STATEWIDE TRENDS OF TRANSMITTED HIV-1 DRUG RESISTANCE IN RHODE ISLAND OVER 2004-2020

CROI 2022
00517

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BACKGROUND

HIV-1 transmitted drug resistance (TDR) remains a roadblock toward ending the HIV epidemic due to its ability to compromise effectiveness of antiretrovirals for prevention and care. Country- and state-wide TDR data beyond selected surveillance and research efforts are absent, and available estimates are heterogenous.

METHODS

We aggregated all available HIV-1 *pol* partial sequences from treatment-naïve persons receiving routine clinical care in the state of Rhode Island over 2004–2020, and evaluated statewide TDR extent, trends, impact on 1st-line regimens, and association with transmission networks, by using Stanford Database tools, Mann-Kendall statistic, and phylogenetic analysis.

RESULTS

A total of 1,123 treatment-naïve persons, ~86% of all new-HIV diagnoses in Rhode Island in 2004-2020 had available sequences. Statewide TDR to any antiretroviral drug increased from 8% (2004) to 26% (2020; Mann-Kendall statistic 0.47, 95% CI 0.16–0.68) (Figure 1). TDR trends were mostly driven by NNRTI-associated mutations (from 5% in 2004 to 18% in 2020; K103N/S most prominent; Figure 2), less by NRTI-associated mutations (from 2% in 2004 to ~8% in 2020; K65R absent, M184V/I 0.5%); and even less by PI-associated mutations (from <2% in mid-2000's to 7% in 2008 and ~2-3% in 2019-2020). Dual- and triple-class TDR were low. Major InSTI TDR was absent in sequences available from 49 individuals. Predicted intermediate-high resistance to 1st-line regimens was in 77% of people with TDR (Figure 3), with differential viral load suppression patterns after 1st-line initiation. Among all individuals, 34% were in molecular clusters; and 14% of all clusters included only members who shared TDR mutations. Among clustered individuals, people with TDR were more likely to be in small clusters.

Conclusions: In a unique, statewide analysis of longitudinal trends in a densely-sampled HIV epidemic over 2004–2020, we found **ongoing increases in transmitted drug resistance prevalence, to a high 26% by 2020**, primarily, but not solely, **driven by NNRTI-associated resistance**.

Figure 1. Dynamics of Transmitted Drug Resistance in Rhode Island. Regression curves are smoothed by Loess method. Lines represent smoothed trends, each dot represents an annual value, and shades indicate 95% Confidence Intervals (CIs).

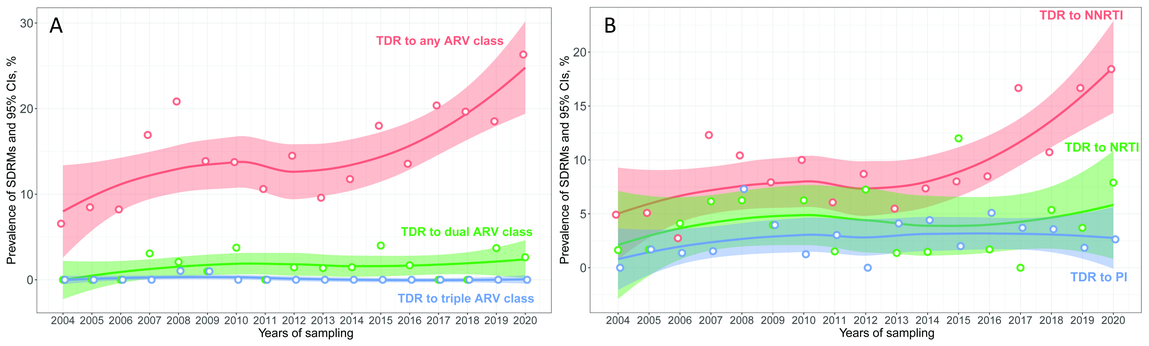


Figure 2. Surveillance Drug Resistance Mutations (SDRMs) in Rhode Island by Antiretroviral Class in four-year time intervals from 2004 to 2020 (note different Y axes scales).

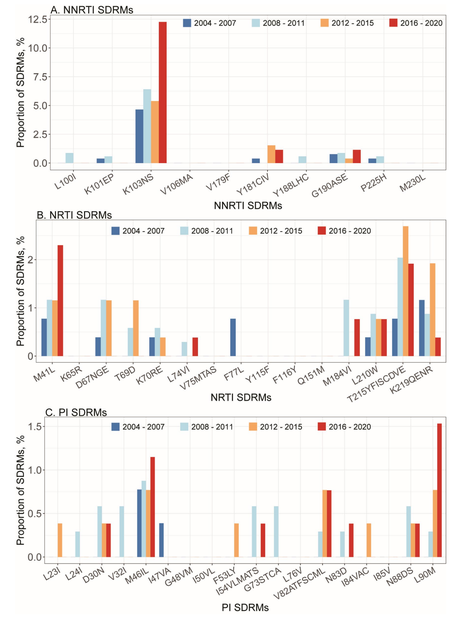
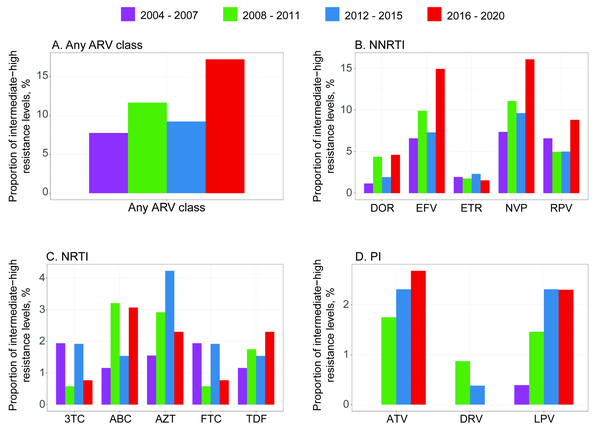


Figure 3. Intermediate-high Predicted Levels of SDRMs in Rhode Island by Antiretroviral Class in four-year time intervals from 2004 to 2020 (note different Y axes scales).



For more information see Novitsky et. al. Statewide Longitudinal Trends in Transmitted HIV-1 Drug Resistance in Rhode Island, USA. *Open Forum Infectious Diseases* 2022;9:ofab587.