

# **HIV Prevention in People who Inject Drugs (PWID)**

**Sunil Suhas Solomon, MBBS PhD MPH**

Professor of Medicine and Epidemiology,  
Johns Hopkins University, USA

**HPTN Annual Meeting 2023**



# Disclosures

- Grants, products and honoraria from Gilead Sciences
- Grants, products and honoraria from Abbott Laboratories

# **Why People who Inject Drugs?**

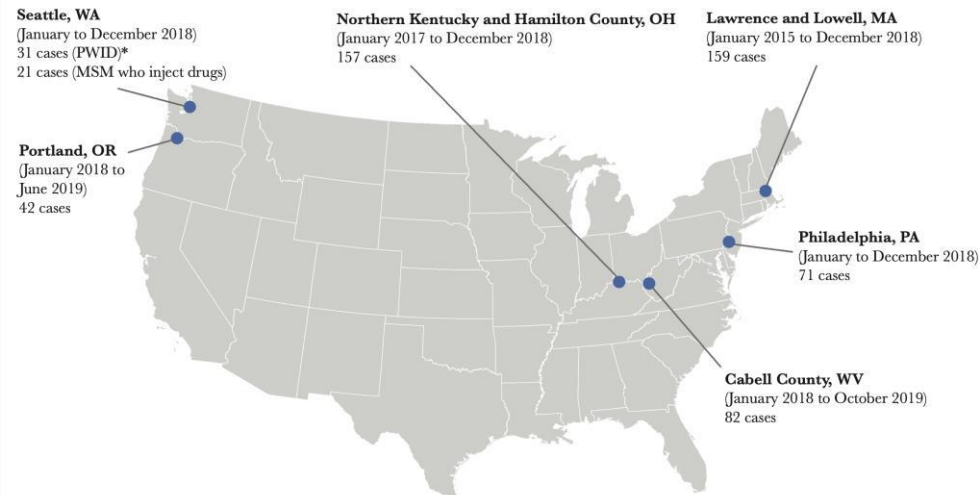
# Overdose Deaths Reached Record High as the Pandemic Spread

More than 100,000 Americans died from drug overdoses in the yearlong period ending in April, government researchers said.

Give this article 847



A memorial service in Baltimore last year for a man who died of an overdose.



\* Does not include MSM who inject drugs

The Journal of Infectious Diseases

SUPPLEMENT ARTICLE



## Responding to Outbreaks of Human Immunodeficiency Virus Among Persons Who Inject Drugs—United States, 2016–2019: Perspectives on Recent Experience and Lessons Learned

Sheryl B. Lyss,<sup>1,2</sup> Kate Buchacz,<sup>1</sup> R. Paul McClung,<sup>1,2</sup> Alice Asher,<sup>3</sup> and Alexandra M. Oster<sup>1,2</sup>

Clinical Infectious Diseases

MAJOR ARTICLE



## Estimated Number of People Who Inject Drugs in the United States

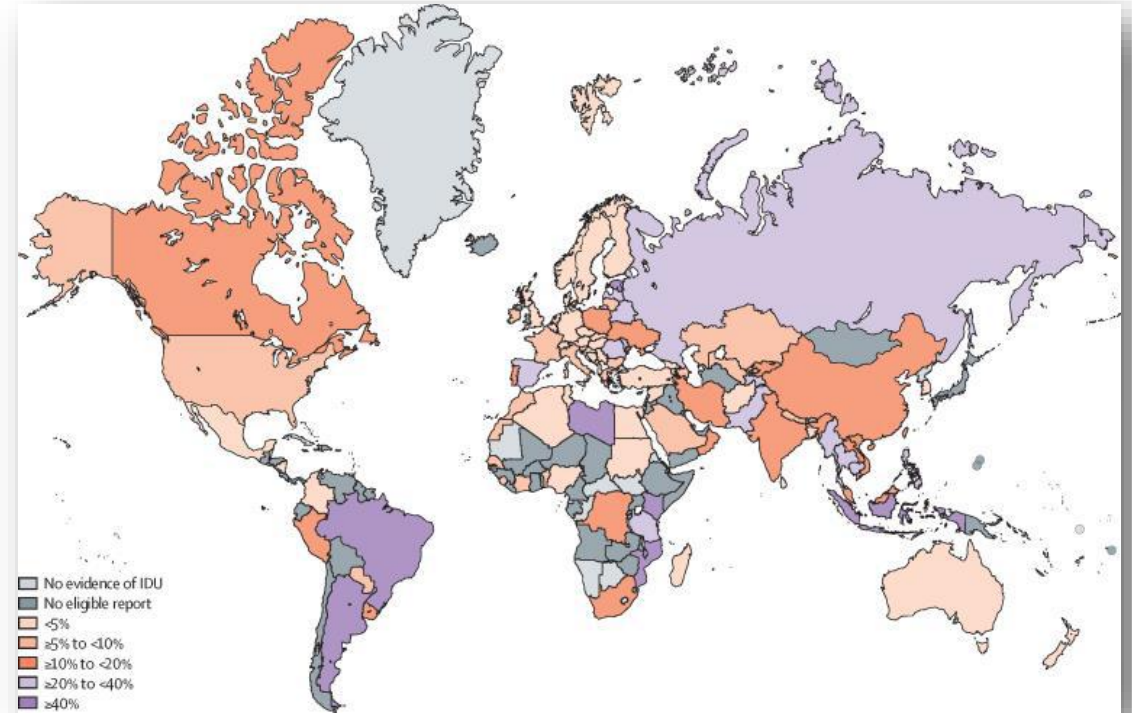
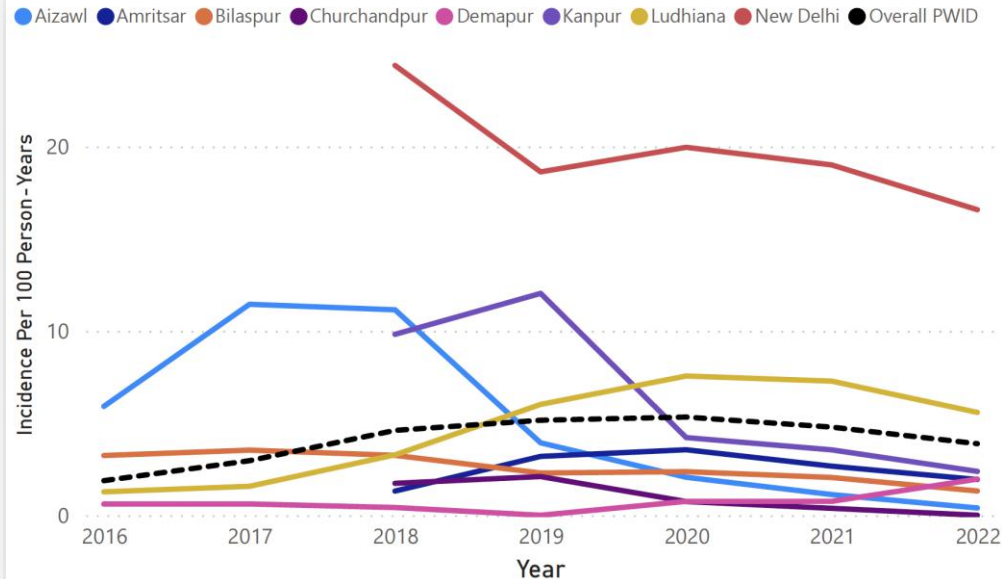
Heather Bradley,<sup>1</sup> Eric W. Hall,<sup>2</sup> Alice Asher,<sup>3</sup> Nathan W. Furukawa,<sup>3</sup> Christopher M. Jones,<sup>4</sup> Jalissa Shealey,<sup>1</sup> Kate Buchacz,<sup>3</sup> Senad Handanagic,<sup>3</sup> Nicole Crepaz,<sup>3</sup> and Eli S. Rosenberg<sup>5,6</sup>

# And not just in the US...

## HIV incidence in a community-based cohort in New Delhi (2017-2020)

Number HIV negative with $\geq 1$ follow-up	Person years of follow-up	Number of incident infections	Incidence rate (95% CI)
782	747	159	21.3 (18.2 – 24.9)

### People Who Inject Drugs (PWID) Sites



### Prevalence Estimates:

- South Africa (21% - 35%)
- Kenya (15 - 21%)
- Tanzania (34%)

# My HPTN “all-time” favorites!!!

The NEW ENGLAND JOURNAL of MEDICINE

## The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812

AUGUST 11, 2011

VOL. 365 NO. 6

### Prevention of HIV-1 Infection with Early Antiretroviral Therapy

Myron S. Cohen, M.D., Ying Q. Chen, Ph.D., Marybeth McCauley, M.P.H., Theresa Gamble, Ph.D., Mina C. Hosseinipour, M.D., Nagalingeswaran Kumarasamy, M.B., B.S., James G. Hakim, M.D., Johnstone Kumwenda, F.R.C.P., Beatriz Grinsztejn, M.D., Jose H.S. Pilotto, M.D., Sheela V. Godbole, M.D., Sanjay Mehendale, M.D., Suwat Charialertsak, M.D., Breno R. Santos, M.D., Kenneth H. Mayer, M.D., Irving F. Hoffman, P.A., Susan H. Eshleman, M.D., Estelle Piwowar-Manning, M.T., Lei Wang, Ph.D., Joseph Makhema, F.R.C.P., Lisa A. Mills, M.D., Guy de Bruyn, M.B., B.Ch., Ian Sanne, M.B., B.Ch., Joseph Eron, M.D., Joel Gallant, M.D., Diane Havlir, M.D., Susan Swindells, M.B., B.S., Heather Ribaud, Ph.D., Vanessa Elharrar, M.D., David Burns, M.D., Taha E. Taha, M.B., B.S., Karin Nielsen-Saines, M.D., David Celentano, Sc.D., Max Essex, D.V.M., and Thomas R. Fleming, Ph.D., for the HPTN 052 Study Team\*

### ORIGINAL ARTICLE

### Cabotegravir for HIV Prevention in Cisgender Men and Transgender Women

R.J. Landovitz, D. Donnell, M.E. Clement, B. Hanscom, L. Cottle, L. Coelho, R. Cabello, S. Charialertsak, E.F. Dunne, I. Frank, J.A. Gallardo-Cartagena, A.H. Gaur, P. Gonzales, H.V. Tran, J.C. Hinojosa, E.G. Kallas, C.F. Kelley, M.H. Losso, J.V. Madruga, K. Middelkoop, N. Phanuphak, B. Santos, O. Sued, J. Valencia Huamaní, E.T. Overton, S. Swaminathan, C. del Rio, R.M. Gulick, P. Richardson, P. Sullivan, E. Piwowar-Manning, M. Marzinke, C. Hendrix, M. Li, Z. Wang, J. MARRAZZO, E. Daar, A. Asmelash, T.T. Brown, P. Anderson, S.H. Eshleman, M. Bryan, C. Blanchette, J. Lucas, C. Psaros, S. Safren, J. Sugarman, H. Scott, J.J. Eron, S.D. Fields, N.D. Sista, K. Gomez-Feliciano, A. Jennings, R.M. Kofron, T.H. Holtz, K. Shin, J.F. Rooney, K.Y. Smith, W. Spreen, D. Margolis, A. Rinehart, A. Adeyeye, M.S. Cohen, M. McCauley, and B. Grinsztejn, for the HPTN 083 Study Team\*

#### HPTN 052 Study Exclusion Criteria

Couple	Index Case (HIV-infected)
<ul style="list-style-type: none"> <li>• Reports a history of injection drug use within the last five years.</li> <li>• Previous and/or current participant in an HIV vaccine study.</li> <li>• Any condition that, in the opinion of the site investigator, would make participation in the study unsafe, complicate interpretation of study outcome data, or otherwise interfere with achieving the study objectives.</li> <li>• Incarceration in a correctional facility, prison, or jail; and involuntary incarceration in a medical facility for psychiatric or physical (e.g. infectious disease) illness</li> </ul>	<ul style="list-style-type: none"> <li>• Current or previous AIDS-defining illness</li> <li>• Current or previous use of any ART drugs (some exceptions apply)</li> <li>• Documented or suspected acute hepatitis within 30 days prior to enrollment, irrespective of AST (SGOT) and ALT (SGPT) values.</li> <li>• Acute therapy for serious medical illnesses, in the opinion of the site investigator, within 14 days prior to enrollment. Candidates with chronic, acute, or recurrent infections that are serious, in the opinion of the site investigator, who must continue with chronic (maintenance) therapy (e.g., TB), must have completed at least 14 days of therapy prior to study entry and be clinically stable.</li> </ul>

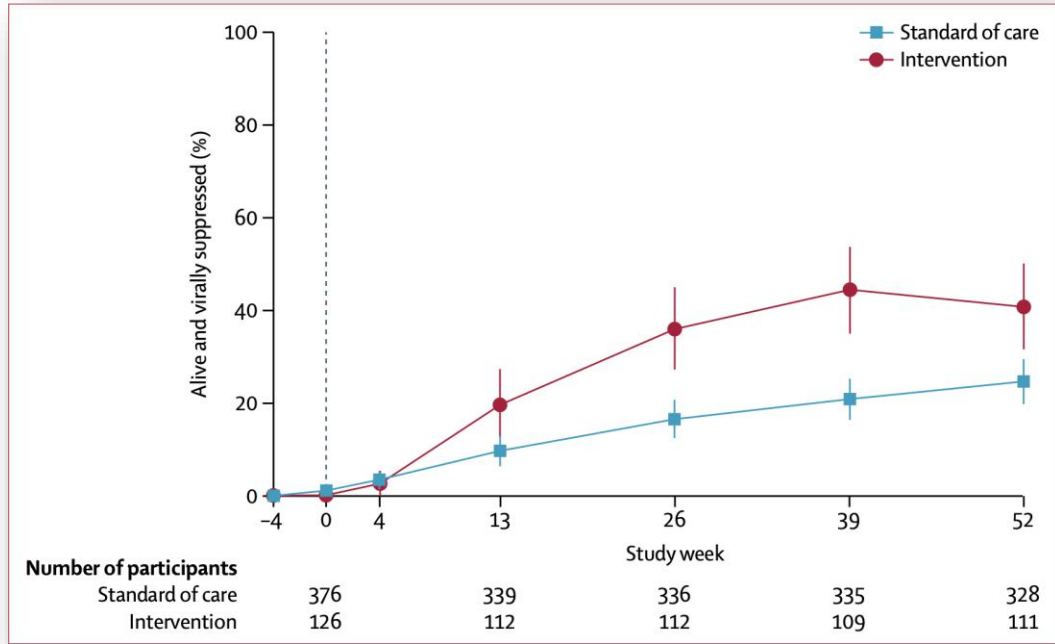
minute.<sup>16</sup> Cisgender MSM and transgender women who have sex with men who were recruited for the trial were at high risk for HIV infection, as defined in the protocol. Key exclusion criteria were the use of illicit intravenous drugs within 90 days before enrollment, previous participation in the active treatment group of an HIV vaccine trial, coagulopathy, buttock implants or fillers, a

# How do we prevent HIV in PWID?

ART



# Viral suppression among PWID



## HPTN 074

Peer navigation + Counseling + ART

## Viral suppression over time



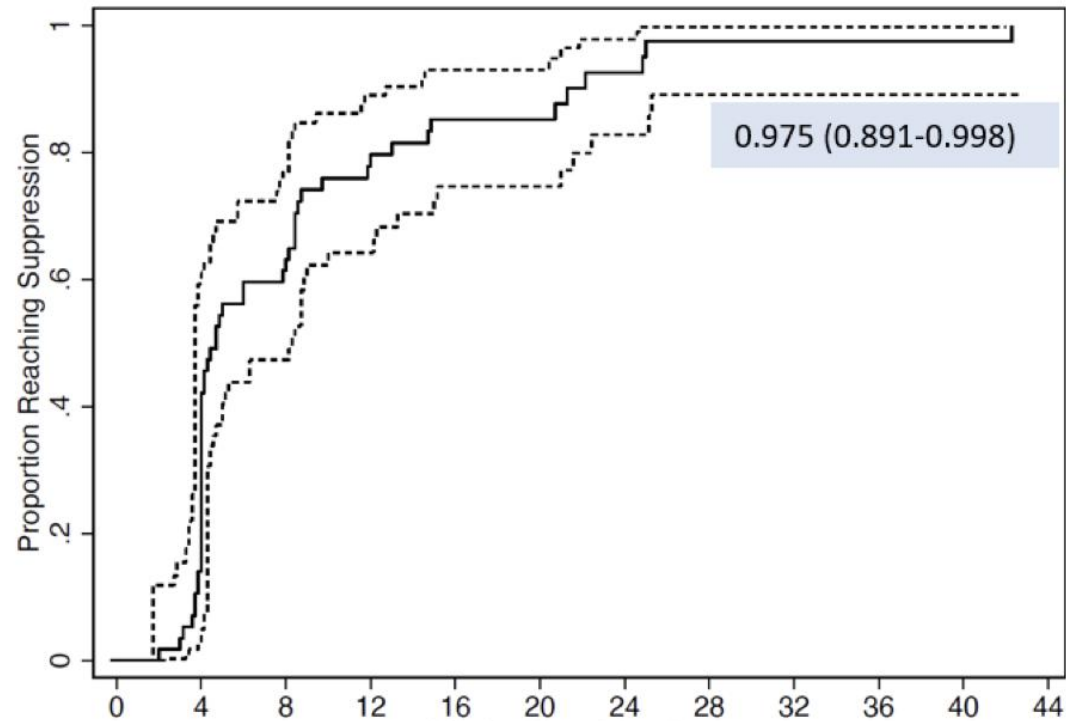
## ICC+ (Lucas/Mehta)

Outreach workers + contingency management



# Role of LA ARVs

**Figure:** KM curve of probability of reaching virologic suppression (VL <30) on LA ART (n=57); dotted lines 95% CI



*Oh, no, no, no, no, no. The only one that sticks me with needles is me and my tattoo artist. [LAUGH] Oh no, I'll stick with the pill* Providence, cisgender man

*So, see them then, get injected or get the shot, and go on and not worry about it for a couple months. That's awesome. That's better than taking something every day.* Providence, cisgender woman

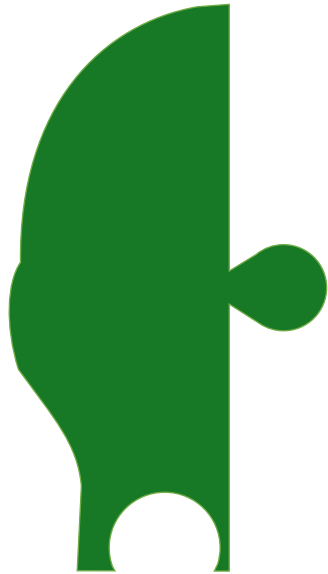
# Resistance: Baseline vs. follow-up



- On-treatment resistance:
  - Cyclical patterns of injection, cessation, relapse
  - Long tail of injectable ARVs
- Transmitted drug resistance?
- ***Trials with long-term follow-up***

# How do we prevent HIV in PWID?

**ART**



**PrEP**



# PrEP uptake in PWID

- Ideal population for PrEP
  - Low viral suppression
  - High incidence
  - Challenge with daily oral adherence
    - LA PrEP



JAMA Network | **Open**



Original Investigation | Public Health

## Prevalence of HIV Preexposure Prophylaxis Prescribing Among Persons With Commercial Insurance and Likely Injection Drug Use

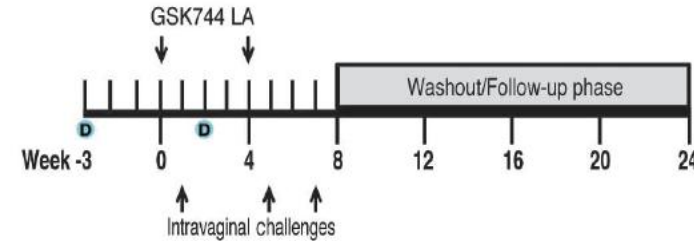
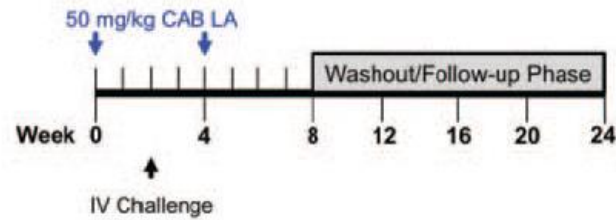
Carl G. Streed Jr, MD, MPH; Jake R. Morgan, PhD; Mam Jarra Gai, MPH; Marc R. Larochelle, MD, MPH; Michael K. Paasche-Orlow, MD, MPH; Jessica L. Taylor, MD

*“...Receipt of PrEP increased from 0.00 to 0.295 per 100 person-years between 2010 and 2019 among PWID....”*

# Evidence for LA PrEP in PWID

A

(a)



**Results:** CAB long acting was highly protective with 21 of the 24 CAB long-acting-treated macaques remaining aviremic, resulting in 88% protection. The plasma CAB concentration at the time of virus challenge appeared to be more important for protection than sustaining therapeutic plasma concentrations with the second CAB long acting injection.

**Conclusion:** These results support the clinical investigation of CAB long acting as PrEP in people who inject drugs. Copyright © 2017 Wolters Kluwer Health, Inc. All rights reserved.

**Intravenous Challenge**

**Intravaginal Challenge**

# LA PrEP in PWID: Way forward...

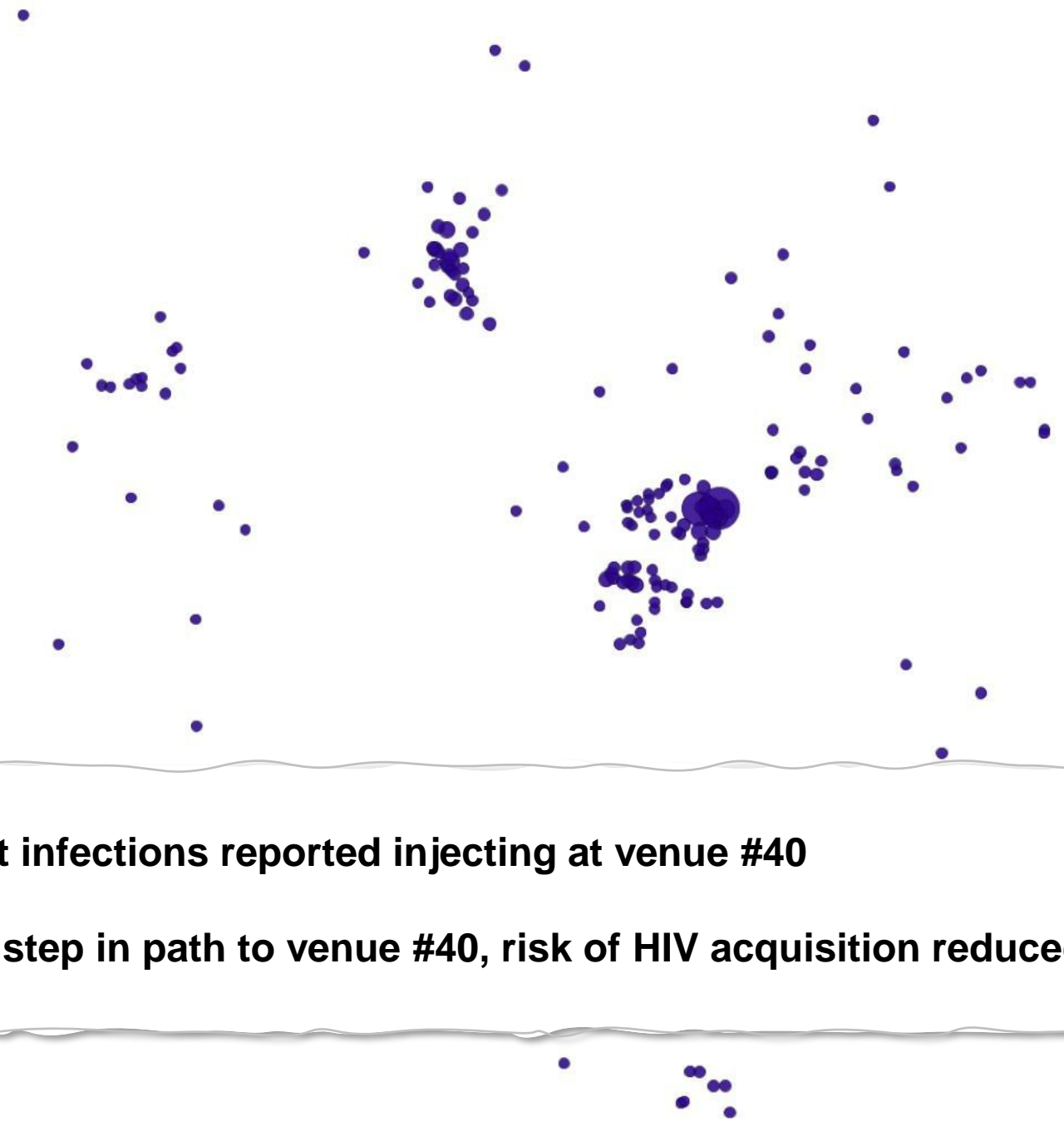
- Drug-drug interaction data
  - Commons substances of misuse
  - Medications for opioid use disorder
- Efficacy data in humans
  - Phase III trials (?unbalanced allocation)
    - Incidence still high among PWID in many settings globally
- Delivery of LA PrEP
  - MOUD/OTP centers
  - Field/van based
    - Could we target high transmission venues?

# Sociospatial Network

Interact with this figure online:  
[Tiny.cc/sociospatial](https://tiny.cc/sociospatial)

## Legend

- Negative & Undetectable Prevalent HIV+
- Spatial Hotspot
- Prevalent HIV+ (Detectable VL)
- Incident HIV+



**113 (71%)** of incident infections reported injecting at venue #40

For every increased step in path to venue #40, risk of HIV acquisition reduced by **23% (IRR: 0.77)**

# How do we prevent HIV in PWID?

**ART**



**PrEP**



**Substance  
Use**

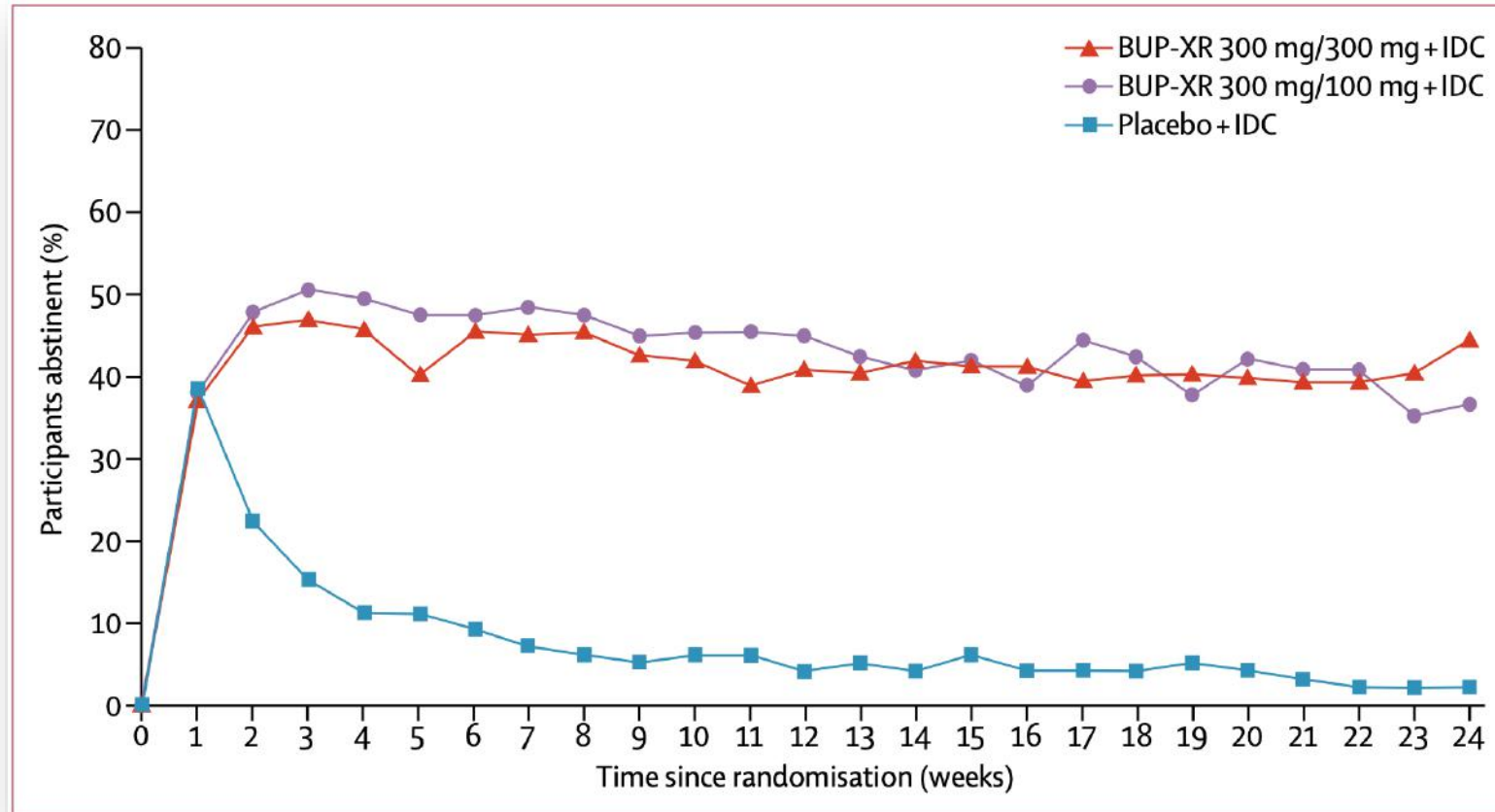




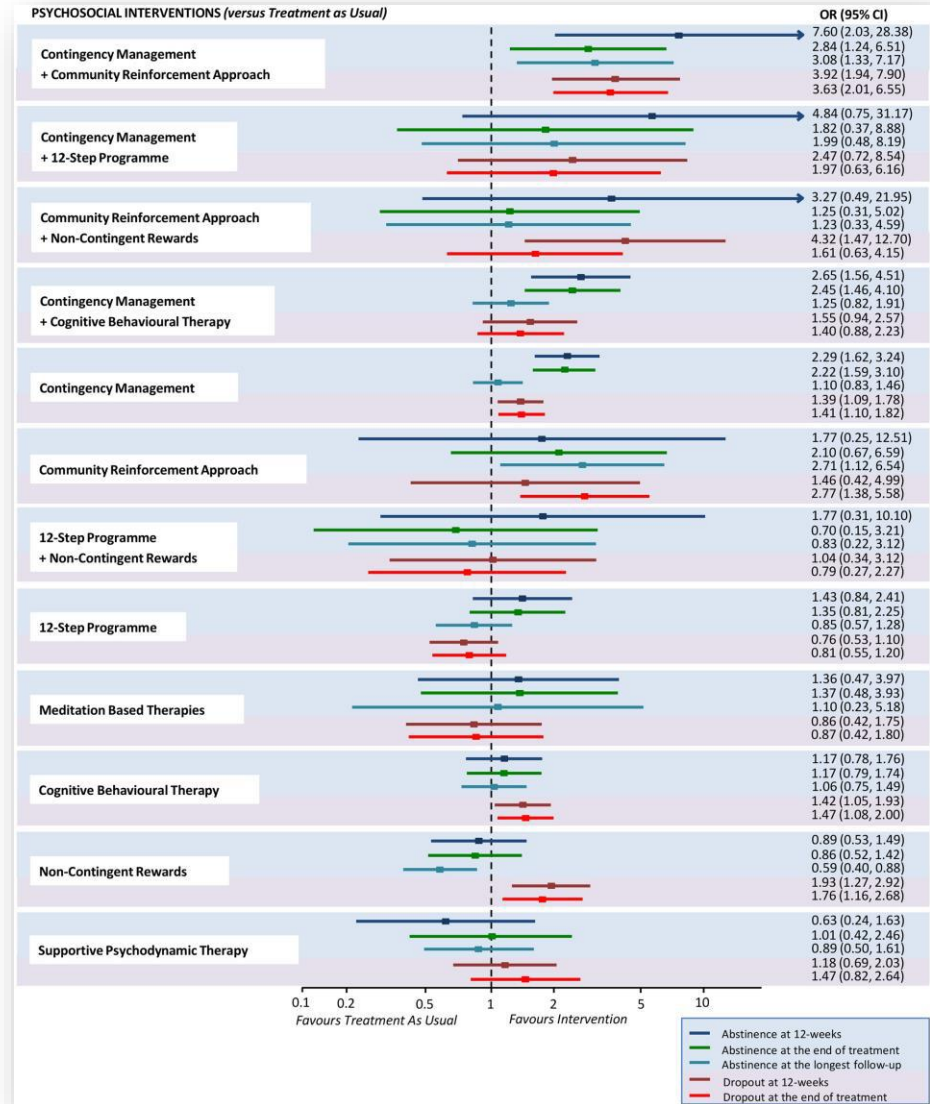
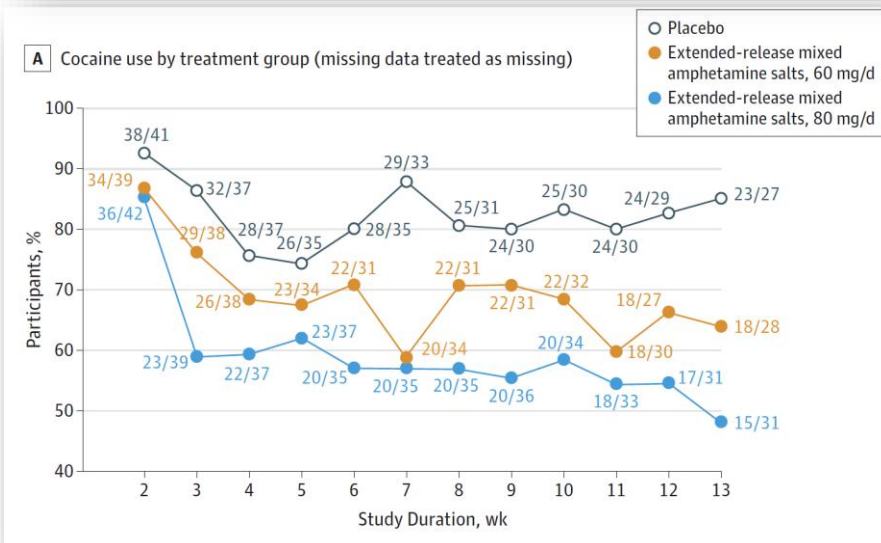
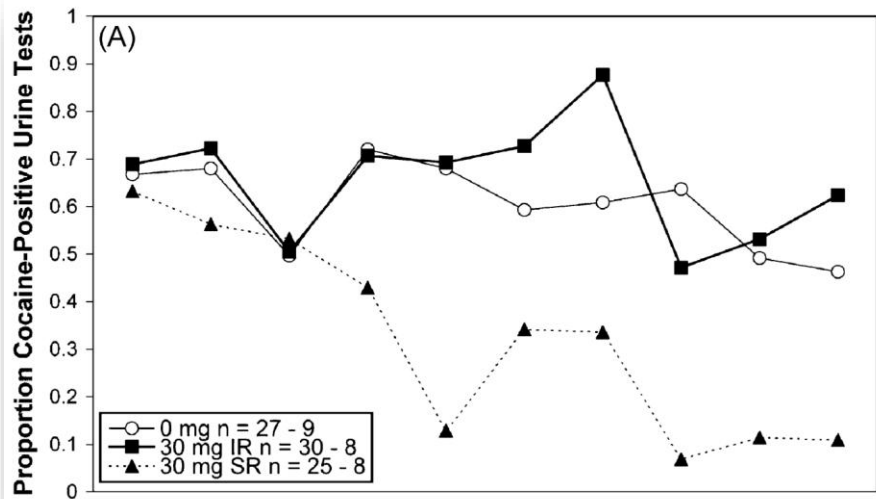
# Management of substance use

- Syringe service programs
- Fentanyl test strips
- Access to naloxone (Narcan)
- Medically supervised injection centers/sites
- Cognitive behavioral therapy
- Pharmacotherapy:
  - Buprenorphine
  - Methadone
  - No FDA approved agents for stimulants

# Long-acting buprenorphine

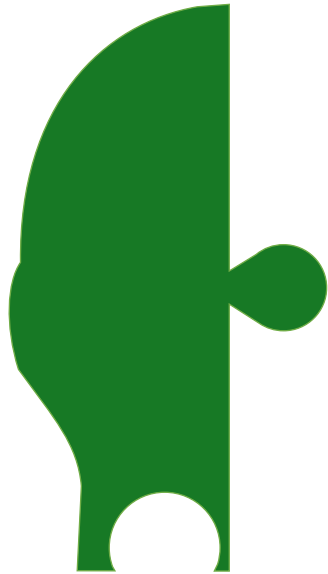


# Treating stimulants with stimulants?



# How do we prevent HIV in PWID?

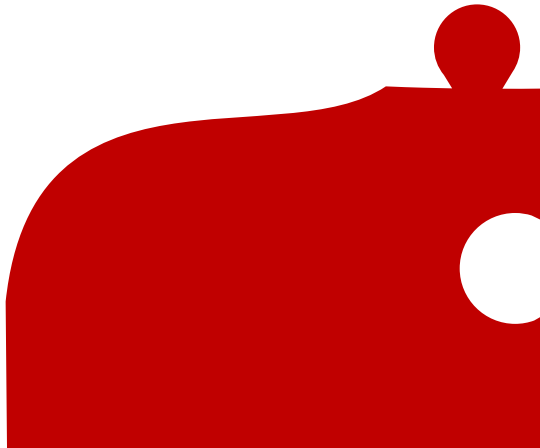
**ART**



**PrEP**



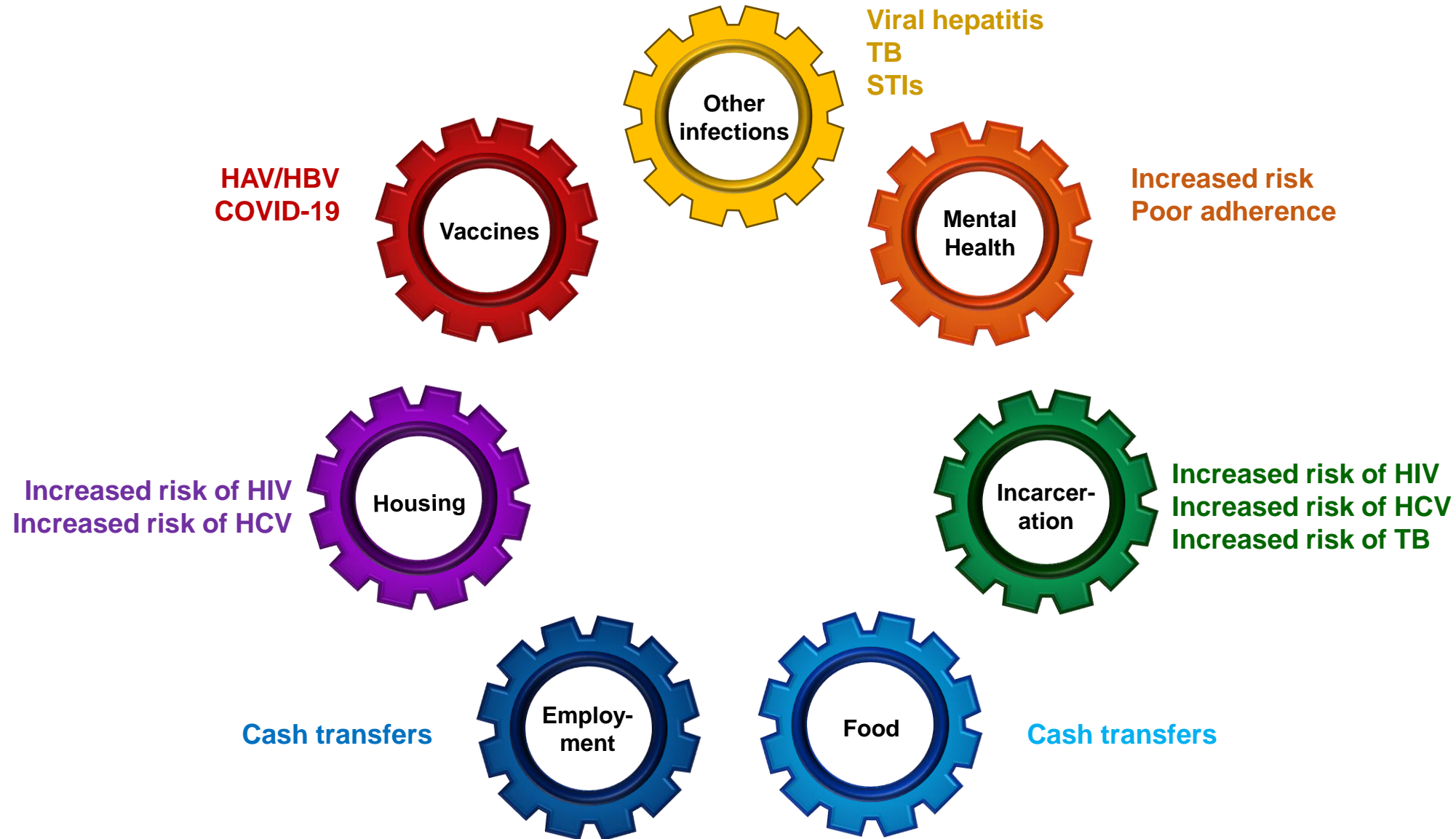
**Health!!!**



**Substance  
Use**

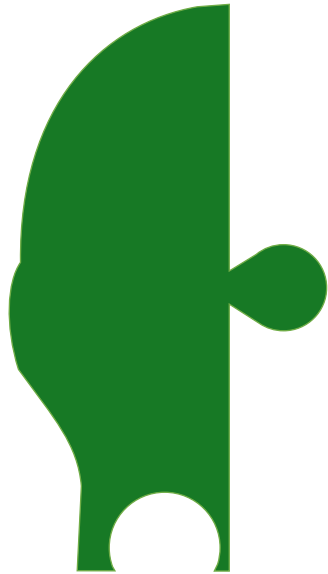


# More to health than HIV...



# How do we prevent HIV in PWID?

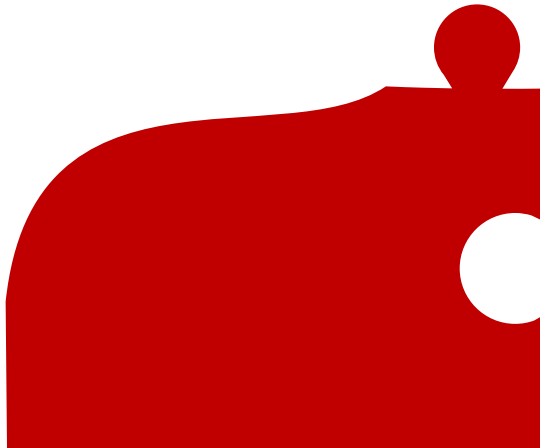
**ART**



**PrEP**



**Health!!!**

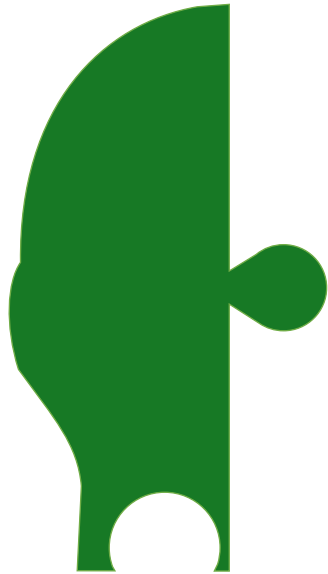


**Substance Use**



# “Status-Neutral Whole Person”

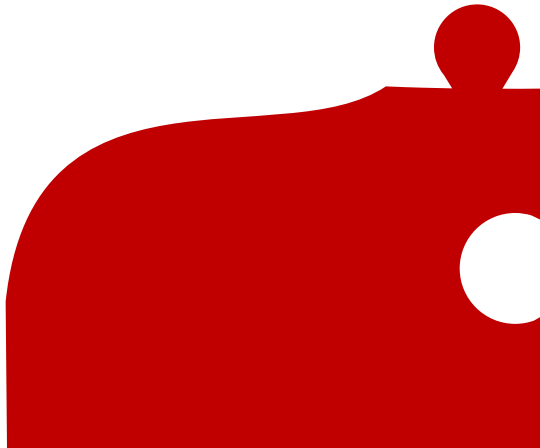
**ART**



**PrEP**



**Health!!!**



**Substance  
Use**



# Acknowledgements

- People who graciously participate in research studies globally
- Johns Hopkins University
  - Shruti Mehta, Gregory Lucas, Steven Clipman, Carl Latkin, Allison McFall, David Celentano
- Funding sources:
  - NIDA (DP2DA040244, R01DA041736, R01DA032059), NIMH (R01MH089266), NIAID (R01AI145555)
  - Abbott Laboratories
  - Gilead Sciences
  - Elton John AIDS Foundation
  - USAID/PEPFAR



**THANK YOU**

