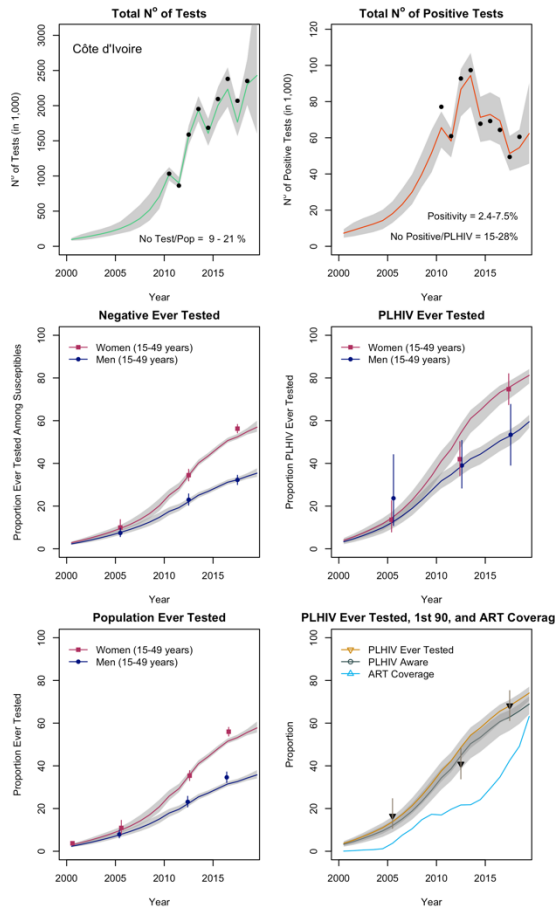
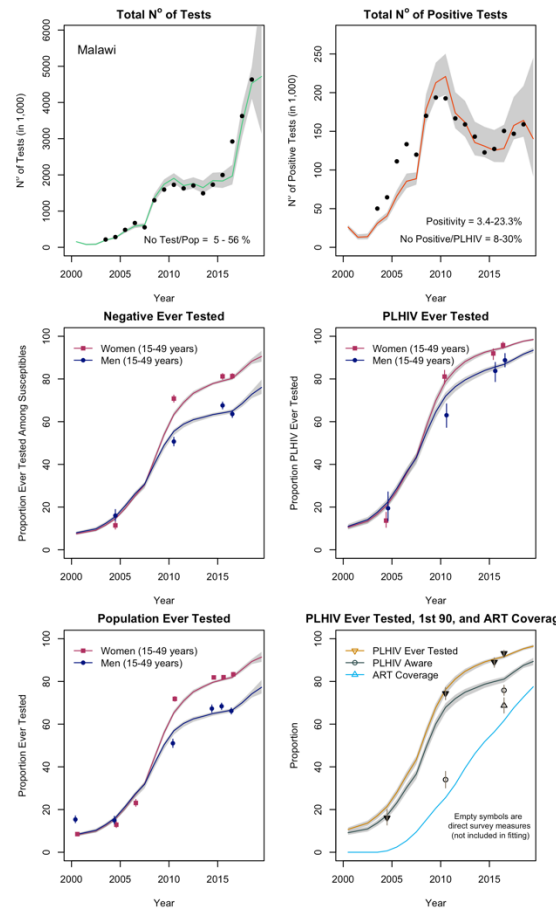


# Supplementary material

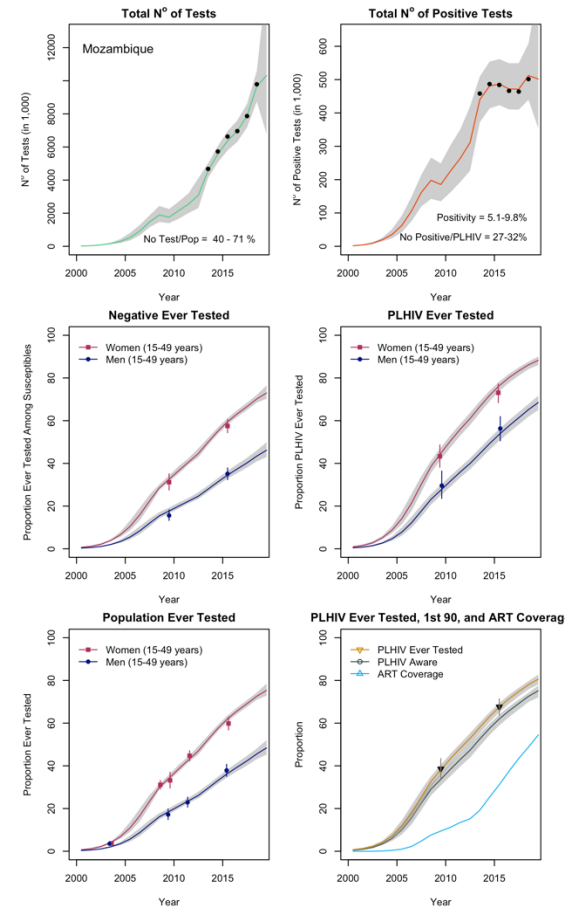
## A) Côte d'Ivoire



## B) Malawi

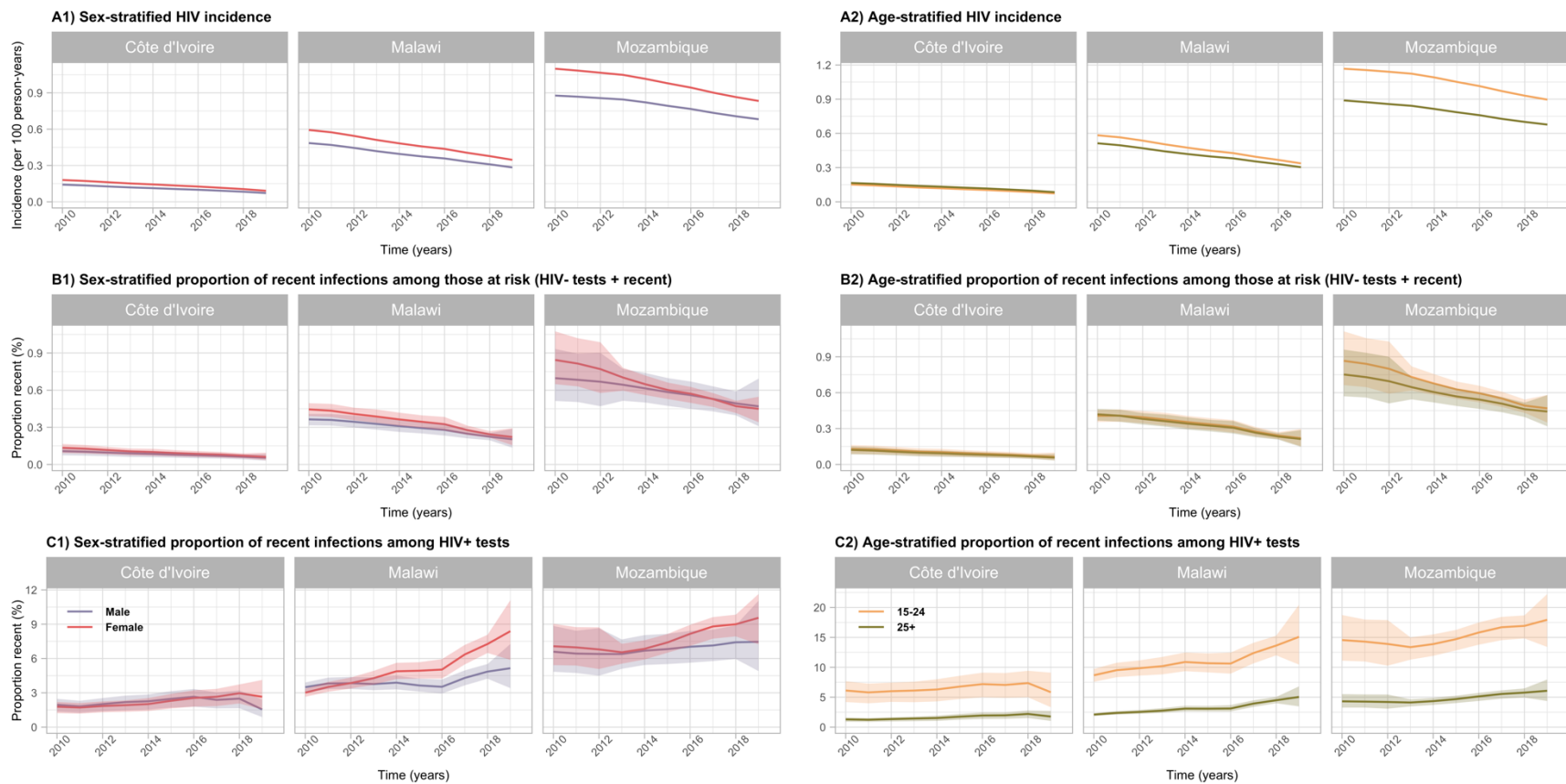


## C) Mozambique



**Figure S1. Model calibration to programmatic and survey data for A) Côte d'Ivoire, B) Malawi, and C) Mozambique (right) over 2000–2019:** The shaded areas on all graphs correspond to 95% credible intervals of the posterior estimates, with the lines corresponding to the median. Black dots on the first row of graphs correspond to the reported HIV testing

services program data for the overall number of tests (upper left) and number of positive tests (upper right). The points on the second row of graphs are survey estimates of the proportion ever tested among women (squares) and men (circles) among the HIV-negative tests (center left), people living with HIV (PLHIV; center right), and the overall population (bottom left). PLHIV aware of their status ('first 90'), and survey estimates of awareness status and Spectrum/EPP's antiretroviral therapy (ART) coverage estimates are shown as black triangles. Estimates used for cross-validation are shown as empty symbols. The lines crossing the points are the 95% confidence intervals of survey estimates.



**Figure S2. Sex- and age-stratified proportions or ratios of recent infection:** A1) sex-stratified and A2) age-stratified HIV incidence; B1) sex-stratified and B2) age-stratified proportions of recent infections among those at risk of HIV acquisition (HIV-negative tests plus recent infections); and C1) sex-stratified and C2) age-stratified proportion of recent infection among HIV-positive (HIV+) tests; and in Côte d'Ivoire, Malawi, and Mozambique in people aged  $\geq 15$  years from 2010 to 2019. The solid lines represent the median proportion or ratio, and the shaded areas represent 95% credible interval