DEVELOPMENT AND VALIDATION OF A GLOBAL MODEL TO OPTIMIZE HIV RESOURCE ALLOCATION AMONG PEOPLE WHO INJECT DRUGS: THE INTREPID MODEL

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Abstract

Background: People who inject drugs (PWID) remain a key population for HIV transmission, with ~17.8% of PWID infected with HIV globally. Despite the UNAIDS target to reduce HIV incidence by 90% by 2030, governments lack guidance on the most cost-effective intervention portfolio to prevent HIV among PWID. We develop and validate a global epidemic economic model of combination HIV prevention among PWID informed by systematic review data.

Methods: We developed the INTREPID model (Intervention Portfolio Economic Model Among People Who Inject Drugs), an economic HIV transmission and intervention model among PWID and their sexual partners including incarceration, homelessness, and gender. We included OST, NSP, and ART, with synergies between interventions. The model was calibrated using Bayesian methods to country-level systematic review data on HIV (prevalence, intervention coverage) and PWID epidemiology (incarceration, gender, homelessness, population size). The model was validated against a separate series of detailed models in 7 key countries. Validation was performed through simulating OST scale-up (to 50% among PWID) and ART scale-up (to 81% among PWID) across 2022-2030, and ensuring <20% relative difference in predicted HIV incidence reductions.

Results: The INTREPID model calibrated well to data in 78 countries. During validation, differences in intervention impact between INTREPID and key country models were primarily driven by differences in baseline OST and ART coverage estimates arising from different data sources and/or methods for calculating coverage. In some settings (e.g. Belarus), differences in HIV prevalence trends drove differences between models. INTREPID data were adjusted with additional country data to ensure validation in the key countries, and critical data driving impact was highlighted for review/adjustment by users.

Conclusions: INTREPID validation yielded important insights into key data uncertainties to inform data collection and improve model accuracy. Ultimately, INTREPID could be used to inform HIV resource allocation among PWID globally.

Disclosure on interest: None