EPP 2009

HIV epidemic trends in the ART era
Low level & concentrated epidemics

UNAIDS/WHO Working Group
on Global HIV/AIDS & STI Surveillance
UNAIDS Estimation & Projection Package 2009

• Objectives
  – Build models of national epidemics
    • Geographically appropriate
    • Containing the key sub-populations
  – Provide short-term projections of HIV prevalence (<5 years)
  – Serve as input to Spectrum for assessing incidence, impacts, ART and PMTCT needs, etc.
EPP’s job: fit the model to the data
What’s new in EPP 2009?

- EPP now gives both incidence & prevalence
- Includes effects of ART on prevalence in fitting
- Faster and better fits using a new approach
- Allows calibration after fitting and shows results
- Calculates and displays contributions to incidence from different sub-populations
- Larger interface with more complete instructions
  – Bigger spreadsheets for data entry and review
What’s new for concentrated epidemics?

• Allows entry and fitting of Workbook trends
  – For countries with low prevalence or limited data
• New male sex worker category for sub-pops
• Allows use of surveys in each sub-population for fitting and calibration
  – e.g. IBBA, national surveys, etc.
What’s new for generalized epidemics?

• More accurate uncertainties (generalized)
• Permits changing urban/rural pop proportions
  – Can change urban pops to UN Pop pattern
• Calculates and displays incidence contributions from urban and rural populations
What are the steps in modeling a national HIV epidemic?
Steps in making an EPP projection

• Create a workset, i.e., a new national projection
  – Must choose either generalized or concentrated

• Define your epidemic
  – What sub-epidemics and sub-populations are important in your country

• Define population characteristics for each sub-pop
  – Size & demographics
  – Turnover and duration in group

• Enter HIV data for each sub-population
• Enter ART data – national & sub-population
Steps in making an EPP projection

• Provide any surveys you wish to use in fitting
• Fit the epidemic starting from initial guesses
• Calibrate to make any final adjustments
• Generate results for the national epidemic
  – Prevalence and incidence trends
  – Produce file with incidence for Spectrum (*.spt)
• Audit check your results
• Document decisions in “Comments” boxes
EPP 2009 leads you through each important step – start on Workset page

Each “tab” represents a step in the process

New workbook trend fitting

Note new larger interface – more data shown, bigger graphs
The EPP Worksets page

• What is a workset?
  – A national epidemic composed of smaller epidemics in different sub-populations and/or geographic areas

• What can I do on this page?
  – Load an existing workset
  – Create a new workset, choose country, enter notes
  – Create a workset from a template
  – Create a new template
  – Choose edit or review mode
Save and continue – use it or lose it!

Push here to save your data or changes and move to next step.
Critical warning – red alert!!

• Do NOT change the workset start year and end year on the Worksets page
• The 1970 to 2015 range is needed for many of the later functions and if you change it after the workset is created, you WILL break the file
If in review mode, it’s just “Continue”

Select review mode here

Moves on without changes to your file – yellow means review
EPP 2009 – review mode

• Can open a projection w/o changing it
• Disables saves
• Indicated two ways:
  – Title bar says “Review mode”
  – “Save & continue” turns to yellow “Continue” button
• Two ways to exit
  – On Workset Page, click “Edit” mode
  – On any page, hit “Save a copy”
Define epi - now you define your epidemic

New feature – MSW group

New concentrated template

Color coding –
Blue – fit is done
Magenta – not yet fit
Need to know - defining an epidemic

• What are sub-populations and sub-epidemics?
  – Sub-population is an epidemic in a specific group
    • Has a population size and HIV & ART data associated with it
  – A sub-epidemic is an epidemic made up from multiple epidemics in sub-populations and/or other sub-epidemics

• Sub-populations can have special characteristics
  – Urban, rural or both
  – Client, FSW, IDU, MSM, MSW or low-risk
The Define Pops page

• What can I do on this page?
  – Set the overall national population & population base year
  – Define population sizes for your sub-populations
  – Define demographic parameters (Generalized)
  – Specify turnover in populations
  – Display populations without an HIV epidemic
Define pops page for concentrated epidemics

Setting the populations

Turnover related controls
Turnover? A way of dealing with changing pops

Clients of sex workers
(1000 men with 5 yr duration)

Death

General pop males

200 in →

200 out
Turnover flattens out projections
Fits to Thai Central Region IDU Data
It can make big contributions to prevalence

Living Thai ex-IDUs with 10 year duration

At peak this is 5.4% of adult male prevalence

Turnover is extremely important in countries with long-standing epidemics – much of the prevalence will now be outside at-risk pops
The turnover controls on the Define Pops page

Duration – time spent in the group

Where to assign prevalence after they leave the group – and how to do it
Why is assign prevalence here?

• Number of HIV+ ex-members of groups may be large
  – e.g., HIV+ ex-sex workers, HIV+ ex-clients or HIV+ ex-IDUs

• These HIV+s are sometimes captured in other surveillance populations
  – e.g., ex-sex workers showing up in antenatal clinic data

• But other times, they’re missed
  – e.g., ex-IDUs may be missed because of limited male surveillance
How is assignment of HIV+ ex’s done?

• For the population selected in the national epidemic tree, if there is turnover:
  – Select which group they go to after they leave the selected at-risk population
  – NOTE: Only populations without turnover (closed pops) can receive from a group with turnover
  – Decide if you want to add or replace prevalence
What do “add” & “replace” prevalence mean?

• Add prevalence
  – The HIV+ former at-risk group members are added to the HIV+ members of the target population
  – This means they have NOT been captured in surveillance there

• Replace prevalence
  – Some of the HIV+’s in the target population are assumed to come from the former at-risk group members
  – The remaining infections that occurred “within group” are calculated
Example – reassignment for ex-sex workers

Why do we use “replace prevalence” here?

Lower-risk women usually set by fitting ANC data, which includes ex-sex workers.
Example – reassignment for ex-clients

Why do we use “add prevalence” here?

Lower-risk men are not captured in surveillance populations, so we can use this to accumulate their HIV prevalence and it’s contribution.
Where do you see the effects?

- In the graphs on the Results page
- By pushing the “Reassigns” button on the Results page
Why was reassignment moved to Define pop?

• In EPP 2009, we include the effect of ART on HIV prevalence

• Prevalence in a population, e.g., ANC women, depends on any HIV assigned to it from ex at-risk population members
  – This may raise current prevalence, so we need to know in advance

• Thus, we need to fit populations to be reassigned first
This led to color coding of sub-pops in the EPP 2009 national epidemic tree

- **Magenta**
  - Sub-population has yet to be fit
- **Blue**
  - Sub-population has been fit
- **If you attempt to fit a sub-population which is assigned HIV prevalence from a pop with turnover, you will be warned to fit the population with turnover first**
A bigger HIV data page

Data is entered by sites for each sub-pop

For each site give HIV prevalence & sample size
Surveillance data considerations

• Strongly recommend reviewing data before you start entering it
  – Remove outliers
  – Eliminate extremely small sample sizes
  – Decide your “site” structure
  – Consider how representative and consistent data is

• Normally need at least 4 to 5 years of consistent data to fit a population
  – Remember we’re looking for trends – repeated measures of the same type in comparable populations
EPP 2009’s first big change – ART Data

Enters number on 1\textsuperscript{st} and 2\textsuperscript{nd} line ART nationally

Divides that ART among the sub-populations
Why an ART data page?

- ART is expanding rapidly across the globe
- People live much longer on ART
- This means HIV prevalence increases
ART increases HIV prevalence

Without ART

With ART
EPP 2009 has expanded model with ART

- Entrants by “birth” at age 15
- Not at-risk population
- Uninfected at-risk population
- Infected at-risk population
- Death

- Number gated by access slots. All untreated + newly eligible have equal chance

- Newly eligible for ART

- Untreated

- First-line ART

- Second-line ART

- Death
The ART data page – what’s on it?

- **First year survival on ART**
  - Default 0.86 (based on review of survival in cohorts [Lewden et al] and lost to FU [Brinkhof et al: 40% mortality overall; 47% mortality at public ART centers in sub-Saharan Africa])
  - As countries increase early access, first year survival can increase (up to about .90?)

- **National adult ART coverage**
  - Number nationally on 1st line, 2nd line ART + totals

- **Distribution of ART among the sub-populations**
  - Prevalence impact depends on treatment numbers
  - We recognize it may be challenging to gather
Summary of features of ART data page

- User fills in blue cells only, others automatic
- Can specify sub-population distribution as
  - Absolute numbers on ART in sub-population or
  - Percent of national ART in that sub-population
- “Still to be assigned” must be zero before leaving page
  - NOTE: needs to be true for both 1\textsuperscript{st} and 2\textsuperscript{nd} line ART
- Remember to check inputs against calculated coverage (on “Results” page: ART results)
Projecting ART

- Fill in all the national 1st and 2nd line data you have (i.e., years available)
- Fill in the distribution among sub-populations for both 1st and 2nd line
- Fill in target ART values for final year (2015)
  - National 1st and 2nd line
  - Sub-population distribution
- Click on “Project ART”
Projecting ART - before

Fill in the two sets of cells indicated

Click on "Project ART"
Projecting ART - after

Select the year in which to start projection

Click OK

Numbers are filled in
Dealing with increasing data availability

• Today, many new sources of data
  – Integrated Biological & Behavioral Surveillance
  – General population surveys of HIV prevalence
  – Ad hoc surveys in populations of interest
    • E.g., large number of surveys among MSM in recent years

• These often:
  – Have better sampling frames than surveillance
  – Are more representative of the situation
  – Provide “anchor values” for calibration
Using this data to inform fitting – Surveys Page

Can enter up to 3 surveys for each sub-pop
Surveys in concentrated epidemics - considerations

• If you enter surveys, they will be used in fitting the epidemic and you can calibrate to them later

• In at-risk population surveys
  – Consider how representative they are
  – Look at geographic origins and patterns of prevalence
  – Develop adjusted “national” value if necessary

• In general population surveys
  – Consider effect of non-response on HIV prevalence: use adjusted HIV prevalence correcting for the effect of non-response
  – Consider the extent to which they capture at-risk populations and adjust for this before entering the value
Now let’s install EPP to work on data entry

• The EPP install file is:
  –EPP2009q.exe