Harnessing technology to revitalize HIV prevention in the lab and the community

Brian Mustanski, Ph.D.

UCLA CFAR/AIDS Institute's Grand Rounds

Overview

- Overview of ISGMH and its translational LGBT health and HIV prevention projects

- eHealth HIV prevention

Mission

As a University-wide Institute, ISGMH:

- Connects scholars across disciplines with the SGM community to forge collaborations and stimulate new research.
- Promotes innovative, multidisciplinary research to improve the health and well-being of SGM individuals and communities.
- Creates opportunities for research and training for the next generation of SGM scholars.
- Disseminates knowledge widely to the SGM community, the public at large, scholars, service providers, educators, and policymakers.
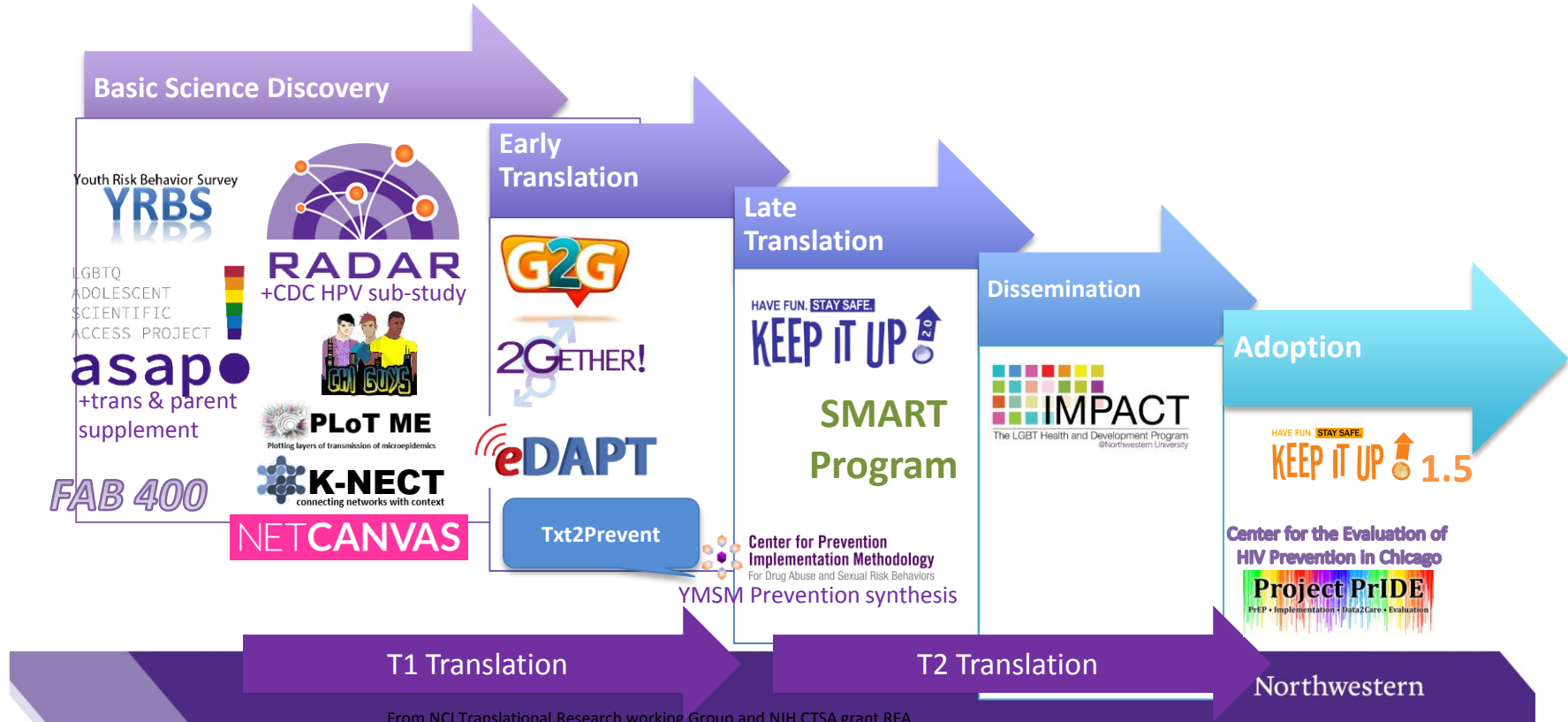
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Current/recent projects on the translational spectrum

U01DA036939

- Cohort study of young men who have sex with men (YMSM) ages 16-29 in Chicago (N > 1200)

- Collecting multilevel data:
  - **Biomedical** – Testing for HIV (phylogenetic), STIs, and drug use
  - **Psychosocial** – Demographics, mental health, drug and alcohol use, HIV preventive behaviors
  - **Network** – Social, sexual, drug

- Participant visits every 6 months (retention > 90%)
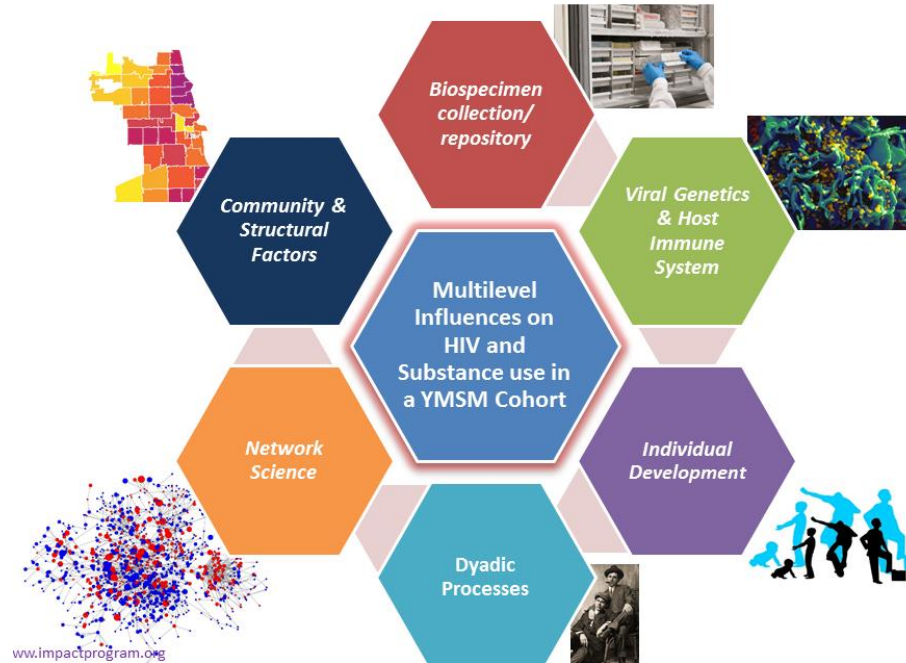
Demographics (n = 885)

Does not include 27 one-time visits
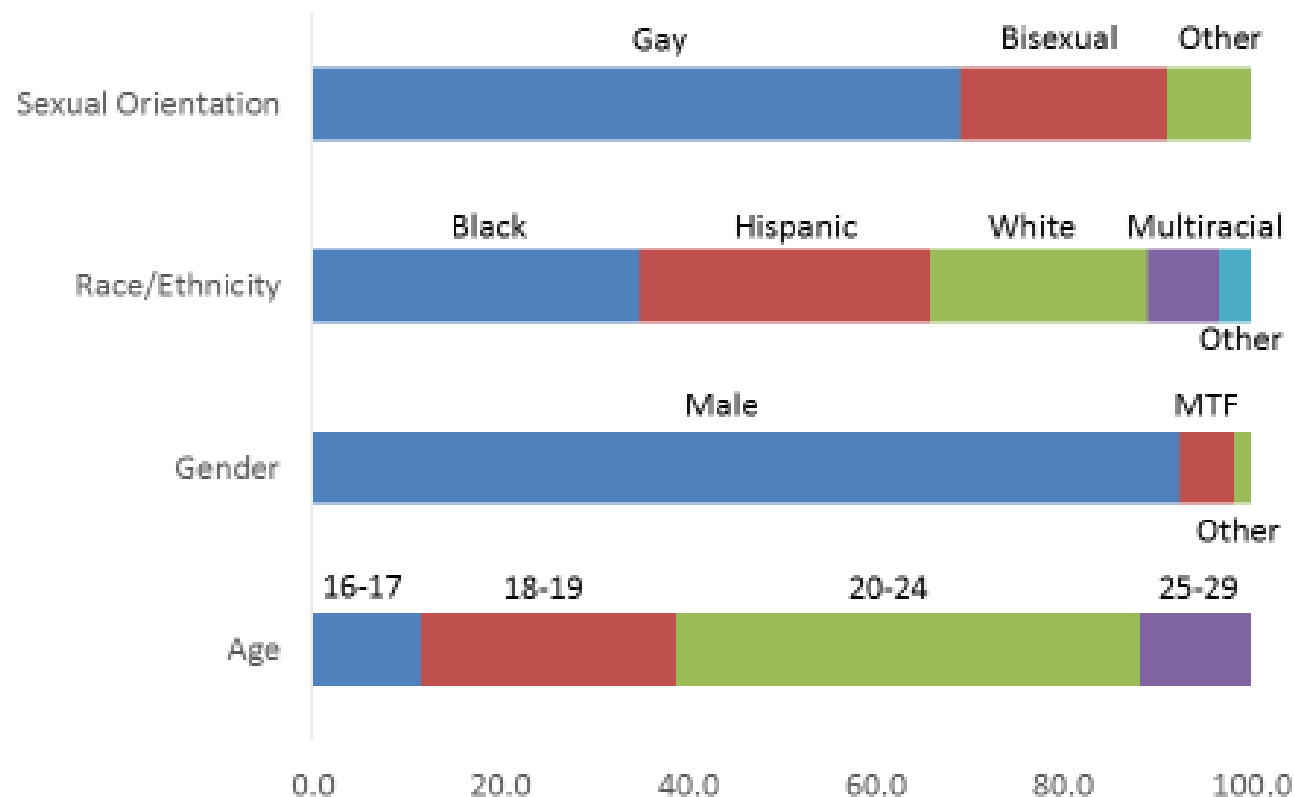
Baseline HIV and STI Prevalence

STI	Count	%
HIV	148	17.1
Rectal Chlamydia	92	10.5
Rectal Gonorrhea	75	8.5
Rectal Chlamydia & Gonorrhea	25	2.8
Rectal Chlamydia or Gonorrhea	142	16.2
Urethral Chlamydia (n=148 HIV+)	1	0.7
Urethral Gonorrhea (n=148 HIV+)	4	2.7

PrEP Stigma

- 7 item measure created by RADAR team.
  - Negatively correlated with PrEP positive attitudes
  - Example items: "People on PrEP can't control their sex drive." and "People who are on PrEP are irresponsible."
- Administered for past 6 months in RADAR cohort

Optimized Hot Spot Analysis (GIS plot at right):

If the Input Features dataset contains incident point data (which we are using here), the tool will aggregate the incidents into weighted features. Using the distribution of the weighted features, the tool will identify an appropriate scale of analysis. The statistical significance reported in the Output Features will be automatically adjusted for multiple testing and spatial dependence using the False Discovery Rate (FDR) correction method.

RADAR Chicago Participants

One Factor

PrEP Stigma

Optimized Hot Spot Analysis

- Cold Spot - 99% Confidence
- Cold Spot - 95% Confidence
- Cold Spot - 90% Confidence
- Not Significant
- Hot Spot - 90% Confidence
- Hot Spot - 95% Confidence
- Hot Spot - 99% Confidence
- Community Area

Data Source:
RADAR study, IMPACT Program, Northwestern University
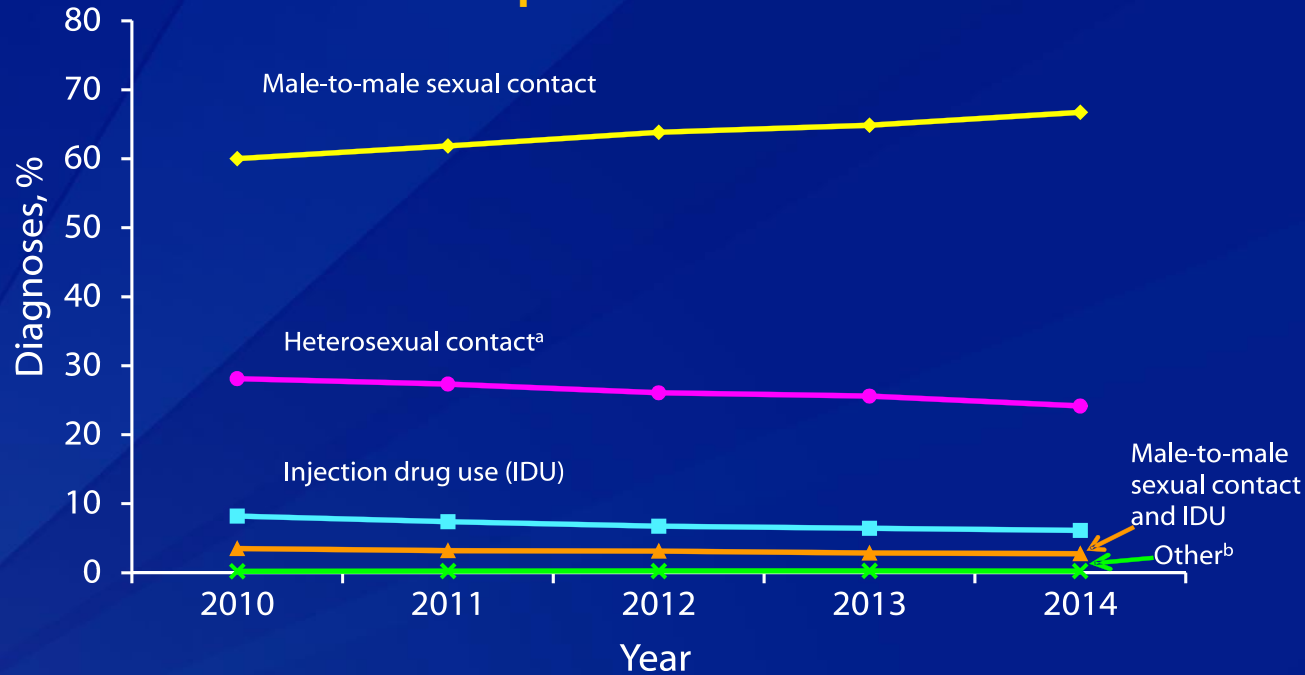N = 411

CSH | 9/27/2016
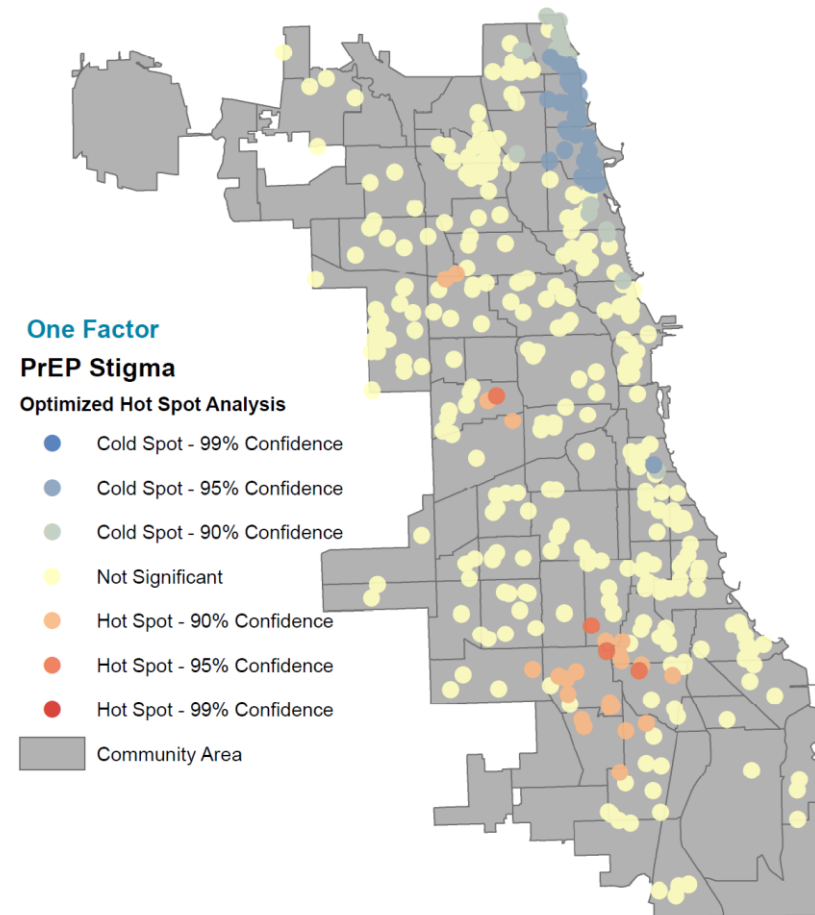
eHealth for HIV prevention with young MSM

- Reason for focus on young MSM
- Reason for eHealth approach
- KIU series of projects

Diagnoses of HIV Infection among Adults and Adolescents, by Transmission Category, 2010–2014—United States and 6 Dependent Areas

Note. Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis. All displayed data have been statistically adjusted to account for reporting delays and missing transmission category, but not for incomplete reporting.

[a] Heterosexual contact with a person known to have, or to be at high risk for, HIV infection.

[b] Includes hemophilia, blood transfusion, perinatal exposure, and risk factor not reported or not identified.

Diagnoses of HIV Infection among Men Who Have Sex with Men, by Age Group, 2010–2014—United States and 6 Dependent Areas
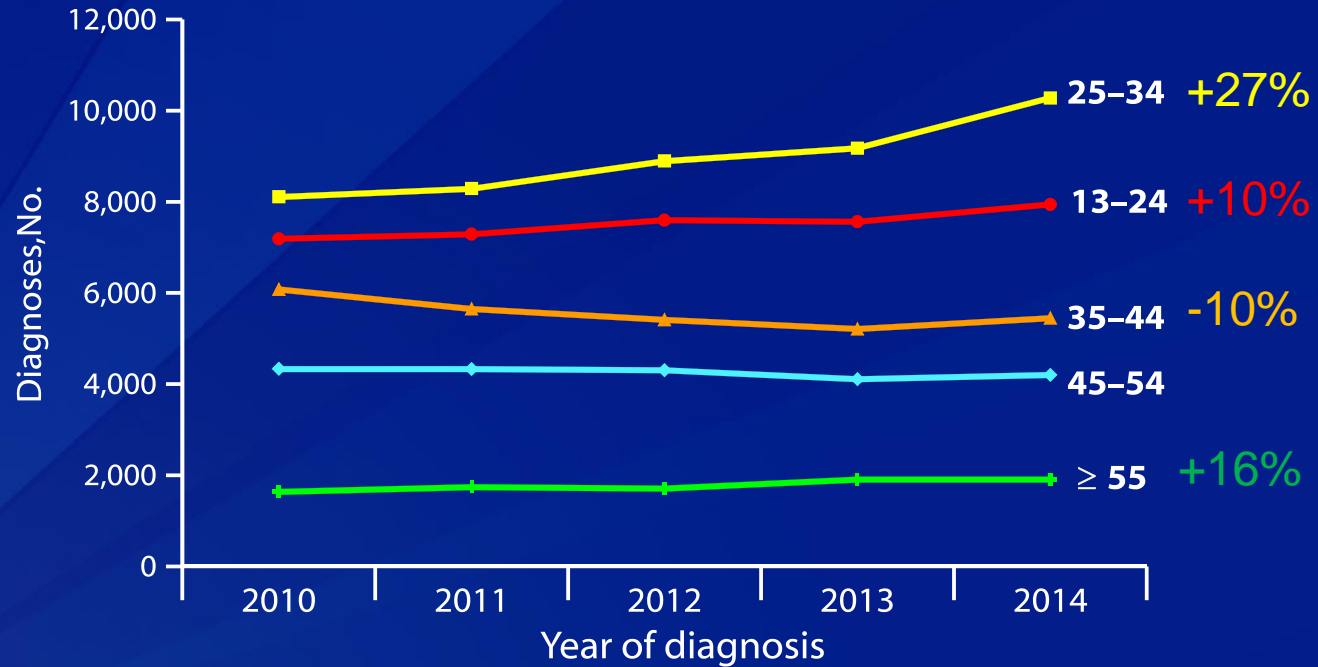
Note. Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis. All displayed data have been statistically adjusted to account for reporting delays and missing transmission category, but not for incomplete reporting. Data on men who have sex with men do not include men with HIV infection attributed to male-to-male sexual contact *and* injection drug use.

Diagnoses of HIV Infection among Men Who Have Sex with Men Aged 13–24 Years, by Race/Ethnicity, 2010–2014 United States and 6 Dependent Areas

Note. Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis. All displayed data have been statistically adjusted to account for reporting delays and missing transmission category, but not for incomplete reporting. Data on men who have sex with men do not include men with HIV infection attributed to male-to-male sexual contact *and* injection drug use.

a Hispanics/Latinos can be of any race.

How to reach gay/bisexual teens with HIV prevention??

Early prevention:
In 1998, a large (N = 6,872) online survey found that the majority of LGBT youth were "coming out" online before doing so in the "real" world (!OutProud!).

Unique prevention:
Reach youth directly with messages and education not possible in traditional settings due to policies (e.g., "no promo homo").

The internet as a research environment

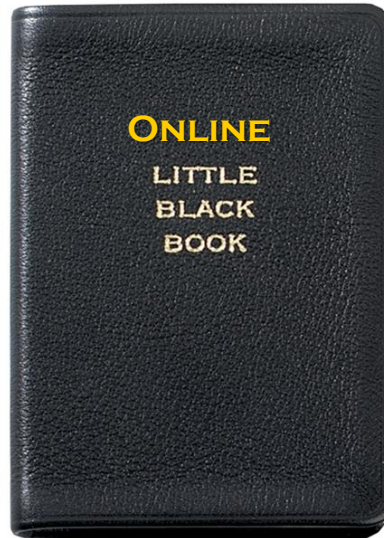## Getting Wired: Exploiting the Internet for the Collection of Valid Sexuality Data

Brian S. Mustanski
Indiana University

This paper explores the use of the Internet as a data collection method for sexuality research. Benefits, such as larger, more representative samples, and risks to validity, such as lying and sabotage, are discussed in the context of a large Internet-based study of how "having sex" is defined by gay, lesbian, and bisexual college students. Suggestions for how to maximize utility as well as combat potential risks and ethical dilemmas are offered. Special attention is paid to the use of the Internet to collect data from traditionally underrepresented groups. The article ends with a look to the future of sex research over the Internet, exploring the collection of nonsurvey data.

First online sexual health diary study

30% of partners met online

60% <u>less</u> likely to have condomless sex with partners met online

Mustanski, 2007 *AIDS Care*

- An online HIV/STI prevention program for YMSM that recently tested HIV negative
  - Why target this group with this recruitment approach?
    - Prevalence
    - Lack of prevention programs
    - Accessing a diverse sample
    - High Internet access and acceptability of sexual content and health information
    - Testing is an under-utilized opportunity for prevention

US National AIDS Strategy

- Testing is a key component of this strategy, because those who are unaware of their status cannot enroll in treatment or take enhanced measures to prevent transmission to partners.

- CDC is now recommending that all MSM get tested for HIV at least once a year, and that sexually active MSM might benefit from HIV testing every 3–6 months

FIGURE 2. Time since last human immunodeficiency virus (HIV) test among men who have sex with men who reported negative or unknown HIV status,* — National HIV Behavioral Surveillance System, United States, 2011[†]
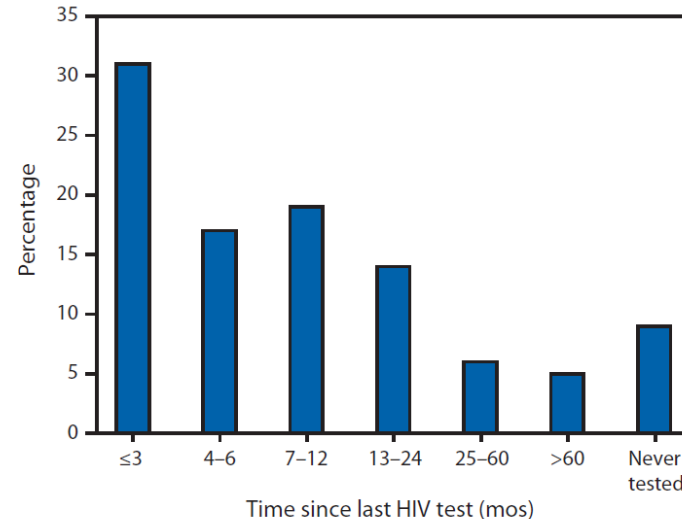
* Includes respondents who reported their last HIV test result was negative, indeterminate, did not receive test results, did not know the results, or had never been tested.
[†] N = 7,312; excludes 76 respondents missing data for time of HIV test.

Psychological impact of HIV testing

- Most research on those who test <u>positive</u>, with trend towards decrease transmission risk behaviors (e.g., Weinhardt et al., 1999; Marks et al., 2005; Rosenberg et al., 2013).

- Meta-analyses show either inconsistent or no effect on those who test negative (Weinhardt et al., 1999; Denison et al., 2008).

- Otten et al (1993) found increase in gonorrhea incidence 6 months after HIV testing among those who tested HIV negative compared to their pre-test incidence and also compared to those who tested HIV positive.
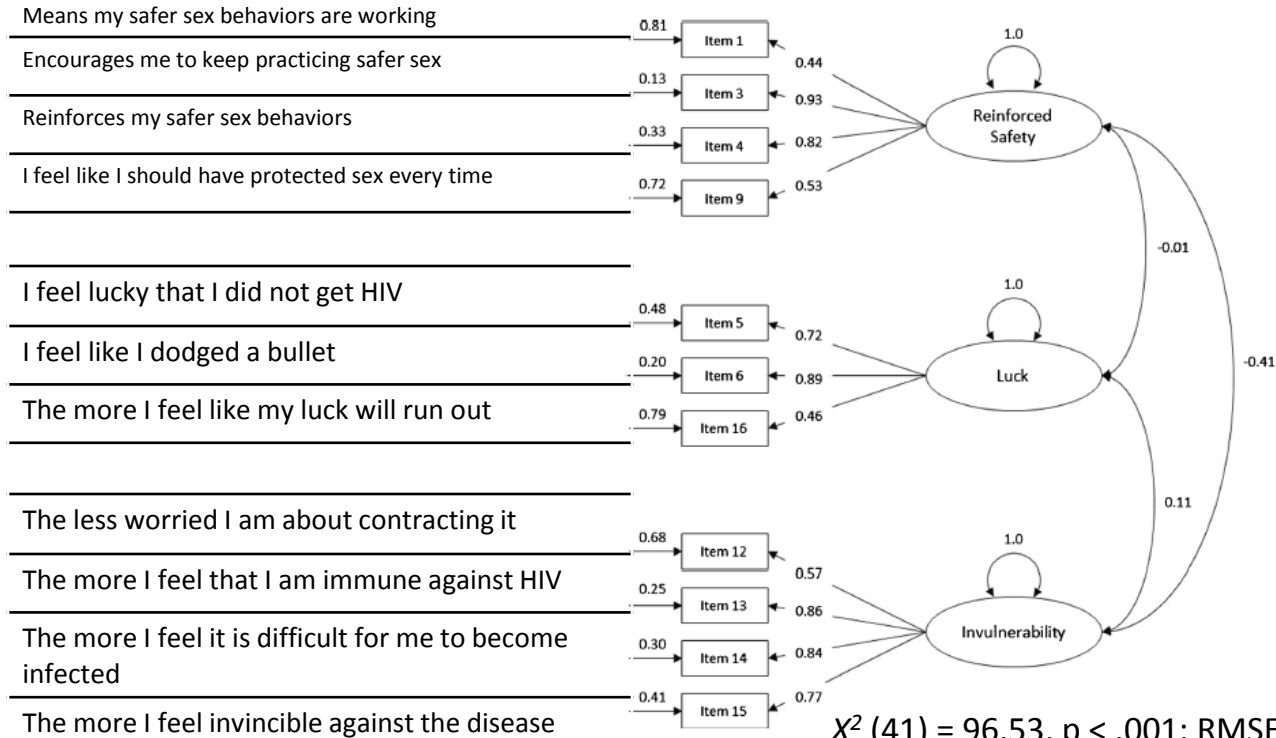
Repeated negative test results

- "Newish" era where MSM may be tested dozens of times in their life.

Operant conditioning suggest that repeated pairing of a pleasurable behavior (i.e., unprotected sex) with no punishment (i.e., negative test result) could reinforce engagement in such risk behaviors.

Original Factor structure

Means my safer sex behaviors are working — Item 1 — 0.81 / 0.44

Encourages me to keep practicing safer sex — Item 3 — 0.13 / 0.93

Reinforces my safer sex behaviors — Item 4 — 0.33 / 0.82

I feel like I should have protected sex every time — Item 9 — 0.72 / 0.53

Reinforced Safety — 1.0

I feel lucky that I did not get HIV — Item 5 — 0.48 / 0.72

I feel like I dodged a bullet — Item 6 — 0.20 / 0.89

The more I feel like my luck will run out — Item 16 — 0.79 / 0.46

Luck — 1.0

The less worried I am about contracting it — Item 12 — 0.68 / 0.57

The more I feel that I am immune against HIV — Item 13 — 0.25 / 0.86

The more I feel it is difficult for me to become infected — Item 14 — 0.30 / 0.84

The more I feel invincible against the disease — Item 15 — 0.41 / 0.77

Invulnerability — 1.0

-0.01

-0.41

0.11

X^2 (41) = 96.53, p < .001; RMSEA = 0.061, CFI = 0.963)

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Revisiting the factors

Model	χ^2	df	p	CFI	TLI	RMSEA
3-Factor Replication	138.38	38	0	0.96	0.94	0.06
3-Factor All Items	368.58	71	0	0.90	0.87	0.08
4-Factor	218.26	68	0	0.95	0.93	0.05

New 4th factor includes items representing concept that testing negative means it is justified to engage in more condomless sex in the future

- I feel that I do not need to protect myself.
- I feel like it is ok to have more unprotected sex with casual partners.
- I feel like its ok to have sex with more people.

Feinstein et al. (2016) *AIDS & Behavior*

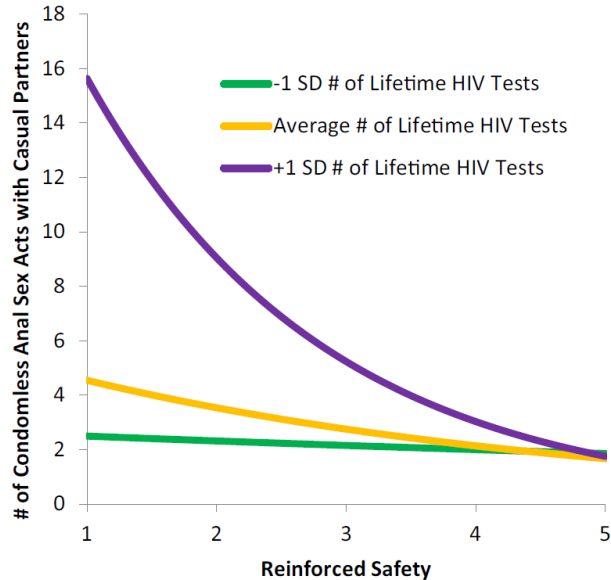Northwestern

Associations with CAS

Fig. 1 Association between Reinforced Safety and CAS with casual partners as a function of number of lifetime HIV tests
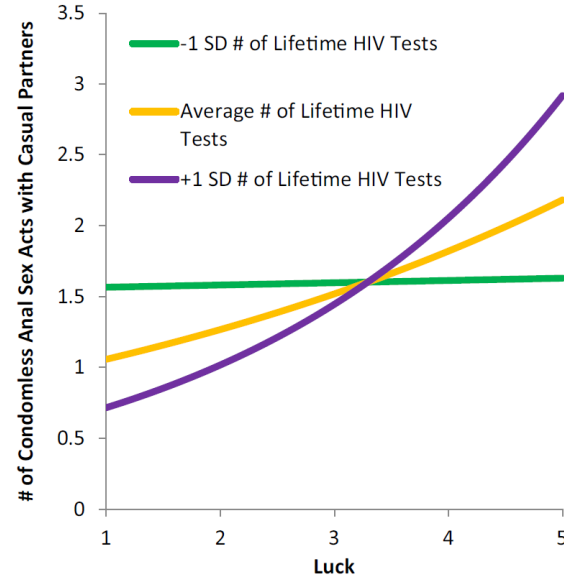

Fig. 2 Association between Luck and CAS with casual partners as a function of number of lifetime HIV tests

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- An online HIV/STI prevention program negative
  - Why target this group with this recruitment a
    - Prevalence
    - Lack of prevention programs
    - Accessing a diverse sample
    - High Internet access and acceptability of sexua
    - Testing is an under-utilized opportunity for preve

- Development process
  - Qualitative interviews with diverse YMSM
  - Co-creation of content with diverse YMSM
  - Constant feedback from community-based testing staff
  - Focus on important contexts with health behavior change principals embedded within these contexts.
    - Responsive to evidence that most transmissions and condomless sex acts occur with serious partners.

Internet Use and Sexual Health of Young Men Who Have Sex with Men: A Mixed-Methods Study

Brian Mustanski · Tom Lyons · Steve C. Garcia

Abstract Young gay, bisexual, and other men who have sex with men (MSM) experience sexual health disparities due to a lack of support in settings that traditionally promote positive youth development. The Internet may help to fill this void, but little is known about how it is used for sexual health purposes among young MSM. This mixed-methods study reports quantitative results of a large survey of 18- to 24-year-old MSM in an HIV testing clinic (N = 329) as well as qualitative the potential for the use of the Internet to facilitate safer sex communication was largely untapped. Our findings generally present an optimistic picture about the role of the Internet in the development of sexual health among young MSM.

Keywords Internet · HIV prevention · Online · Gay · Bisexual · MSM

The Keep It Up! (KIU!) Series of Projects

KIU! 1.0

NIMH R34 to develop and demonstrate feasibility and acceptability.

KIU! 1.5

CDPH-funded implementation trial of home-grown intervention in Chicago.

KIU! 2.0

NIDA and NIMH R01 to test efficacy of KIU! in three cities with behavioral and biomedical outcomes.

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Module 1:
Healthy Person

➤ Discusses connections to family, community, and romantic partners and setting positive peer norms for condom use and obtaining support from family of origin and choice

– "Our communities, our families, and our relationships definitely impact our health. See how guys in our community feel about these things."

➤ Promotes social norms for healthy relationships and sexuality (including being SINGLE or PARTNERED), family acceptance, and connection to MULTIPLE communities

➤ Videos specific to each city all using core elements

Module 2:

Hooking Up Online

➢ Follows 3 guys chatting online

- Effects of mood on risk taking
- Identifying triggers for unprotected sex
- Negotiating correct condom use and assertive communication
- Information about STI transmission, symptoms, and prevention
- Consequences of drug and alcohol abuse on decision making

Module 3:

Sex in the City

➢ Video soap opera of four friends highlights the risks in making assumptions about a partner's HIV status or monogamy and the limits of serosorting.

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➢ Virtual bar/club game that addresses
   – Pros/cons of condom use
   – Steps to correct condom use
   – Issues with presuming HIV status in others
   – Effects of sexual arousal on decision making
   – Consequences of excessive alcohol consumption or drug use

How To Play

Interact: Click objects and people to interact with them.

Look Around: Use the left and right arrows to turn.

Move: Click the green circles on the map to change rooms. You're the blue circle.

Drinks

Points

Tasks: Find them All

Back

Start

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➢ Addresses:

- Emotional, sexual, and health needs in relationships

- Power dynamics between an older and younger man in a dating relationship

- Continuum of HIV and STI risk behaviors

- Experiences of someone living with HIV

- Examples of good/bad communication

➢ Personalized risk reduction plan and goal setting

Dating: It's Complicated

It's great to start dating someone you like. But even when you feel like you're getting to know and trust someone new, it's not always easy to make the choices that will keep you HIV negative.

Launch Scenario

How to Talk to Your Guy About Condoms

It's not always easy to talk about condom use, but some ways are better than others. These guys show us the difference.

Launch Video

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Booster Sessions

- **3-Month Booster**
  - Motivations for regular HIV testing
  - Biomedical prevention options
  - Condom options
  - Setting goals for risk reduction

- **6-Month Booster**
  - Having sexual, emotional, and health needs met in a relationship
  - How to create a sexual agreement
  - Steps to take before stopping condom use within a relationship

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Keep It Up! 1.0 Pilot RCT Methods

➢ **Recruitment:** HIV-negative YMSM, 18 to 24 years old, were recruited from the HIV testing clinics of several community-based organizations in Chicago between August 2009 and September 2010.

➢ **Measures** assessed sexual behaviors and condom use at baseline and 12-week follow-up.

➢ **Intervention acceptability** was measured at the post-intervention assessment.

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102 (84%) randomized	→	98 (81%) completed intervention	→	94 (92%) and 90 (88%) completed 6- and 12-week assessments

➢**Baseline Demographic Characteristics (N = 102)**
  ➢**Age:** 18 to 24 years (mean = 21.32, SD = 1.85)
  ➢**Race/Ethnicity:** 46% White, 26% Latino, 13% Black
  ➢**Sexual Orientation:** 82% gay
  ➢**Relationship Status:** 52% none, 26% open, 23% monogamous

Compared to control arm, KIU arm had 44% lower rate of condomless anal sex at 12 week follow-up (OR = .56, p < .05)

Mean acceptability rating was 5.29 (1 = strongly disagree to 6 = strongly agree) (e.g., "This program was a good way to learn about HIV and STDs and how to prevent them."

"I was able to see mistakes that I make in the actions of the characters. I wasn't completely aware of my behavior until I judged a character's behavior and then compared the same behavior to my own. As an educational game/tool it is superb in its credibility and fun interactivity. Cool animation and 'real-world' mini films. The future of gay sexed."

Keep It Up! 1.5 Service Project Methods

➢**Recruitment:** HIV-negative YMSM, 18 to 24 years old, were recruited in the Chicagoland area from April 2012 through December 2013:

  ➢Center on Halsted HIV testing clinic
  ➢In-reach programs/services, events
  ➢Outreach
  ➢Print/online ads
  ➢Friend referrals

➢**Measures** assessed HIV knowledge, sexual behaviors, and condom use at baseline and 12-week follow-up.

➢**Intervention acceptability** was measured at the post-intervention assessment and at the 12-week follow-up.

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Keep It Up! 1.5 Results

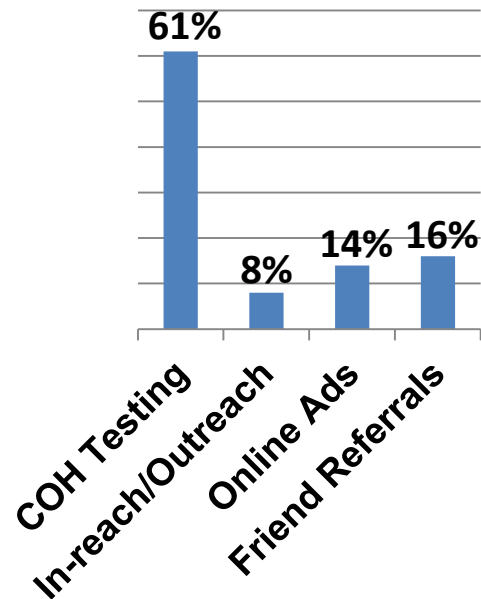**977 YMSM screened; 755 (77%) eligible** → **343 (45%) completed intervention** → **219 (64%) and 200 (58%) completed 6- and 12-week assessments**

➢ **Baseline Demographic Characteristics (N = 343)**
  ➢ **Age:** 18 to 24 years (mean = 21.52, SD = 1.94)
  ➢ **Race/Ethnicity:** 34% White, 32% Black, 22% Latino
  ➢ **Gender Identity:** 93% male
  ➢ **Sexual Orientation:** 73% gay
  ➢ **Relationship Status:** 45% none, 32% monogamous, 22% open

➢ **Recruitment Source**

Bar chart of Recruitment Source:
- COH Testing: 61%
- In-reach/Outreach: 8%
- Online Ads: 14%
- Friend Referrals: 16%

Keep It Up! 1.5 Results

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Keep It Up! Intervention Effects

Outcome	Baseline		Follow-up					Effect Size
	Mean	SD	Mean	SD	N	Z	p	
HIV knowledge	80.29	17.88	84.40	15.34	196	5.15	< .001	0.25
Condom errors	1.96	0.62	1.76	0.62	80	3.20	< .01	0.32
Condom failures	1.44	0.82	1.27	0.64	80	2.37	< .05	0.23
Erection loss	1.87	0.95	1.66	0.90	78	1.89	.06	0.23
Male Sex Partners								
Total partners	1.32	1.37	0.90	1.07	197	4.63	< .001	0.34
Total casual partners	0.82	0.94	0.51	0.77	196	4.57	< .001	0.37
Condomless Anal Sex Acts w/Male Partners								
Total acts	2.97	6.96	2.66	6.48	196	1.37	.17	0.05
Total acts, casual partners	1.03	2.10	0.66	1.63	196	2.27	< .05	0.20

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Keep It Up! 2.0 Multisite RCT Methods

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SCHOOL OF MEDICINE

IMPACT
The LGBT Health and Development Program
@Northwestern University

PI: Mustanski

HUNTER
The City University of New York

CHEST
Center for HIV Educational Studies & Training
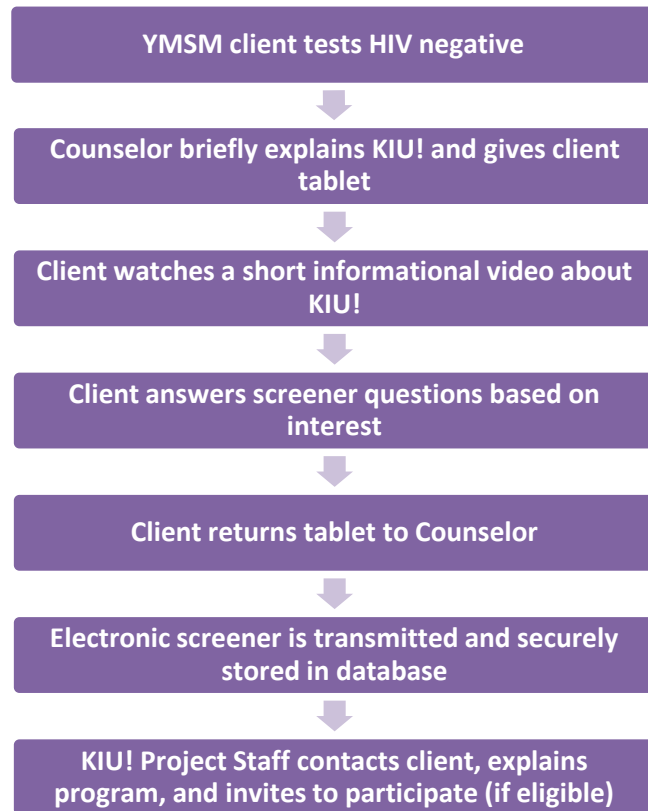
Co-I: Parsons

EMORY
ROLLINS
SCHOOL OF
PUBLIC
HEALTH

PRISM
HEALTH

Co-I: Sullivan

➢ **Design:** Randomized control trial in Chicago, New York, and Atlanta with diverse YMSM ages 18-29.

➢ **Primary Outcomes:**
- ➢ Self-reported number of condomless sex acts
- ➢ Prevalence of STIs (urethral and rectal mail-based testing; rectal added through NIDA/CDC supplement)

➢ **Secondary Outcomes:** Reduced unprotected sex after drug use and Condom errors

➢ **Assessments:** baseline and follow-up at 3, 6, and 12 months

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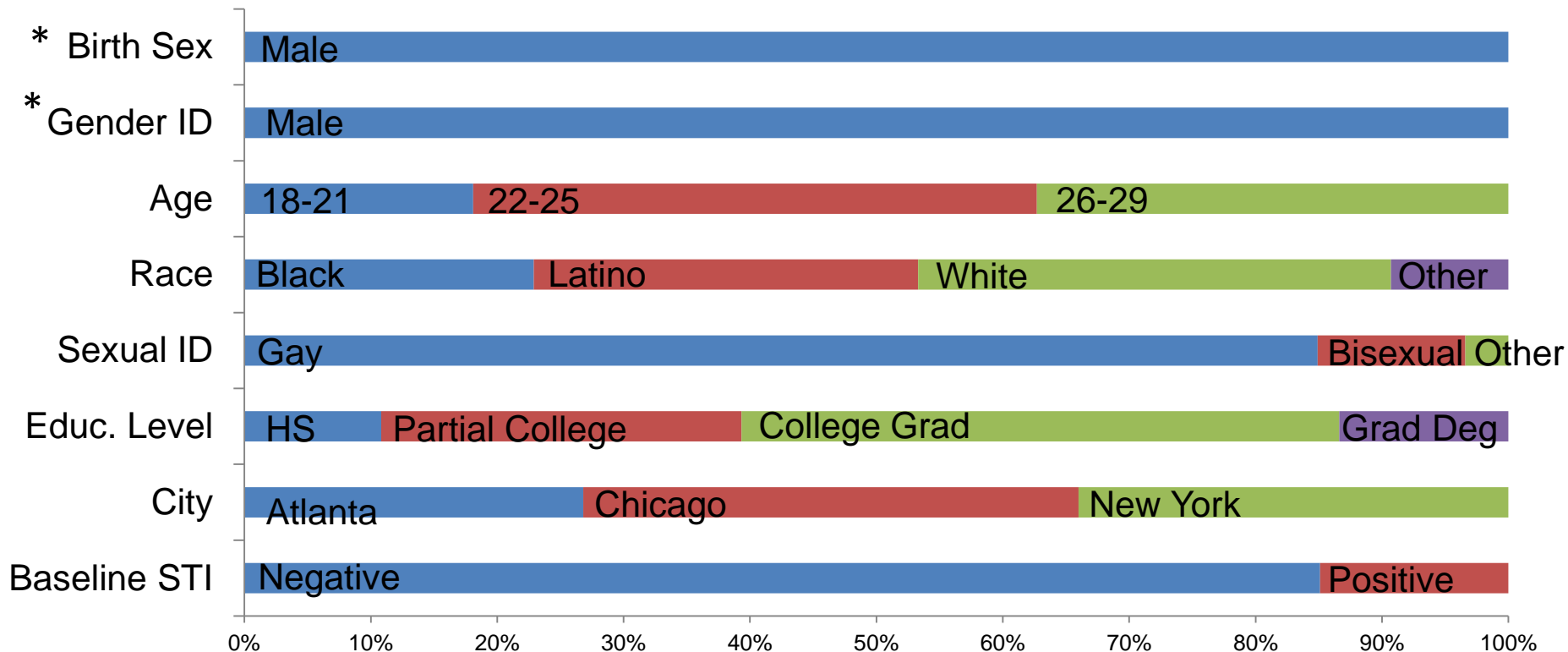
Keep It Up! 2.0 Clinic-Based Recruitment

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YMSM client tests HIV negative

↓

Counselor briefly explains KIU! and gives client tablet

↓

Client watches a short informational video about KIU!

↓

Client answers screener questions based on interest

↓

Client returns tablet to Counselor

↓

Electronic screener is transmitted and securely stored in database

↓

KIU! Project Staff contacts client, explains program, and invites to participate (if eligible)

KIU! Welcome Video

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➤ At-home HIV testing was also piloted through a national ad on a popular dating app.

 – Eligible YMSM mailed OraQuick test kits after confirming interest in study.

 – Participants required to upload photo of test stick to confirm HIV status.

➤ 144 participants were enrolled through this pilot*.

*In addition to the national campaign, each site did local at-home HIV testing campaigns that led to enrollment of 86 additional participants.

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Sample Characteristics
[not final sample]

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Characteristic				
* Birth Sex	Male			
* Gender ID	Male			
Age	18-21	22-25	26-29	
Race	Black	Latino	White	Other
Sexual ID	Gay		Bisexual	Other
Educ. Level	HS	Partial College	College Grad	Grad Deg
City	Atlanta	Chicago	New York	
Baseline STI	Negative		Positive	

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

* Eligibility requirement for enrollment into the study.

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- Among rectal STI positive: 9.3% urethral positive

- Among urethral STI positive: 34.5% rectal positive

OR = 3.92, p = .001

Error Bars: 95% CI

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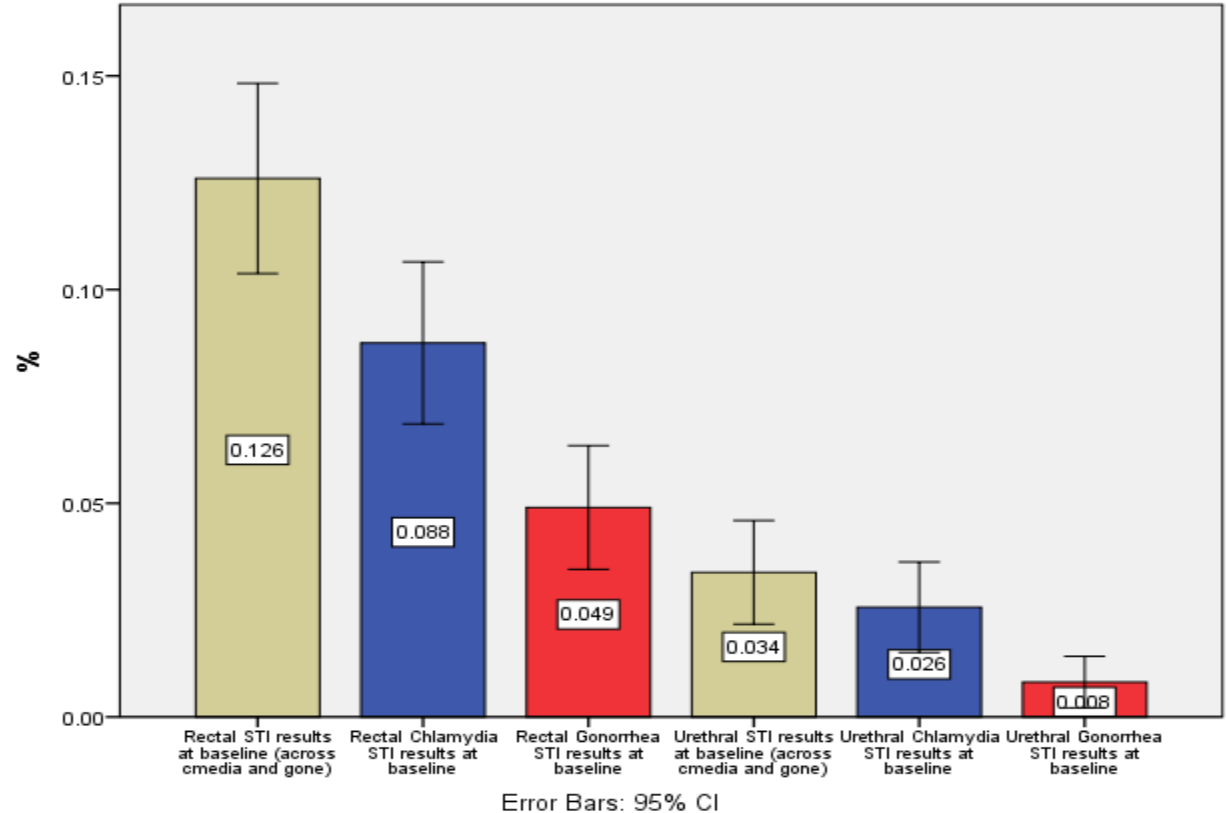
Implications and Next Steps

➢ The KIU! intervention approach can engage diverse YMSM who are traditionally underrepresented in research. Currently examining effects on self-reported condomless sex and STIs through 12 months.

➢ As observed in the pilot study and community implementation, KIU! can promote health behavior change among diverse samples of YMSM.

➢ Possible to integrate self-testing into an eHealth program
  ➢ Implications for PrEP?

➢ Exploring implementation of KIU 2.5 in several cities

➢ SMART Program U01 testing stepped eHealth strategy for HIV prevention with diverse teenage MSM

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The Science of Drug Abuse & Addiction

National Institute of Mental Health
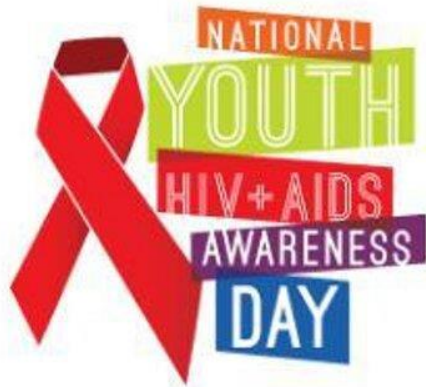
@IMPACTProgram
www.impactprogram.org

Wait, back up. What's next after I test positive for #HIV? Our video can help: