

TITLE: MODELING THE IMPACT OF CHANGING DRUG MARKETS AND STRUCTURAL DETERMINANTS ON HCV AND HIV TRANSMISSION AMONG PEOPLE WHO INJECT DRUGS IN THE UNITED STATES: A RURAL AND URBAN COMPARISON

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ABSTRACT

Background. The impact of changing drug use patterns on hepatitis C virus (HCV) and HIV incidence among people who inject drugs (PWID) in the US is understudied.

Methods. An HCV and HIV transmission model was calibrated to urban and rural area data (San Diego, CA and Central/Northern Wisconsin). Fentanyl use among PWID was assumed to increase mortality and injecting-related risk of HIV and HCV based on San Diego data. We predicted HCV/HIV incidence with recent trends (in fentanyl use, transition from injecting to smoking drugs, opiate agonist treatment (OAT) and incarceration), and scenarios with no trend changes since 2020. We calculated the population attributable fraction of fentanyl on incidence, comparing to a no fentanyl counterfactual from 2015-2025.

Results. High and increasing self-reported fentanyl use among PWID was observed in Central/Northern Wisconsin (20% in 2018 to 45% in 2021) and San Diego (51% in 2021 to 66% in 2023). Between 2015-2025, modeling suggests fentanyl use contributed to 18% (95%CI 9-25) and 34% (95%CI 26-45) of new HCV infections among PWID in Central/Northern Wisconsin and San Diego, respectively. Fentanyl contributed to 10% (95%CI 1-26) of HIV infections in San Diego; no HIV was observed among Central/Northern Wisconsin PWID. Fentanyl-associated risk was mitigated by increased OAT, reduced incarceration (Wisconsin), and shifts from injecting to smoking drugs (San Diego).

Conclusions. Fentanyl use increased HCV and/or HIV in an urban and rural area, suggesting expanded access to harm reduction, alongside interventions to reduce blood-borne virus transmission risk among PWID who use fentanyl are urgently needed.

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