The price of change – Replacing Stavudine with Tenofovir in first-line ART in scaling-up settings

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Jari Kivela
Health Economist
+31 20 850 8497
jari.kivela@qalys.eu
Background

- WHO recommendation to replace d4T
- Scaling-up

Problem: How much will it cost?
Tool: Health economic model
Objectives

Develop a model to:

- Support decision making
- Demonstrate budget impacts
- Compare timing of introduction
- Forecast ART budget 2008 - 2014
Tenofovir vs. Stavudine

**Tenofovir (TDF)**
- WHO recommendation
- Better toxicity profile
- Once a day dosing
- TDF $128 PPY

**Stavudine (d4T)**
- d4T $19 PPY
- Significant toxicities
- Fixed dose combination: d4T / 3TC / NVP 30mg / 150mg / 200mg

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Current first-line regimen

- d4T
- 3TC
- NVP
New improved first-line regimen

- d4T
- NVP
- 3TC
- TDF
- EFV
Price of d4T/3TC/NVP
Price of TDF/3TC/EFV
ART survival and 2nd-line switch rate

- Global Cohort MSF
  - 57,000 ART patients
- Extrapolated after 48 months
- ART survival 9.7 years
- 2nd-line switching rate
Epworth Program

Epworth, Harare township
- Population 400,000
- 20% infected with HIV

MSF program
- 6,000 HIV+ patients
- 1,400 on ART
- First ARTs April 2007
- 150 new patients / month
150 new ART patients / month
Methods

- **Patient volume**
  Nr of patients, speed of scaling-up

- **Medical data**
  ART regimens, ART survival, rate of switch to 2nd-line, CD4 baselines

- **Financial information**
  Forecasted ART prices, actual expenditures, annual budget

- **Sensitivity analyses**
Base case: All patients on d4T/3TC/NVP

$1.8M
All patients on TDF/3TC/EFV 2008

$8.8M

$1.8M
Only new patients on TDF/3TC/EFV 2008

- $8.8M
- $7.6M
- $1.8M
Only new patients on TDF/3TC/EFV 2009

![Graph showing USD (million) from 2008 to 2014 for different patient groups.](graphic)

- All patients on d4T
- New patients on TDF
- All patients on TDF

- $8.8M in 2009
- $6.1M in 2010
- $1.8M in 2011

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Only new patients on TDF/3TC/EFV 2010

USD (million)

2008 2009 2010 2011 2012 2013 2014

- All patients on d4T
- New patients on TDF
- All patients on TDF

$4.7M
$8.8M
$1.8M
Current first-line regimen

- d4T
- 3TC
- NVP
Change to TDF/3TC/NVP

- d4T
- 3TC
- TDF
- NVP
All patients on TDF/3TC/NVP 2008

- $6.6M
- $1.8M

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## ART Prices

<table>
<thead>
<tr>
<th>Drug</th>
<th>Current price</th>
<th>Price in 2014</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>TENOFOVIR</td>
<td>128 USD</td>
<td>88 USD</td>
<td>Hetero</td>
</tr>
<tr>
<td>LAMIVUDINE</td>
<td>35 USD</td>
<td>27 USD</td>
<td>Cipla</td>
</tr>
<tr>
<td>EFAVIRENZ</td>
<td>146 USD</td>
<td>101 USD</td>
<td>Hetero</td>
</tr>
<tr>
<td>FDC TDF/3TC/EFV</td>
<td>365 USD</td>
<td>350 USD KIT</td>
<td>Matrix</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cipla</td>
</tr>
<tr>
<td>d4T/3TC/NVP</td>
<td>82 USD</td>
<td>61 USD</td>
<td>Aubindo</td>
</tr>
<tr>
<td></td>
<td>87 USD</td>
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</tr>
<tr>
<td>d4T</td>
<td>19 USD</td>
<td></td>
<td>Cipla</td>
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</tbody>
</table>
Limitations

- Potential cost savings: from better toxicity profile of TDF
- ART price development
- Inadequate TDF survival data
Summary

- Useful tool to forecast costs:
  - ART regimen changes
  - Scaling-up
  - Higher CD4 threshold
  - Forecasting human resource needs

- High cost of TDF and EFV

- Major barrier in resource poor settings
Jari Kivela
Health Economist
+31 20 8508497
jari.kivela@qalys.eu

Daniel O’Brien
HIV/AIDS Advisor
MSF-OCA

Clair Mills
Medical Director
MSF-OCA

Kalpana Sabapathy
HIV/AIDS Advisor
MSF-OCA

Field team
Epworth
Zimbabwe

Qalys Health Economics