Finding the right partners, interventions and implementation science framework

BROWN UNIVERSITY

"Putting Implementation Science into Practice"

The New England HIV Implementation Science Network 4th Annual Symposium

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Philip A. Chan, MD, MS
Assistant Professor of Medicine
Brown University
Providence, Rhode Island

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).

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 x Implementation = 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.

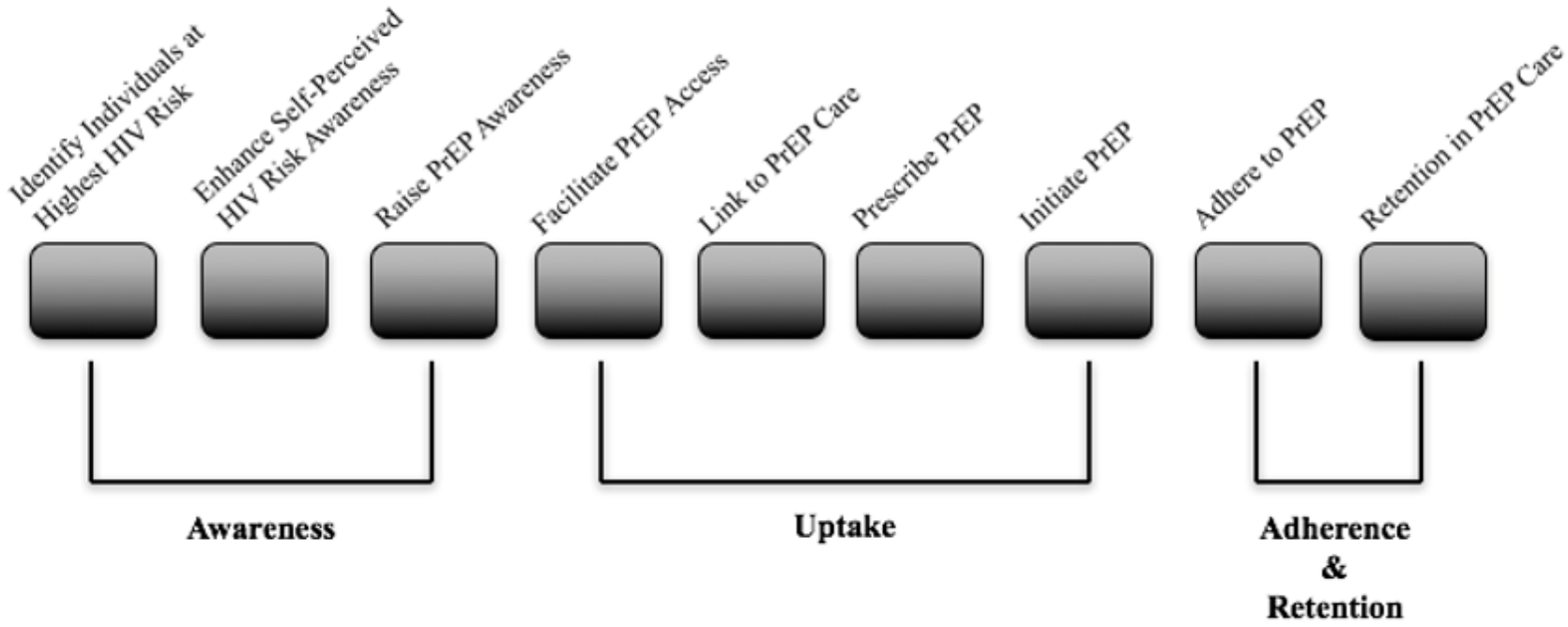
PrEP IMPLEMENTATION

Clinical Trials	Demonstration Projects	Clinical Programs
"Efficacy"	"Feasibility"	"Real world"

Major Implementation Questions:

1. How do we **R**each and are we reaching the target population (i.e. MSM, substance use populations)?
2. What is the **E**ffect on different outcomes (i.e. risk compensation, STDs, adherence, etc.)?
3. Which settings are **A**dopting PrEP (i.e. primary care, ID specialists?)
4. How is PrEP being **I**mplemented (i.e. daily versus intermittent) and what are the costs (i.e. to the individual and system)?
5. What is the **M**aintenance and long-term impact of PrEP?

Figure 1: The PrEP Care Continuum



Nunn, Chan et al., *AIDS*, 2017

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)

	PrEP Awareness			PrEP Use
	%	OR	95% CI	%
Race/Ethnicity				
Non-Hispanic White (N=203)	51	Ref		3
Non-Hispanic Black (N=34)	26	0.35**	0.16 to 0.79	0
Hispanic/Latino (N=50)	40	0.65	0.35 to 1.21	4
Other/Unknown (N=29)	58	1.38	0.63 to 3.03	4
Age group				
16-19 (N=17)	18	Ref		0
20-24 (N=84)	35	2.46	0.65 to 9.26	0
25-29 (N= 61)	59	6.72***	1.75 to 25.85	10
30-34 (N=55)	58	6.49***	1.67 to 25.23	0
35-44 (N=34)	47	4.15**	1.01 to 17.11	0
45-54 (N=44)	59	6.74***	1.69 to 26.91	2
55+ (N=21)	33	2.33	0.50 to 10.91	0

Notes: PrEP use was not great enough to analyze differences in PrEP use by demographic characteristics. **p≤0.05, ***p≤0.01

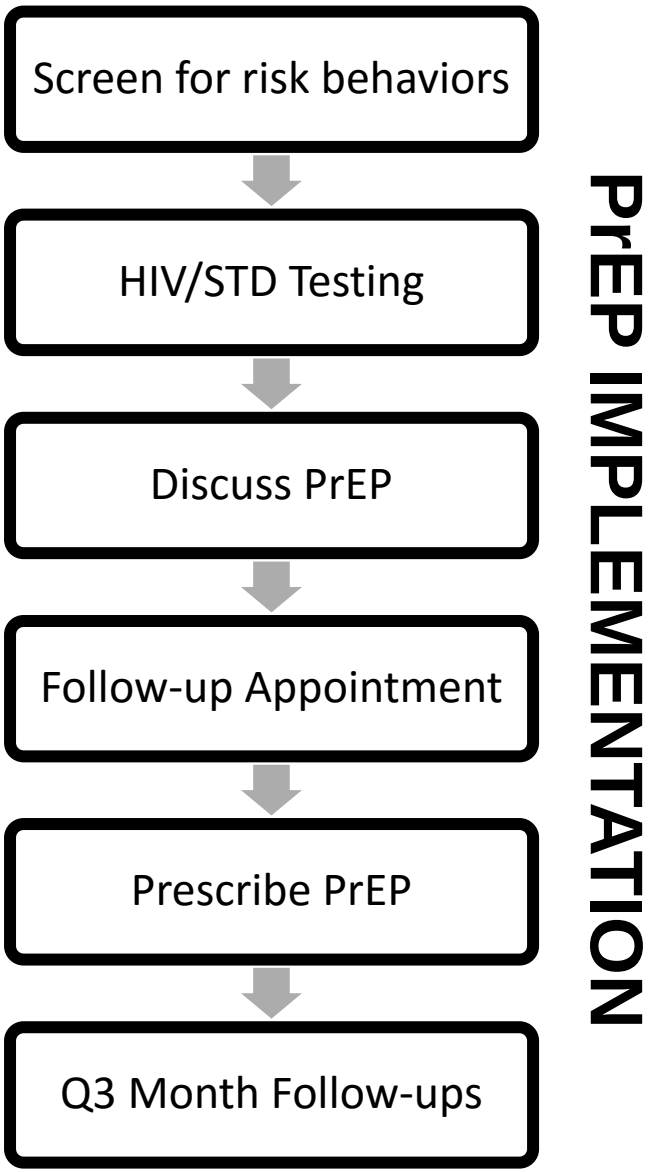
Raifman, Chan et al., 2017 in-press

The Rhode Island HIV/STD Clinic

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.



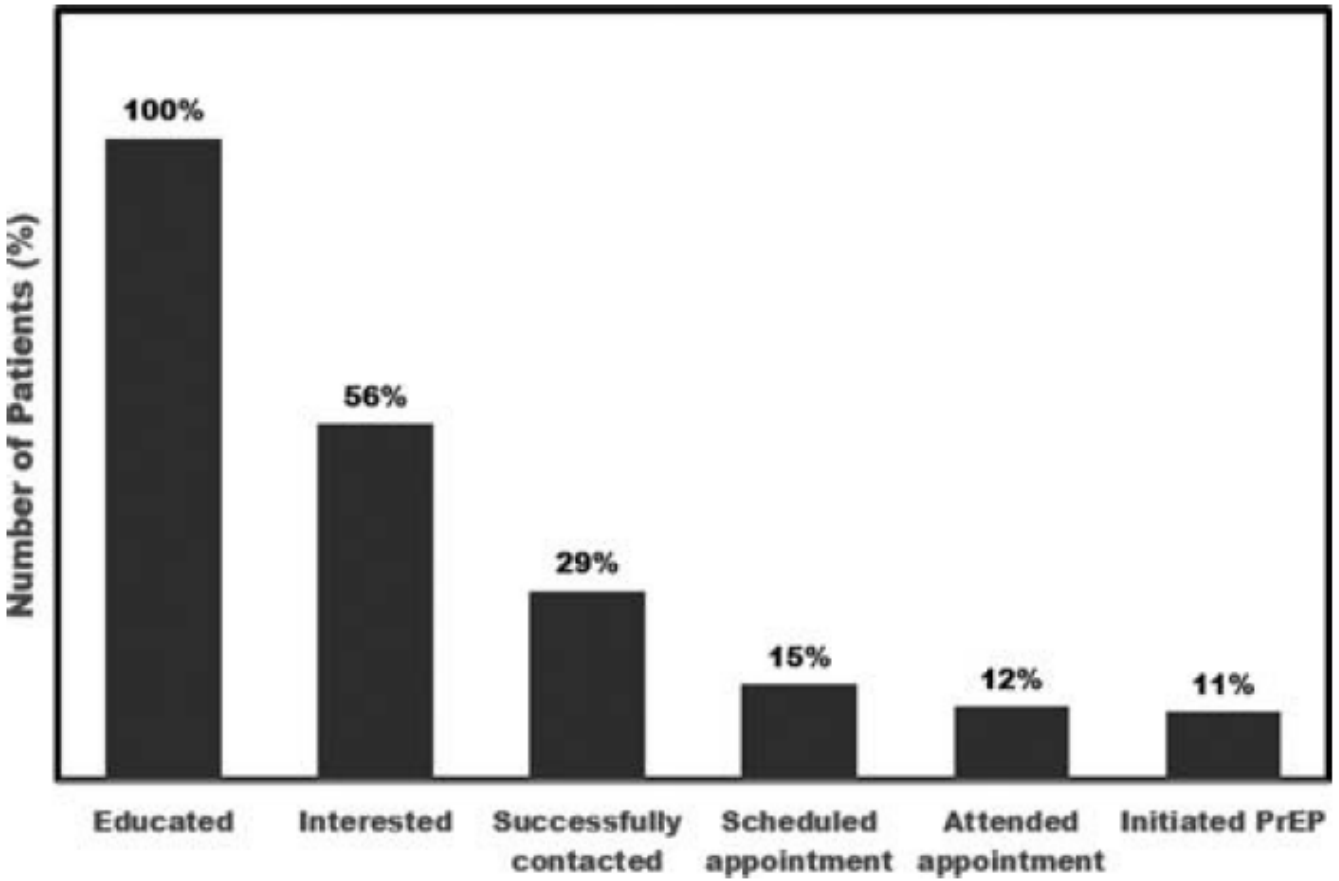


Figure 1. The PrEP implementation cascade among men who have sex with men presenting to the Rhode Island STD Clinic (N=234)

Chan et al., *STD*, 2016

TABLE 4B. Logistic Regression Results Predicting Being Prescribed PrEP*

	AOR*	95% CI
HIV risk perception†	2.17§	1.29–3.64
Any sex with HIV-positive partner‡	7.08‡	2.35–21.34
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.

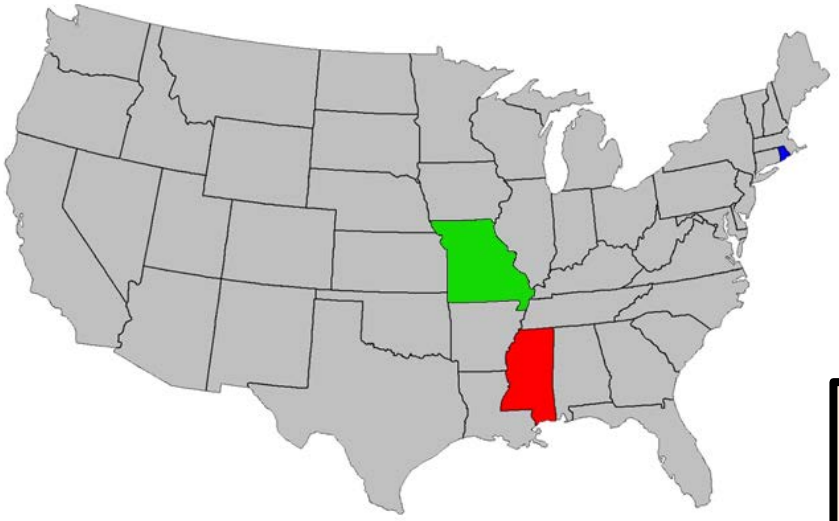
†Likert scale ranging from 1 (no risk) to 5 (high risk).

‡Reference group = No, AORs displayed for Yes group.

§$P \leq 0.01$.

¶$P \leq 0.001$.

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%)

A total of 267 prescribed PrEP across all sites

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

Chan et al., *JIAS*, 2016

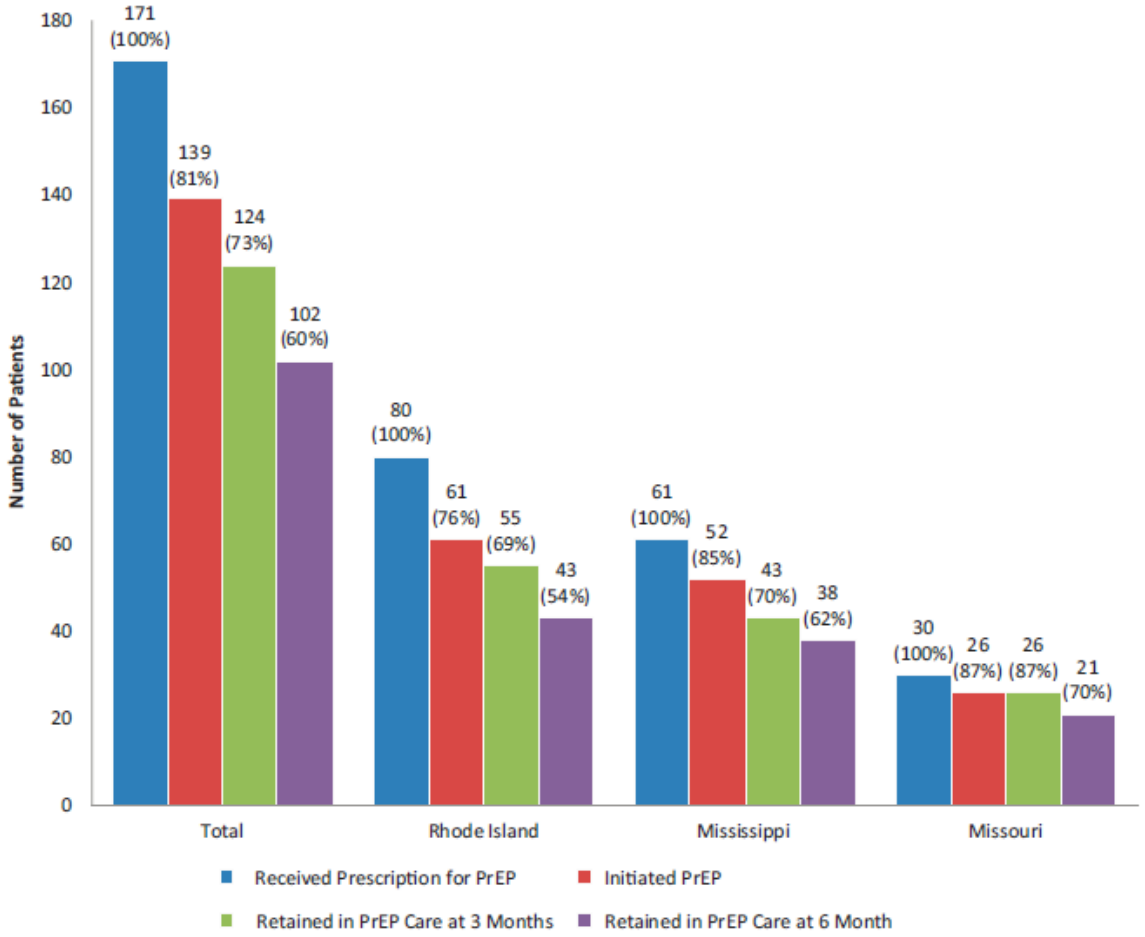


Figure 1. Retention in HIV pre-exposure prophylaxis (PrEP) care cascade overall and for Rhode Island, Mississippi and Missouri. Blue bars indicated the number of patients who received a prescription for PrEP (and had been in the programme for six or more months), red bars indicate the number who initiated 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.

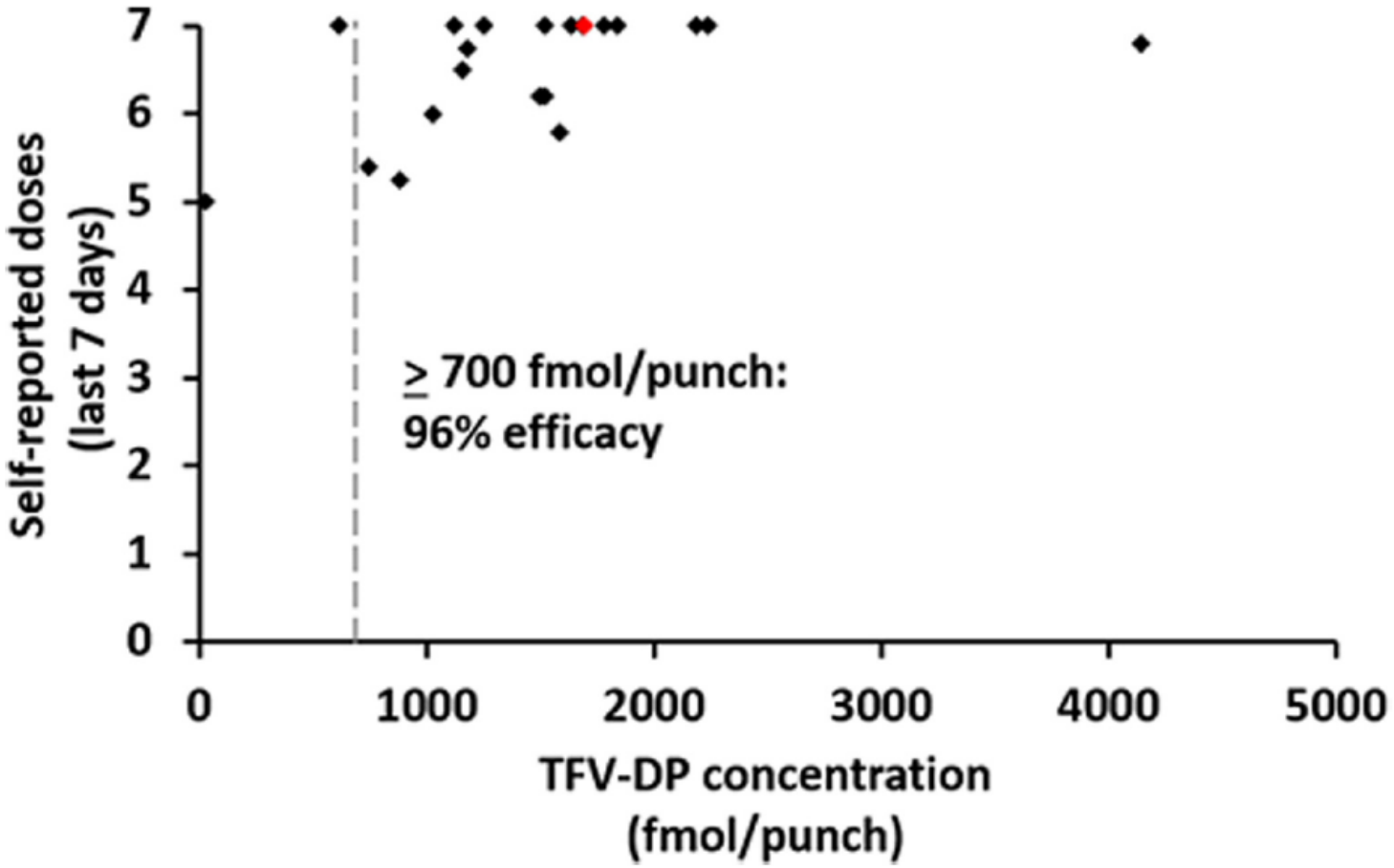


Fig 2. Tenofovir-diphosphate (TFV-DP) concentration and self-reported number of doses taken in the past seven days among pre-exposure prophylaxis (PrEP) patients (n = 21). Red marker indicates the patient who seroconverted while taking PrEP.

Montgomery, Chan et al., *PLoS One*, 2016

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

How often did you have a drink containing alcohol in the last three (3) months: **Audit-C**

Never (0) Monthly or less (1) 2-4x a month (2) 2-3x a week (3) 4+ a week (4)

How many drinks did you have on a typical day when you were drinking in the last three (3) months:

None, I do not drink (0) 1 or 2 (0) 3 or 4 (1) 5 or 6 (2) 7 to 9 (3) 10+ (4)

How often did you have six or more drinks on one occasion in the last three (3) months:

Never (0) Less than monthly (1) Monthly (2) Weekly (3) Daily or almost daily (4)

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

	Rhode Island (N=91)	Connecticut (N=40)
Age <25 years	21%	15%
Non-White	39%	33%
Hispanic/Latino	22%	23%
Income <$12K	23%	15%
College Degree	26%	23%
Uninsured	1%	0%

	Rhode Island (N=91)	Connecticut (N=40)
MSM+W	3%	13%
Partners, 3mo	5.8 (0-50)	8.2 (0-30)
Condomless	2.9 (0-25)	3.8 (0-30)
HIV+ Partner	23%	16%
IDU Ever	6%	0%

	Rhode Island (N=91)	Connecticut (N=40)
Any drug use	57%	55%
Marijuana	45%	28%
Poppers	28%	33%
Cocaine	2%	0%
Crystal Meth	1%	0%
Ecstasy	3%	0%

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)

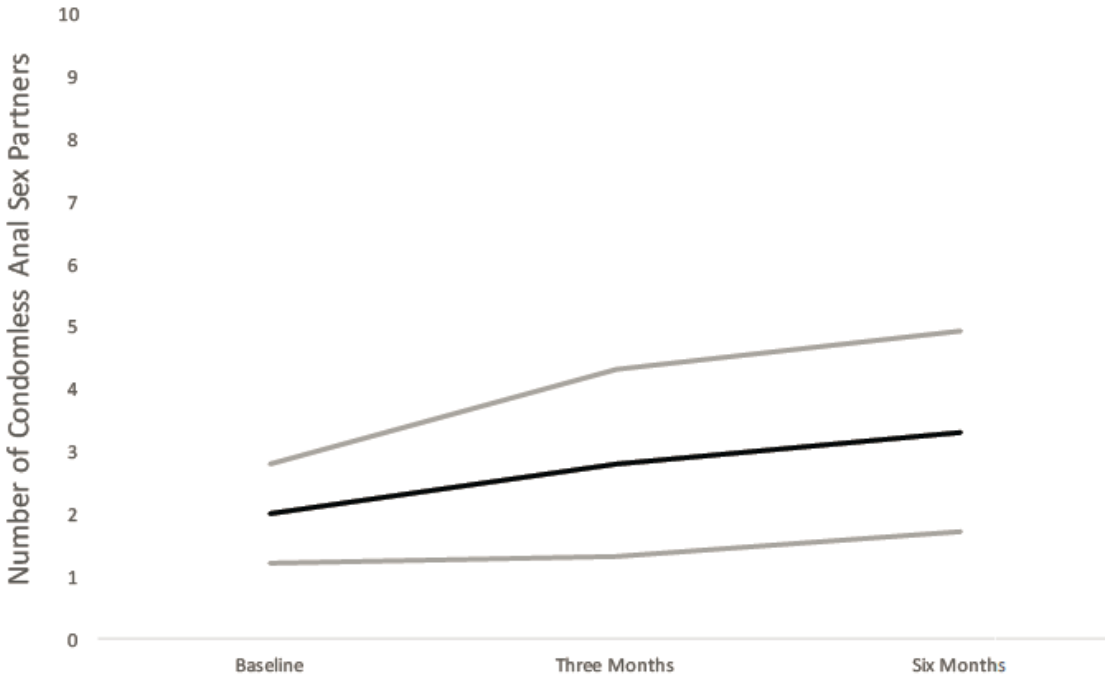
Alcohol Use

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

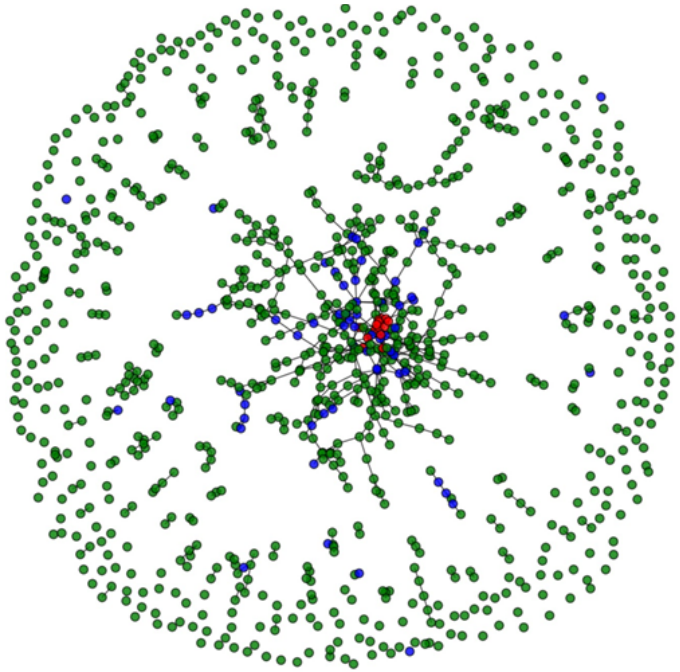
3) Significant increase in number of condomless anal sex partners at six months (+1.31 partners)

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.[32]

Evaluating HIV pre-exposure prophylaxis using an all payers claims database (R21MH113431)

Philip A. Chan, Omar Galarraga, Julia Raifman, Ira Wilson

Medicaid

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.

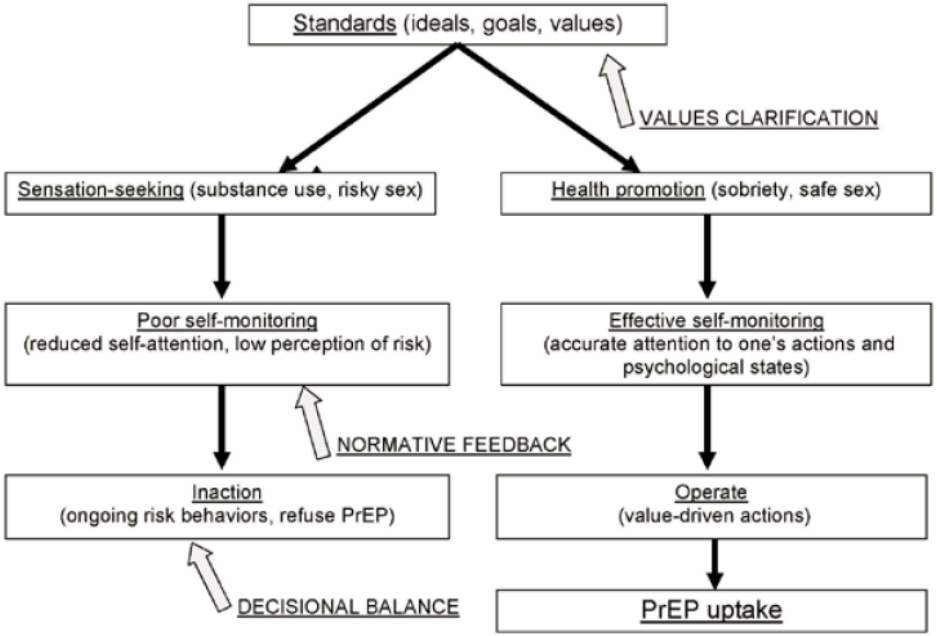
A brief motivational interviewing-based intervention to improve HIV pre-exposure prophylaxis uptake among men who have sex with men (R34DA042648)

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.



PrEP Uptake, Adherence and Retention for African American MSM in Mississippi (R34MH109371)

MPIs: Amy Nunn, Philip A. Chan, Leandro Mena

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

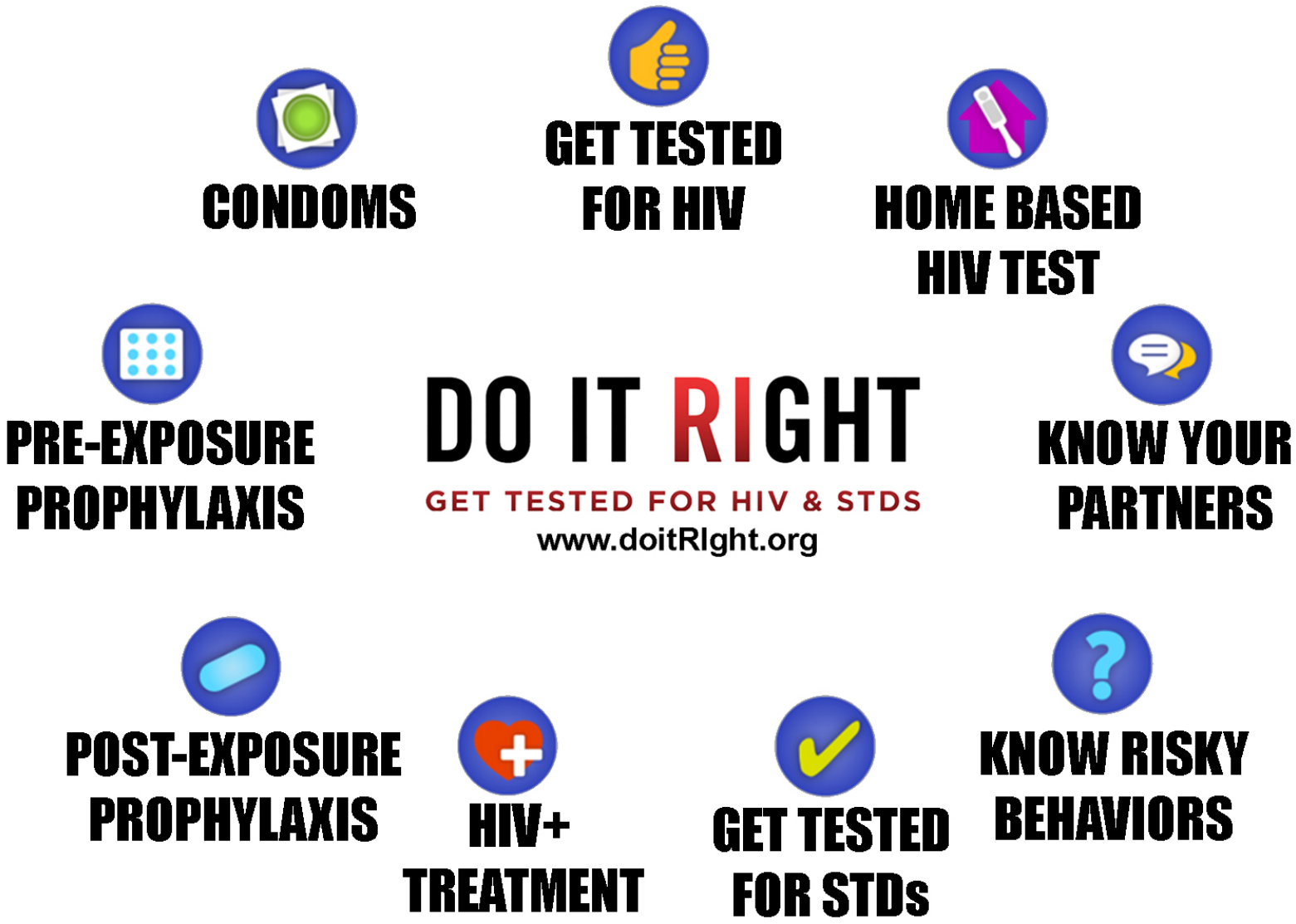
Setting: Project Weber in Providence. **Goals:** 1) Promote PrEP uptake among MSWs; 2) Improve adherence and retention in PrEP care

Approach: Development of a peer-based intervention to address social, structural, and individual level barriers.

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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Project Weber
RIDOH
CFAR
The Miriam Hospital

Contact Information

Philip A. Chan, MD, MS
Assistant Professor of Medicine, Brown University
Medical Director, Rhode Island Department of Health
Director, Rhode Island STD Clinic
1125 North Main Street
Providence, Rhode Island 02906
Philip_Chan@brown.edu