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Background. Baseline genotype antiretroviral resistance testing (GART) were introduced to allow better selection of antiretroviral therapy (ART), minimizing the use of less effective drugs and risk for ongoing transmission of drug-resistant virus. However, the value of baseline GART has recently been questioned due to declining incidence of TDR in the setting of improved drug tolerability profiles and effectiveness. We aimed to evaluate the long-term clinical and economic impact of TDR using a well characterized, geographically defined cohort between 1999–2018.

Methods. In the Southern Alberta Cohort (SAC) database we identified all (ART naïve) HIV patients, ≥16 years of age, with a baseline GART. They were classified by presence or absence of TDR. Clinical and sociodemographic data were obtained from database and chart review. All statistical analysis was performed with Stata.

Results. During the study 745 GART tests were done on ART naïve patients. Baseline ART resistance was documented in 78 /745 patients. TDR was to the NNRTI class in 59 (75.6%), to NRTI in 12 (15.4%) and to the PI class in 7 (8.9%) patients. Two patients had two class resistance and none had INSTI resistance. There was a significant difference in cost per year of therapy comparing the TDR and control ($17,152/year vs. $15,362/year, $P \leq 0.001$). Patients with TDR had greater pill burden with 20% being on BID/TID ART regimens compared with the controls of 13% ($P = 0.003$). No differences in incident ART adverse events (12.8% TDR vs. 13.3% no TDR), drug interactions (1.6% vs. 1.0%) or reasons to stop or change ARVs were seen between study groups. The duration of ART on any given drug class was similar between the two populations ($P = 0.6694$) as was status of viral suppression at one year 73% vs. 65%.

Conclusion. Presence of TDR at baseline had little immediate impact on ART initiation or tolerance, but by limiting choices negatively impacted pill burden and dosing as well as drug costs.

Table 1: Demographics (Active patients in SAC 1999-2018)

Characteristic	Total Population at SAC with baseline GART (n=667)	TDR positive (n=78)	P-Value
Age at HIV diagnosis, years, mean	37.4 (16-79)	38.4 (22-60)	0.4525
<30 years old	198	18 (23.0)	
31-40 years old	224	31 (39.7)	
41-50 years old	166	17 (21.8)	
51-60 years old	79	12 (15.4)	
Gender			
Male	525 (78.7)	67 (85.9)	0.119
Female	139 (20.8)	10 (12.8)	
Transgender	3 (0.5)	1 (1.3)	
Ethnicity			
Caucasian	383 (57.4)	51 (65.4)	0.051
Indigenous	64 (9.6)	6 (7.7)	
African/Caribbean/Black	114 (17.1)	5 (6.4)	
Asian	63 (9.5)	6 (7.7)	
Hispanic	15 (2.3)	3 (3.4)	
Other/unknown	28 (4.2)	7 (8.5)	
HIV Risk Behavior			
Homosexual	308 (38.8)	43 (51.2)	0.204
Heterosexual	292 (36.8)	21 (25.0)	
Bisexual	58 (7.3)	8 (9.5)	
PWID	62 (7.8)	6 (7.1)	
Endemic region	64 (8.1)	3 (3.6)	
Other/unknown	9 (1.2)	3 (3.6)	
HIV Diagnosis			
1999-2008	139 (20.8)	20 (25.6)	0.7425
2008-2018	528 (79.2)	58 (74.4)	
HIV Subtype			
A/A1/A2	31 (4.6)	4 (5.1)	0.049
B	489 (73.3)	65 (84.4)	
C	101 (15.1)	4 (5.2)	
Recominant	28 (4.2)	1 (1.3)	
Other/unknown	28 (2.6)	4 (5.2)	

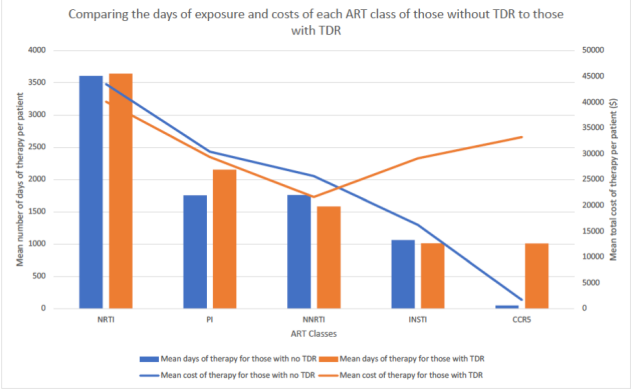

Figure 2: The average number of days of each class of ART per patient comparing those with TDR to the control is shown on the left Y axis with the bar graph. The secondary right Y axis is evaluating the average total cost of therapy per ART class being used comparing patients with TDR to the control group is shown by the line graph.

Disclosures. **All authors:** No reported disclosures.

2506. Trends of Transmitted Resistance Mutations to Four Drug Classes, HIV-Subtypes And Herpesviruses Replication Among Subjects Recently Diagnosed as HIV Infected Over 2004–2019

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Background. to evaluate circulation of drug resistance mutations (DRMs), subtypes (ST) and Herpesviruses replication among subjects recently diagnosed as HIV infected (pts) in Veneto (Italy), over 16 years, comparing previously reported trends with the most recent one, updated to 2019.

Methods. on plasma from 2919 patients diagnosed from July 2004 to April 2019, protease (PR), reverse transcriptase (RT) and recently Integrase (In) were analyzed for DRMs, susceptibility profile (Stanford db) and ST. Potential low-level resistances were excluded. CMV-DNA and EBV-DNA were evaluated by in-house Real-Time-PCR in PBMCs.

Results. in 5 periods (2004/06, 07/09, 10/12, 13/16, 17–19) 334, 796, 752, 750 and 287 patients were recruited; non-B-ST were 21.9, 29.3, 33, 32.7 and 48.1% (33.5% Italians in 17–19), respectively. A significant increase of non-B-ST ($P < 0.0001$ for trend) and of the percentage of Italians with non-B-strains ($P = 0.029$) were observed. Resistance to PR or to multiple classes declined but not to non-nucleoside RT inhibitors (NNRTI) (Fig 1). E138A alone, not included in the previous evaluations, increased from 2.3 to 1.8, to 3.2, to 3.6, to 4.7% in 2017-19. No primary TDRM to In-Inhibitors (InIn) were found in 469 B-ST-Pts enrolled in 2014–19; 16% had major TDRM for RT/PI. Among 231 non-B patients, 12,5% with other TDRMs, only a 143C and a 66I were found. Accessory InIn-TDRMs were detected (Figures 2 and 3). Nevertheless, from 2009 to 2019 in Veneto 114 InIn-failed and potentially transmitters patients with In-DRMs were found. In 2017–19 17,3% of patients had CMV-DNA in PBMCs, with a median CD4 of 55 (8%), HIV-RNA 247251 cps/mL and EBV-DNA of 811 cps/106 PBMCs (3% were neg); Patients CMV-DNA-negative (82,7%) had median CD4 of 334 (18,9%), HIV-RNA 47770 cps/mL and a significantly lower EBV-DNA of 194 cps/106 PBMCs (15% were neg): differences between immuvirological variables were significant.

Conclusion. An increase of non-B strains and a slight increase of TDRMs among B-ST were observed. The persistent circulation of NNRTI-DRMs, the shortage of major In-TDRMs but a circulation of many In-polymorphisms have implications on the screening at baseline and on the selection of the first-line HAART. Many patients with lower CD4 and higher HIV replication has an incomplete control of co-infecting herpesviruses, which contribute to immunoactivation.

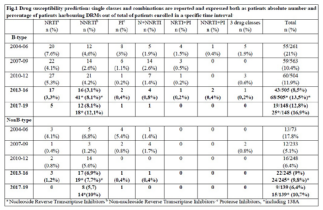

Fig 2. Prevalence of InSTI TDRMs amongst 469 patients with B subtype HIV infection

	2013-16	2017-19
Number of patients	**359**	**110**
Age (mean and SD)	**38.8 (10.8)**	**40.4 (10.9)**
CD4+ cell count/mm3 (mean and SD)	**401 (273)**	**377 (368)**
CD4+ cell count percentage (mean and SD)	**20.8 (10.9)**	**18.1 (11.6)**
Plasma HIV RNA (copies/mL,mean and SD	**501853(1594266)**	**947736 (4811393)**
Pts with wild type	**302**	**92**
Pts with NRTI	**14**	**2**
Pts with NNRTI	**35**	**14**
Pts with PI	**1**	**1**
Pts with NRTI+NNRTI	**4**	**1**
Pts with NRTI+PI	**1**	
Pts with NRTI+NNRTI+PI	**1**	
Pts with 157Q mutation	**8 (2 with NNRTI)**	**4 (1 with NRTI, 1* with n NNRTI)**
Pts with Minor		
68IV	1	
97A	1	
74IM	6	8
119R	2	
121 CFSY	1	
151I	1	
163AGKRT	2	1* (with NRTI)
260I	1	
263KN	1	

Fig.3 Prevalence of InSTI TDRMs amongst 231 patients with non-B subtype HIV infection		
	2013-16	2017-19
Number of patients	125	106
Age (mean and SD)	36.8 (11)	38 (13)
CD4+ cell count/mm^3 (mean and SD)	383 (286)	355 (335)
CD4+ cell count percentage (mean and SD)	19 (11.4)	17,8 (11,8)
Plasma HIV RNA (copies/ml,mean and SD	718784 (2045027)	568033 (1713447)
Pts with wild type	108	94
Pts with NRTI	2	
Pts with NNRTI	14	11
Pts with PI	1	1
Pts with NRTI+NNRTI		
Pts with NRTI+PI		
Pts with NRTI+NNRTI+PI		
Pts with 157Q mutation	5 (1 with NNRTI)	3
Pts with 143C mutation	1	
Pts with 153F		1
Pts with 68IV	1	
Pts with 97A	20	5
Pts with 74IM	20 (1 with PI)	28
Pts with 119R	2	
Pts with 263K		1
138K		1
223		1
121 CFSY		1
Pts with 66IT mutation		1
Pts with 260I mutation	1	4

Disclosures. **All authors:** No reported disclosures.

2507. Transmitted and Acquired NNRTI Resistance in the Philippines: Are Newer Generation NNRTIs a Viable Option?

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Background. Doravirine, rilpivirine, and etravirine are newer generation non-nucleoside reverse transcriptase inhibitors (NNRTI) that are intended to be more durable alternatives to efavirenz and nevirapine. We examined transmitted drug resistance (TDR) and acquired drug resistance (ADR) to NNRTIs from recent local TDR and ADR data to determine whether these can be useful as first-line or second-line antiretroviral (ARV) agents.

Methods. We reanalyzed Sanger-Based sequences (SBS) from an ADR surveillance study; and SBS and near-whole-genome next-generation sequences (NGS) from a TDR surveillance study using the Stanford HIV Drug Resistance Database.

Results. ADR: Out of 513 Filipino PLHIV from an ADR surveillance study on one year of ARV treatment, 53 (10.3%) failed (HIV VL >1,000 copies/mL). Among these, 48 had clinically significant mutations. Table 1 shows NNRTI ADR frequencies. There was no significant ADR difference between first-generation and newer generation NNRTIs. TDR: 298 treatment-naïve Filipino PLHIV underwent baselines sequencing. All 298 had SBS. 266 had successful NGS. Table 1 shows SBS and NGS TDR NNRTI resistance at a 5% minor variant cutoff. There was no significant TDR difference between first-generation and newer generation NNRTIs.

Conclusion. ADR and TDR rates to the newer NNRTIs are similar to first-generation NNRTIs. High TDR to doravirine on NGS is concerning, but its clinical significance is unclear. Etravirine had the lowest TDR and ADR and may be the most useful new-generation NNRTI. However, integrase strand transfer inhibitor-based regimens will likely be more durable.

Table 1. ADR and TDR NNRTI resistance in the Philippines.

Antiretroviral	SBS ADR Resistance in those with clinically significant mutations (%) N=48/ among those failing treatment (%) N=53/ and overall (%) N=513	SBS TDR Resistance (%) among those with TDR N=18/ and overall (%) N=298	NGS TDR Resistance (%) among those with TDR N=45/ and overall (%) N=266
DOR	39 (81.3)/(73.6)/(7.6)	3 (16.7)/(1.0)	20 (44.4)/(7.5)
EFV	45 (93.8)/(84.8)/(8.8)	6 (33.3)/(2.0)	8 (17.8)/(3.0)
ETR	36 (75.0)/(68.0)/(7.0)	2 (11.1)/(0.7)	6 (13.3)/(2.3)
NVP	45 (93.8)/(84.9)/(8.8)	6 (33.3)/(2.0)	9 (20)/(3.4)
RPV	41 (85.4)/(77.3)/(8.0)	9 (50)/(3.0)	16 (35.6)/(6.0)
Any NNRTI	47 (97.9)/(88.7)/(9.2)	10 (55.6)/(3.4)	30 (66.7)/(11.3)

Disclosures. **All authors:** No reported disclosures.

2508. Virologic Suppression in Patients Switched to BIC/TAF/FTC with Baseline NRTI and/or INSTI Resistance

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Background. BIC/TAF/FTC is the first fixed-dose combination tablet to contain both a second-generation INSTI and TAF and has therefore become a popular treatment option for HIV. Historically, patients with NRTI mutations were placed on four-drug, NRTI-retaining regimens or two-drug, NRTI-sparing regimens. Recently, data have emerged supporting the use of second-generation INSTIs with tenofovir/FTC in the setting of the M184V mutation alone. There is a paucity of data, however, evaluating the use of BIC/TAF/FTC in the setting of NRTI and/or INSTI mutations. This study assessed the role of BIC/TAF/FTC in patients with baseline NRTI and/or INSTI mutations.

Methods. This was an observational retrospective study conducted at an inner city HIV clinic. Patients were eligible if they were switched to BIC/TAF/FTC with confirmed adherence and had either the M184V mutation alone, M184V plus another NRTI mutation(s), an INSTI mutation alone, or both NRTI and INSTI mutation(s) at the time of ART switch. We evaluated virologic response (HIV RNA < 200 copies/mL) and duration of BIC/TAF/FTC therapy.

Results. There were 16 patients eligible for analysis. Among the patients, 69% were male and 31% were female. The majority of patients were Black (81%). The mean age was 63 years (SD ± 8.6). Thirteen patients were virologically suppressed (HIV RNA < 200 copies/mL) at baseline. The mean CD4 count at baseline was 630.4 cells/mm^3 (SD ± 297.1). Mutations at baseline were as follows: M184V alone (25%), M184V plus another NRTI mutation(s) (56.25%), INSTI mutation alone (12.5%), NRTI and INSTI mutation(s) (6.25%). BIC/TAF/FTC mean duration of therapy was 10.5 months (range 6–14 months). The mean CD4 count of the patients switched to BIC/TAF/FTC was 687 cells/mm^3 (SD ± 20.7). All patients switched to BIC/TAF/FTC achieved or maintained virologic suppression (HIV RNA < 200 copies/mL) with a mean HIV RNA of 26.25 copies/mL (SD ± 14.1). Fifteen of those switched to BIC/TAF/FTC had an undetectable HIV RNA level (HIV RNA < 50 copies/mL).

Conclusion. While a larger cohort and longer follow-up period is needed, BIC/TAF/FTC may maintain virologic suppression in patients with select baseline NRTI and/or INSTI mutations.

Disclosures. **All authors:** No reported disclosures.

2509. Pooled Resistance Analyses of Darunavir (DRV) Once Daily (QD) Regimens and Formulations Across 10 Clinical Studies of Treatment-Naïve (TN) and Treatment-Experienced (TE) Patients with Human Immunodeficiency Virus (HIV)-1 Infection