomless Sex (70%)

**Mississippi (N=88)**
- AA/Black (72%)
- Hispanic/Latino (2%)
- MSM (88%)
- Low SES (52%)
- Condomless Sex (65%)

A total of 267 prescribed PrEP across all sites

Chan et al., JIAS, 2016
Implementing successful models for HIV and STD prevention in Rhode Island

**Figure 1.** Retention in HIV pre-exposure prophylaxis (PrEP) care cascade overall and for Rhode Island, Mississippi and Missouri. Blue bars indicated the number of patients who received a prescription for PrEP (and had been in the programme for six or more months), red bars indicate the number who initiated PrEP (confirmed to have started the medication), green bars indicate the number who were retained in PrEP care at three months and purple bars indicate the number who were retained in PrEP care at six months.
Fig 2. Tenofovir-diphosphate (TFV-DP) concentration and self-reported number of doses taken in the past seven days among pre-exposure prophylaxis (PrEP) patients (n = 21). Red marker indicates the patient who seroconverted while taking PrEP.
Implementing successful models for HIV and STD prevention in Rhode Island

Implementation of HIV pre-exposure prophylaxis for men who have sex with men with and without substance use in Providence and New Haven (CIRA/CFAR)

Philip A. Chan, Brandon Marshall, E. Jennifer Edelman, Onyema Ogbuagu

<table>
<thead>
<tr>
<th>How often did you have a drink containing alcohol in the last three (3) months:</th>
<th>Never (0)</th>
<th>Monthly or less (1)</th>
<th>2-4x a month (2)</th>
<th>2-3x a week (3)</th>
<th>4+ a week (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many drinks did you have on a typical day when you were drinking in the last three (3) months:</td>
<td>None, I do not drink (0)</td>
<td>1 or 2 (0)</td>
<td>3 or 4 (1)</td>
<td>5 or 6 (2)</td>
<td>7 to 9 (3)</td>
</tr>
<tr>
<td>How often did you have six or more drinks on one occasion in the last three (3) months:</td>
<td>Never (0)</td>
<td>Less than monthly (1)</td>
<td>Monthly (2)</td>
<td>Weekly (3)</td>
<td>Daily or almost daily (4)</td>
</tr>
</tbody>
</table>

I am going to read a list of drugs. For each drug, please tell me if and how often you used them in the past three (3) months:

1. Marijuana | Never | Less than once a month | 1-3x a month | 1-3x a week | 4-6x a week | Every day
2. Cocaine/Crack | Never | Less than once a month | 1-3x a month | 1-3x a week | 4-6x a week | Every day
3. Meth/Methamphetamine | Never | Less than once a month | 1-3x a month | 1-3x a week | 4-6x a week | Every day
4. Poppers | Never | Less than once a month | 1-3x a month | 1-3x a week | 4-6x a week | Every day
5. MDMA/Ecstasy/Molly | Never | Less than once a month | 1-3x a month | 1-3x a week | 4-6x a week | Every day
6. Ketamine/Special K | Never | Less than once a month | 1-3x a month | 1-3x a week | 4-6x a week | Every day
7. GHB | Never | Less than once a month | 1-3x a month | 1-3x a week | 4-6x a week | Every day
8. Heroin | Never | Less than once a month | 1-3x a month | 1-3x a week | 4-6x a week | Every day
9. Opioids (non-prescription) | Never | Less than once a month | 1-3x a month | 1-3x a week | 4-6x a week | Every day
10. Benzodiazepines | Never | Less than once a month | 1-3x a month | 1-3x a week | 4-6x a week | Every day
11. Other: ____________ | Never | Less than once a month | 1-3x a month | 1-3x a week | 4-6x a week | Every day

Specific Drug/Route:
Injection drug use in the past three (3) months: YES NO
Injection drug use ever: YES NO If yes, have you ever shared a needle or syringe? YES NO
Implementing successful models for HIV and STD prevention in Rhode Island

<table>
<thead>
<tr>
<th></th>
<th>Rhode Island (N=91)</th>
<th>Connecticut (N=40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &lt;25 years</td>
<td>21%</td>
<td>15%</td>
</tr>
<tr>
<td>Non-White</td>
<td>39%</td>
<td>33%</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>22%</td>
<td>23%</td>
</tr>
<tr>
<td>Income &lt;$12K</td>
<td>23%</td>
<td>15%</td>
</tr>
<tr>
<td>College Degree</td>
<td>26%</td>
<td>23%</td>
</tr>
<tr>
<td>Uninsured</td>
<td>1%</td>
<td>0%</td>
</tr>
</tbody>
</table>
### Implementing successful models for HIV and STD prevention in Rhode Island

<table>
<thead>
<tr>
<th></th>
<th>Rhode Island (N=91)</th>
<th>Connecticut (N=40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSM+W</td>
<td>3%</td>
<td>13%</td>
</tr>
<tr>
<td>Partners, 3mo</td>
<td>5.8 (0-50)</td>
<td>8.2 (0-30)</td>
</tr>
<tr>
<td>Condomless</td>
<td>2.9 (0-25)</td>
<td>3.8 (0-30)</td>
</tr>
<tr>
<td>HIV+ Partner</td>
<td>23%</td>
<td>16%</td>
</tr>
<tr>
<td>IDU Ever</td>
<td>6%</td>
<td>0%</td>
</tr>
<tr>
<td>Drug Type</td>
<td>Rhode Island (N=91)</td>
<td>Connecticut (N=40)</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Any drug use</td>
<td>57%</td>
<td>55%</td>
</tr>
<tr>
<td>Marijuana</td>
<td>45%</td>
<td>28%</td>
</tr>
<tr>
<td>Poppers</td>
<td>28%</td>
<td>33%</td>
</tr>
<tr>
<td>Cocaine</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>Crystal Meth</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Ecstasy</td>
<td>3%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Alcohol Use

Positive Screen (AUDIT-C Score of 4+)

1. 54% Total (56% RI, 50% CT)
2. High frequency (49% reported drinking 2-3+ times a week)
3. No one reported drinking 6+ daily (8% reported weekly)
Alcohol Use

Demographics and behaviors associated with unhealthy alcohol use

1. No significant demographic variables.
2. Unhealthy alcohol use was associated with a greater number of reported sex partners and a lower number of HIV+ partners
AIDS and Behavior

Behavioral changes following uptake of HIV pre-exposure prophylaxis among men who have sex with men in a clinical setting

1) Longitudinal mixed effects model (N=61)

2) No difference in total number of partners

3) Significant increase in number of condomless anal sex partners at six months (+1.31 partners)

Oldenberg, Chan et al., *AIDS and Behavior, 2017*
Enhancing Population Impact of HIV Pre-Exposure Prophylaxis Implementation (R21MH109360)

MPIs: Philip A. Chan, Brandon Marshall

**Background:** The impact of PrEP on HIV incidence is largely unknown

**Setting:** Rhode Island, MSM

**Goals:** Evaluate the impact of a real-world PrEP clinic on HIV incidence

**Approach:** Develop an agent-based model using local surveillance and PrEP clinic data

*Red:* Acutely infected agents; *Blue:* chronically-infected agents; *Green:* HIV-negative agents. Edges linking nodes represent past-year sexual and/or injecting risk behavior. Note the cluster of acutely-infected agents forming a “core” high-risk transmission group. Reproduced from Marshall et al. 2012.\(^2\)
Implementing successful models for HIV and STD prevention in Rhode Island

Evaluating HIV pre-exposure prophylaxis using an all payers claims database (R21MH113431)
Philip A. Chan, Omar Galarraga, Julia Raifman, Ira Wilson

**Background:** Evaluating statewide PrEP uptake is critical to determine effective implementation.

**Setting:** Rhode Island

**Goals:** Evaluate the number of PrEP prescriptions across Rhode Island using an insurance claims database.
A brief motivational interviewing-based intervention to improve HIV pre-exposure prophylaxis uptake among men who have sex with men (R34DA042648)
Philip A. Chan, Ethan Moitra, Jacob van den Berg, Amy Nunn

**Background:** Low self perceived HIV risk is a barrier to PrEP uptake among MSM.

**Setting:** The Rhode Island STD Clinic.

**Approach:** Evaluate the impact of a brief MI intervention on PrEP uptake among MSM.
**Background:** Jackson, Mississippi has among the highest rates of HIV infection in the country.

**Setting:** Established PrEP program at LGBTQ clinic. Retention in PrEP care is 62% at 6 months and only 40% for young AA MSM.

**Goals:** 1) Promote uptake among young AA MSM (under age 30); 2) Improve retention in PrEP care and adherence.

**Approach:** Develop an intervention to enhance retention in PrEP care among young AA MSM. Intervention will address the following components:

- **Social:** Address stigma associated with homophobia.
- **Structural:** Case management.
- **Behavioral factors:** Use text reminders, reduce risk behaviors.
- **Clinic level:** Health system factors, including intake.
Optimizing PrEP Uptake & Adherence among male sex workers using 2-Stage Randomization (1R34MH110369)

MPIs: Philip A. Chan, Katie Biello, Matthew Mimiaga

**Background:** Male sex workers (MSW) are at significantly elevated risk of HIV infection

**Setting:** Project Weber in Providence.

**Goals:** 1) Promote PrEP uptake among MSWs; 2) Improve adherence and retention in PrEP care

**Approach:** Development of a peer-based intervention to address social, structural, and individual level barriers.
Implementing successful models for HIV and STD prevention in Rhode Island

Exploring use of real-time, remote monitoring and follow-up system for home-based, HIV self-testing among high-risk men who have sex with men (R21MH109374)
PI: Tyler Wray, Co-I Philip A. Chan

Alcohol use and adherence to daily oral HIV pre-exposure prophylaxis in men who have sex with men and transgender women (CFAR)
PI: Tyler Wray, Co-I Philip A. Chan

Acceptability of next-generation pre-exposure prophylaxis formulations among young African American and Hispanic/Latino men who have sex with men at two urban sexually transmitted diseases clinics (CFAR)
PI: Jacob van den Berg and Meg Sullivan, Co-I Philip A. Chan
Implementing successful models for HIV and STD prevention in Rhode Island

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www.doitRlght.org

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KNOW YOUR PARTNERS
POST-EXPOSURE PROPHYLAXIS
HIV+ TREATMENT
GET TESTED FOR STDs
KNOW RISKY BEHAVIORS
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