PROJECTING THE IMPACT OF GENERIC HIV DRUGS ON 90-90-90

ESTEBAN BURRONE
MEDICINES PATENT POOL
1. Impact in terms of treatment affordability
2. Impact in making new treatments available faster
3. Impact in making needed new formulations
INNOVATION IN HIV TREATMENT

• HIV treatment has witnessed innovation on a major scale

• Over 30 new antiretrovirals (ARVs) developed for the treatment of HIV since 1983

• Several “fixed dose combinations” developed that contain 3 or 4 ARVs in one single pill

• New medicines under development, including new mechanisms of action, new delivery systems, long acting formulations, implants, monoclonal antibodies, etc.
IMPACT IN TERMS OF TREATMENT AFFORDABILITY
Today:

- 21.7 million people on treatment worldwide of which at least **19 million people** in low and middle-income countries (based on UNAIDS data)
- At approximately **USD 85** per patient per year for 1\textsuperscript{st} line (WHO GPRM; Global Fund) *
- Spending on ARVs in LMICs is estimated at approximately **USD 2 billion**

* Some countries procure at higher prices and 2\textsuperscript{nd} and 3\textsuperscript{rd} line ARVS are more expensive
Without generic manufacturers (hypothetical):

- **Scenario 1**: at US$ 10,439 per patient per year* (lowest originator price in year 2000): we would need **US$ 198 billion** to procure medicines for the same number of people in LMICs.

- **Scenario 2**: at US$ 613 per patient per year* (lowest originator price in 2017): we would need **US$ 11.6 billion** to procure medicines for the same number of people in LMICs.

or...

if we only have USD 2 billion we would only be able to procure ARVs for approximately **3.3 million people** in LMICs.

Many factors contributed to large price reductions for ARVs through generic competition enabling treatment scale up (donor funding, strong activism, development of national programs, political will, patent laws, generic manufacturers’ ability to make quality-assured treatments, etc.)

One key mechanism has been access oriented licensing which has increasingly become the norm in HIV

Access-oriented licences are agreements with the patent holders that allow multiple manufacturers to make generic versions of patented medicines and supply large number of LMICs.
The MPP is funded by Unitaidd
<table>
<thead>
<tr>
<th>Product(s) Licensed</th>
<th>LIC</th>
<th>LMIC</th>
<th>UMIC</th>
<th>HIC</th>
<th>Undefined</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Abacavir (paed.)</td>
<td>31</td>
<td>53</td>
<td>31</td>
<td>5</td>
<td>1</td>
<td>121 +</td>
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<tr>
<td>Atazanavir</td>
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<td>52</td>
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<td>122 +</td>
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<tr>
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<td>48</td>
<td>25</td>
<td>9</td>
<td>4</td>
<td>116</td>
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<tr>
<td>Daclatasvir</td>
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<td>46</td>
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<td>2</td>
<td>3</td>
<td>112 +</td>
</tr>
<tr>
<td>Dolutegravir (paed.)</td>
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<td>53</td>
<td>31</td>
<td>5</td>
<td>1</td>
<td>121 +</td>
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<td>Dolutegravir</td>
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<td>6</td>
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<td>0</td>
<td>92 +</td>
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<tr>
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<td>17</td>
<td>8</td>
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<td>10</td>
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<tr>
<td>Raltegravir (paed.)</td>
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<td>9</td>
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<td>92</td>
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<tr>
<td>Ravidasvir</td>
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<td>9</td>
<td>9</td>
<td>-</td>
<td>-</td>
<td>19 #</td>
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<tr>
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<td>30</td>
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<td>25</td>
<td>9</td>
<td>4</td>
<td>116</td>
</tr>
<tr>
<td>TAF</td>
<td>30</td>
<td>48</td>
<td>25</td>
<td>9</td>
<td>4</td>
<td>116</td>
</tr>
</tbody>
</table>

* Additional countries may be able to procure generics

# Complements DNDi licence for a total of over 130 countries
PARTNERSHIPS WITH INNOVATORS

**AbbVie**
- Lopinavir
- Ritonavir (separate licences - adults and paediatrics)

**Bristol-Myers Squibb**
- Atazanavir
- Daclatasvir (HCV)

**Boehringer Ingelheim**
- Nevirapine (non-assert)

**Gilead**
- Bictegravir
- Cobicistat
- Elvitegravir
- Emtricitabine
- Tenofovir Alafenamide
- Tenofovir Disoproxil

**Janssen**
- Darunavir (pediatric non-assert)

**MSD Be well**
- Raltegravir (pediatric)

**Roche**
- Valganciclovir (pricing agreement)

**ViiV Healthcare**
- Abacavir (paediatric)
- Dolutegravir (pediatric)
- Dolutegravir (adults)

**NIH**
- Darunavir related

**Johns Hopkins University**
- Sutezolid (TB)

**Pharco Pharmaceuticals**
- Ravidasvir (HCV)
More affordable treatments contribute to the second 90, enabling more people to access treatment with available resources.
IMPACT IN MAKING NEW TREATMENTS ACCESSIBLE FASTER IN LMICS
IN THE PAST LONG DELAYS FOR UPTAKE OF NEW MEDICINES IN LOW AND MIDDLE INCOME COUNTRIES

The Case of Tenofovir (TDF)

10-11 Years from Approval to Scale-up

Source: GF PPM/PQR data. 2014 for part year;
4 years from originator approval to availability from multiple suppliers in a new fixed dose combination ("TLD") at affordable prices

August 2013: DTG approved by US FDA

April 2014: MPP license with ViiV Healthcare

June 2016
WHO guidelines recommend DTG in 1st line

November 2016:
First MPP licensees filed for WHO Prequalification

Sept 2017:
Price of USD 75 announced for DTG combination

August 2017:
First approval of new combination (TLD) from MPP licensee
IMPACT IN MAKING NEEDED NEW FORMULATIONS
Case of Tenofovir/lamivudine/dolutegravir (TLD)

- Dolutegravir has higher barrier to resistance than current first line with efavirenz (SPRING trial)
- It is better tolerated, with fewer treatment discontinuations
- TDF: enables treatment for hepatitis B in co-infected people and no need for HLA-B*5701 screening
- Potential for lower price than efavirenz combination

Caution regarding potential safety signal for women with HIV at time of conception (issue to be further discussed at IAS)

13 MPP licensees are currently developing TDF/3TC/DTG, of which:

- 6 have filed with WHO-PQ
- 7 have filed with USFDA; of which **two** have received approvals
- **4 companies** have received approval by the WHO/Global Fund Expert Review Panel
- In all, **2 generic versions of TLD** are already in the market and an **additional 4** are expected to be launched soon
### TDF/3TC/DTG: Country-wise Filing Status

<table>
<thead>
<tr>
<th>Approved (6) (19.4% PLHIV in LMICs)</th>
<th>Filed (25) (69.2% PLHIV in LMICs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botswana</td>
<td>Benin</td>
</tr>
<tr>
<td>Côte d’Ivoire</td>
<td>Burkina Faso</td>
</tr>
<tr>
<td>India</td>
<td>Burundi</td>
</tr>
<tr>
<td>Kenya</td>
<td>Cameroon</td>
</tr>
<tr>
<td>Malawi</td>
<td>Congo</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>DR Congo</td>
</tr>
</tbody>
</table>

- Approved countries: 6
- Filed countries: 25

Generic TLD has been filed in 31 countries, of which approval is received from 6.
Another 25 filings are planned for 2018.
<table>
<thead>
<tr>
<th>Product</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPV/r</td>
<td>Three companies working on this product:</td>
</tr>
<tr>
<td></td>
<td>1. <strong>One company</strong> has received USFDA approval</td>
</tr>
<tr>
<td></td>
<td>2. Another has filed with WHO-PQ and USFDA in Q1-18</td>
</tr>
<tr>
<td></td>
<td>3. The third plans to file with USFDA and WHO-PQ in Q3-19</td>
</tr>
<tr>
<td>LPV/r/ABC/3TC</td>
<td>Three companies working on this product:</td>
</tr>
<tr>
<td></td>
<td>1. One plans to file with USFDA and WHO-PQ in Dec-18</td>
</tr>
<tr>
<td></td>
<td>2. Another plans to file with USFDA and WHO-PQ in 2019</td>
</tr>
<tr>
<td></td>
<td>3. Another developing, filing status and plans unknown</td>
</tr>
<tr>
<td>ABC/3TC/EFV</td>
<td>Three companies working on the product</td>
</tr>
<tr>
<td></td>
<td>• Filing plans in 2019</td>
</tr>
<tr>
<td>ABC/3TC/DTG</td>
<td>Multiple companies interested in development, awaiting WHO recommendation on dosage</td>
</tr>
</tbody>
</table>
Faster access to new optimized ARVs and development of needed adult and paediatric formulations contributes to the third 90, through access to optimized formulations that are better tolerated, lower treatment discontinuations, higher resistance barrier
The MPP’s HIV, TB and hepatitis C activities are fully funded by:

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Innovation in Global Health
THANK YOU

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