

Population Dynamics Strongly Influence HIV Estimates: A Descriptive Study

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The presentation is released to inform interested parties of ongoing research and to encourage discussion of work in progress. Any views expressed are those of the authors and not necessarily those of the U. S. Census Bureau

Global HIV Estimates

- Software from Avenir Health (*avenirhealth.org*)
- Models developed and revised by the UNAIDS Reference Group on Estimates, Modelling and Projections (*http://www.epidem.org/*)
- Different methods for obtaining HIV incidence and prevalence estimates from available data
- Cohort-component population projection starting in 1970 for obtaining HIV indicators, etc.

Objectives

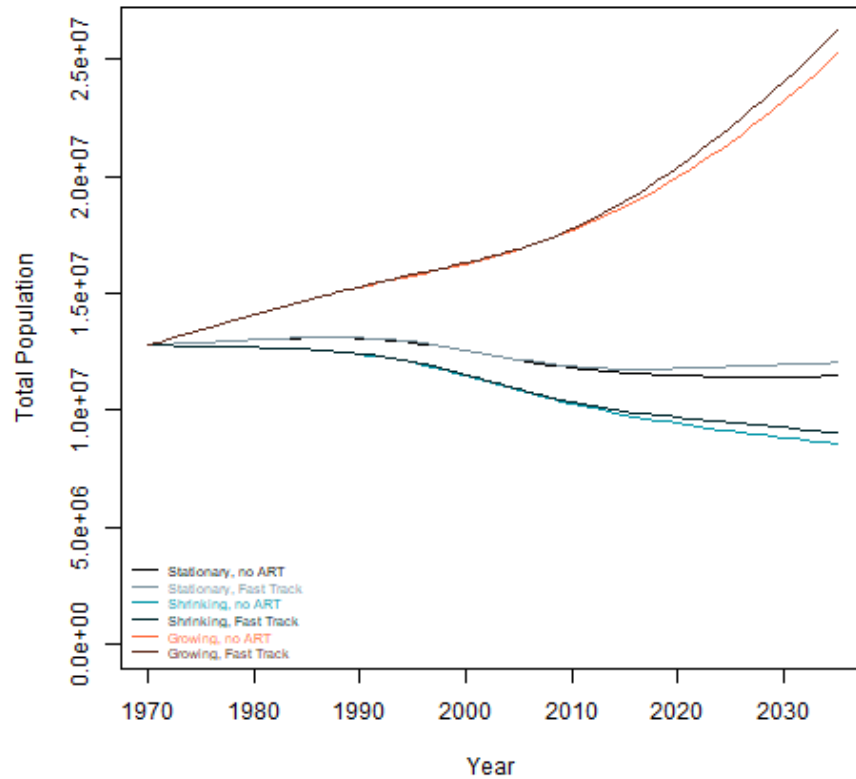
Descriptive analysis to explore how population dynamics shape HIV projections using the Spectrum model

Methods

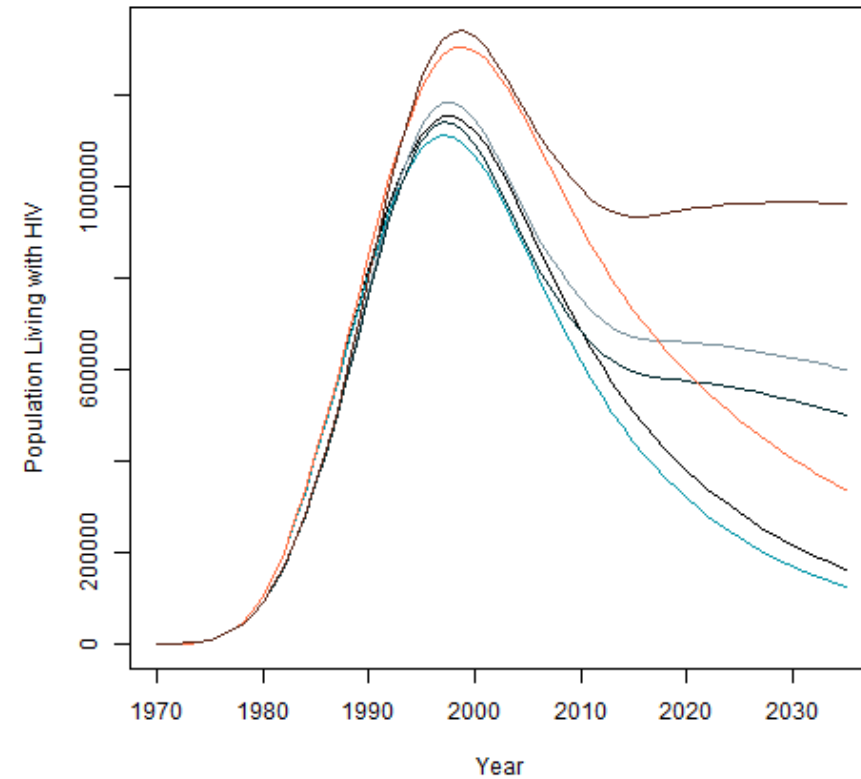
- Project a stationary population from 1970 to 2035 in Spectrum with 2 HIV curves: one with no antiretroviral (ART) interventions and another with Fast Track (95-95-95) targets attained by 2030
- Compare with a stable, growing population projection and a stable, declining population projection
- Compare with projections for 4 fertility levels based on observed total fertility rate (TFR) trends in countries with high HIV burden
- Compare with projections where timing for fertility decline is varied

Stationary, Growing, Shrinking Populations

(a) Total Population

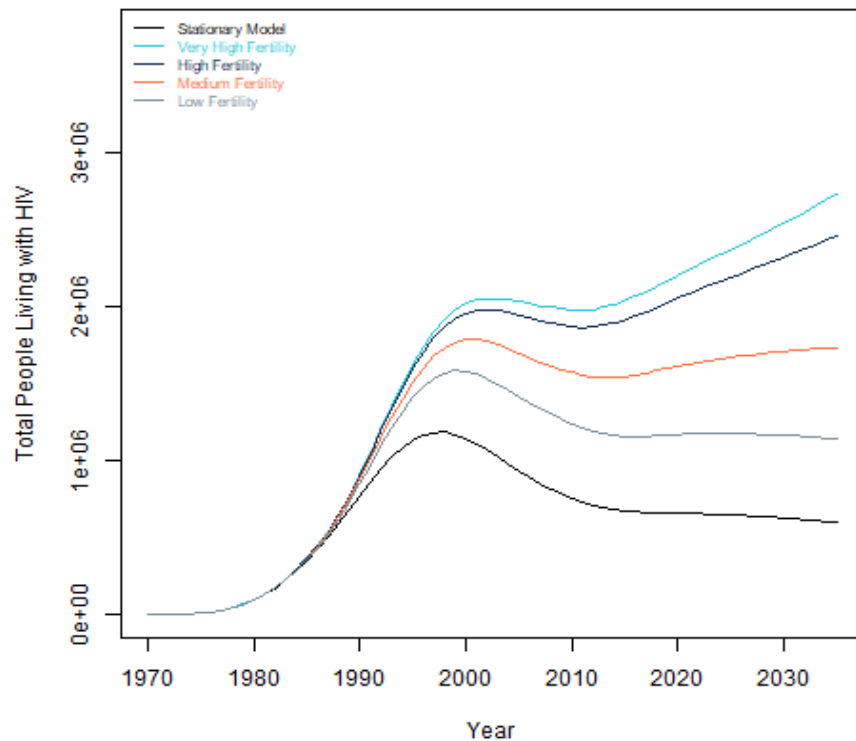


(b) Population Living with HIV

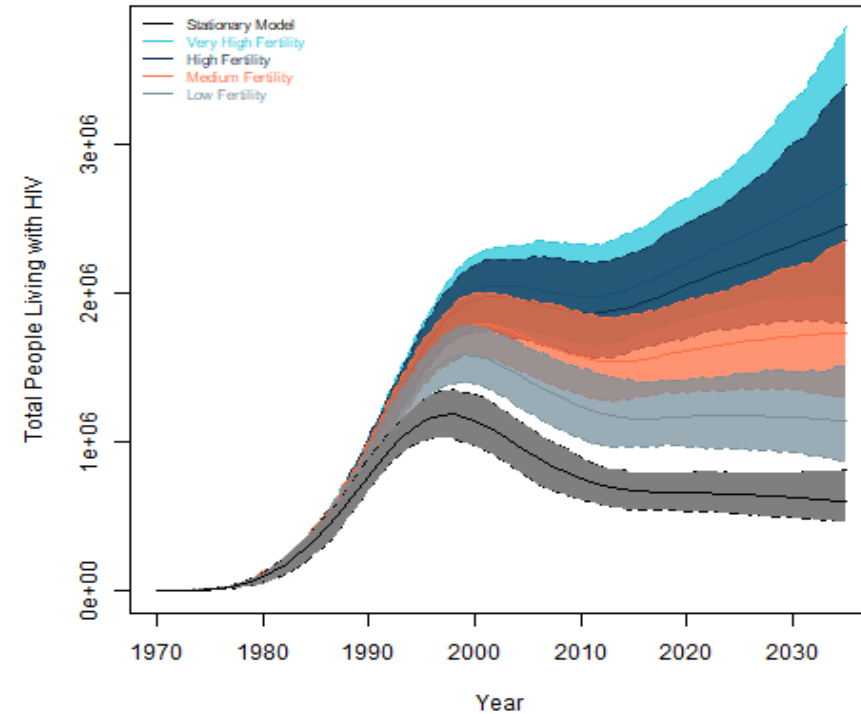


Very High, High, Medium and Low Fertility: PLHIV Population

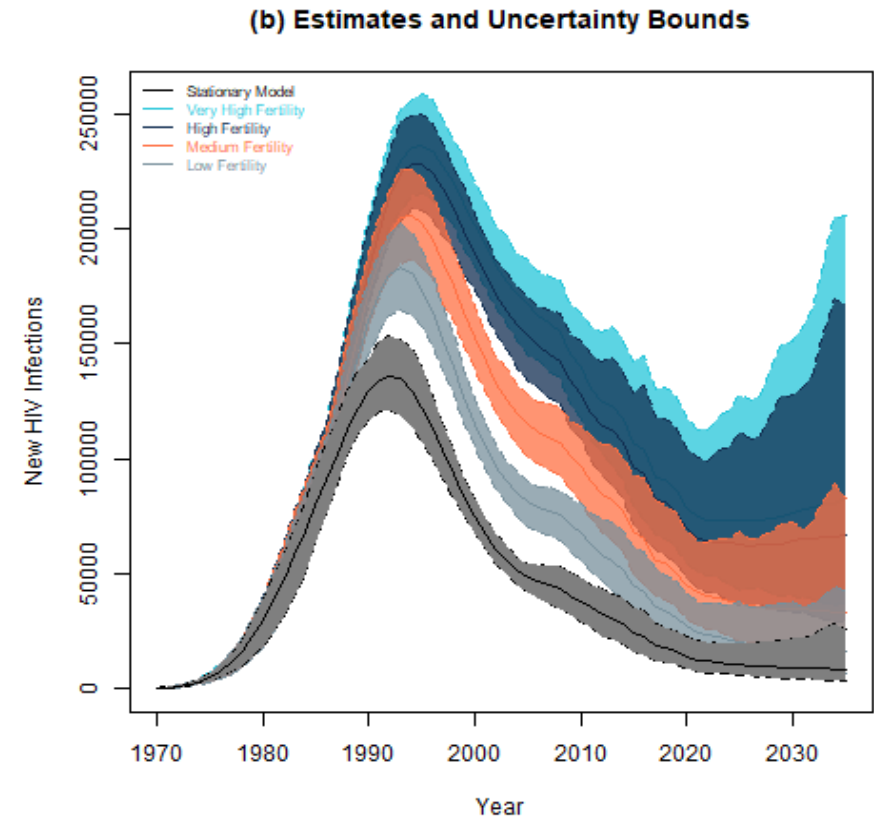
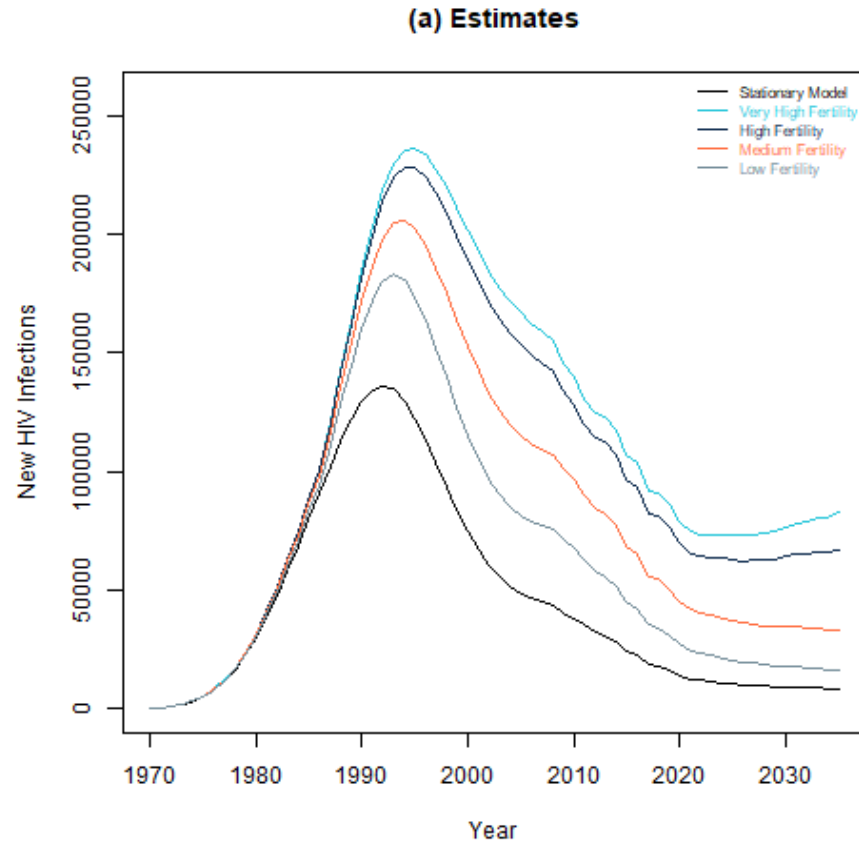
(a) Estimates



(b) Estimates and Uncertainty Bounds

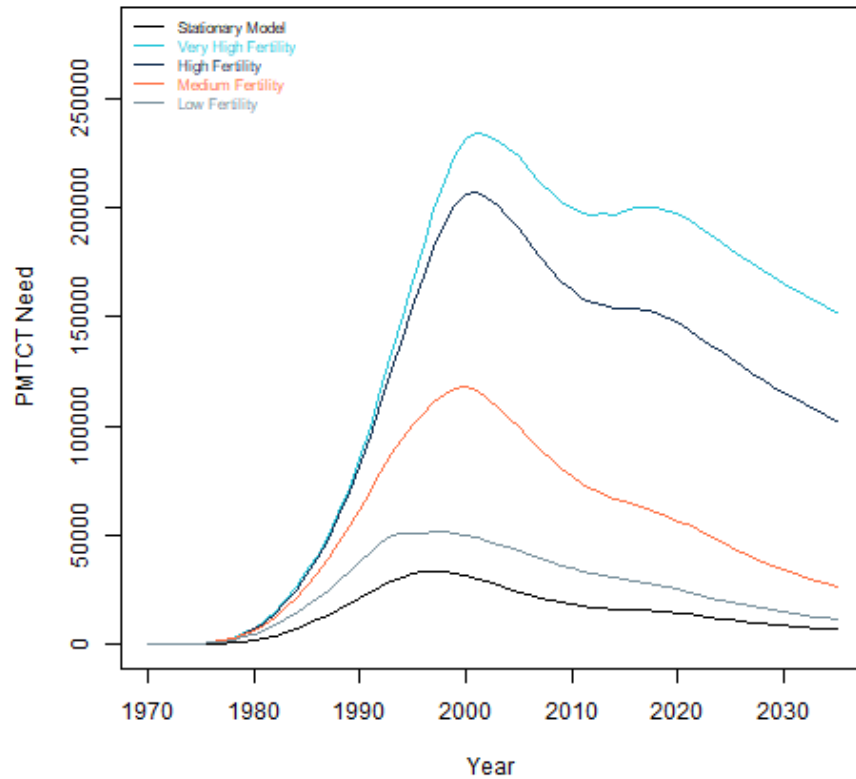


Very High, High, Medium and Low Fertility: New HIV Infections

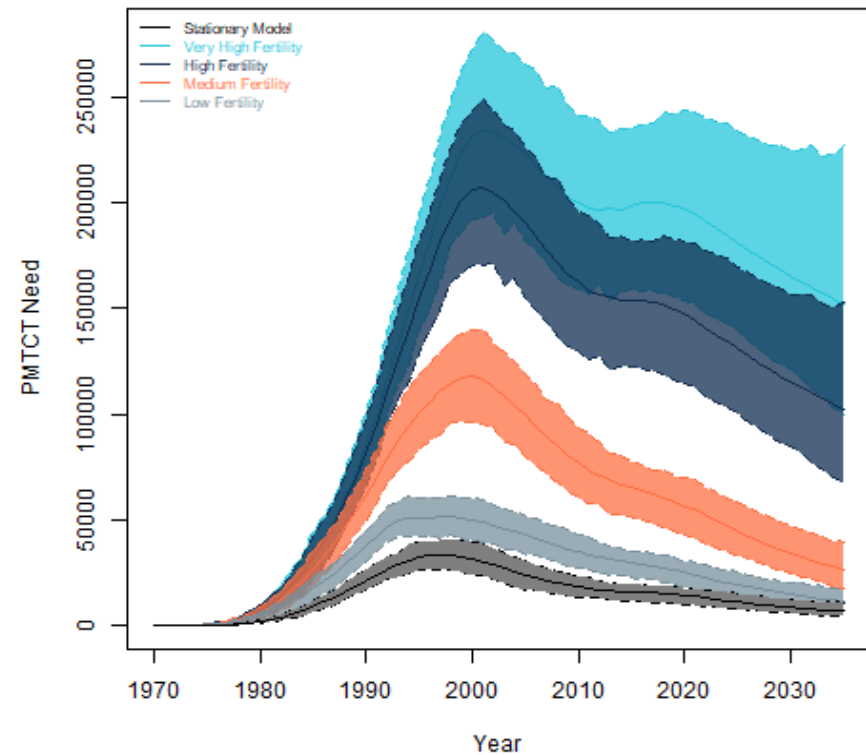


Very High, High, Medium and Low Fertility: PMTCT Need

(a) Estimates

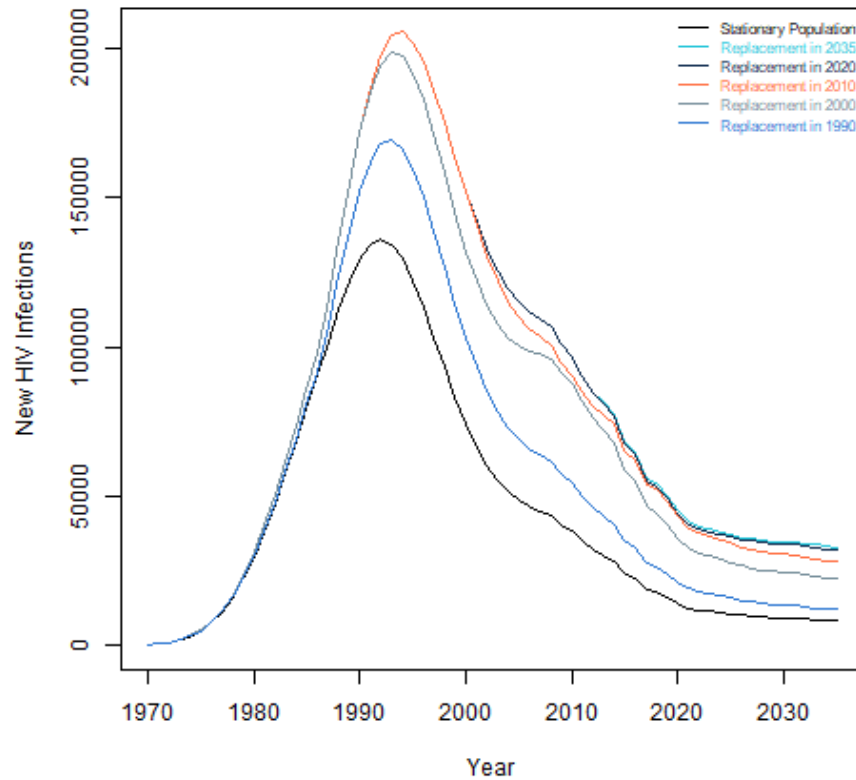


(b) Estimates and Uncertainty Bounds

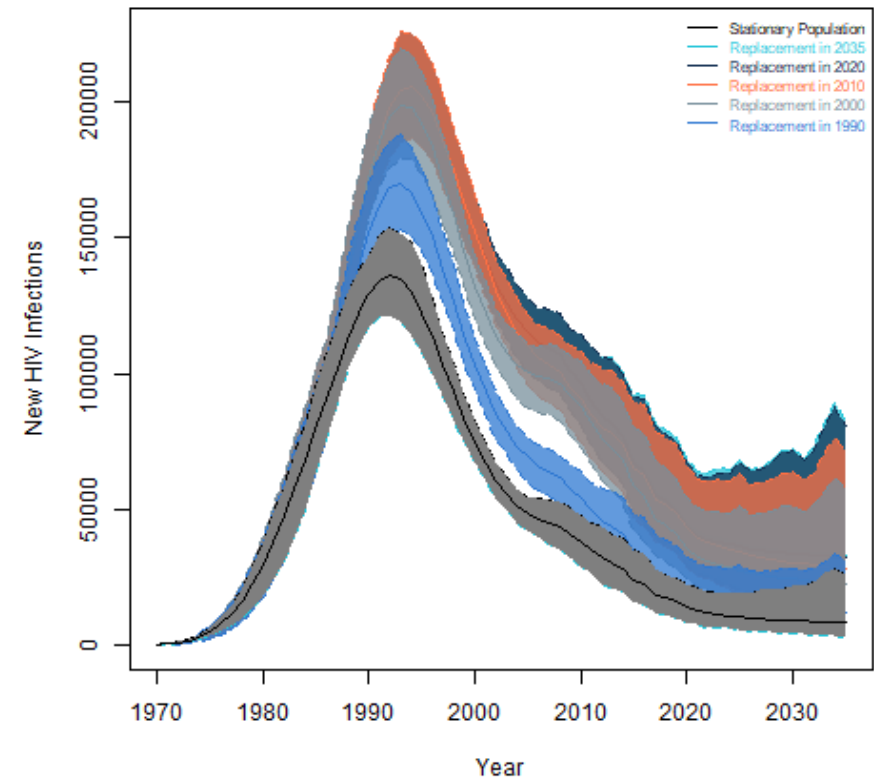


Timing of Fertility Decline: New HIV Infections

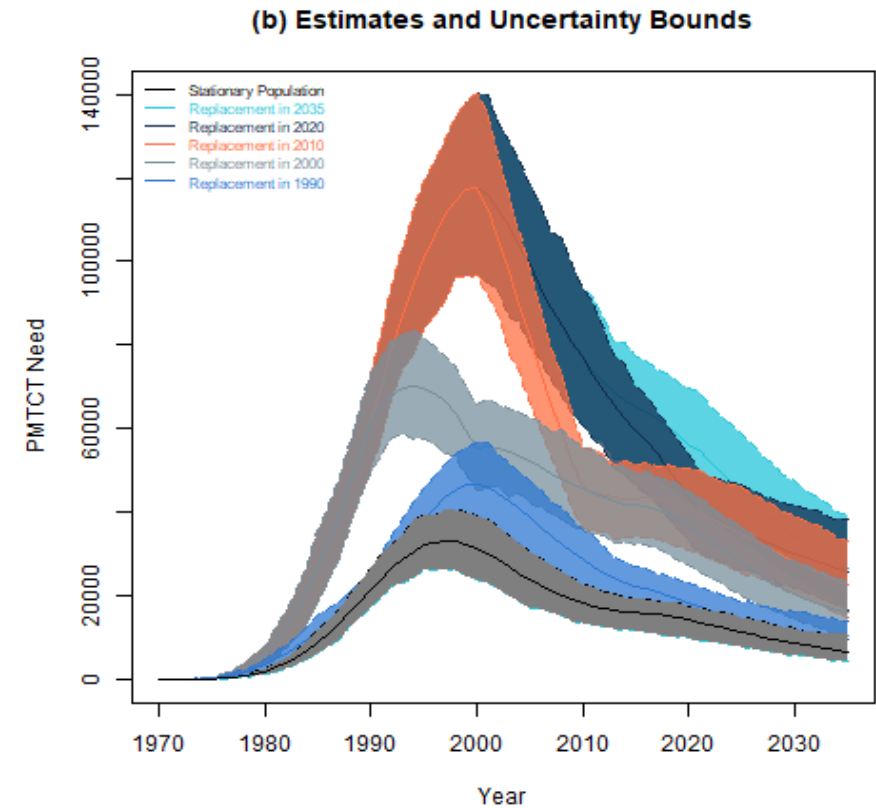
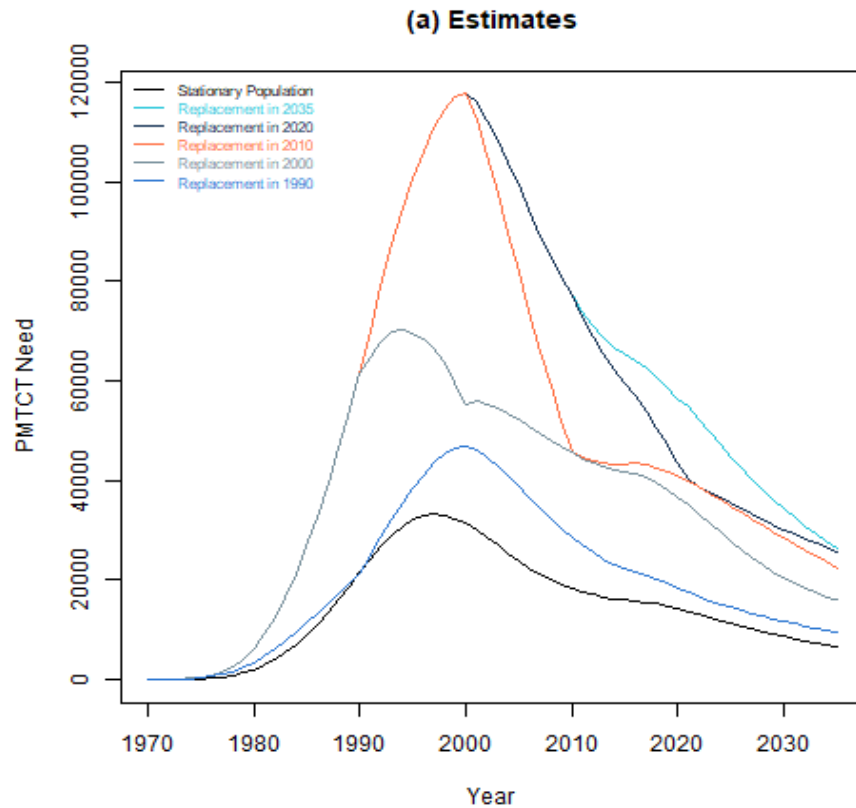
(a) Estimates



(b) Estimates and Uncertainty Bounds



Timing of Fertility Decline: PMTCT Need



Conclusions

- Identical HIV curves produce different estimates of key HIV indicators under different population dynamics.
- These differences are generally within the estimated uncertainty, though they can still be quite large.
- The differences are large enough to likely impact decision-making.
- Analyzing trends obtained from these different estimates would lead to different conclusions about the success of interventions and the general trends of the HIV epidemic.

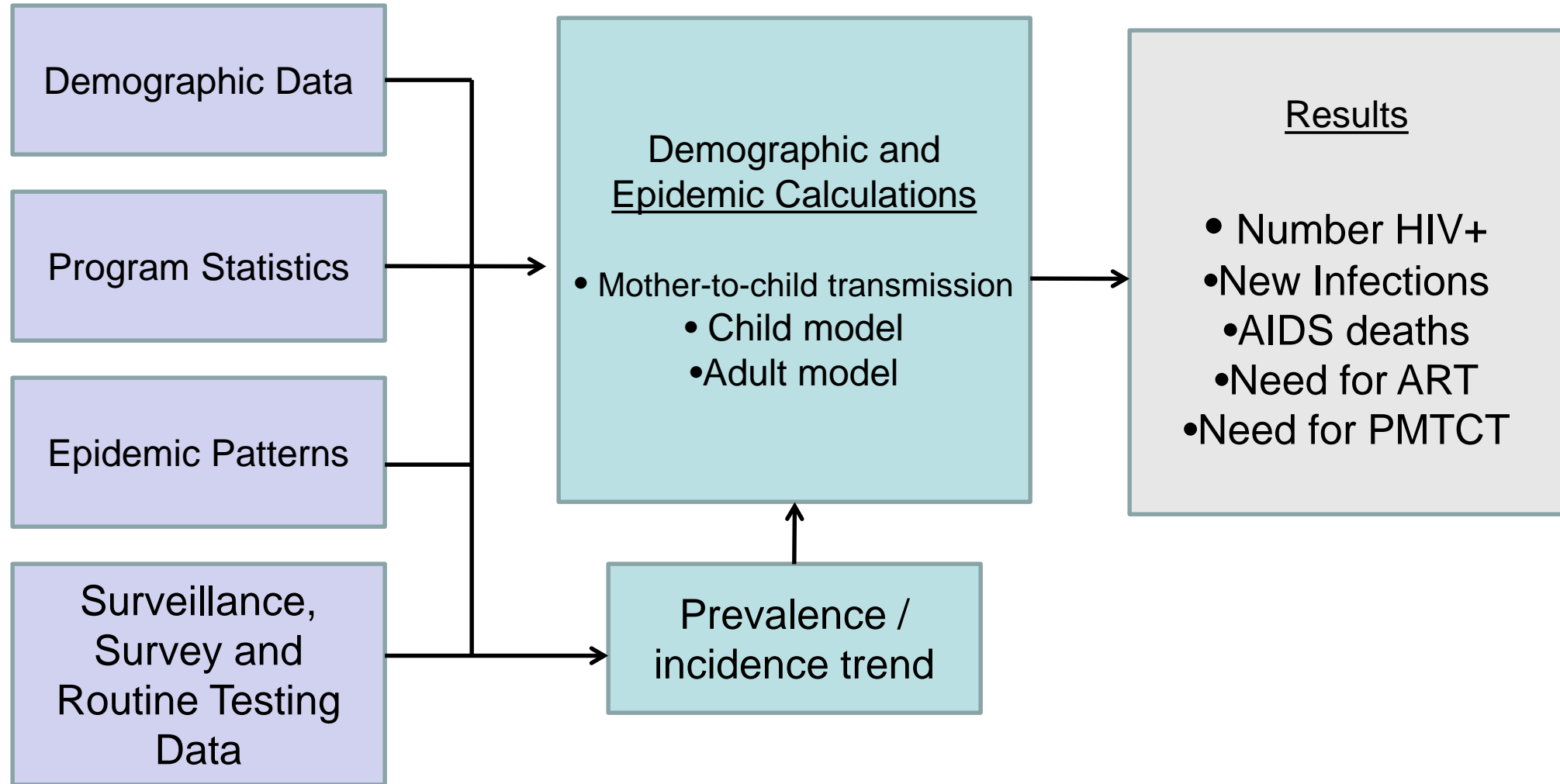


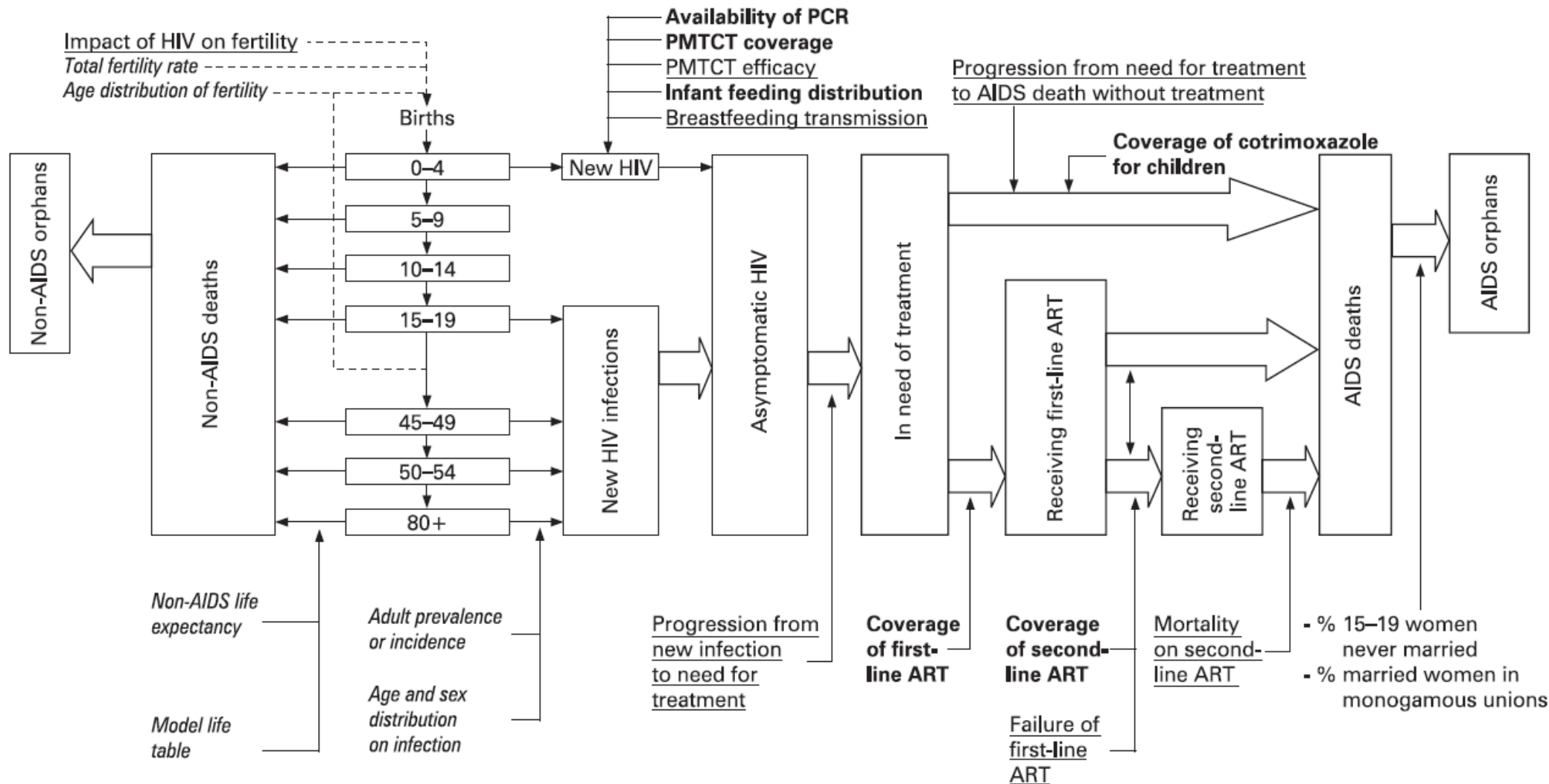
Underlying population dynamics need to be considered when using estimated HIV indicators

Thank you!

Extra Slides

Structure





Variables in italics are country-specific demographic and epidemiological inputs

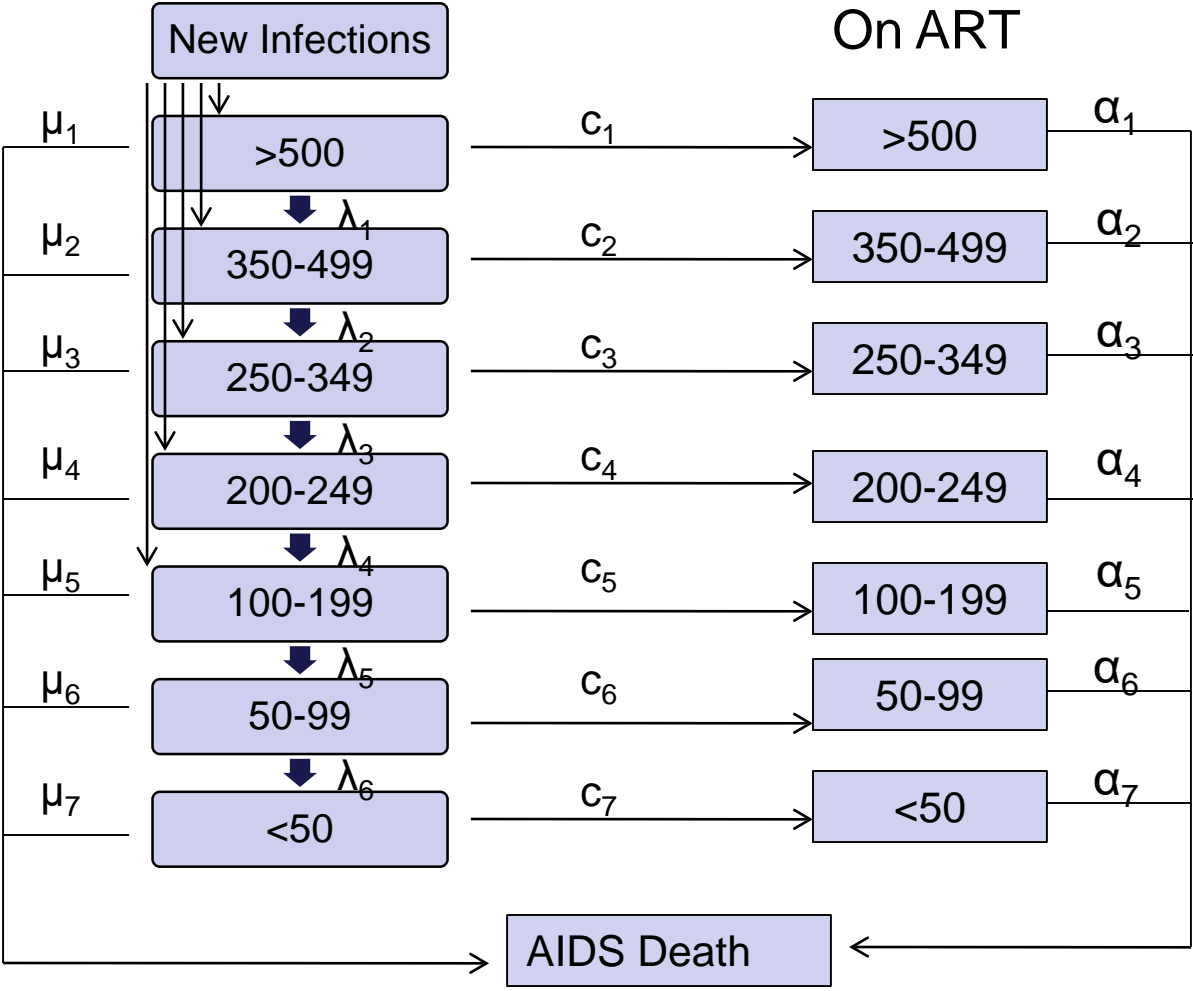
Variables in bold are based on country-specific service statistics and projections

Variables in underlined type are based on international studies

ART = antiretroviral therapy; PMTCT = prevention of mother-to-child transmission

- % 15–19 women never married
- % married women in monogamous unions

Tracking New Adult HIV Infections by CD4 Count



μ = non-AIDS mortality rate, λ = progression rate, c = rate of initiating ART, α = mortality rate on ART