

# NDARC

National Drug &  
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## The Impact of Opioid Agonist Treatment on Mortality Among People Who Inject Drugs: A three-setting modelling study

Medicine

National Drug and Alcohol Research Centre

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# Acknowledgements and disclosures

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# Background

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People who are opioid dependent are at risk of multiple health outcomes

Opioid agonist treatment (OAT, typically methadone or buprenorphine) is highly effective in treatment of opioid dependence – a WHO essential medicine

Accumulating evidence of the multiple benefits of OAT, but:

- Uncertainty on how they combine to improve health of PWID,
- And how this may vary between settings
- Important to understand full benefits of OAT

Previous modelling has evaluated the benefits of OAT on:

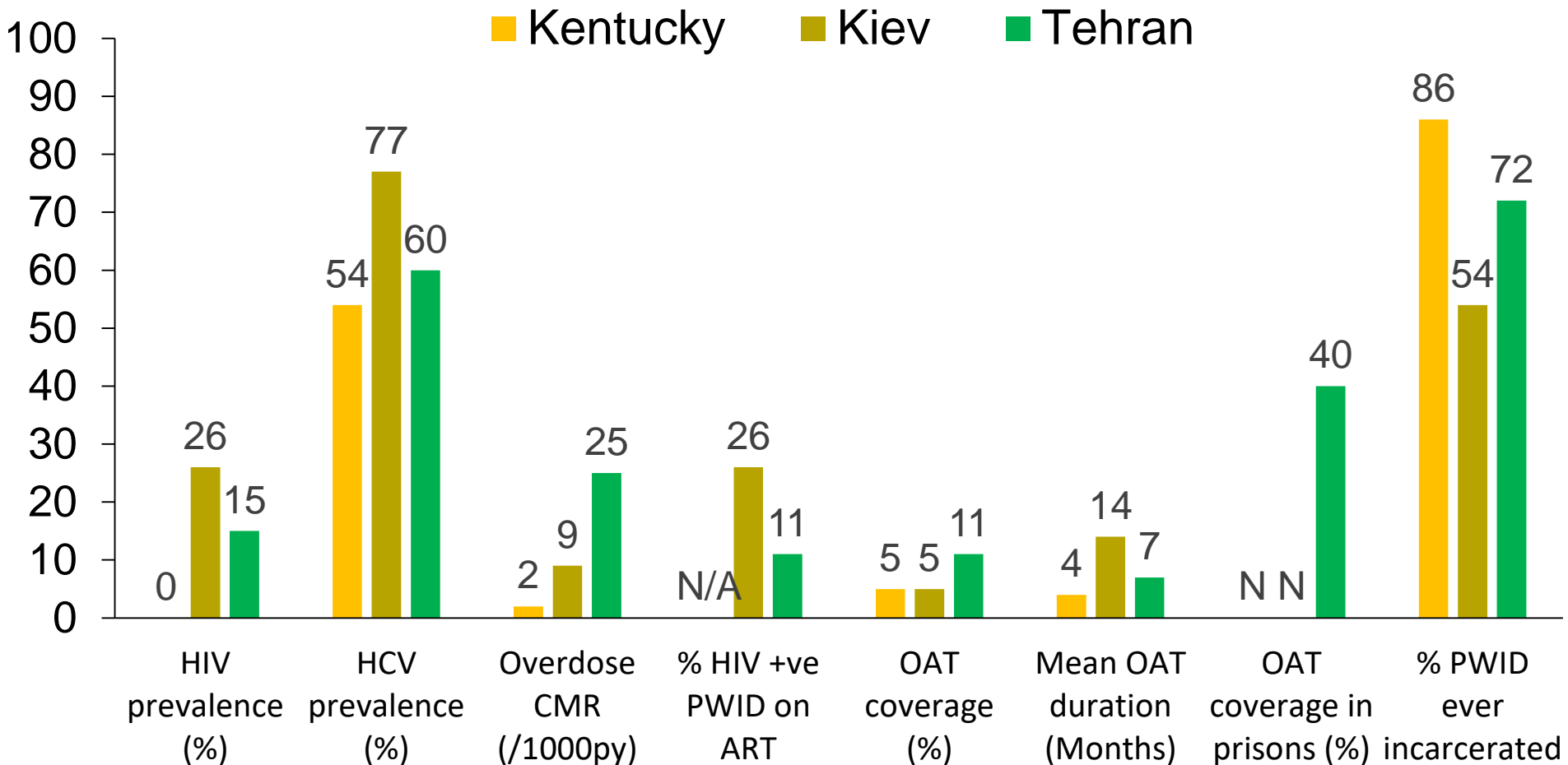
- HIV and HCV transmission and morbidity
- Drug-related mortality

But **no analyses** have considered:

- Multiple benefits of OAT on drug related mortality and BBV mortality
- Benefits in reducing incarceration or improving OAT outcomes
- How that may vary across different epidemiological settings

We aimed to comprehensively evaluate the health benefits of OAT among PWID in 3 varied global settings: Kentucky (USA), Kyiv (Ukraine), and Tehran (Iran)

# Summary of settings



# Model structure

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Dynamic, deterministic model of HIV and HCV transmission and disease progression, ART and OAT, and incarceration among PWID

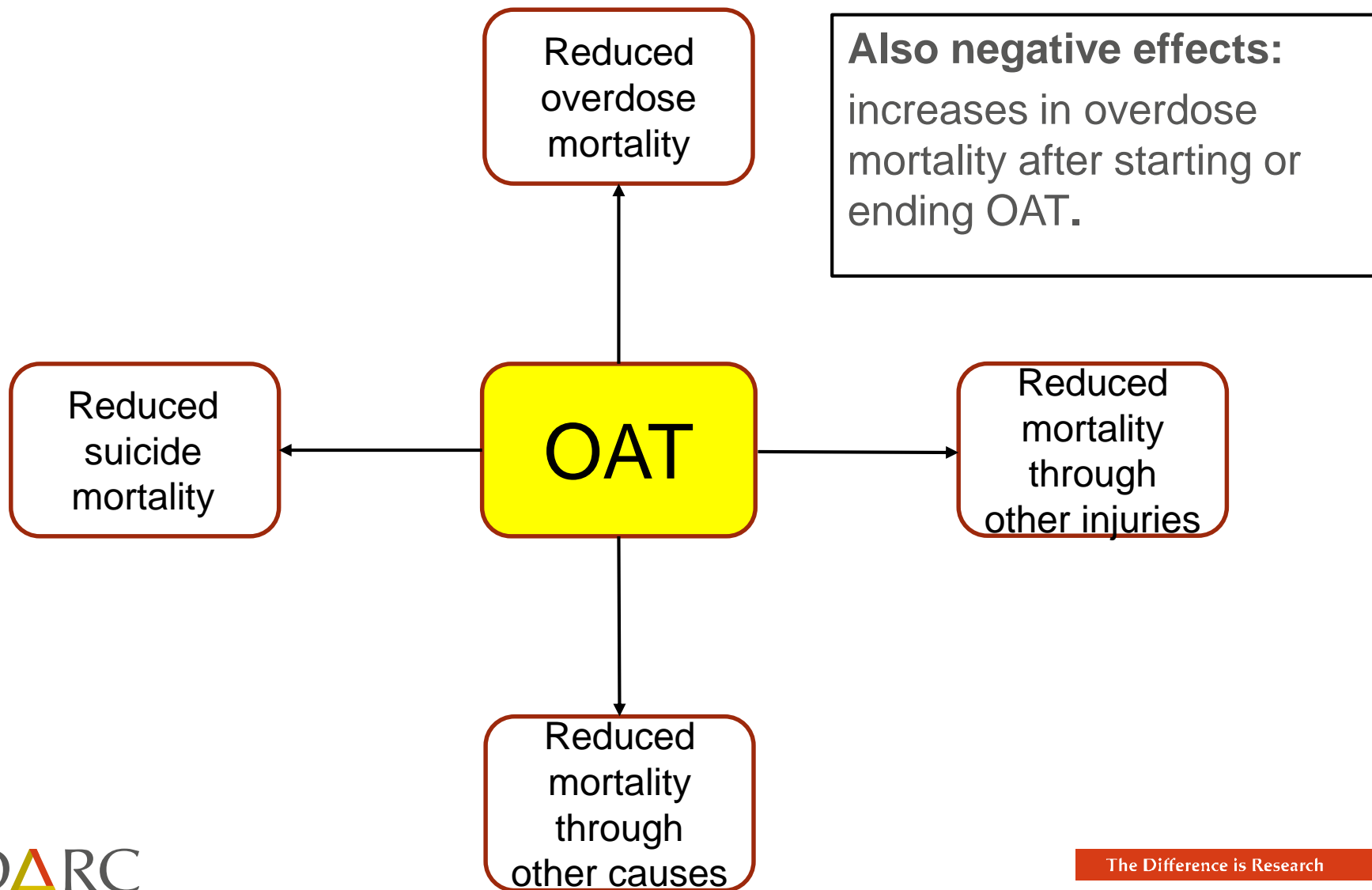
Includes mortality due to:

- Overdose
- Suicide
- Other injuries
- HIV
- HCV
- Other causes

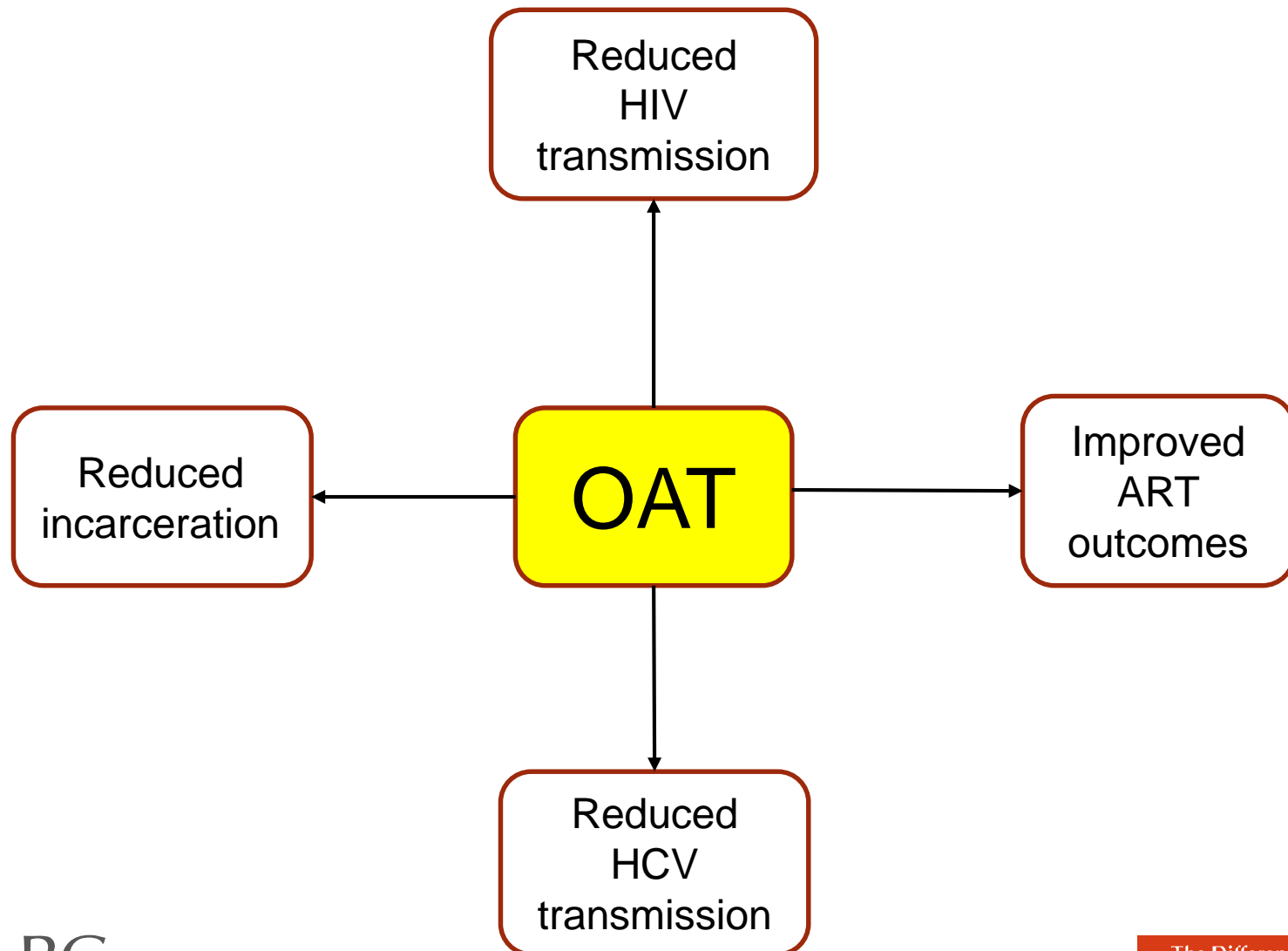
Incorporates both injecting and sexual transmission of HIV

Includes ex-PWID to capture HIV/HCV disease related mortality.

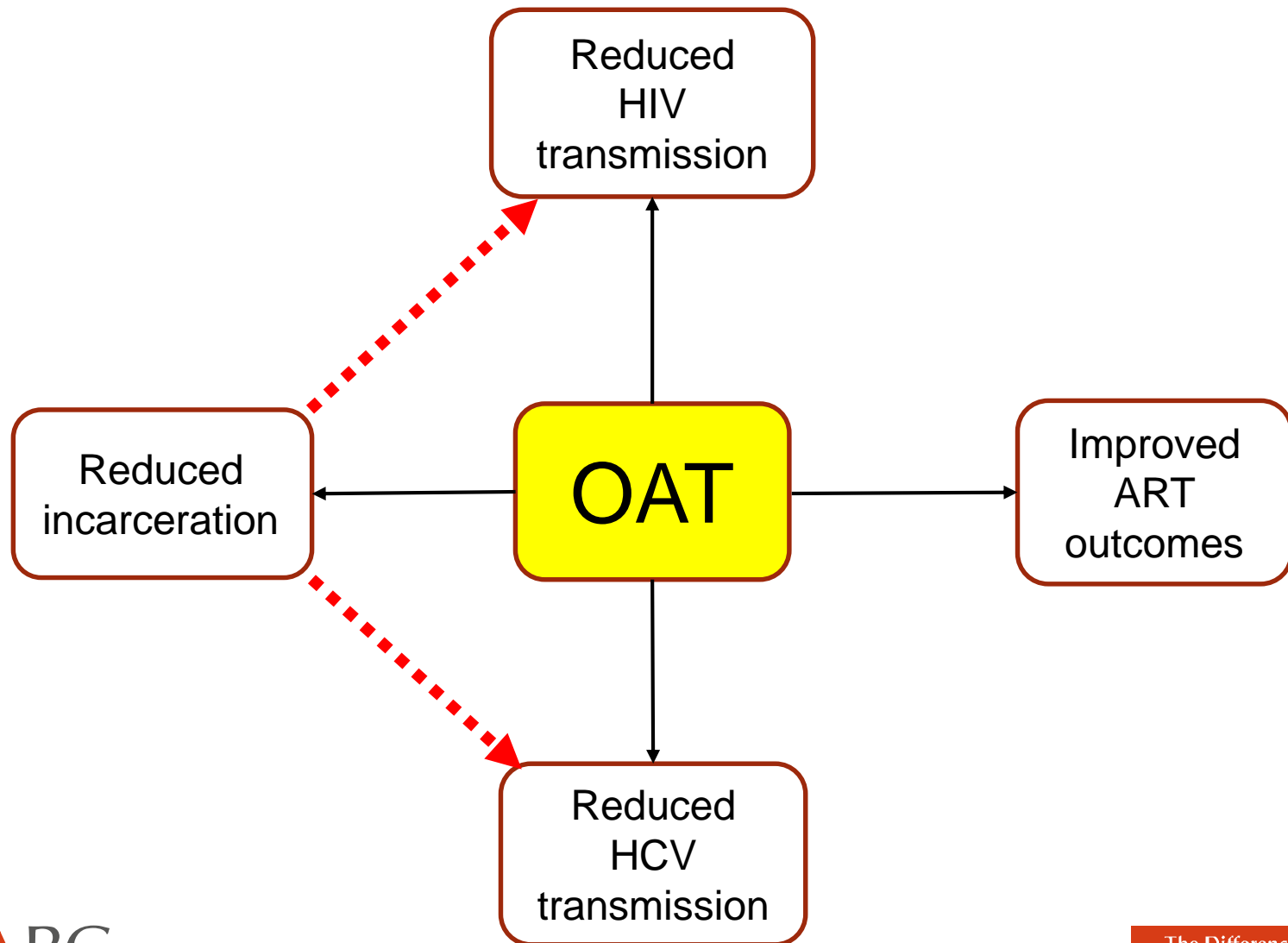
# OAT effects modelled – direct effects



# OAT effects – indirect effects

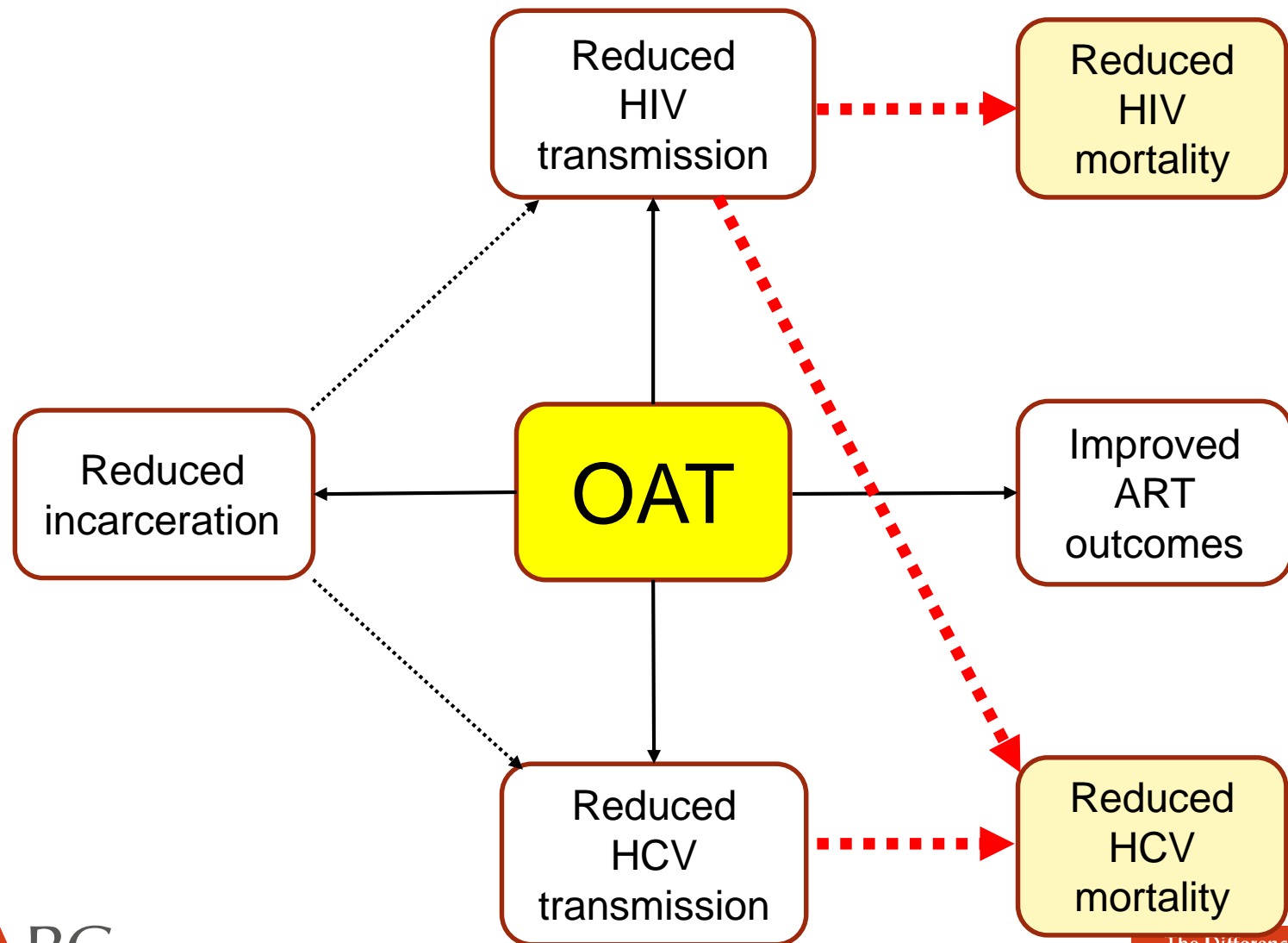


# OAT effects – indirect effects

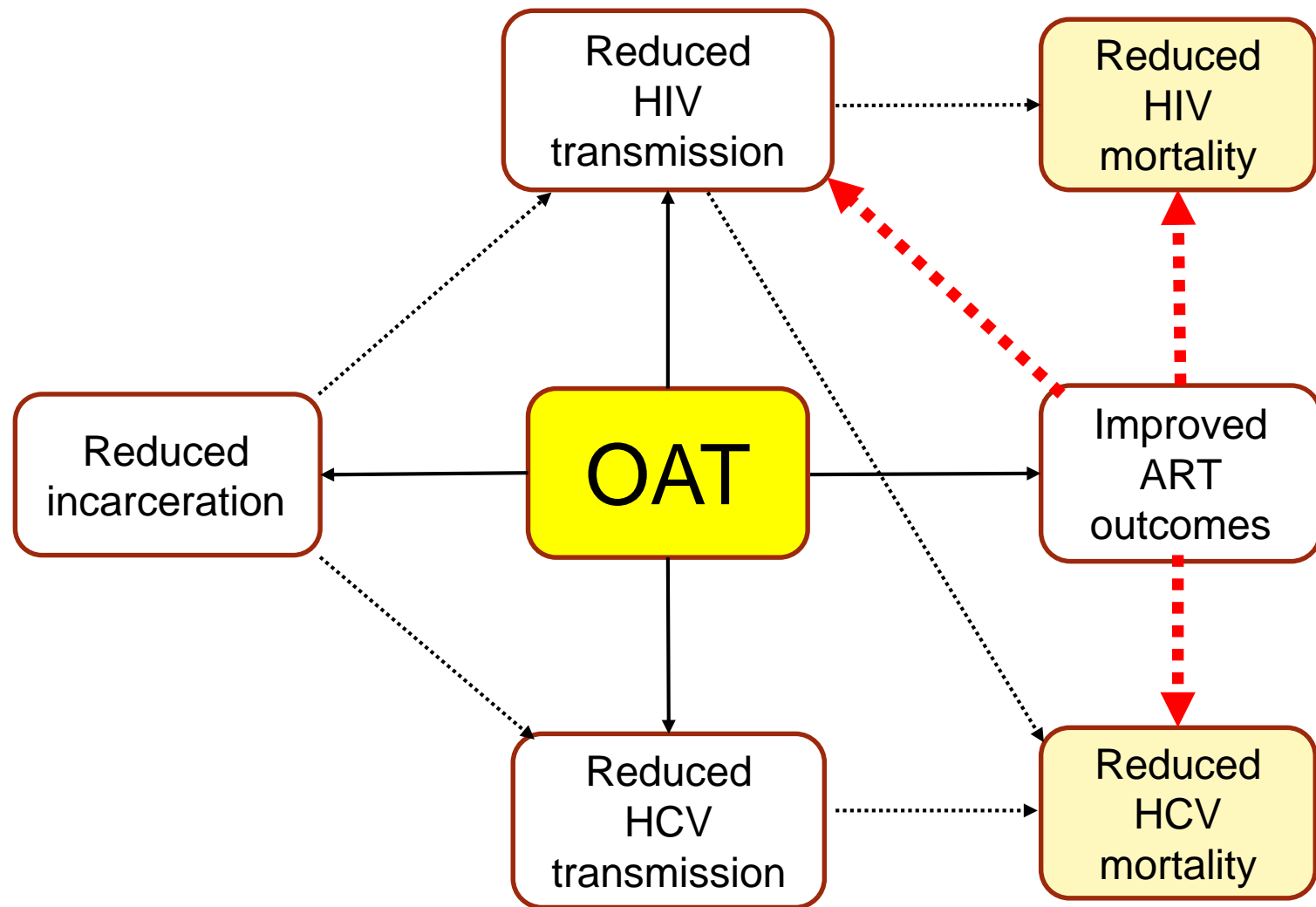




# OAT effects – indirect effects



# OAT effects – indirect effects



# Effects of OAT

Effect of OAT	Effect Size (95%CI)
Relative reduction in overdose mortality if on OAT	In community: 0.59 (0.49, 0.71) During incarceration: 0.13 (0.05, 0.35) First 4 wks after release: 0.25 (0.14, 0.45)
Relative reduction in suicide mortality if on OAT	In community: 0.48 (0.39, 0.59) During incarceration: 0.13 (0.05, 0.35)
Relative reduction in mortality through other injuries if on OAT	In community: 0.40 (0.34, 0.46) During incarceration: 0.13 (0.05, 0.35)
Relative reduction in other mortality	0.86 (0.75-0.99)
Relative reduction in HIV transmission if on OAT	0.46 (0.32, 0.67)
Relative reduction in HCV transmission if on OAT	0.50 (0.40, 0.63)
Relative increase in overdose mortality:	
1 <sup>st</sup> 4 weeks of OAT vs rest of time on OAT	1.97 (0.94, 4.10)
1 <sup>st</sup> 4 weeks off OAT vs rest of time off OAT	2.38 (1.51, 3.74)
Reduction in (re-) incarceration rates if on OAT	0.80 (0.71, 0.90)
Relative increase in recruitment onto ART if on OAT	1.87 (1.50, 2.33)
Relative reduction in ART attrition rate if on OAT	0.77 (0.63, 0.95)
Odds of viral suppression if on ART if on OAT	1.45 (1.21, 1.73)

# Model calibration

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- We calibrated the model using an approximate Bayesian computation methods to setting-specific data on:
  - HIV and HCV prevalence among PWID by incarceration status
  - the difference in HIV and HCV prevalence between previously incarcerated PWID and never incarcerated PWID;
  - the difference in HCV prevalence between HIV positive PWID and HIV negative PWID;
  - the proportion of PWID who have ever been incarcerated, and incarcerated twice or more;
  - the proportion of PWID currently on OAT or ART;
  - all-cause mortality rates amongst PWID;
  - the proportion of deaths among PWID that are HIV related or due to overdose, injury, suicide or other.

# Data sources

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Kentucky:

- Social Networks Among Appalachian People study<sup>1</sup>

Kyiv:

- 2015 and 2017 Alliance for Public Health Integrated Bio-Behavioural Assessment (IBBA) surveys
- 2015 Expanding Medication-Assisted Therapy (ExMAT) bio-behavioural survey<sup>2</sup>
- Vanguard randomised controlled trial study<sup>3</sup>

Tehran:

- Recent IBBA's, ENHANCE study
- published data from exhaustive literature search.

# Model analyses

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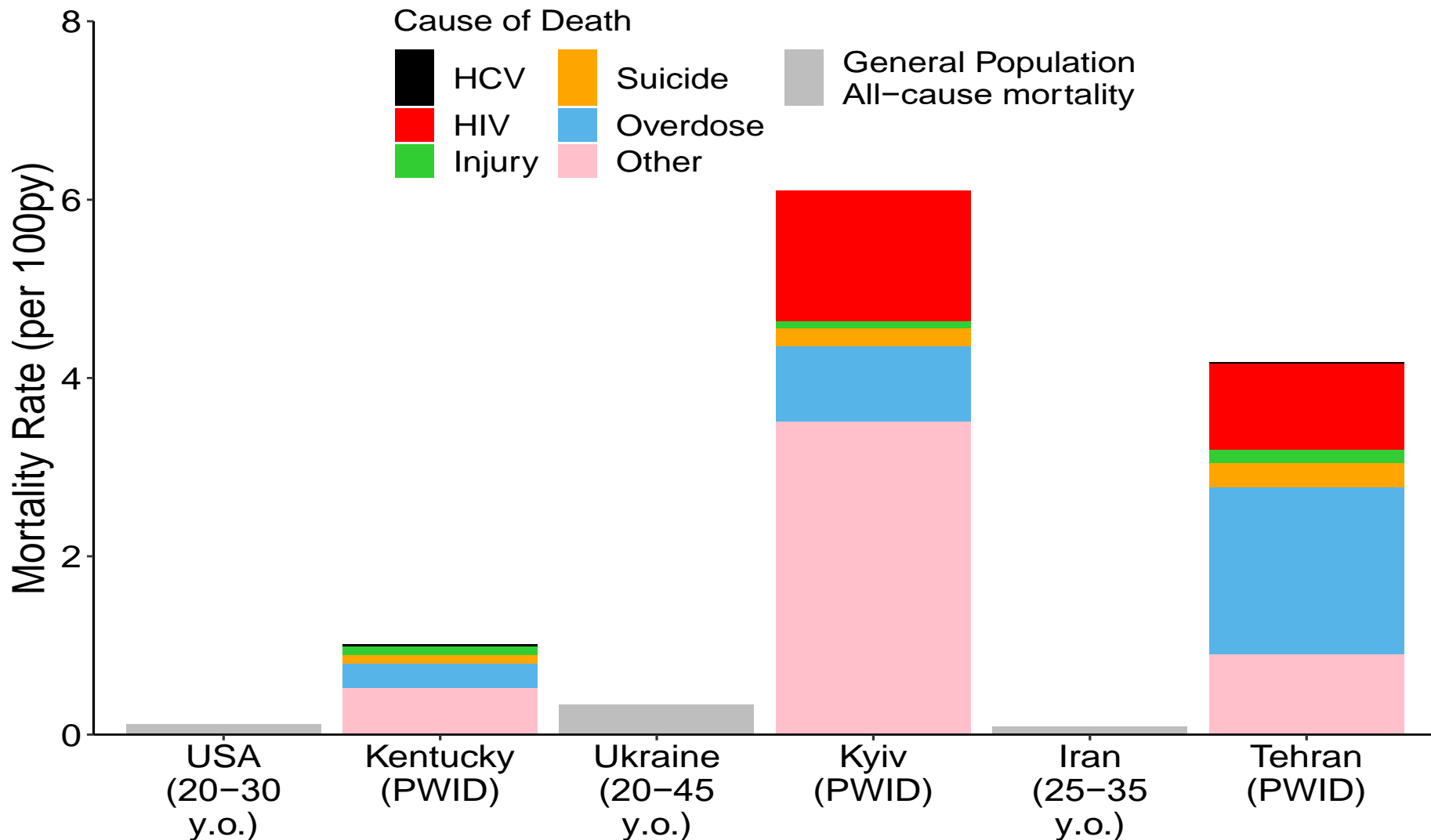
Mortality rates among PWID and ex-PWID over 2020-2040 and contribution of different causes of death

Impact of different OAT scenarios vs scenario with no OAT in terms of deaths averted over 2020-2040

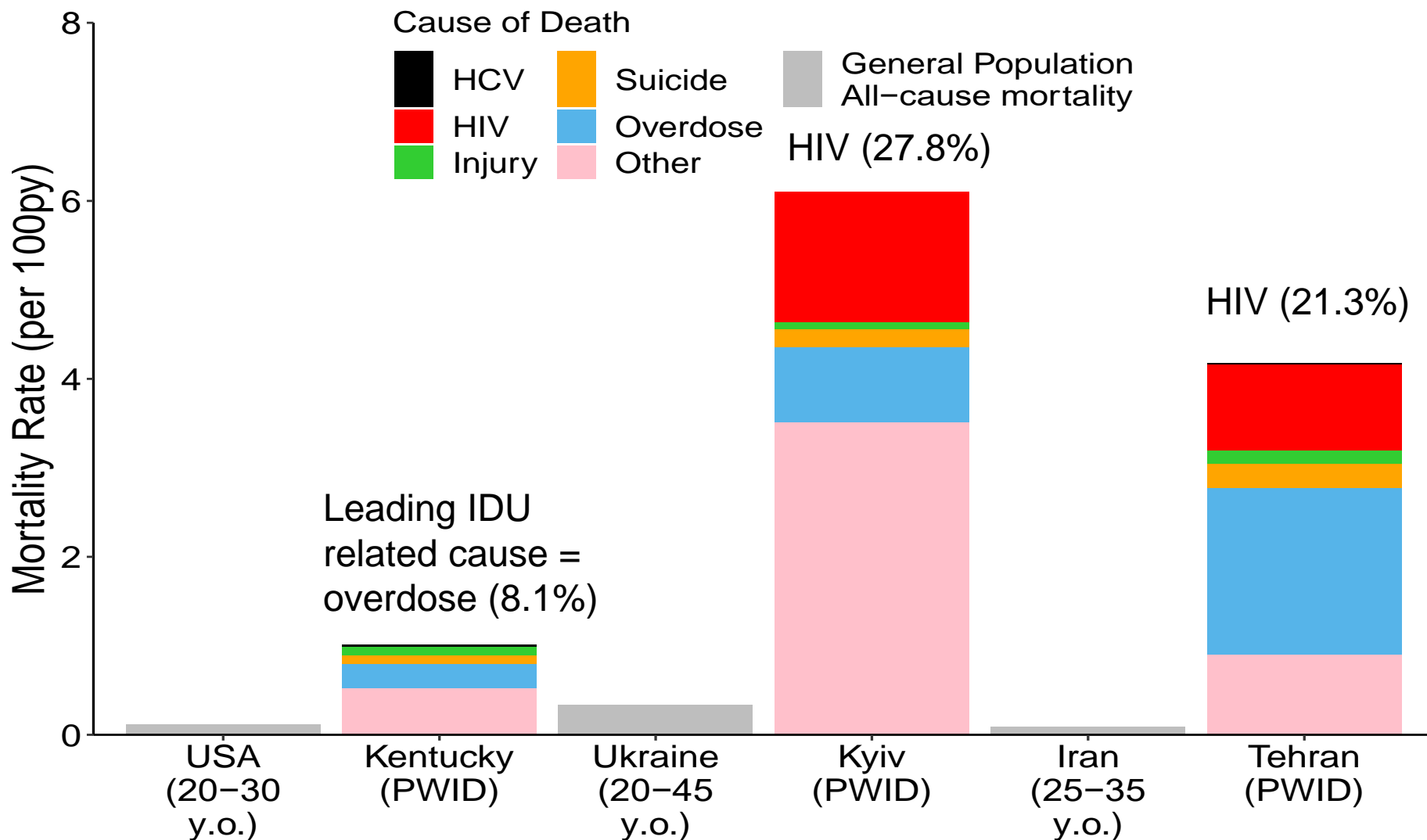
- Current OAT coverage ('Status quo')
- Scaling-up OAT to 40% coverage amongst community PWID (A)
- A and also increase the average length of OAT to 2 years (B)
- B and also provide same OAT (same rates of recruitment onto OAT and same rates of retention as the community) in prison as community, with 100% retention on OAT upon incarceration or release from prison (C – 'best case')

How does each effect of OST contribute to the reductions in mortality in each setting?

# Mortality rates among PWID and the general population over 2020-2040; Status Quo

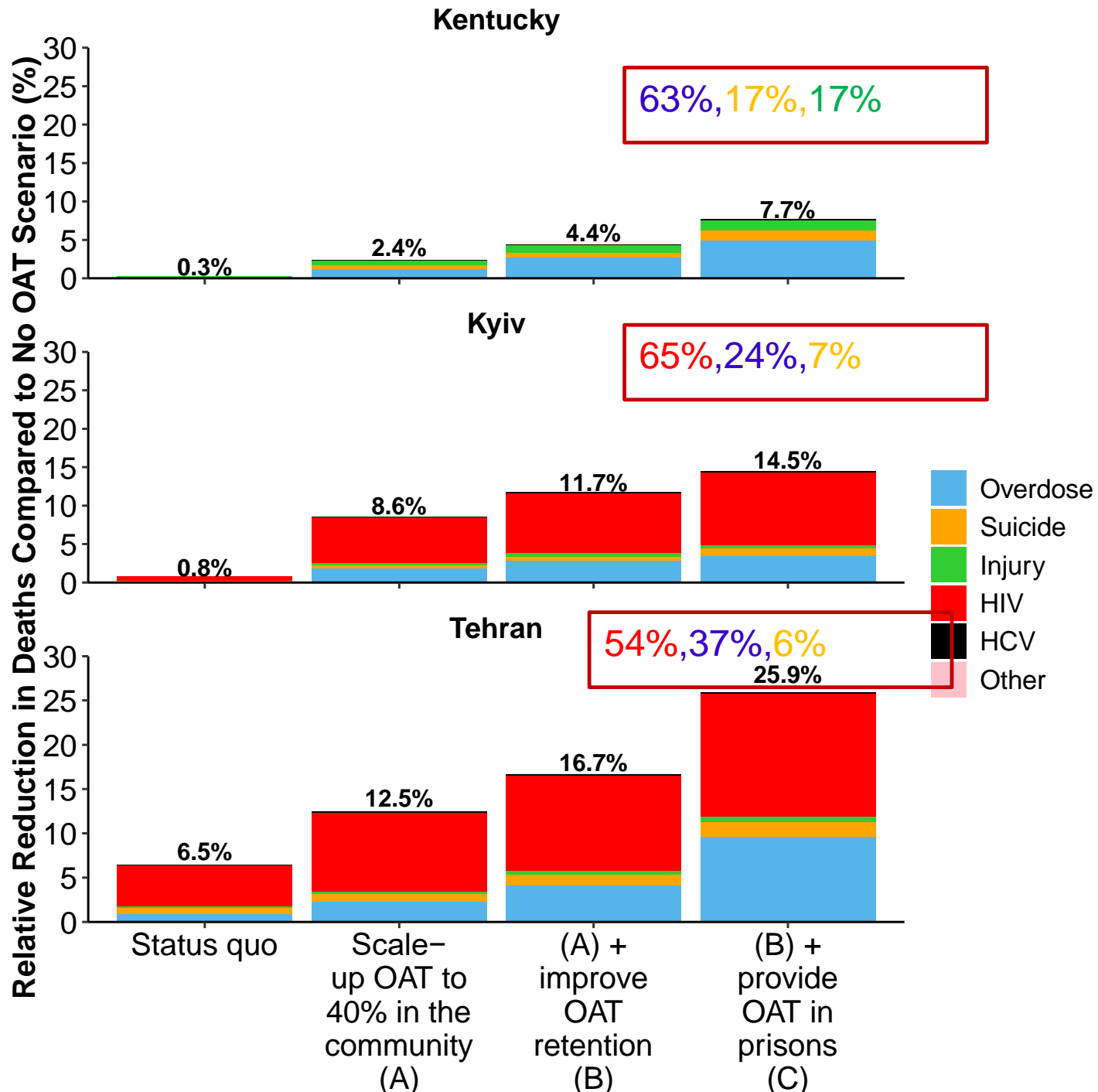


# Mortality rates among PWID and the general population over 2020-2040; Status Quo

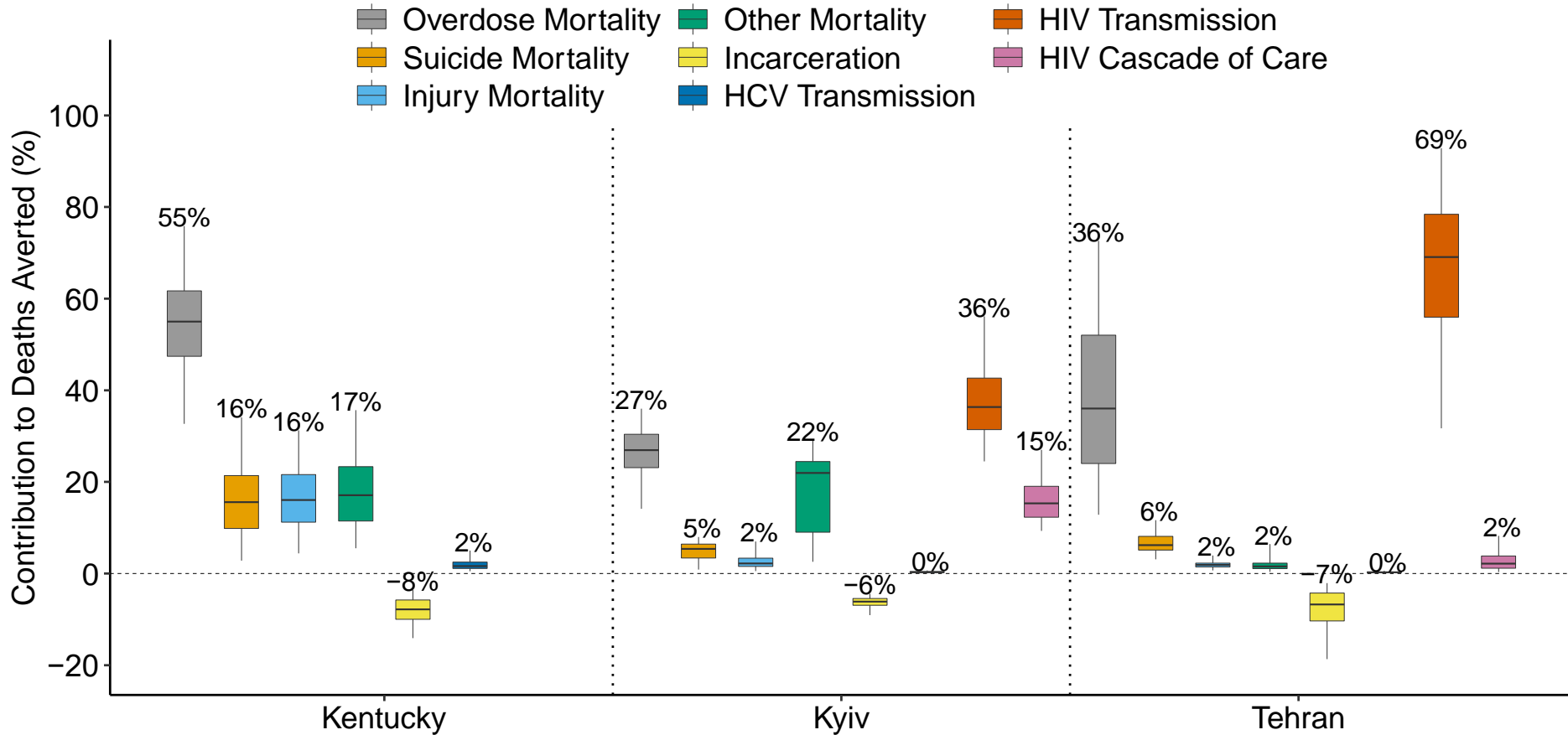




# Relative Reduction in Deaths among PWID over 2020-2040



# Most important effects of OAT



# Discussion

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- Injecting drug use causes significant health loss which can be significantly reduced through scaling-up OAT.
- Our findings highlight the importance of:
  - Scaling-up OAT
  - Improving OAT retention
  - Increasing the availability of OAT in prisons
- The impact of scaling-up OAT on all-cause mortality varies substantially between the three settings
- Primarily because of differences in how the varied harms associated with drug use contribute to mortality among PWID

# Discussion

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- Even after scaling-up OAT, mortality rates among PWID would still far exceed that among the general population
- There is a need to scale-up and develop other interventions to improve the health of PWID.
- However, unlikely other interventions will have as strong effects on a wide range of different outcomes
- Given extremely low global coverages of OAT, a key priority in most countries must be to first scale-up OAT.

# Thank you

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