# Cost-Effectiveness Analysis of HIV Prevention and Treatment Portfolios in US Prison Settings

EE314

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## BACKGROUND

### HIV Epidemic in US Correctional Settings

- HIV burden remains disproportionately high among people living in prison
- Economic value of prison-based HIV prevention and treatment interventions is unknown

## OBJECTIVE

- To evaluate the cost-effectiveness of HIV prevention and treatment interventions in prison settings

## METHODS

- **Model:** Dynamic compartment model is developed to simulate HIV transmission within prisons and in the general community
- **Interventions**: 1) Testing scale-up, 2) treatment (ART) scale-up, 3) condom, 4) needle and syringe programs (NSPs), 5) opioid agonist therapy (OAT), and 6) daily oral pre-exposure prophylaxis (PrEP)
- **Target population**: High-risk incarcerated persons—people who inject drugs (PWID) and/or men who have sex with men (MSM)
- **Outcome measures**: Discounted total costs, quality-adjusted life-years (QALYs), and incremental cost-effectiveness ratios (ICERs) of 20-year implementation
- **Intervention costs:** Increasing marginal cost of recruiting additional participants at higher program levels (see Figure 1)

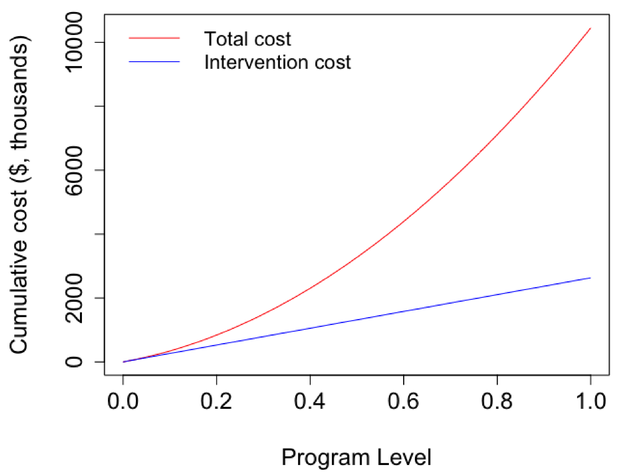
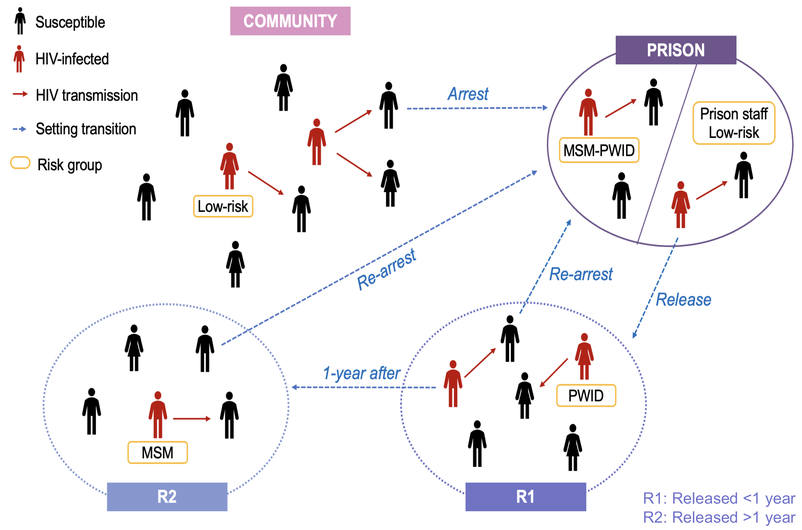



**Figure 1.** 20-year cumulative costs of a prison-based PrEP program at increasing coverage levels (0-100%)

### Dynamic Compartment Model of HIV Transmission and Incarceration




## RESULTS

### Single intervention

| Intervention | Program level | Outcome |
|---|---|---|
| Testing | Any | Cost-saving |
| ART | 25% scale-up | $91,000/QALY gained |
| | 50% scale-up | $96,000/QALY gained |
| | 100% | $105,000/QALY gained |
| Condom | Any | Cost-saving |
| NSP | Any | Cost-saving |
| OAT | 25% | $78,000/QALY gained |
| | 50% | $82,000/QALY gained |
| | 100% | $90,000/QALY gained |
| PrEP | 25% | $44,000/QALY gained |
| | 50% | $60,000/QALY gained |
| | 100% | $124,000/QALY gained |

### Portfolios

- Combining current levels of testing and ART with **distribution of condoms and NSPs for 25%** of high-risk incarcerated people can be **highly cost-effective** (ICER = $20,000/QALY gained)

## RESULTS

- Expanding testing and ART by 25% can be cost-effective (ICER = $70,000/QALY gained)
- **100% coverage of testing and ART** remains **cost-effective** (ICER = $78,000/QALY gained)
- Even though **OAT and PrEP** provide health benefits, adding them into portfolios may **not be cost-effective** due to **overlapping effects** with other interventions

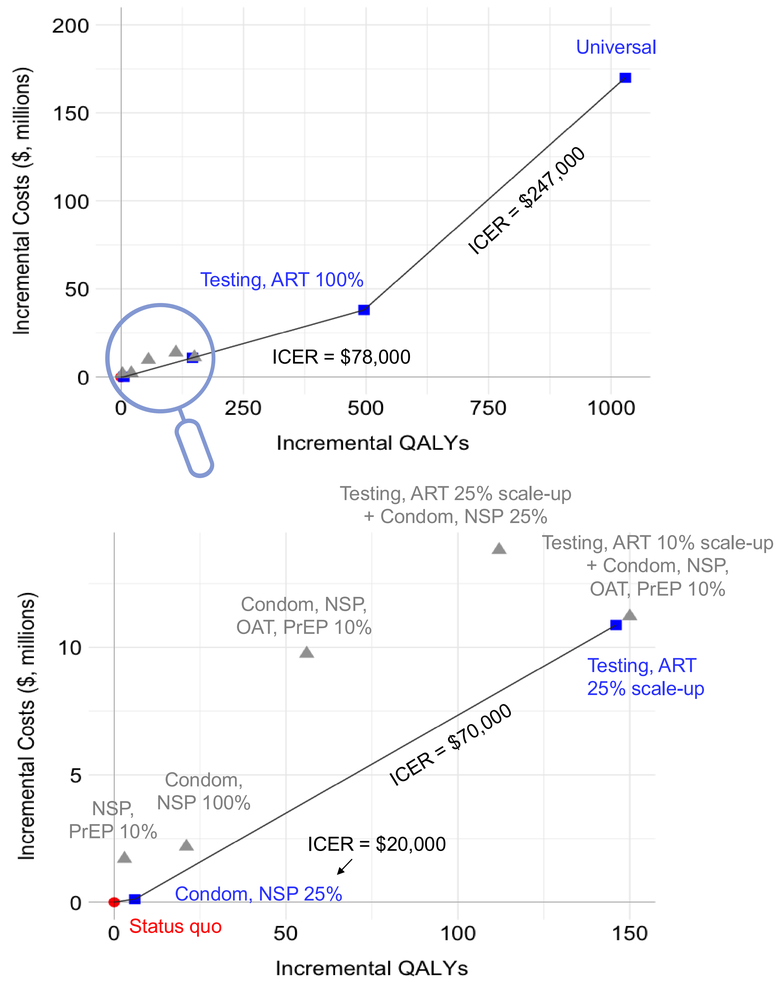



**Figure 2.** Incremental costs incurred and QALYs gained of base-case analysis

## CONCLUSION

- Prison-based HIV prevention and treatment interventions could provide substantial and **cost-effective health benefits to both incarcerated and general populations**
- Given a limited budget, resource allocation should **prioritize distribution of condoms and NSPs**, **followed by expanded access to testing and ART**