## Treatment Access Cascades: Effects of viral load, resistance testing and safety in pregnancy on access to Dolutegravir in Low and Middle income countries

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2016 estimates

Total = 975,000

Total = 114,791

Total = 208,712

Total = 212,992

Total =1,024,000

Total = 187,425

Total = 172,265

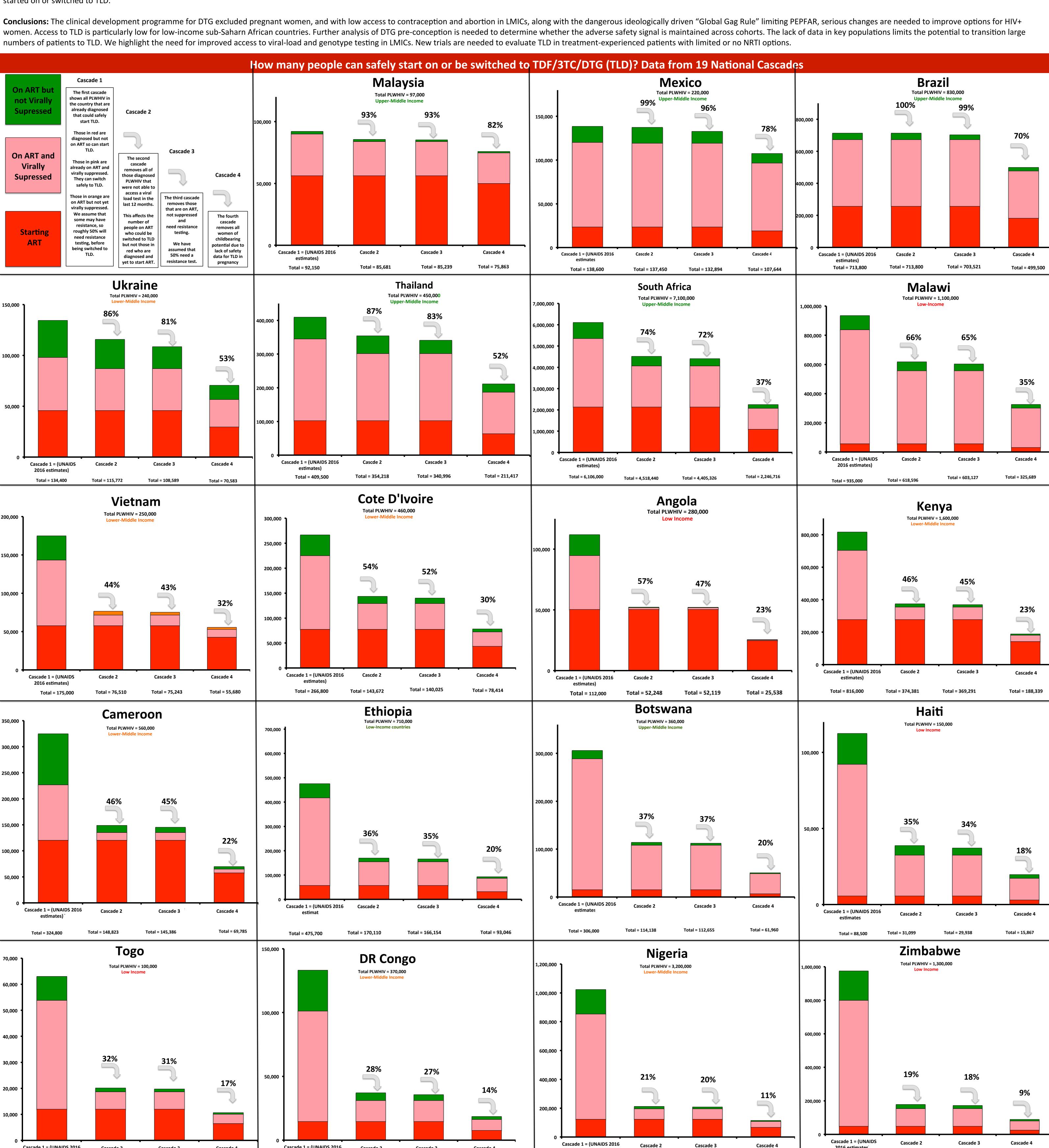
Total = 89,578

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Objectives: Generic antiretroviral treatment with tenofovir disoproxil fumarate/lamivudine/dolutegravir (TDF/3TC/DTG; TLD) is available in eligible countries for \$75/person-year. There are big plans to transition millions of HIV+ people to TLD in 2018–2019. However, the Phase 3 trial programme for Dolutegravir excluded many important patient groups. Pregnant women, ART-naïve HIV+ People without genotypic resistance testing were all not included in safety and feasibility studies. The DAWNING study also excluded ART-experienced HIV+ people with no active NRTIs. Furthermore, recent reports of neural tube defects (NTDs) after use of DTG at conception could limit use in women of child-bearing potential. We wanted to model how realistic it is to start and switch diagnosed HIV+ people to TLD in low and middle income countries (LMIC) given these limitations.

Method: Using UNAIDS 2016 data we made 4 separate cascades for each LMIC with available data. LMICS were categorised into low income (\$1000-3955 GDP/capita) and upper-middle income (3956-\$12,235 GDP/Capita). We excluded countries with <100,000 HIV+ people. Cascade 1 shows all diagnosed HIV+ people, split into three categories; those on ART and HIV-RNA suppressed (pink) and those on ART but unsuppressed (green). We subsequently modeled the impact on access to TLD if patients could not be started or switched due to various factors. Cascade 2 models the impact of the lack of access to viral load test in the last year – as they may actually be unsuppressed either due to low adherence or drug resistance. Viral load testing access data was collected from the UNAIDS Spectrum model. Cascade 3 models the impact that can be safely switched to TLD. We assumed 50% of PLWHIV on ART can access resistance testing before switching due to a lack of available national data. Cascade 4 shows the impact that can be switched or started on TLD. We defined HIV+ women of childbearing potential as all of those aged 15-49.

Results: All of the data is displayed in the 19 national cascades below, [key in top left corner]. Each graph is in order of the percentage of diagnosed PLWHIV that are eligible to start on or switch to TLD, in the final stage - cascade 4. Access to Viral Load in the upper-middle income countries was good. It was 100% in Brazil, 99% in Mexico, 82% in Thailand, 80% in Malaysia, 60% in South Africa and 38% in Botswana. Therefore the effects on access to TLD after excluding patients without a HIV-RNA test in the last 12 months (Cascade 2) was minimal for richer countries. The lowest-income countries had much worse access to viral load testing: 64% in Malawi, 31% in Haiti, 27% in Ethiopia, 16% in Togo and just 14% in Zimbabwe. Therefore, many more HIV+ people on ART are being excluded from switching to TLD due to lack of access to viral load testing in poorer countries. There is a lack of data in access to resistance testing for LMICs, so it is not clear exactly how many people in each country will be excluded from taking TLD. We assumed that only those HIV+ people on ART who are found to be not HIV-RNA virally suppressed would need a resistance test before switching to TLD. As the majority of people on ART are estimated to be successfully HIV-RNA suppressed in all countries did not have a big impact on the number of people able to switch to TLD in any country. The largest exclusion factor was unknown safety for HIV+ women of childbearing age (Cascade 4). In sub-Saharan African countries there is a high percentage of HIV+ women of childbearing potential. In total Zimbabwe (9%) and Nigeria (11%) had the lowest number of people who could be safely started on or switched to TLD.



Cascade 4

Total = 10,674

Cascade 3

Total = 19,767

Cascade 1 = (UNAIDS 2016

estimates)

Total = 133,200

Cascade 2

Total = 37,176

Cascade 3

Total = 35,656

Cascade 4

Total 18,541

Cascade 1 = (UNAIDS 2016

Total = 63,000

Cascade 2

Total = 20,135