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Switching from a criminalisation to a public health approach to injecting drug use in Eastern Europe and Central Asia: A modelling analysis of the costs and impact on HIV transmission

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Acknowledgements

The study was commissioned by the Economist Intelligence Unit (EIU) and sponsored by Alliance for Public Health (Funded by the Global Fund to fight AIDS, Tuberculosis and Malaria), which is a leading non-governmental organisation aiming to make a significant impact on the epidemics of HIV/AIDS and other serious infectious diseases in the EECA region and globally.

JS, ZW and PV acknowledge support from the NIHR Health Protection Research Unit in Behavioural Science and Evaluation at the University of Bristol.

PV also acknowledges support from the NIHR funded EPIToPe project and the NIHR HTA project (NIHR128513). PV and JS acknowledge support from U.S. National Institute for Drug Abuse (NIDA grant number R01 AI147490, R01 DA037773, R21 DA046809 and R01 DA047952,).

JS, TL, FLA and PV acknowledge support from NIDA (R01 DA033679).

FLA is supported on research related to this grant from the National Institute on Drug Abuse (K24 DA017072, R01 DA025943, R01 DA029910, R01 DA030768, R01 DA030762, R21 DA041953).

JC acknowledges support from K01DA043421.

This work was carried out using the computational facilities of the Advanced Computing Research Centre, University of Bristol – *http://www.bristol.ac.uk/acrc/*.

Disclosure of Interest

- No conflicts of interest

Background

HIV epidemic in Eastern Europe and Central Asia

- HIV incidence and mortality has increased since 2010[1]
- Injecting drug use accounts for 48% of new HIV infections[1]
- HIV prevalence between 7% and 53% in people who inject drugs (PWID)[2]
- PWID subject to high levels of incarceration (36% ever)[2]
- HIV treatment and harm reduction in prison is sub-optimal globally and in EECA region[3]
- Post release period is associated with increased risk of HIV transmission[4]

HIV treatment and opiate agonist therapy

- Anti-retroviral therapy (ART) reduces both morbidity and infectivity[5]
- Opioid agonist treatment (OAT)
  - reduces overdose mortality[6] and halves HIV acquisition risk[7]
  - improves HIV continuum-of-care[8,9]
  - reduces criminal activity/incarceration[10-12]
- Previous modelling has shown incarceration increases HIV transmission[13,14]
- OAT and ART have been shown to be cost-effective interventions[15,16]

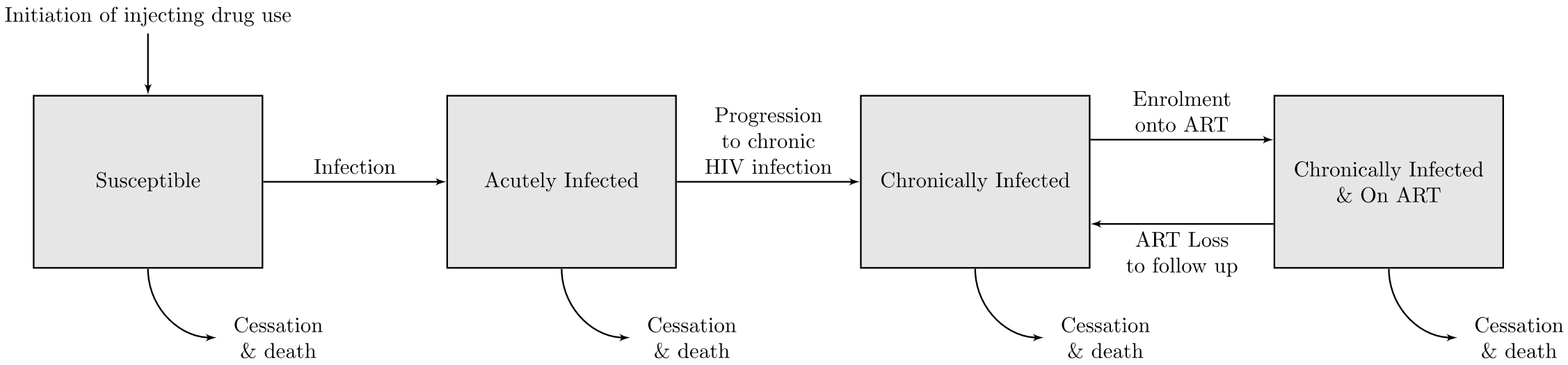
Aims

- Model the impact of reducing incarceration and reinvest monies saved to HIV treatment and OAT scale-up on HIV epidemics
- Use dynamic HIV transmission modelling in four EECA countries
  - Belarus
  - St Petersburg in Russia
  - Kyrgyzstan
  - Kazakhstan

Methods

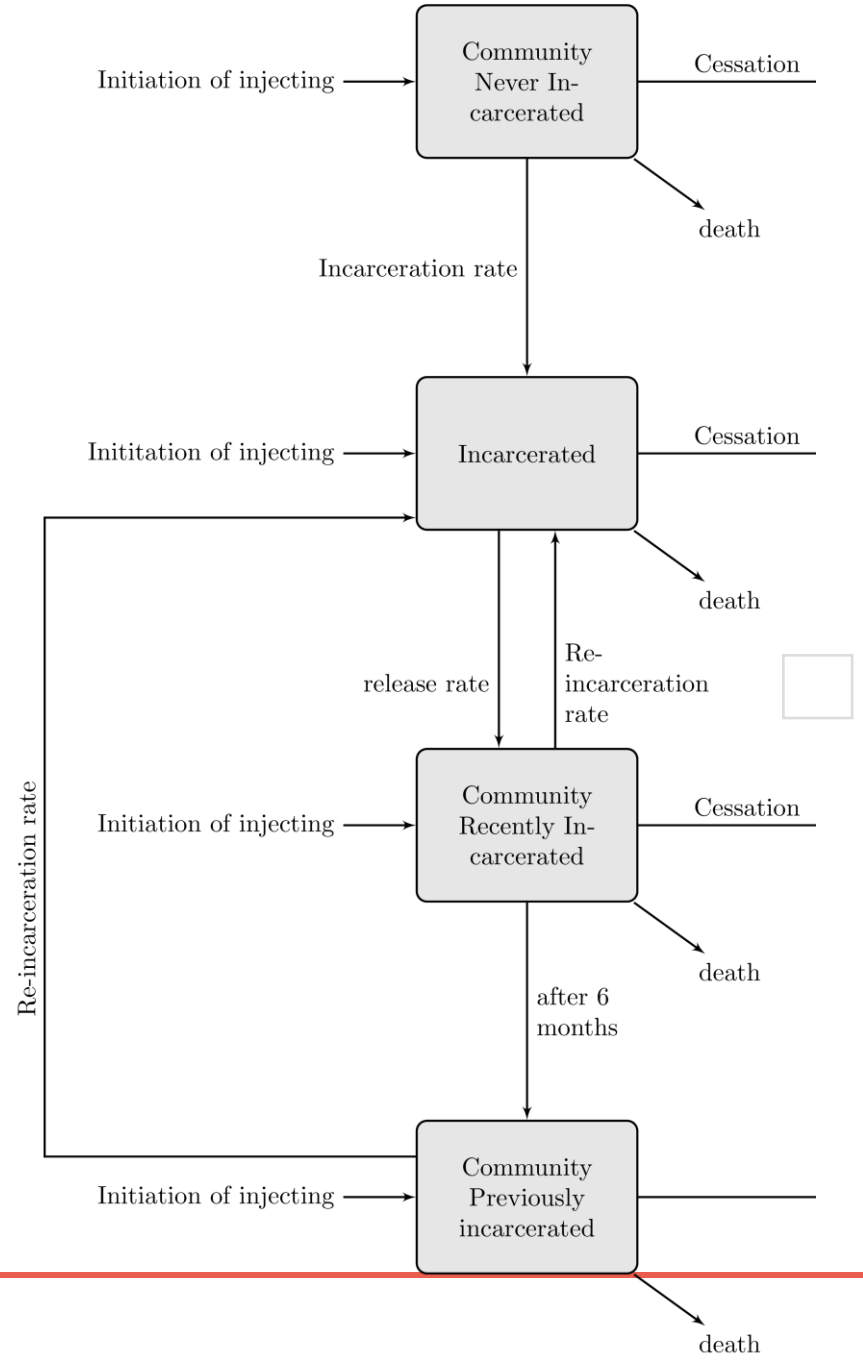
Mathematical Model

- Population stratified by injecting status, HIV status, incarceration status and OAT status



Incarceration modelling

- Four incarceration states: never, current, recent and ever
- Initiates to injecting can enter the model in any of the incarceration states
- Recently incarcerated state is 6 months in duration
- Incarceration and re-incarceration are at different rates



Modelling Opioid Agonist Therapy

- New initiates start as not on OAT
- A proportion of those entering and leaving prison remain on OAT

Effects of OAT included in the model

- Reduction in incarceration rate[10-12]
- Reduction in drug related mortality (except for first 4 weeks on or off OAT)[6]
- Increase in initiation rate onto ART[8]
- Increase in proportion of viral suppression for those also on ART[9]
- Reduced HIV transmission risk[7]

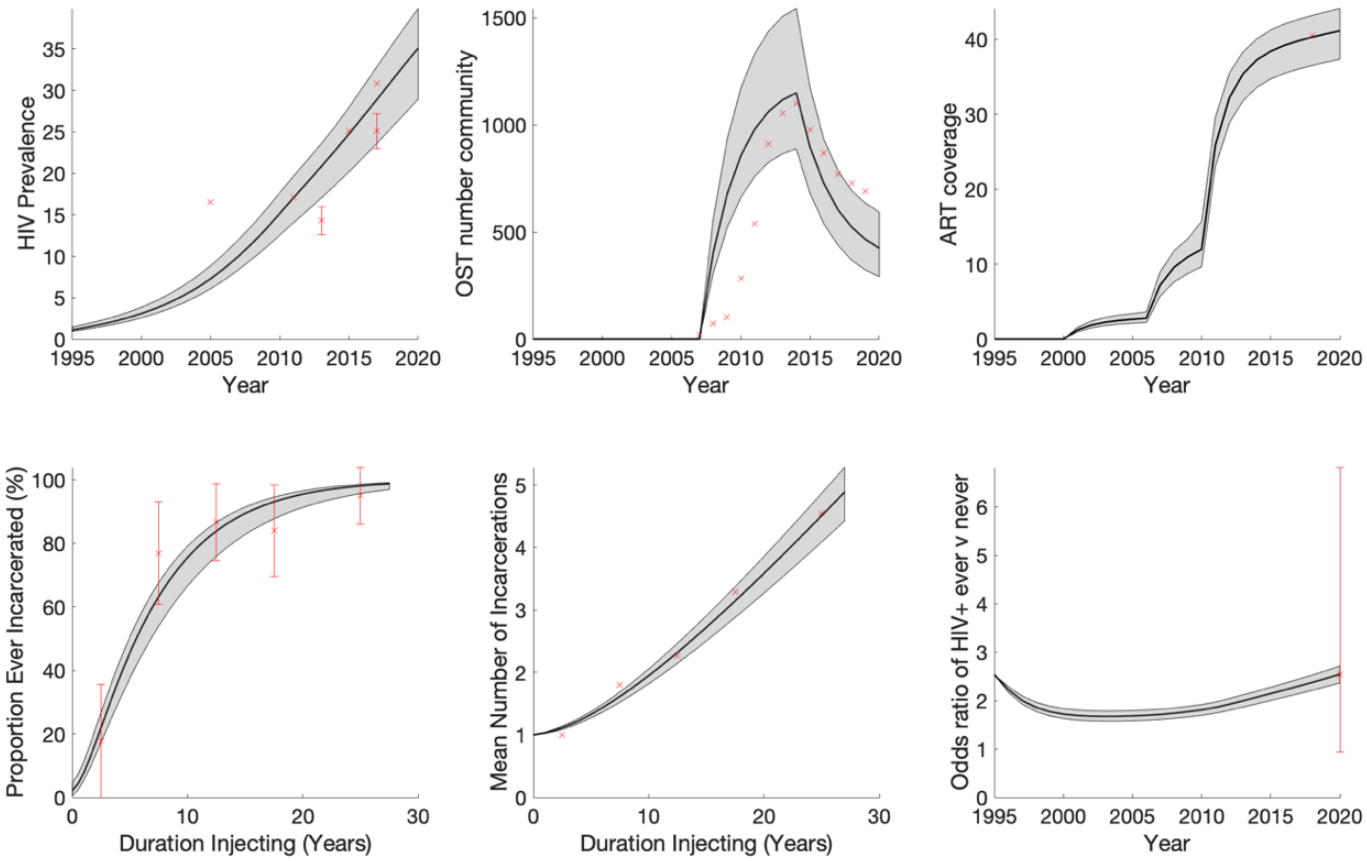
Model Calibration

Data point	Belarus	Kazakhstan	Kyrgyzstan	St Petersburg
HIV Prevalence	31% (2018)	8% (2018)	14% (2016)	48% (2017)
Population size	75,000 (2014)	120,500 (2016)	25,000 (2013)	74,000 (2009)
% ever incarcerated	76% (2020)	44% (2018)	46% (2016)	34% (2012)
% ART coverage	41% (2018)	29% (2018)	27% (2016)	42% (2017)
% viral suppression	46% (2016)	54% (2019)	89% (2018)	81% (2017)
% OAT coverage	4% (2019)	0.2% (2019)	4% (2019)	0%

Calibration

- Calibration using Sequential Monte Carlo Approximate Bayesian Computing method fitting to
  - HCV prevalence
  - OAT and ART coverage
  - Incarceration dynamics
  - Population size

Example: Belarus Calibration



Cost data

Costs (all converted to 2018 euros)	Belarus	Kazakhstan	Kygyzstan	St Petersburg, Russia
Cost of ART per person per year	€302	€1230	€363	€1259
Cost of OAT per person per year@	€550	€422	€383	€441 scaled from KAZ costs
Cost of prison per person per year@	€5480 scaled from Azerbaijan	€5952 scaled from Russia costs	€1259	€6641
Arrest and conviction cost per person	€960 scaled from Russia costs	€1161 scaled from Russia costs	€2008	€1371
Average GDP per capita	€5419	€8157	€1123	€9586

ART and OAT costs[17] Incarceration costs[18,19]

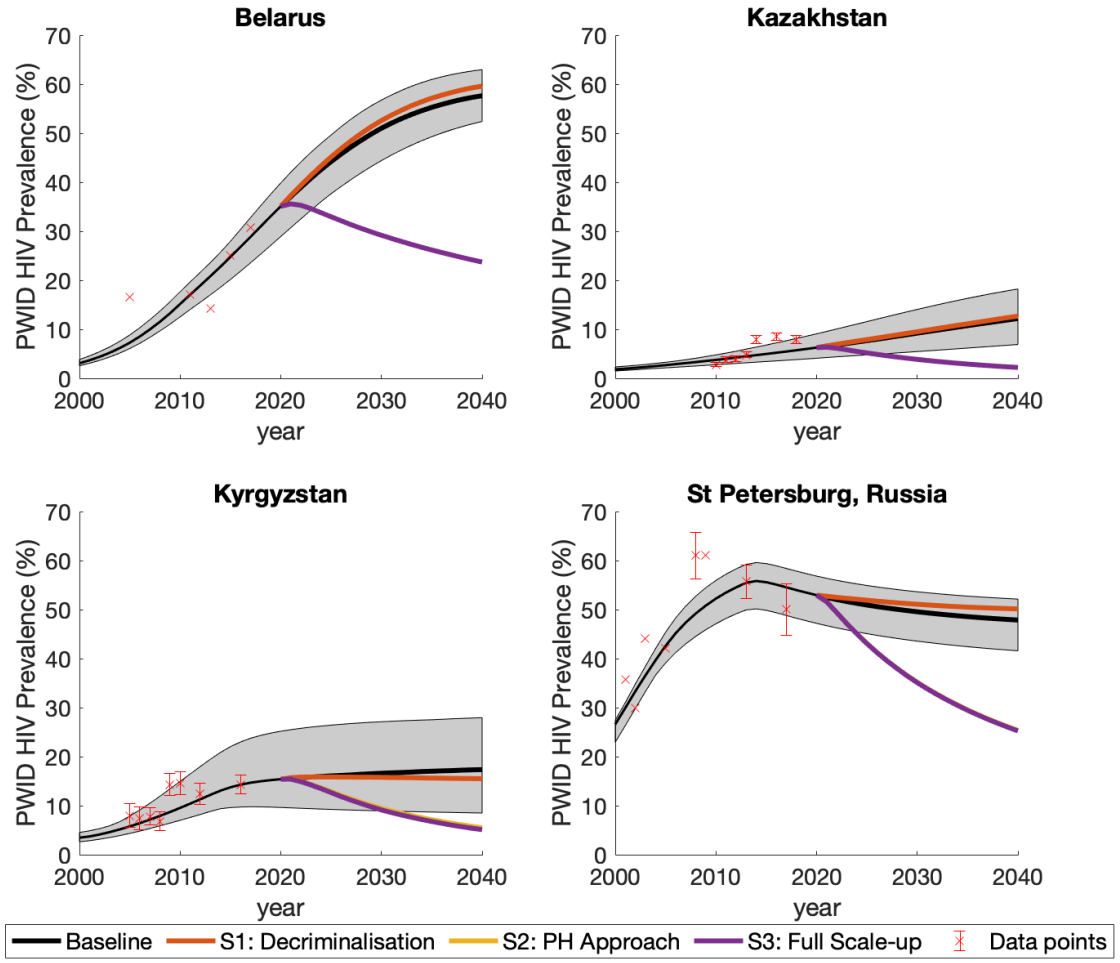
Modelled scenarios

- **Baseline:** current ART and OAT levels for PWID and ex-injectors
- **Scenario 1 Decriminalisation:** removal of incarceration due to criminal sanctions on drug use and or possession for personal use
  - 46% reduction in Russia[20], 25% elsewhere[21]
- **Scenario 2 Public Health Approach:** as scenario 1 with cost savings diverted to first ART scale up, then OAT scale up
- **Scenario 3 Full Scale Up:** as scenario 2 with scale up of OAT and ART to UNAIDS/WHO targets in community and prison

- Impacts and costs measured for 2020-2040, with 3% discounting of costs and life years gained
- Breakdown of costs for each scenario to determine where savings occurred
- Calculate total life years gained and percentage of infections averted compared to Baseline
- Incremental Cost Effectiveness Ratio as incremental cost per life year gained
- Compared ICER to willingness to pay threshold of GDP per capita

Results

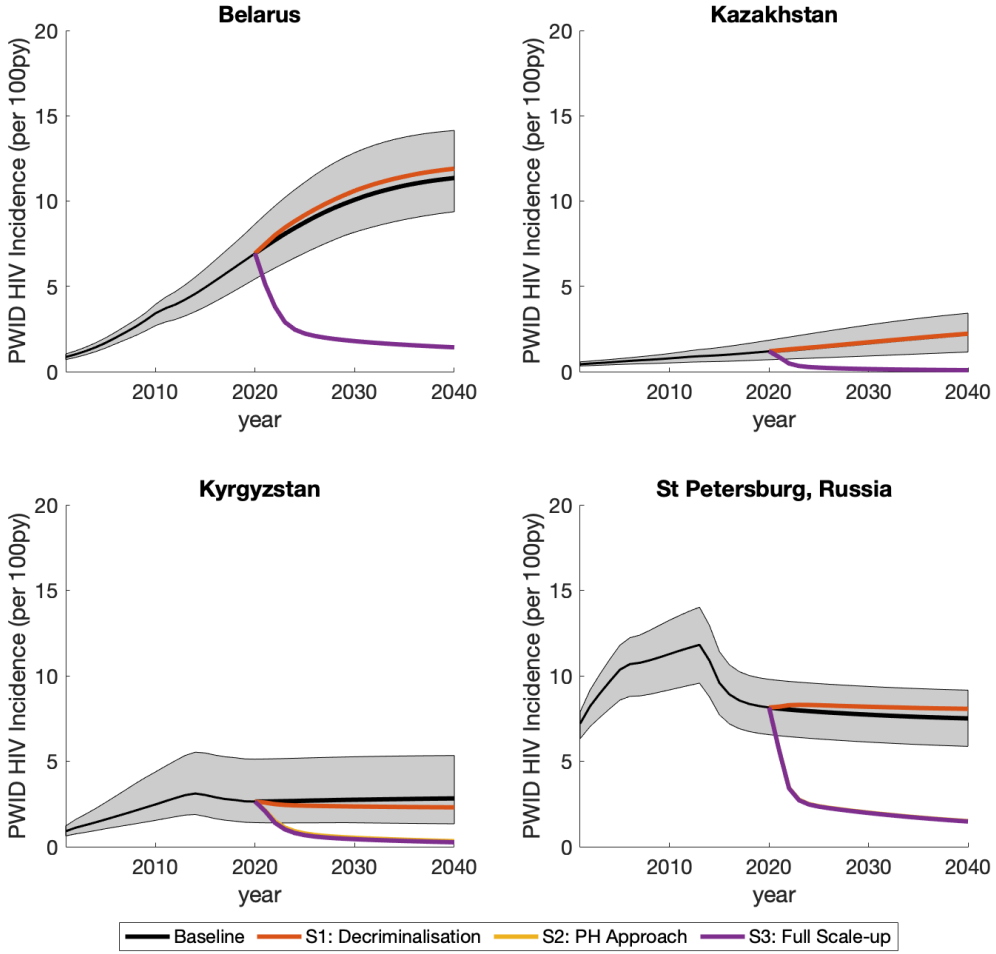
Baseline Projections



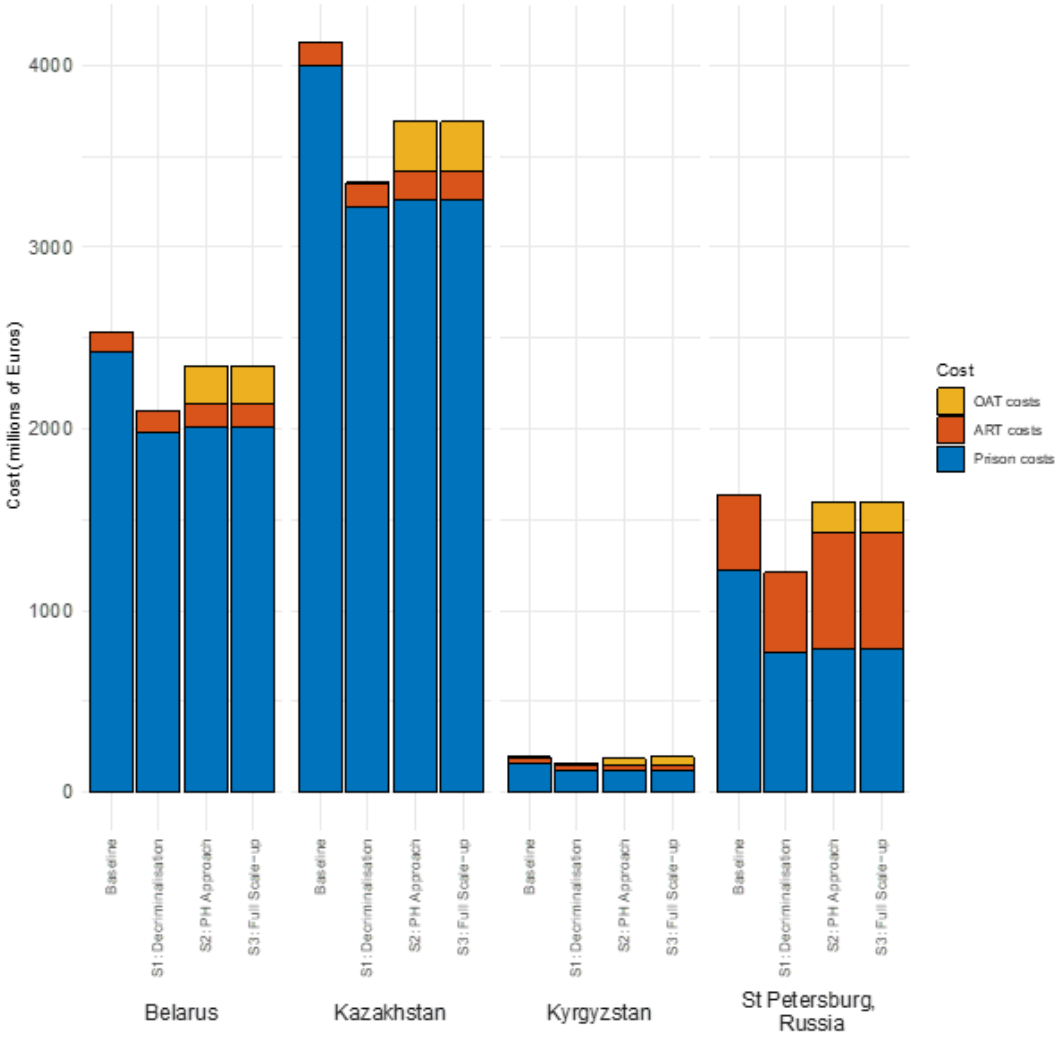
- All epidemics relatively stable except Belarus
- Across settings 16-35% of PWID were incarcerated
- HIV transmission risk in prison lower than community (0.35-0.88) in all settings except Kyrgyzstan (2.58)
- In Kazakhstan and Belarus S2 = S3
- Scale up of ART for S2 achieved by 2024 in all settings

Impact on infections and incidence

- Decriminalisation scenarios show slight rise in incidence in all settings except Kyrgyzstan
- 58% decrease in infections in Russia compared to 84% in Kazakhstan for Public Health approach



Costs



- Cost of incarceration makes up between 75 and 96% of total costs
- Higher proportion of costs from ART in Russia due to higher ART coverage and lower proportion of population currently incarcerated
- Costs saved from decriminalisation can pay for all settings to scale up to >81% coverage of ART
- Full scale-up is cost saving after decriminalisation of drug use in all settings except Kyrgyzstan which is €523,000 more than baseline

Cost effectiveness Analysis

- Public Health Approach vs Baseline
  - all settings cost saving

- The WHO/UNAIDs vs Public Health Approach
  - all cost-effective below 1xGDP per capita threshold except Kyrgyzstan which is cost-effective below 3xGDP per capita

Summary

Conclusions

- Decriminalising drug use and/or possession and investing the money saved in ART and OAT could reduce HIV incidence by 75% in our modelled settings and the number of new infections by greater than 58%
- Cost-saving in 3 out of 4 settings and cost-effective in all
- Allows scale up to 90/90/90 UNAIDs target by 2024 and 40% OAT WHO target with little or no additional investment

Further Information

- Report in collaboration with APH and EIU can be found here

https://eiuperspectives.economist.com/healthcare/drug-control-policies-eastern-europe-and-central-asia-economic-health-and-social-impact

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