

Trends in HIV-1 Drug Resistance Mutations from a US Reference Laboratory: 2006-2017

Background

- Antiretroviral therapy (ART) has increased survival and improved the quality of life of patients living with HIV-1 and has led to a decline in HIV-1 transmission.¹⁻³
- However, drug-resistance mutations (DRMs) have emerged owing to the error-prone replication of HIV-1 and regimens that provide incomplete virologic suppression.⁴
- Temporal trends in DRMs can inform clinical decisions and drug development.
- **Objective:** The investigators evaluated trends in DRMs for antiretroviral drugs (ARVs) among specimens submitted for testing at a large US reference laboratory.

Methods

- Investigators analyzed deidentified HIV-1 subtype B drug resistance test results for single- and multi-class resistance to ARVs, from the database of a large US reference laboratory.
 - Over 10,000 specimens/year (2006 to 2017) were analyzed for nucleoside reverse transcriptase inhibitor (NRTI), non-nucleoside reverse transcriptase inhibitor (NNRTI), and protease inhibitor (PI) DRMs.
 - Over 1,000 specimens per year (2010 to 2017) were analyzed for integrase strand transfer inhibitor (INSTI) DRMs.
- Trends for DRMs with a Stanford HIVDB mutation score ≥ 10 were evaluated.⁵

Results

- The prevalence of specimens with single- or multi-class DRMs associated with NRTI, NNRTI, or PI declined from 48.9% in 2006 to 39.3% in 2017.
 - The percentage of specimens with high-level dual- and triple-class DRMs declined from 43.3% to 17.1%. The percentage of specimens with only single-class DRMs increased from 40.0% to 52.9%.
 - The percentage of specimens with DRMs associated with some earlier prescribed drugs declined. The percentage of specimens with DRMs associated with some newer drugs increased.
- From 2010 to 2017, the overall prevalence of major DRMs associated with INSTI declined. However, the prevalence of DRMs associated with some newer INSTI drugs increased.
- Among patients with serial genotypic resistance testing, ~50% without prior reportable DRMs associated with NRTI/NNRTI/PI drugs or INSTI drugs developed at least 1 high-level DRM.

Conclusions

- Data from a large US reference laboratory indicates the prevalence of specimens with multi-class drug resistance declined from 2006 to 2017 among tested patients living with HIV-1; however, the prevalence of resistance to only a single class of ART drugs increased.
- The identification of emerging DRMs following serial genotypic resistance testing supports testing after ART failure.
- Sustained decreases in DRM prevalence among treatment-experienced HIV patients may lower the incidence of transmitted drug resistance in newly infected patients.

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Webpage

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