

## BACKGROUND

- The prevalence of transmitted drug resistant mutations in the United States is 19-33%.<sup>1,3</sup>
- Integrase strand transfer inhibitors (INSTIs) have recently become the most widely prescribed class of antiretrovirals (ARVs) for the treatment of HIV; however, few studies have described the trends in the prevalence of resistance to NRTIs, NNRTIs, PIs, and INSTIs.
- This study sought to assess the trends in the prevalence of TDRMs over a period of 11 years at a single center in Charlotte, NC

## OBJECTIVES

- To examine the incidence of TDRMs during 2008-2019 at a single institution
- To examine the association between TDRMs and year as well as type of therapy

## METHODS

- All treatment-naïve HIV-1 – infected adults (2008-2019), who had baseline genotype testing performed, were retrospectively evaluated
- Analysis of the HIV pol, protease, and integrase genes was performed by LabCorp laboratory
- Resistance was defined based in International AIDS Society 2019 definition and Stanford University's HIV Drug Resistance Database.
- Clinical and patient characteristics were compared between patients who were screened between 2008 through 2013 and patients screened between 2014-2019 using independent samples t-tests, Wilcoxon Mann-Whitney tests, and chi-square statistics, where appropriate.
- Relative risk and multivariable logistics regression were used to analyze data
- All tests were two-tailed with an alpha less than 0.05 indicating statistical significance.
- All analyses were conducted using SAS v9.4 (Cary, NC).

## RESULTS

Table 1. Demographics (n=456)

Age [mean (SD)]	33.5 (11)
Male, n (%)	363 (80%)
White, n (%)	36 (8%)
Black, n (%)	391 (86%)
Hispanic, n (%)	24 (5%)
Asian, n (%)	3 (1%)
Baseline HIV-1 RNA [log <sub>10</sub> , mean (SD)]	4.6 (0.8)
CD4 <sup>+</sup> count [cells/mm <sup>3</sup> , mean (SD)]	359 (265)
Elapsed time from HIV diagnosis to resistance testing [months, median (IQR)]	3 (11)

## RESULTS

Figure 1. Annual Cumulative Incidence of TDRMs, Per Period 2008-2019, per 100,000 (n=456)

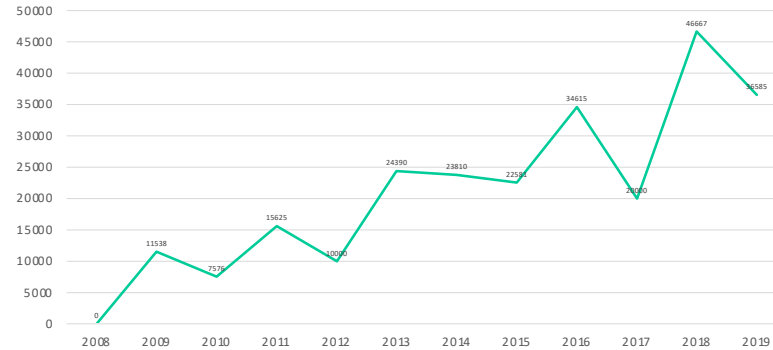
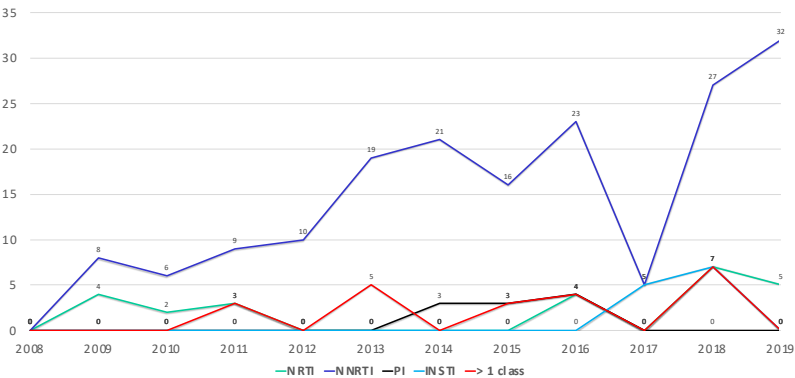


Figure 2. Annual Rates (%) of TDRMs Among Classes of Antiretrovirals, 2008-2019 (n=88)



- Patients presenting 2014-2019 were younger, than patients who presented 2008-2013 (31.96 years v. 34.71 years,  $t=-2.65$ ,  $DF=454$ ,  $p=0.008$ ), had slightly higher baseline CD4<sup>+</sup> counts (389.9 v. 337.8,  $t=2.07$ ,  $DF=454$ ,  $p=0.04$ ), were more often male ( $\chi^2=17.99$ ,  $p<0.0001$ ), and were more likely to initiate treatment with INSTI-based treatment ( $\chi^2=287.99$ ,  $DF=3$ ,  $p<0.0001$ ).

- Figure 1 represents the annual cumulative incidence rate from 2008-2019.
  - The total number of cases of TDRMs was 19.30% (n=88).
  - There has been a steady increase in annual cumulative incidence in incident resistance since 2008, with a peak in 2018 (46,667/100,000).
  - The relative risk (RR) for TDRMs was 1.76 (95% CI=1.42-2.17).
  - For patients who were tested for resistance within the first year of their diagnosis (n=349), the RR was 1.77 (95% CI=1.42-2.21).

- Compared to patients assessed for TDRM within a year of diagnosis (n=456) and whose initial treatment was NNRTI-based, patients who started treatment on PI-based therapies (OR=5.34, 95% CI=2.17-13.11) or INSTI-based therapies (OR=4.00, 95% CI=1.43-11.20) had significantly greater odds of TDRMs, controlling for age, gender, race, baseline CD4<sup>+</sup> count, HIV RNA, hepatitis B status, hepatitis C status, and time period of testing.
- For all patients who started on treatment (n=432), those who began with INSTI treatment had significantly lower odds of TDRM (OR=0.25, 95% CI=0.08-0.72) compared to those who started on NNRTI-treatment controlling for age, gender, race, etc.

- Figure 2 describes the annual rates of TDRMs by year and drug class
  - Over the 11-year study period NNRTI resistance was most common (67/88; 76%), followed by NRTI (9/88; 10%), PI (4/88; 5%), and INSTI (2/88; 2%).
  - Dual class resistance was noted in 6 (7%) patients over the 11-year study period, one of whom had TDRMs in the INSTI and NNRTI classes (2015).

## CONCLUSIONS

- The overall incidence of TDRMs in our clinic of 19.3% mirrors national surveillance data, with notably higher rates of resistance in the last 2 years.
- Prescribing of the INSTI-based regimens over the last 5 years reflects the 1<sup>st</sup> line place of therapy of these drugs according to the DHHS and IAS guidelines and is appropriate due to the continued increase in the incidence of NNRTI TDRMs.

## REFERENCES

- Henegar C et al. Trends and characteristics of HIV-1 drug resistance in the United States (2012-2018). Poster #0521; CROI 2020.
- Feng J et al. Transmitted drug resistance in people living with diagnosed HIV in California. Poster #3184; CROI 2020.
- McClung et al. Integrase and other transmitted HIV drug resistance – 23 U.S. jurisdictions, 2013-2016. Poster 3337; CROI 2019.