

Epidemiology of HIV in children under 5 years of age, and health expenditure on HIV in Central Asian countries

Method

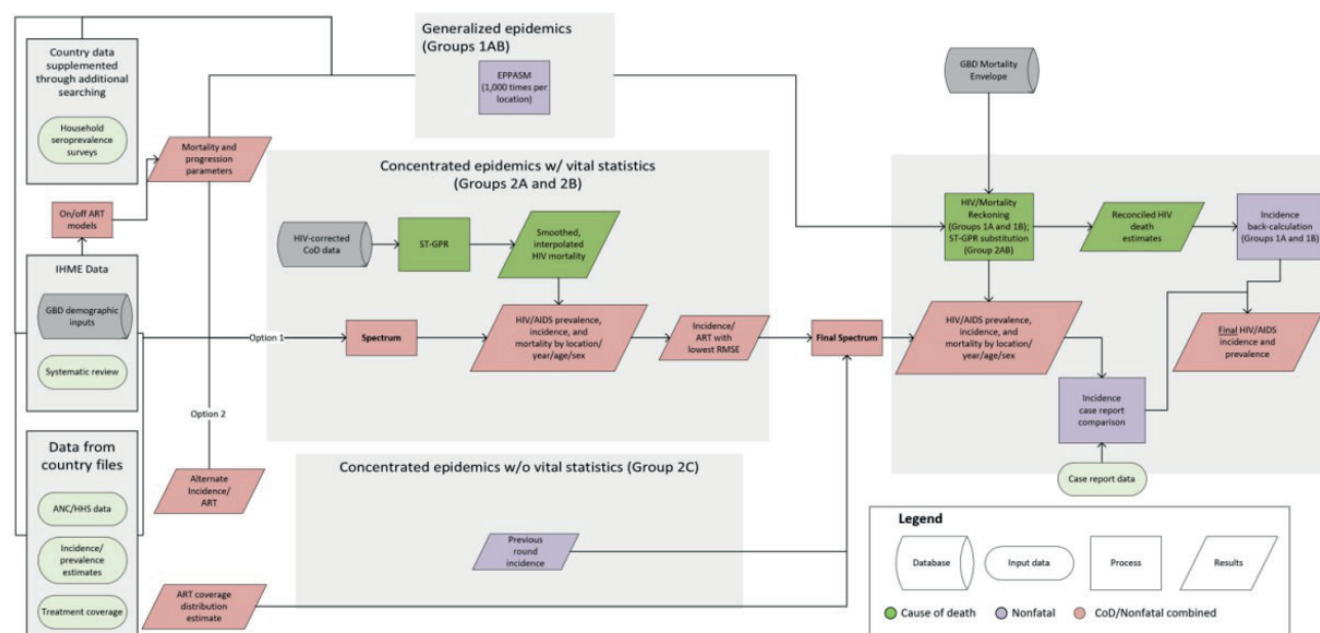


Figure S1. The flow diagram of data collection and input for HIV/AIDS cases

Input data

Household seroprevalence surveys

Geographically representative HIV seroprevalence survey results were used as inputs to the model for countries with generalized HIV epidemics where available.

GBD demographic inputs

Location-specific population, fertility, migration, and HIV-free survival rates from GBD 2020 were used as inputs in modelling all locations.

Data from countries

The files compiled by UNAIDS for their HIV/AIDS estimation process were one of our sources of data for producing estimates of HIV burden. The files are often built by within-country experts with the support of UNAIDS, which publishes estimates annually on behalf of countries and only shares their files when permission is granted. The files contain the HIV-specific information that is needed to run the Spectrum1 and Estimation and Projection Package-Age Sex2 (EPP-ASM) models. Spectrum and EPP-ASM require the following input data: AIDS mortality among people living with HIV with and without ART, CD4 progression among people living with HIV not on ART, ART coverage among adults and children, cotrimoxazole coverage among children, coverage of breastfeeding among women living with HIV, prevention of mother-to-child transmission coverage, and CD4 thresholds for treatment eligibility. EPP-ASM additionally uses HIV prevalence data from surveillance sites and representative surveys. Antenatal care (ANC), incidence, prevalence, and treatment coverage data from UNAIDS were used in modelling for all locations. We extracted all of this data from the proprietary format used by UNAIDS.

Vital and civil registration

We used all available sources of vital and civil registration and sample registration data from the GBD Causes of Death database after garbage code redistribution and HIV/AIDS mis-coding correction⁴ in Group 2A countries from the Central Asian region. Both systems are administered by the Centers for Disease Control and Prevention, of which the reported number of deaths due to HIV is archived.

Case notifications data

We searched for case notifications data using the ECDC database and country reports series in countries with four- and five-star vital registration data. We identified all nine countries with available information.

Prevalence Data

Household seroprevalence surveys

Geographically representative HIV seroprevalence survey results were used as inputs to the model for countries with generalized HIV epidemics where available. From these surveys, we used age- and sex-specific prevalence data.

Data from countries

The files compiled by UNAIDS for their HIV/AIDS estimation process were our main source of data for producing estimates of HIV burden. The files are often built by within-country experts with the support of UNAIDS, which publishes estimates annually on behalf of countries and only shares their files when permission is granted. The files contain the HIV-specific information needed to run the Spectrum⁴ and Estimation and Projection Package-Age Sex (EPP-ASM)⁵ models. We extracted all of this data from the proprietary format used by UNAIDS. The EPP-ASM and Spectrum models used for GBD estimation vary slightly from those used by UNAIDS, with details on this variation included below. On top of the differences in model structure, we integrate our estimates of input model parameters, including new transition parameters and demographic rates. The differences between our estimates and UNAIDS' estimates reflect differences in model structure, model parameters, and the location-specific data used to calibrate our models.

Disease model

We used two different components to derive year-, age-, and sex-specific estimates of HIV incidence, prevalence, and mortality depending on the locations' availability of data and extent of HIV burden, as described below:

1. EPP-ASM was used to estimate incidence, prevalence, and mortality that are consistent with serosurveillance data from antenatal care clinics and/or prevalence surveys.
2. Spectrum is a compartmental HIV progression model used to generate age-sex-specific incidence, prevalence, and death rates from input incidence and prevalence curves and assumptions about intervention scale-up and local variation in epidemiology. This model was used in conjunction with EPP-ASM for India and for all Group 2A countries.

Trends

Trends in prevalence, incidence, and mortality attributed to HIV in children under 5 years of age with comparison of Central Asian countries with global and national scenarios.

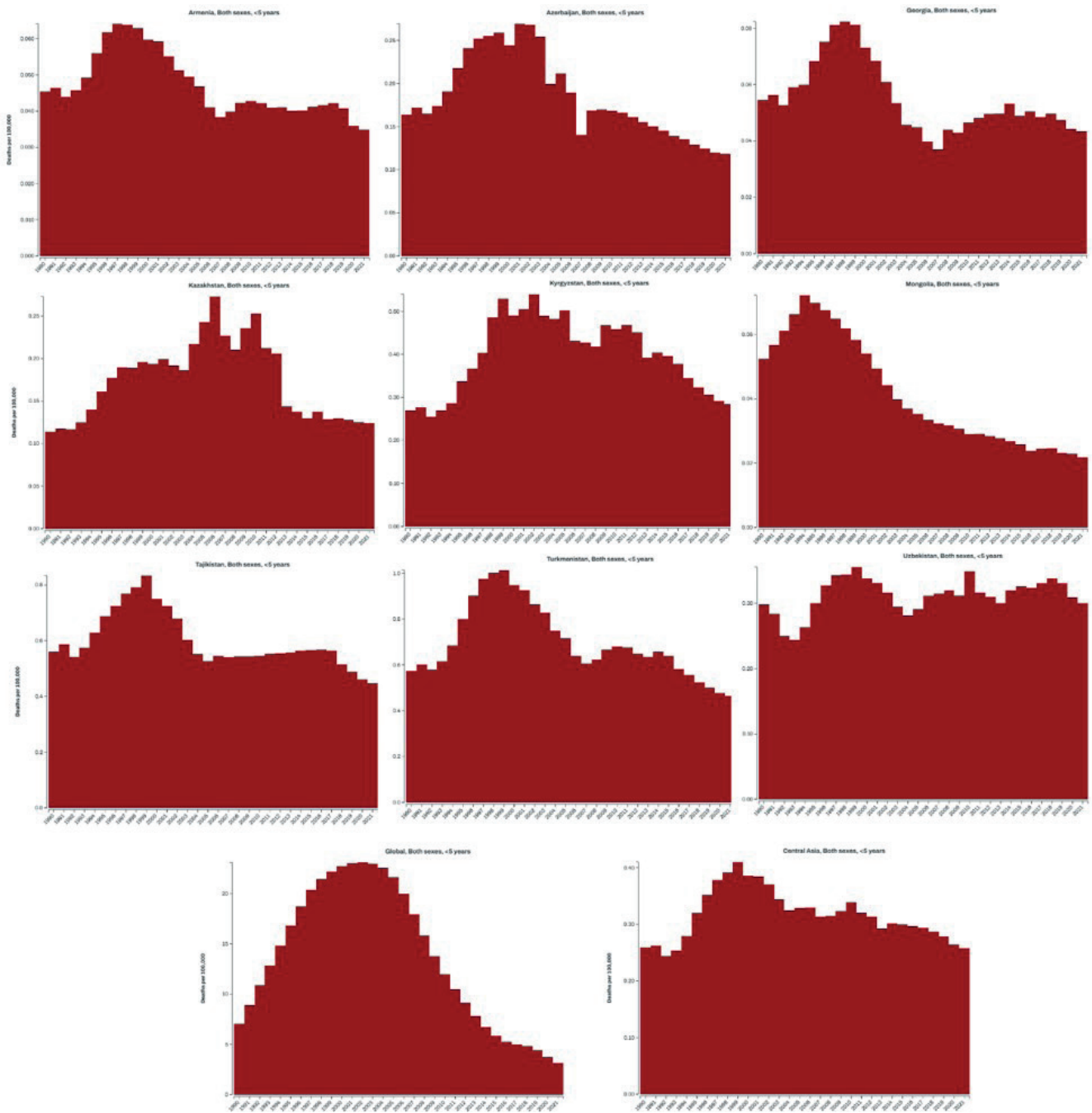


Figure S2. HIV-related trend in mortality among individual Central Asian countries from 1990 to 2019

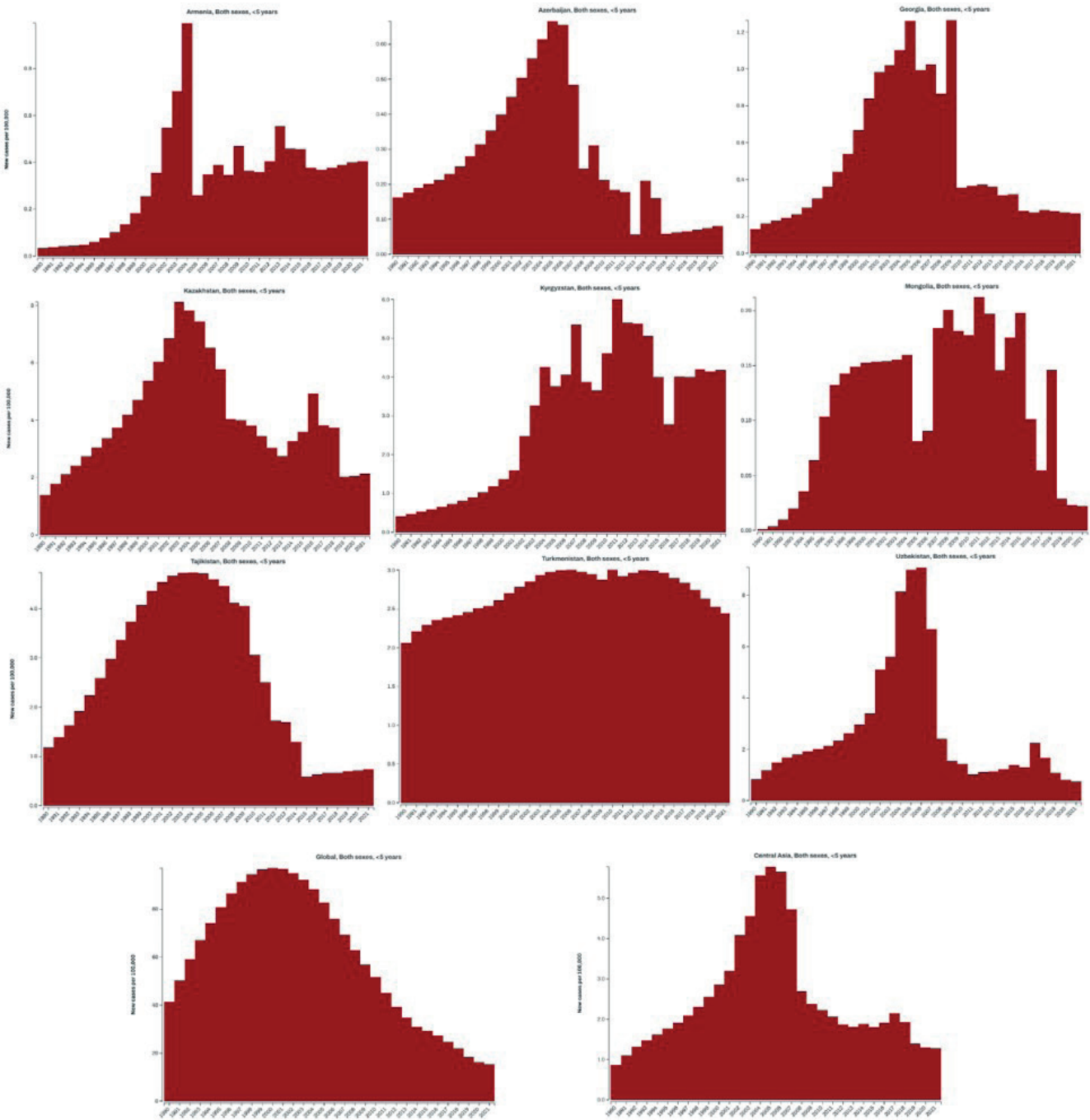


Figure S3. HIV-related trend of incident cases among individual Central Asian countries from 1990 to 2019

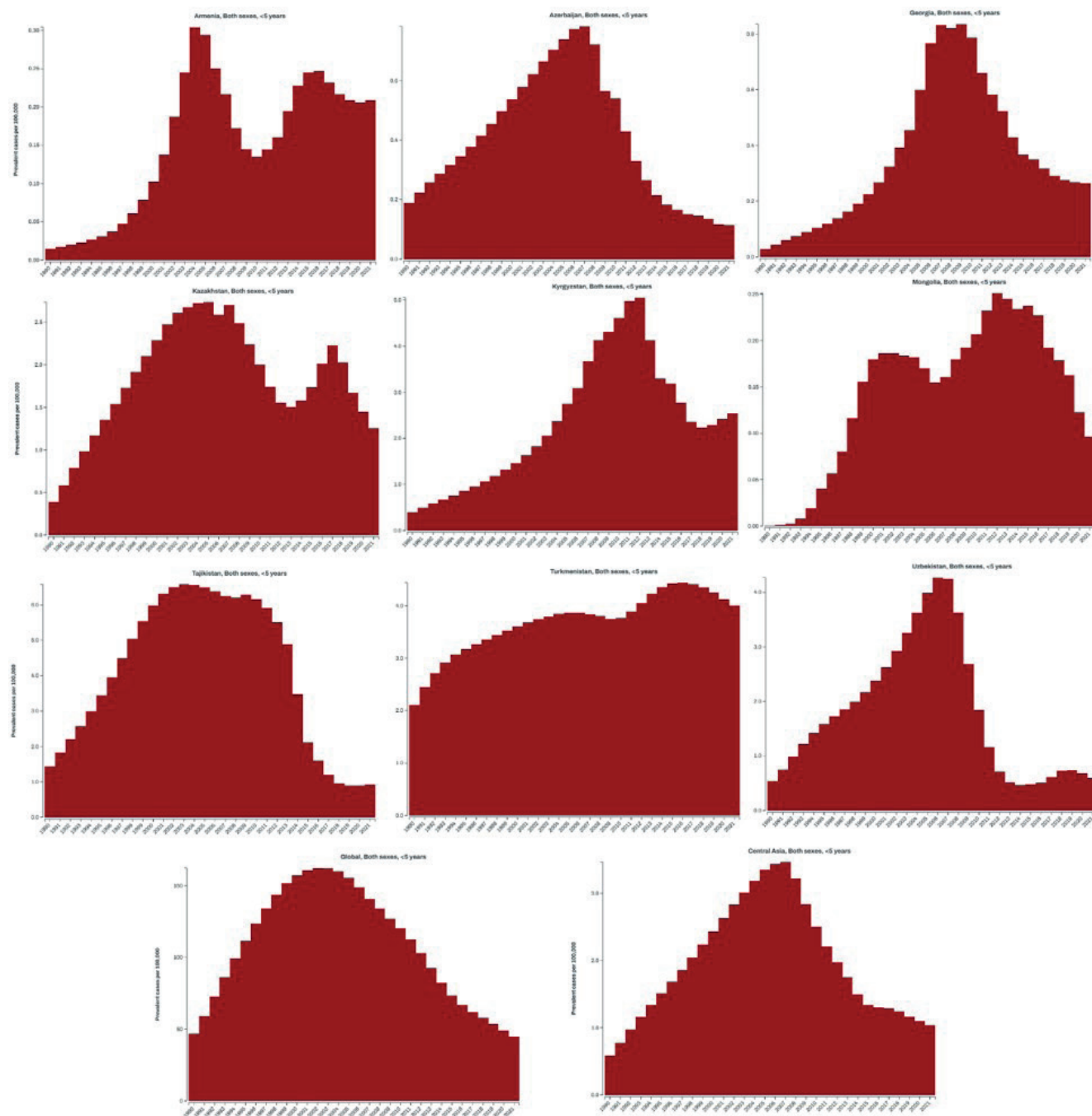


Figure S4. HIV-related trend of prevalence among individual Central Asian countries from 1990 to 2019