Where did we start?
Where did we get to?
Where do we want to go?

IMPROVING GLOBAL ESTIMATES: PROCESS AND MILESTONES
IATT Webinar June 7th 2016

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Where did we start?

Paediatric ARV Drug Optimization PADO meeting (Dakar, Senegal, 22-23 October 2013)

- Challenges in the development and uptake of ARVs for children
- Mid and long-term priorities
- Research priorities
Objectives

• Estimate the **number of children living with HIV by 2020** globally, in countries with generalized epidemic and in the 21 priority countries
• Characterize the **size and age** of the population on a yearly basis
• Estimate the number of **children in need of ART by 2020**
• Explore **size and age** of the paediatric population in need of ART
Assumptions on Coverage reached by 2020

MAX
Adult ART coverage 95%
PMTCT coverage 95%
Paediatric ART coverage 100%

Likely (Based on current performance)
PMTCT coverage 95% if currently >75%
  90% if 50-75
  80% if 25-50
  70% if <25
Paediatric ART coverage 100% if currently >75%
  90% if 50-75
  80% if 25-50
  70% if <25

STABLE (No improvement)
Adult ART coverage stable
PMTCT coverage stable
Paediatric ART coverage stable

• All values are mid-year values
• Projected values for Ethiopia (2017-2020) and Kenya (2016-2020) were calculated applying the percentage change between years for the total of all countries. This is because the country files stopped at 2015.
• ART need for children under 5 based on population living with HIV by single year age group
Children living with HIV

- 2013: 3,193,775
- 2014: 2,836,736
- 2015: 2,665,191
- 2016: 2,302,510
- 2017: 1,960,718
- 2018: 1,829,575
- 2019: 1,661,875
- 2020: 1,470,310

**MAX**
- Adult ART coverage 95%
- PMTCT coverage 95%
- Paediatric ART coverage 100%

*LMIC*  
*21 PMTCT Priority Countries*  
*Generalized epidemic countries*
Roadmap to streamline access to ARVs for children

- Develop accurate forecasting of demand for paediatric ARVs
- Explore new drug delivery systems
- Accelerate approval of new drugs and new formulations
- Reach patent-sharing agreement for key agents
- Identify innovative financial mechanisms to sustain a diminishing market

Collective engagement in driving innovations that meet unique needs of infants and children
June 17\textsuperscript{th}-18\textsuperscript{th} 2014
October 28\textsuperscript{th} - 29\textsuperscript{th} 2015

Where did we get to?
Modelling approach

1. Proposed structure
2. Parameters
3. Data sources
Modelling structure

• Is this reasonable representation of the natural history?
• Does this reflect the programmatic reality
• Can this match Spectrum?
We discussed

• Do these parameters need to be stratified based on (i.e., mode of transmission, age, regimens,..)?
• How many strata do we need by parameter?
• Do we expect these parameters to change in the next 5 to 10 years? In which direction?
• Which value do we attach to these parameters? Input data vs default value.
Decided to maintain and adjust Spectrum

Estimating the Number of New Child Infections

1 Demographic Data
- TFR
- Age distribution of fertility
- Number of women by age 15-49

2 Surveillance and Survey Data

3 Epidemic Patterns
- Female/male ratio of incidence
- Age distribution of incidence
- Mortality

4 Fertility Adjustment
- Reduced fertility among HIV+ women

5 Number of births to HIV+ women

6 Program Statistics
- Number receiving ARV prophylaxis or treatment by regimen

7 Number of children born HIV+

8 Breastfeeding Patterns

9 Total number of new child infections
New Infections

• Fertility differential in HIV infected (and on ART) or changing patterns over time and concentrated epidemics
• BF in HIV infected vs general population
• HIVDR impact transmission rate
• Adherence to interventions
• Length of first line for pregnant women that may impact transmission
Survival

• Identification and initiation by age
• Survival off ART
• Survival on ART by age at initiation (adolescents) and time since initiation
• Adherence to the intervention (retention/adherence)
• Failure by line of treatment and time from initiation
### Steps required

#### To adjust in SPECTRUM
- Default assumption for attrition on ARVs
- Add national EID to Validation panel of Spectrum
- Age stratification at treatment initiation
- Paeds compartmental model for CD4
- CTX effect to be included from ARROW

#### To gather data on
- BF duration
- Fertility on and off ART
- Early vs late initiation of ART in PW
- Retention during BF
- Interaction between retention and VL suppression
- Feasibility of collecting start of ARV by weeks of gestation.
- Age stratification for newly initiated children
- Martison dataset to look at CD4

#### To explore in Spectrum or other models
- Impact of time of ARVs in PW
- HIVDR impact
- Effect of change in fertility on estimates for concentrated epidemics
- Testing strategies and impact on outcomes
- Explore role of BF and maternal health on mortality off ART and on ART.
Mean time a few changes happened....

More infections are prevented

New HIV infections among the 21 Global Plan countries dropped below 200,000 in 2014
Meantime a few changes happened....

**More children are in need for ART**

Change in policy was uptaken very rapidly resulting in an increasing number children living with HIV being eligible for ART.
Meantime a few changes happened....

More children age into adolescence

Adolescents living with HIV is a global issue

2.1 million adolescents were living with HIV globally in 2013.

“A HIV first cause of deaths among adolescents in Africa”
Meantime a few changes happened....

*More guidelines coming soon*

- Treat All! (no more eligibility)
- Treat sooner (impact on incidence)
- Introduce better sequencing (more emphasis on 2nd and 3rd line)
- Enhance postnatal prophylaxis in high risk babies
- Breastfeed for longer
- Expand testing net for children and scale up EID (as early as birth to minimise early mortality)
- Adapt service delivery models to specific populations and type of patients (ie adolescents)
- Support actively adherence and retention to optimise programme quality
2nd edition:
October 28th - 29th 2015

• Continue improving Spectrum estimates
  – To measure progress
  – To improve forecasting
  – To inform programme planning

Objectives:
1. Identifying relevant changes for Spectrum
2. Outline data gaps to be filled
3. Propose next steps to address crucial parameters or assumptions.
4. Explore approaches for better forecasting
Steps required

To adjust in SPECTRUM
- Default assumption for attrition on ARVs
- Add national EID to Validation panel of Spectrum
- Age stratification at treatment initiation
- Paeds compartmental model for CD4
- CTX effect to be included from ARROW
- Retention by age, CD4 and time on ART
- Retention pattern
- HIV prevalence by age
- Fertility by CD4
- Transmission probabilities

To gather data on
- BF duration
- Fertility on and off ART
- Early vs late initiation of ART in PW
- Retention during BF
- Interaction between retention and VL suppression
- Feasibility of collecting start of ARV by weeks of gestation.
- Age stratification for newly initiated children
- Martison dataset to look at CD4
- HEUs mortality

To explore in Spectrum or other models
- Impact of time of ARVs in PW
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- Explore role of BF and maternal health on mortality off ART and on ART.
Where do we want to go?

• Further refinement of Spectrum to capture better some of the **programmatic reality** (that will depend on availability of data in countries, particularly age-disaggregated data)

• Explore opportunities for further improvement of the model structure to promote a **more granular approach** to modelling treatment response

• Addition of a **Forecasting module** to Spectrum: more discussion to explore detailed next steps needed

• **Resource mobilisation** to support research needed to collect primary data and to conduct analysis by observational database
UNAIDS reference group meeting
Fall 2016