

Mapping age- and sex-specific HIV prevalence in adults in sub-Saharan Africa, 2000–2018

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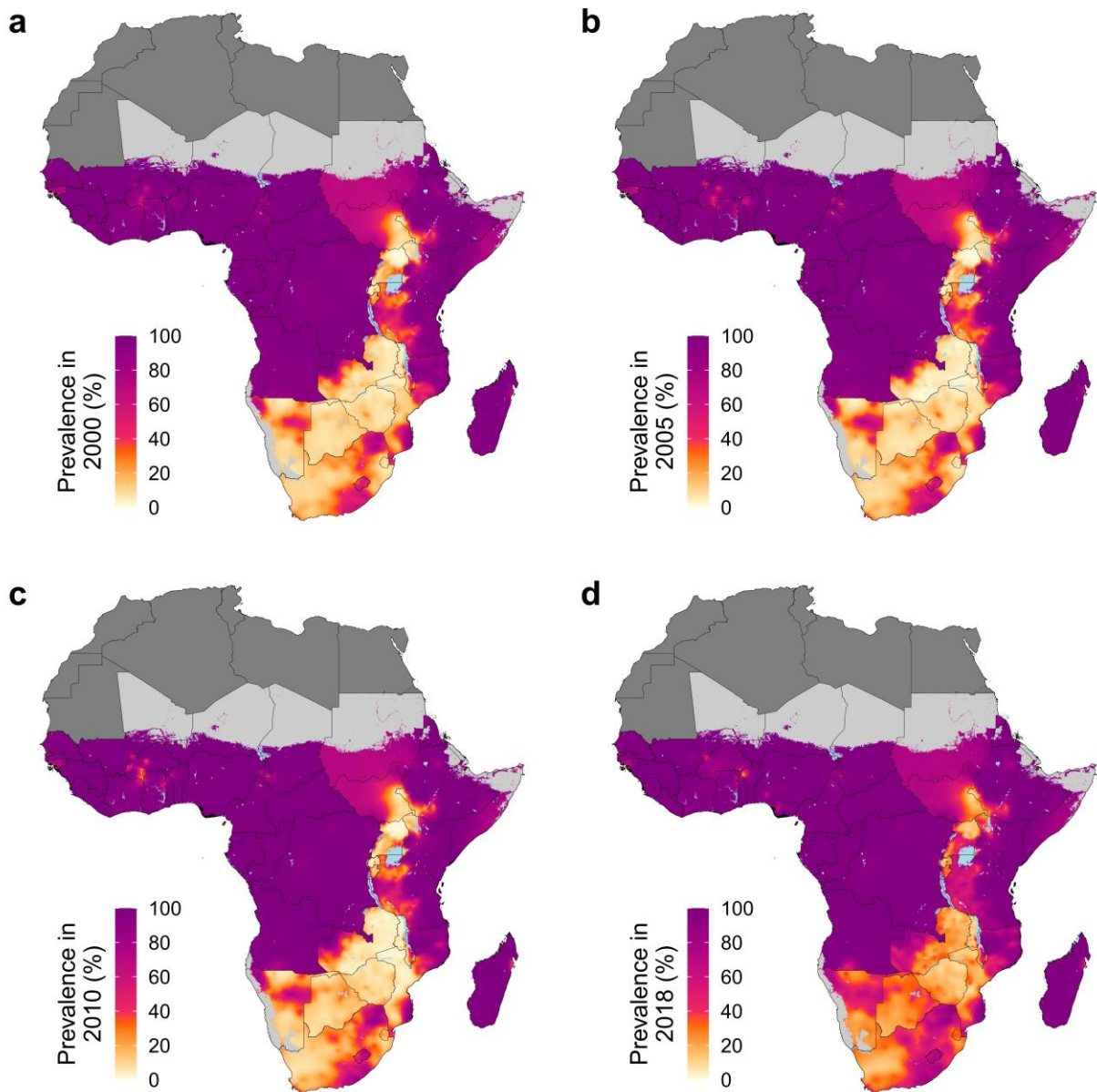
Mapping age- and sex-specific HIV prevalence in adults in sub-Saharan Africa, 2000–2018

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47 Figure S1: Prevalence of male circumcision



48
 49 **Figure S1: Prevalence of male circumcision.** Prevalence of male circumcision, including medical or
 50 traditional circumcision, among males ages 15–49 years at the 5 x 5-km grid cell level in (a) 2000, (b)
 51 2005, (c) 2010, and (d) 2018. Maps reflect administrative boundaries, land cover, lakes, and population;
 52 grid cells with fewer than ten people per 1 x 1-km and classified as "barren or sparsely vegetated" are
 53 colored in light grey. Countries colored in dark grey were not included in the analysis.

Figure S2: Prevalence of signs and symptoms of sexually transmitted infections

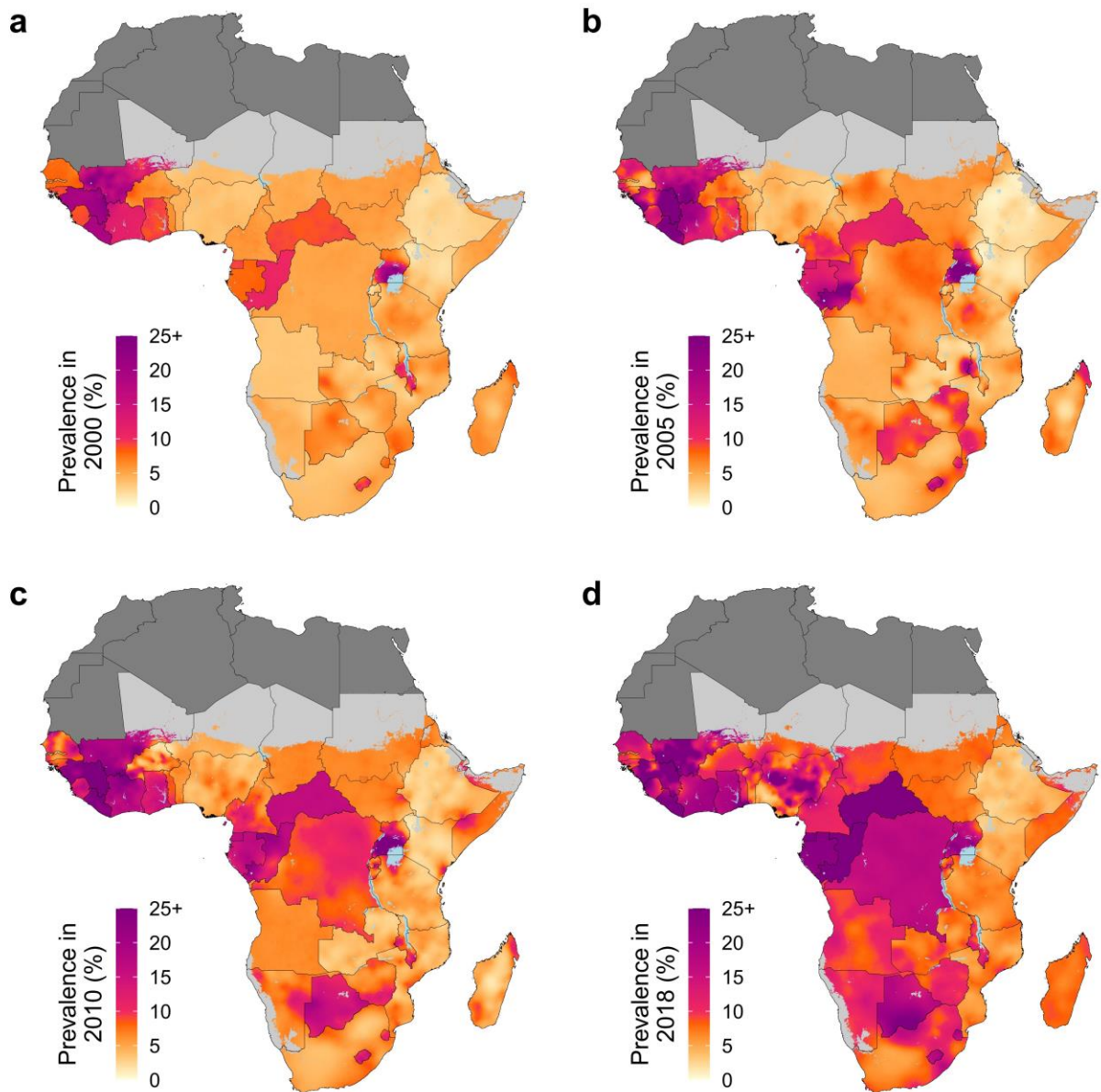


Figure S2: Prevalence of signs and symptoms of sexually transmitted infections. Prevalence of self-reported STI symptoms (genital discharge and/or genital ulcer/sore) in the last 12 months among adults ages 15–49 years at the 5 x 5-km grid cell level in (a) 2000, (b) 2005, (c) 2010, and (d) 2018. Maps reflect administrative boundaries, land cover, lakes, and population; grid cells with fewer than ten people per 1 x 1-km and classified as “barren or sparsely vegetated” are colored in light grey. Countries colored in dark grey were not included in the analysis.

Figure S3: Prevalence of marriage or living as married

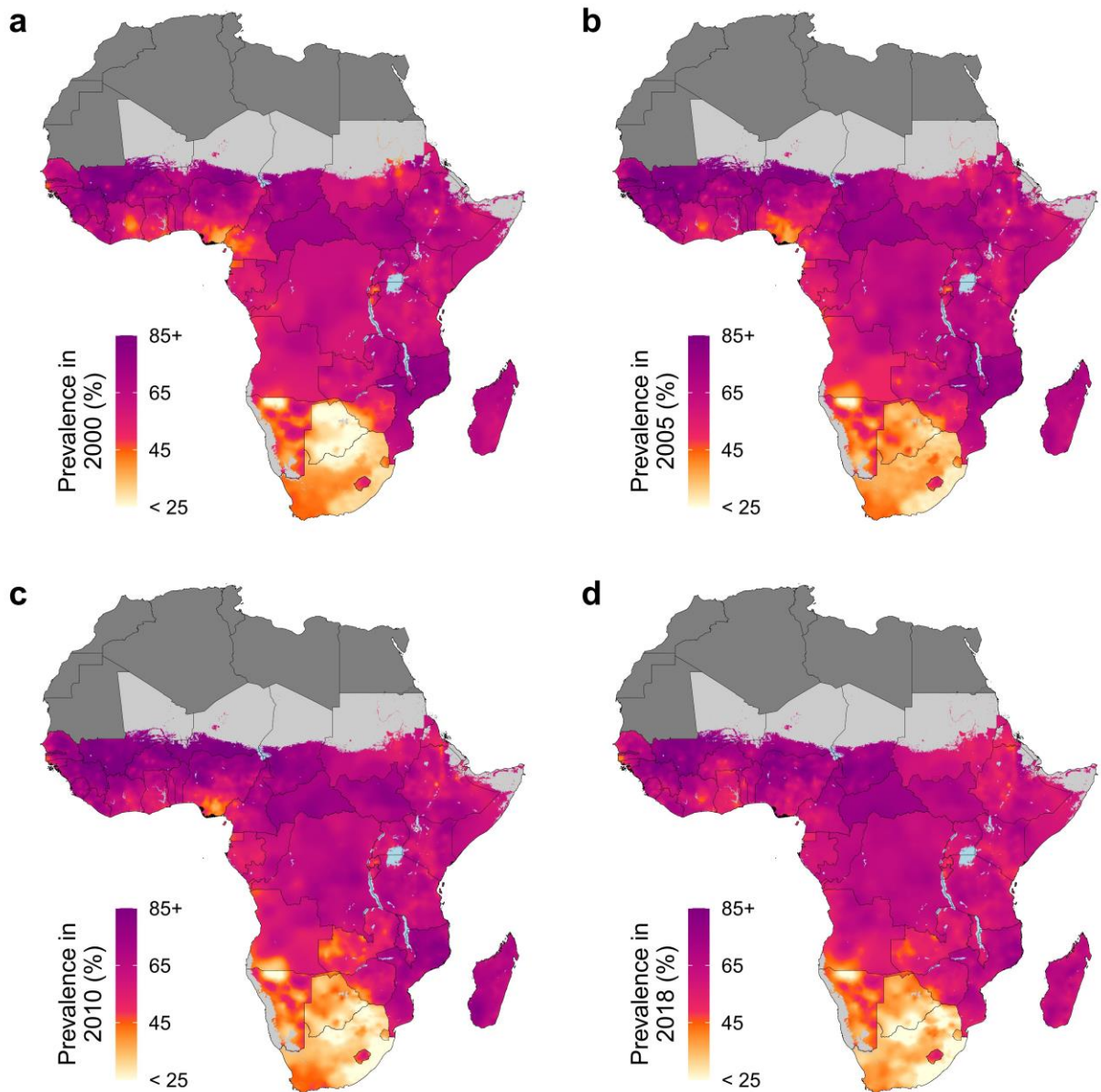
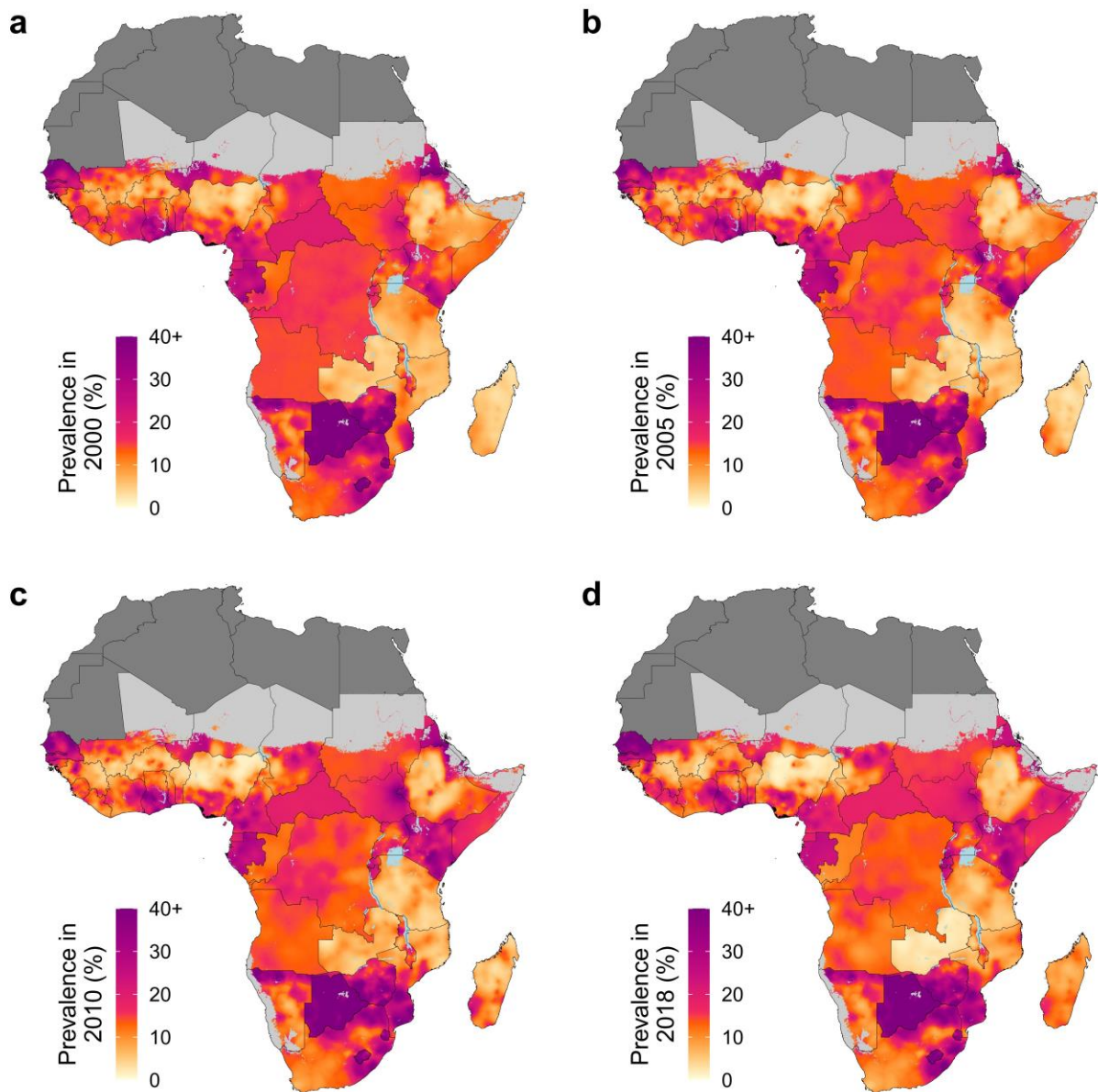


Figure S3: Prevalence of marriage or living as married. Prevalence of marriage or living as married among adults ages 15–49 years at the 5 x 5-km grid cell level in (a) 2000, (b) 2005, (c) 2010, and (d) 2018. Maps reflect administrative boundaries, land cover, lakes, and population; grid cells with fewer than ten people per 1 x 1-km and classified as "barren or sparsely vegetated" are colored in light grey. Countries colored in dark grey were not included in the analysis.

70 Figure S4: Prevalence of partner living elsewhere among females



71

72 **Figure S4: Prevalence of partner living elsewhere among women.** Prevalence of partner living elsewhere
73 among females ages 15–49 years at the 5 x 5-km grid cell level in (a) 2000, (b) 2005, (c) 2010, and (d)
74 2018. Maps reflect administrative boundaries, land cover, lakes, and population; grid cells with fewer
75 than ten people per 1 x 1-km and classified as "barren or sparsely vegetated" are colored in light grey.
76 Countries colored in dark grey were not included in the analysis.

Figure S5: Prevalence of condom use during most recent sexual encounter

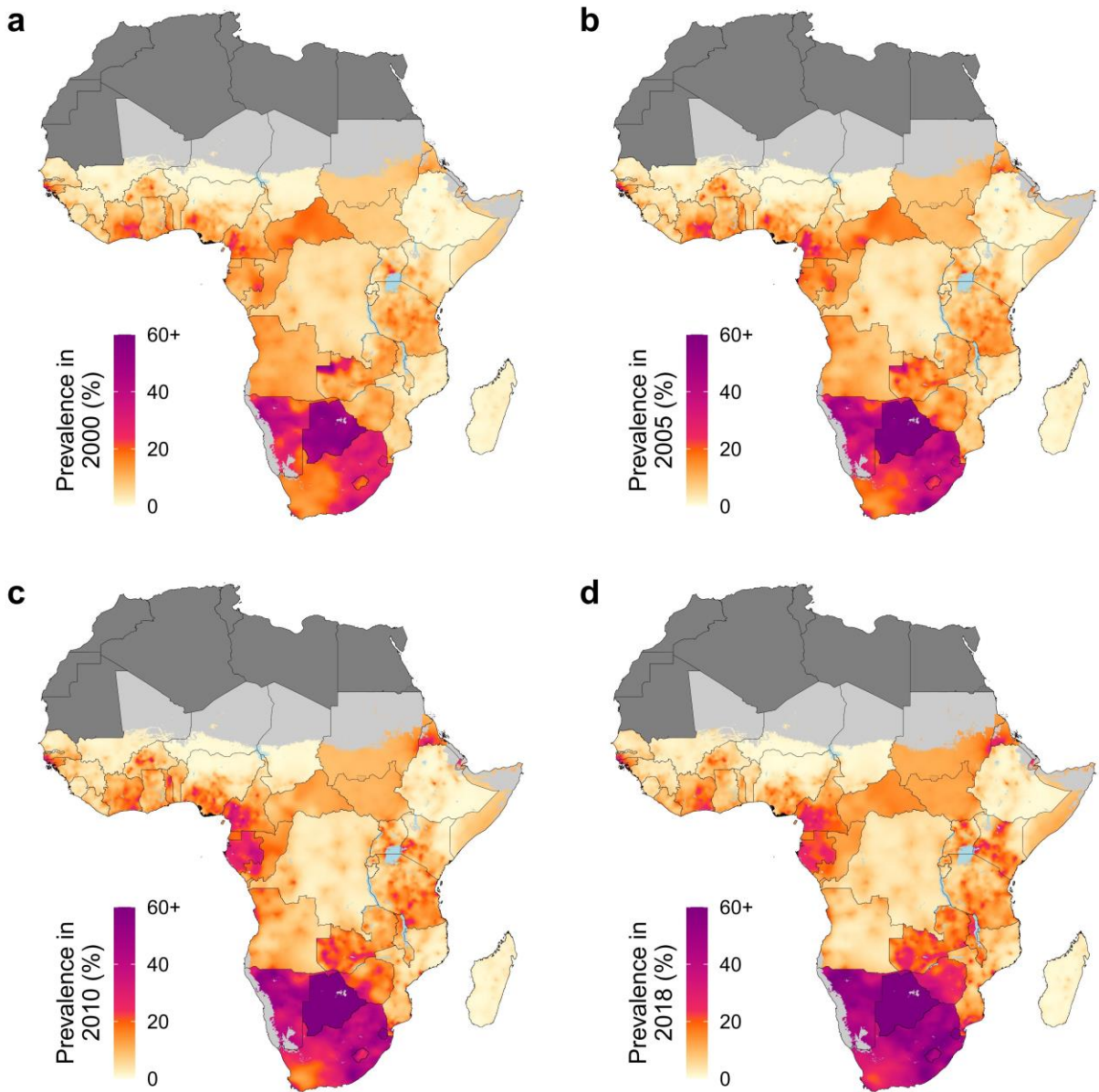


Figure S5: Prevalence of condom use during most recent sexual encounter. Prevalence of condom use during most recent sexual encounter within the last 12 months among adults ages 15–49 years at the 5 x 5-km grid cell level in (a) 2000, (b) 2005, (c) 2010, and (d) 2018. Maps reflect administrative boundaries, land cover, lakes, and population; grid cells with fewer than ten people per 1 x 1-km and classified as “barren or sparsely vegetated” are colored in light grey. Countries colored in dark grey were not included in the analysis.

Figure S6: Prevalence of sexual activity among young females

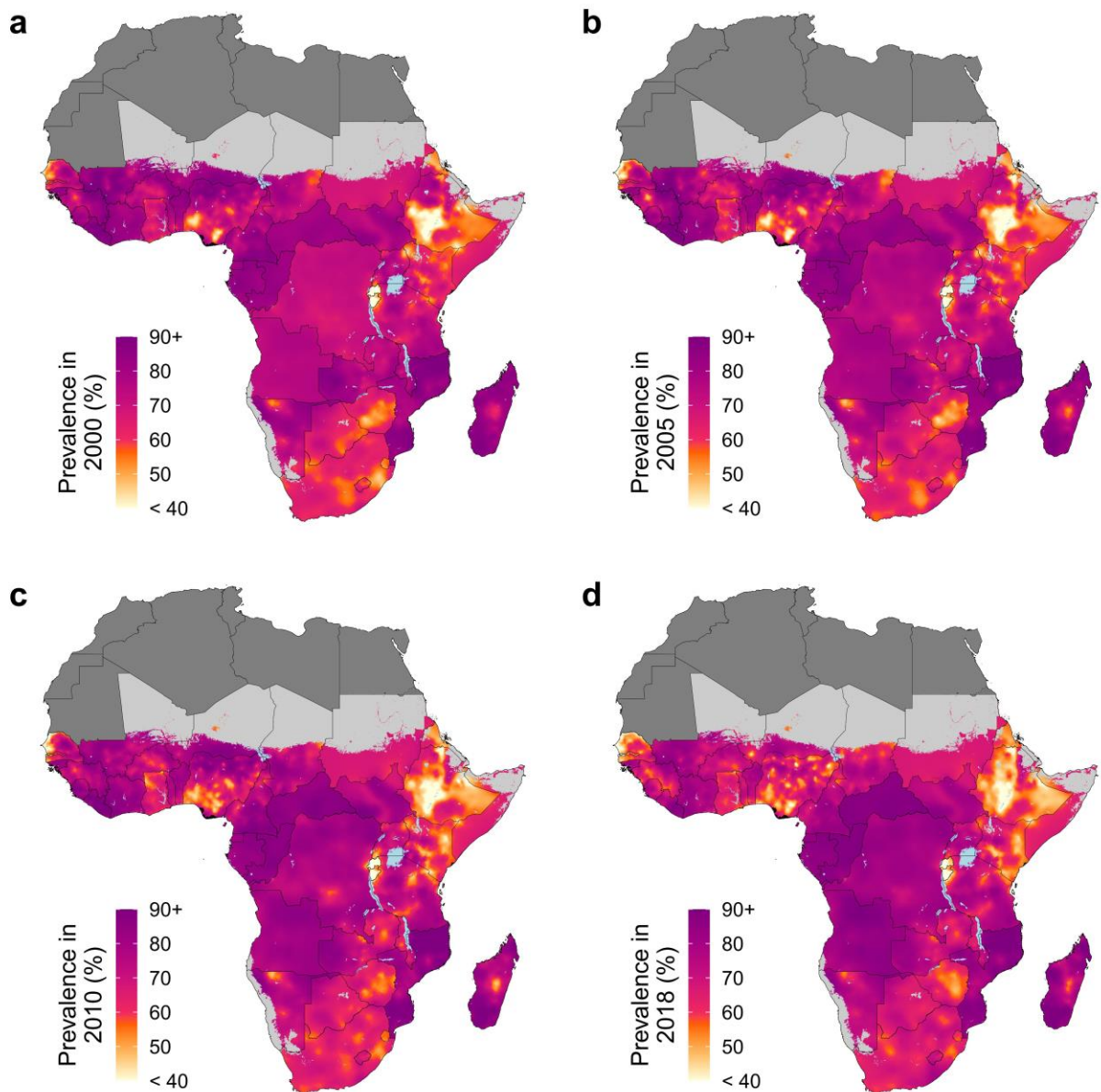
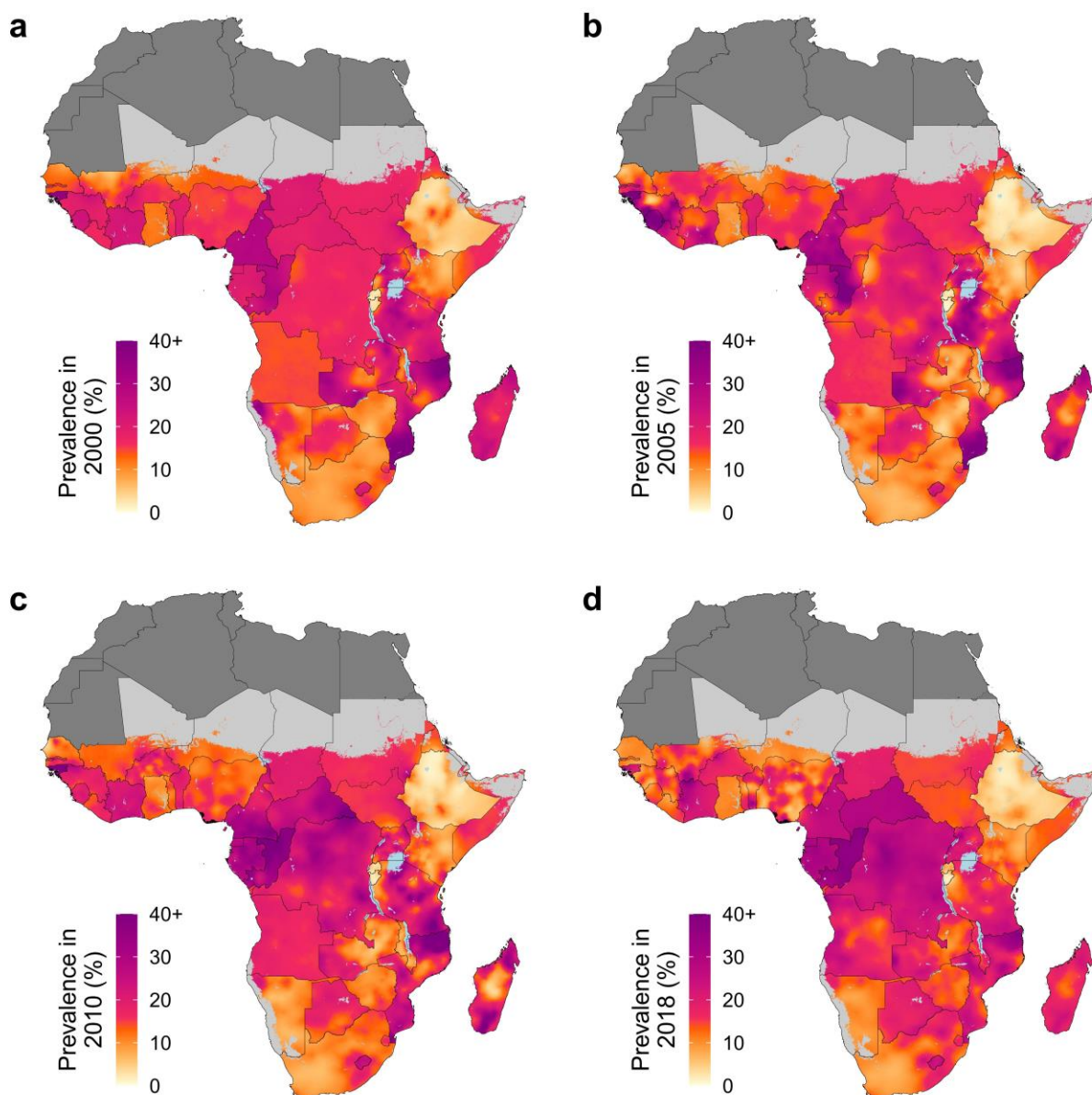


Figure S6: Prevalence of sexual activity among young females. Prevalence of sexual activity among females ages 15–24 years at the 5 x 5-km grid cell level in (a) 2000, (b) 2005, (c) 2010, and (d) 2018. Maps reflect administrative boundaries, land cover, lakes, and population; grid cells with fewer than ten people per 1 x 1-km and classified as “barren or sparsely vegetated” are colored in light grey. Countries colored in dark grey were not included in the analysis.

94 Figure S7: Prevalence of multiple partners among males in the past year



95
 96 **Figure S7: Prevalence of multiple partners among males in the past year.** Prevalence of multiple partners
 97 among males ages 15–49 years at the 5 x 5-km grid cell level in (a) 2000, (b) 2005, (c) 2010, and (d) 2018.
 98 Maps reflect administrative boundaries, land cover, lakes, and population; grid cells with fewer than ten
 99 people per 1 x 1-km and classified as "barren or sparsely vegetated" are colored in light grey. Countries
 100 colored in dark grey were not included in the analysis.

Figure S8: Prevalence of multiple partners among females in the past year

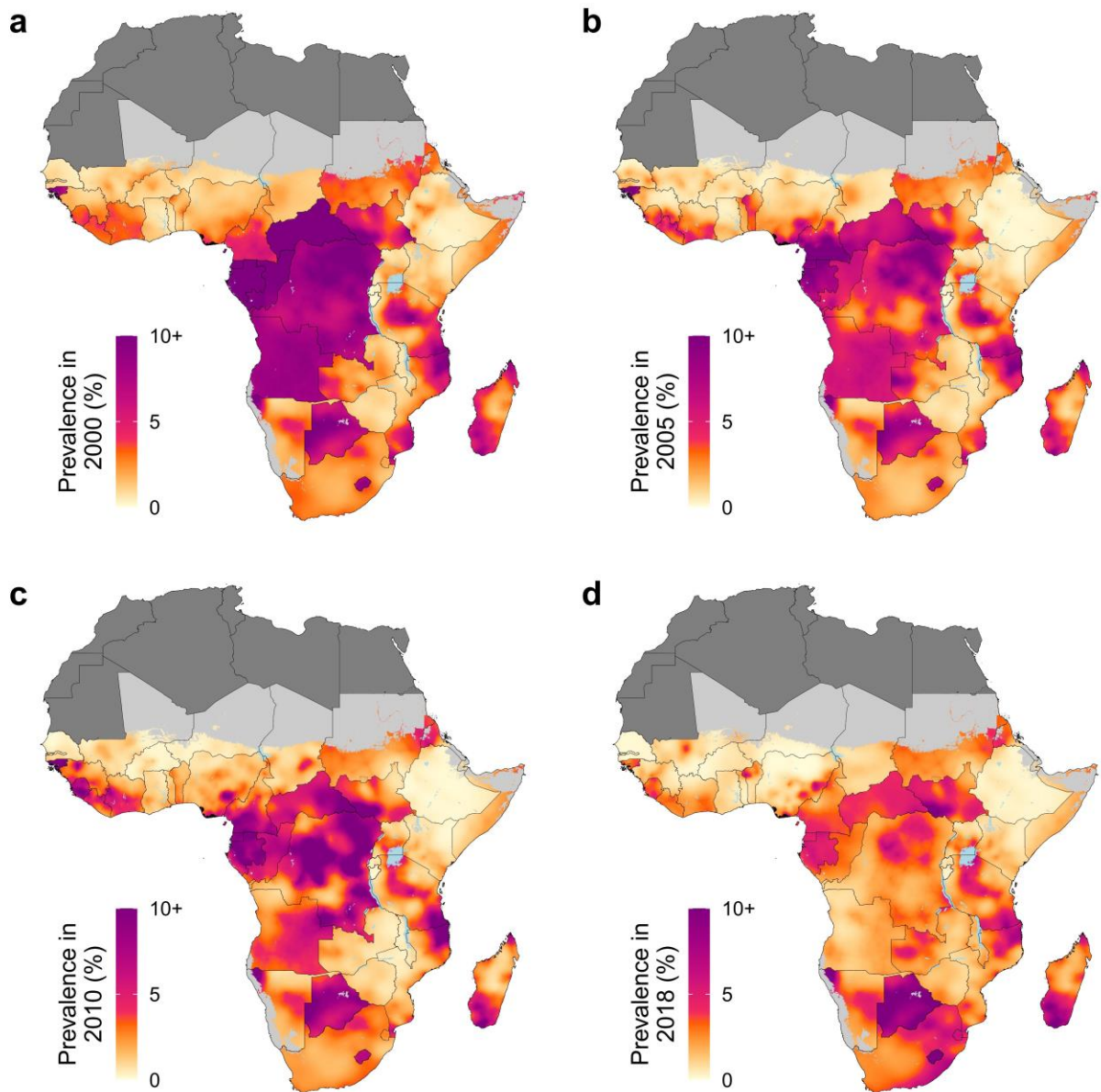


Figure S8: Prevalence of multiple partners among females in the past year. Prevalence of multiple partners among females ages 15–49 years at the 5 x 5-km grid cell level in (a) 2000, (b) 2005, (c) 2010, and (d) 2018. Maps reflect administrative boundaries, land cover, lakes, and population; grid cells with fewer than ten people per 1 x 1-km and classified as “barren or sparsely vegetated” are colored in light grey. Countries colored in dark grey were not included in the analysis.

Figure S9: HIV prevalence predictions from the boosted regression tree model

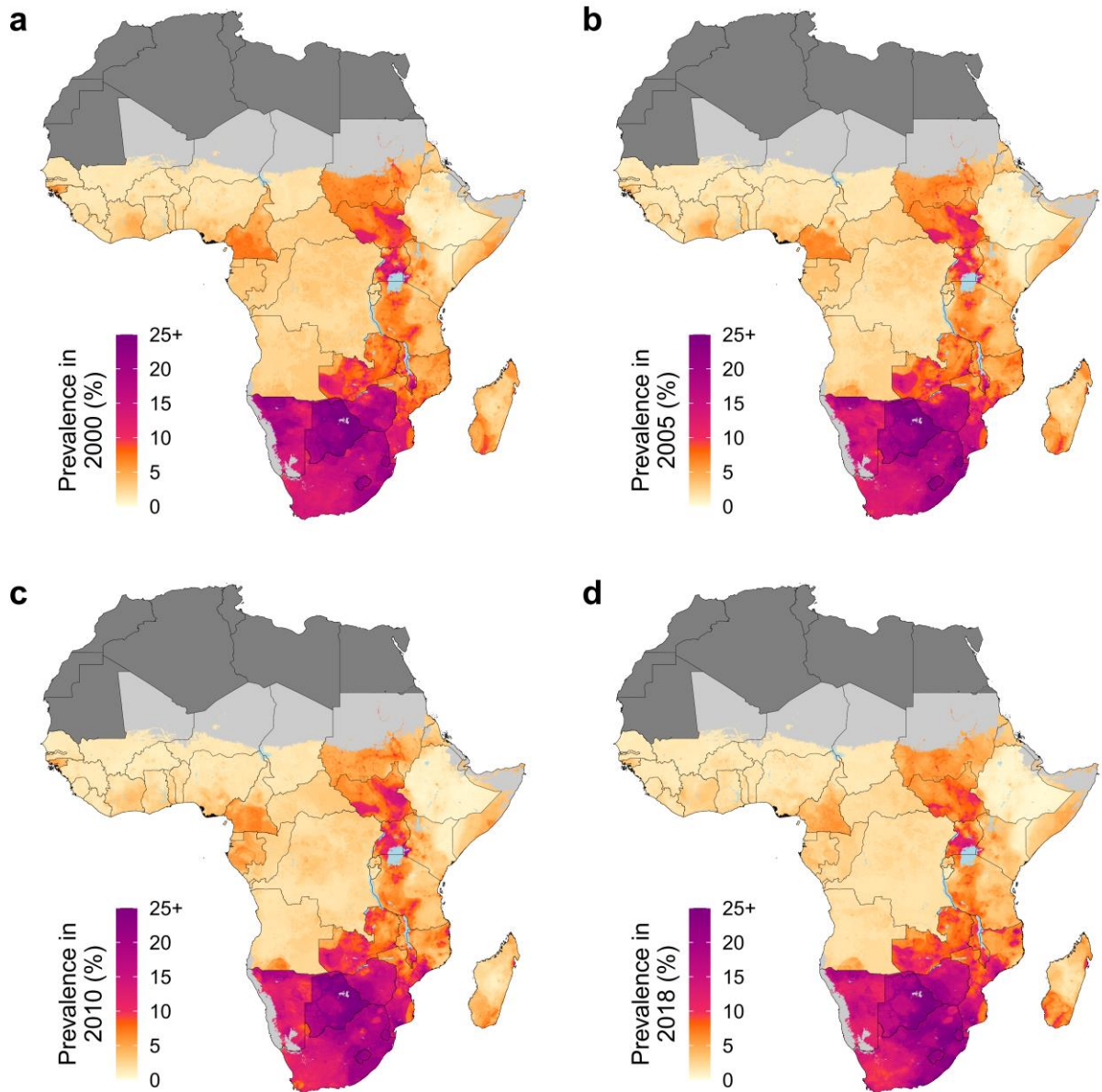


Figure S9: HIV prevalence predictions from the boosted regression tree model. HIV prevalence among adults ages 15–49 years at the 5 x 5-km grid cell level in (a) 2000, (b) 2005, (c) 2010, and (d) 2018 as estimated in the boosted regression tree model. Maps reflect administrative boundaries, land cover, lakes, and population; grid cells with fewer than ten people per 1 x 1-km and classified as “barren or sparsely vegetated” are colored in light grey. Countries colored in dark grey were not included in the analysis.

Figure S10: HIV prevalence predictions from the generalized additive model

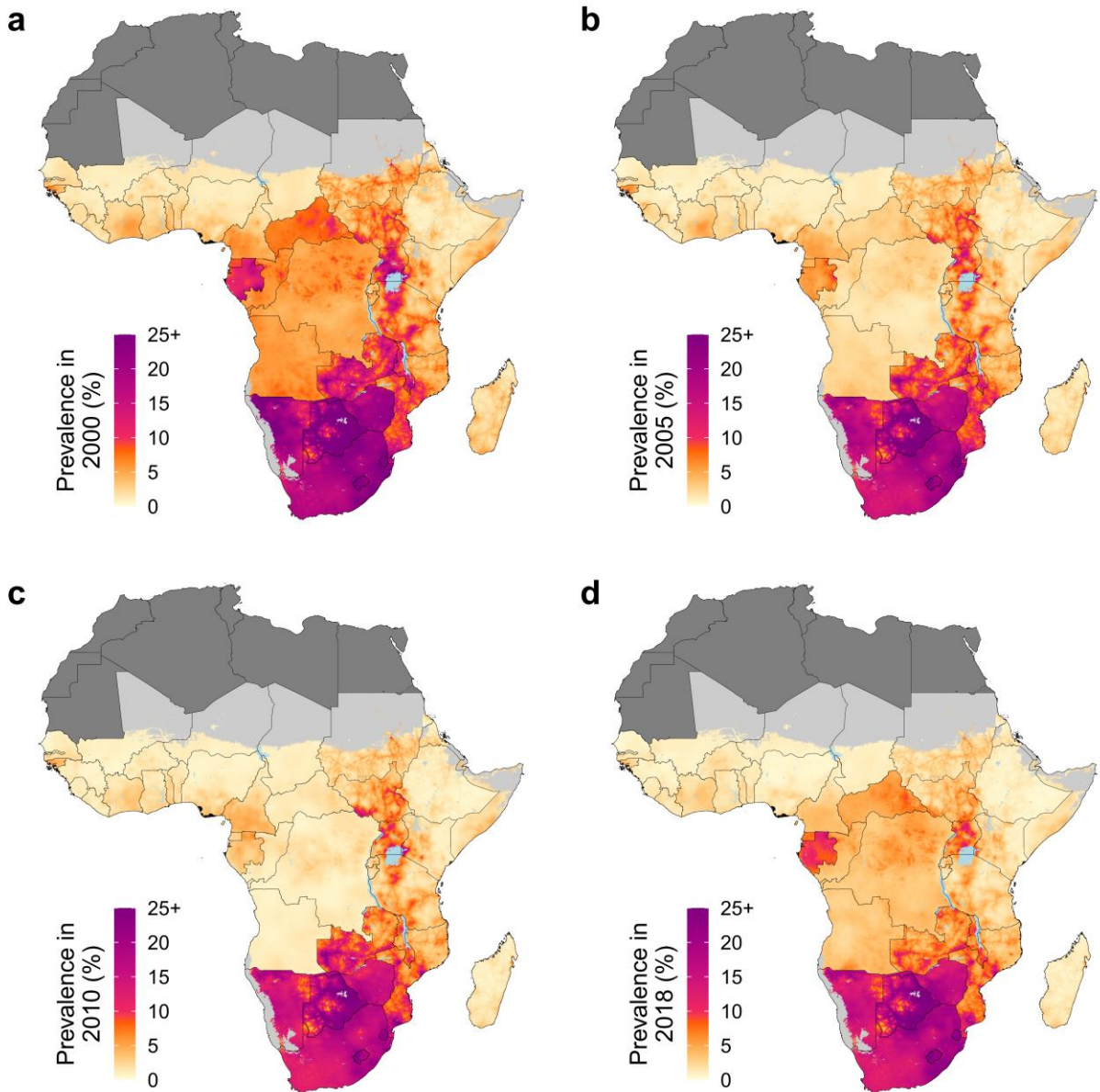


Figure S10: HIV prevalence predictions from the generalized additive model. HIV prevalence among adults ages 15–49 years at the 5 x 5-km grid cell level in (a) 2000, (b) 2005, (c) 2010, and (d) 2018 as estimated in the generalized additive model. Maps reflect administrative boundaries, land cover, lakes, and population; grid cells with fewer than ten people per 1 x 1-km and classified as "barren or sparsely vegetated" are colored in light grey. Countries colored in dark grey were not included in the analysis.

Figure S11: HIV prevalence predictions from the lasso regression model

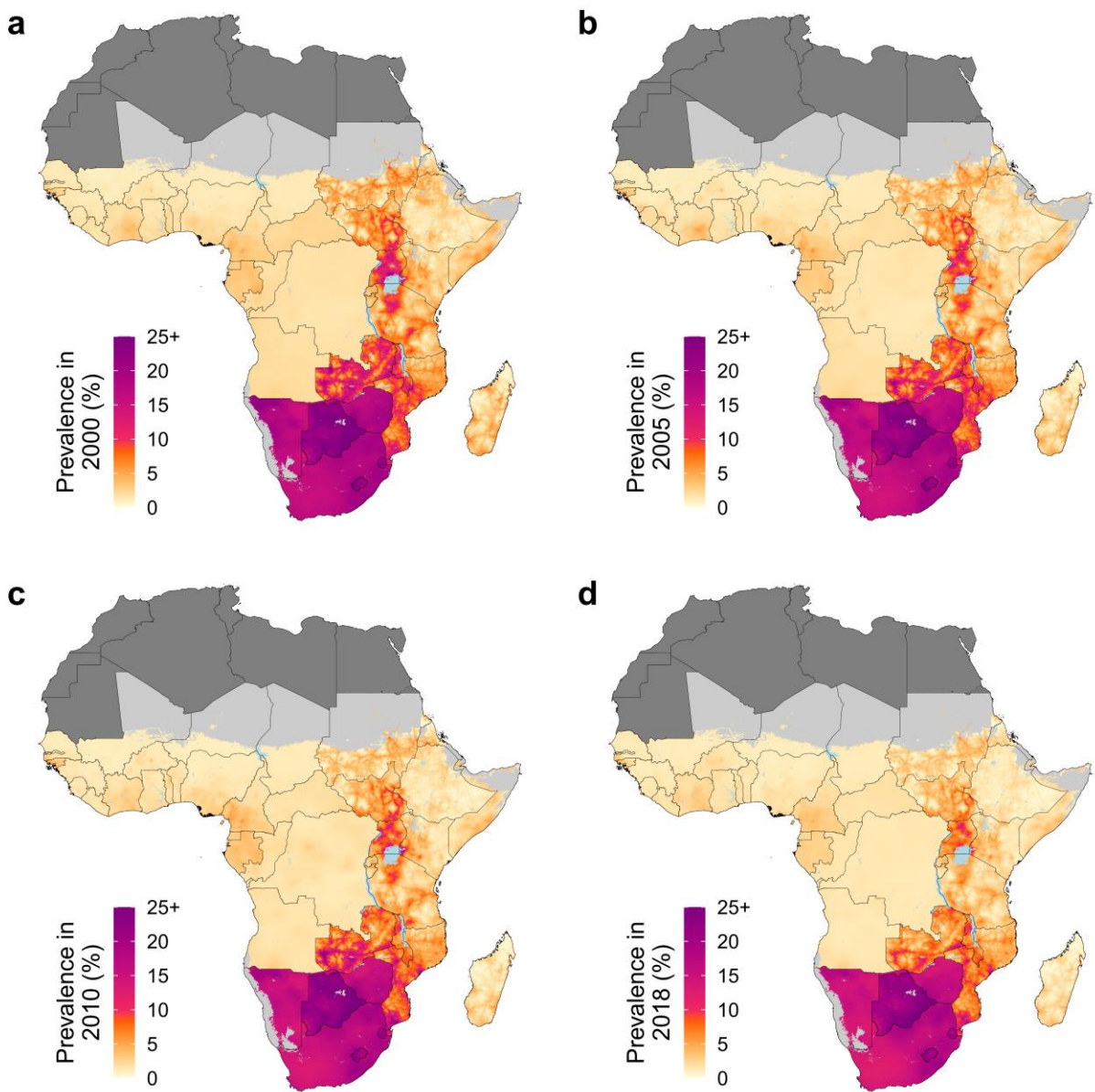
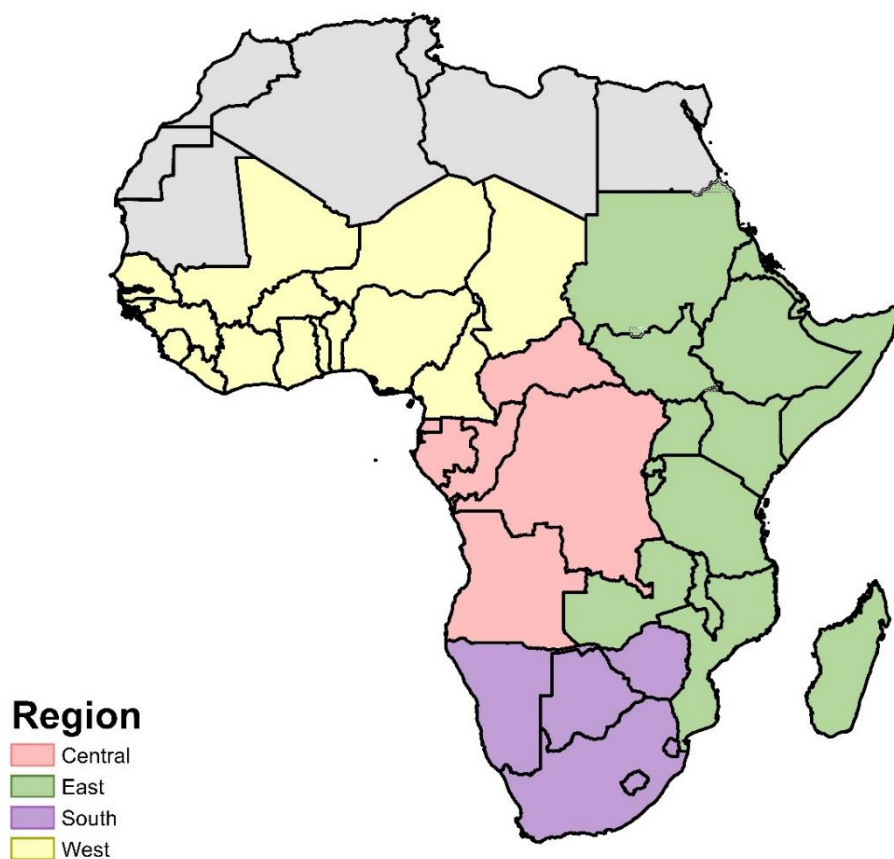


Figure S11: HIV prevalence predictions from the lasso regression model. HIV prevalence among adults ages 15–49 years at the 5 x 5-km grid cell level in (a) 2000, (b) 2005, (c) 2010, and (d) 2018 as estimated in the lasso regression model. Maps reflect administrative boundaries, land cover, lakes, and population; grid cells with fewer than ten people per 1 x 1-km and classified as “barren or sparsely vegetated” are colored in light grey. Countries colored in dark grey were not included in the analysis.

137 Figure S12: Modeling regions



138

139

140 **Figure S12: Modeling regions.** Modeling regions were based on the four Global Burden of Disease Study
141 (GBD) regions in sub-Saharan Africa: Central, East, South, and West. We removed Cape Verde, Comoros,
142 São Tomé and Príncipe, and Mauritania from our analysis due to data missingness. Countries coloured in
143 grey were not included in the analysis.

Figure S13: Age- and sex-specific vs. adult prevalence modeling

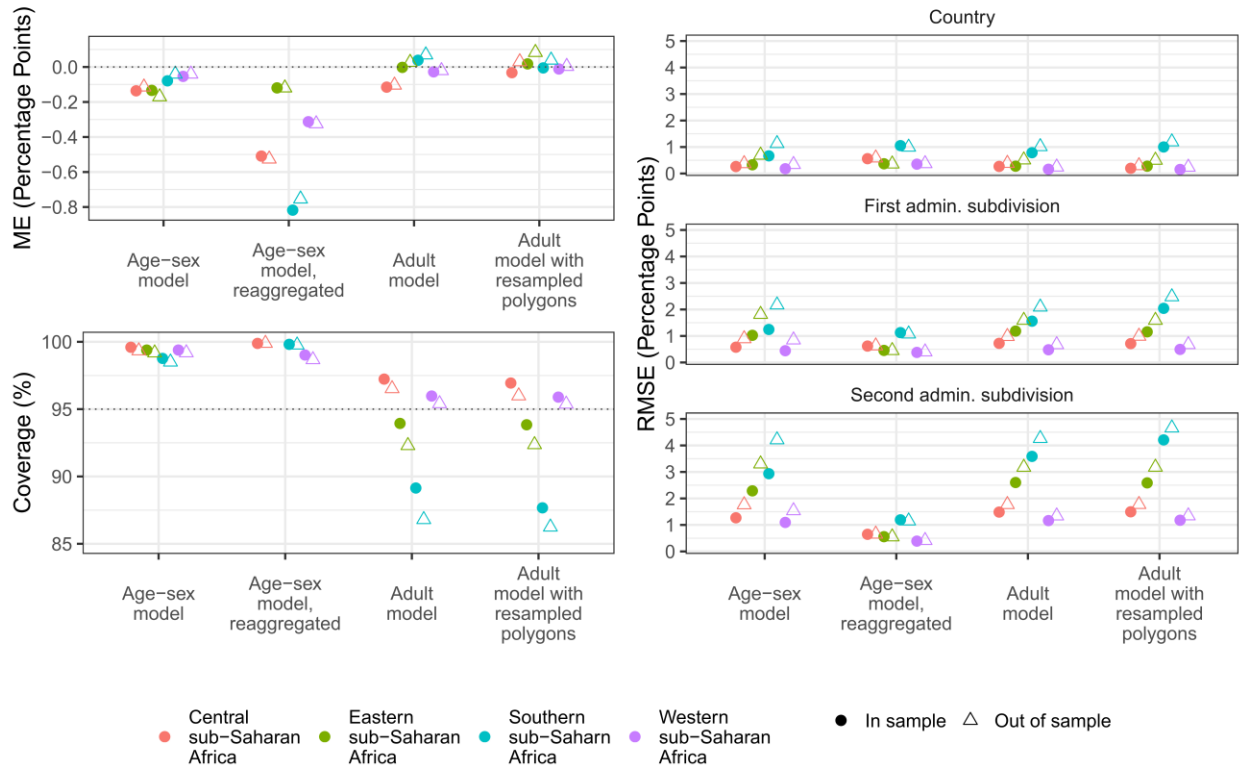
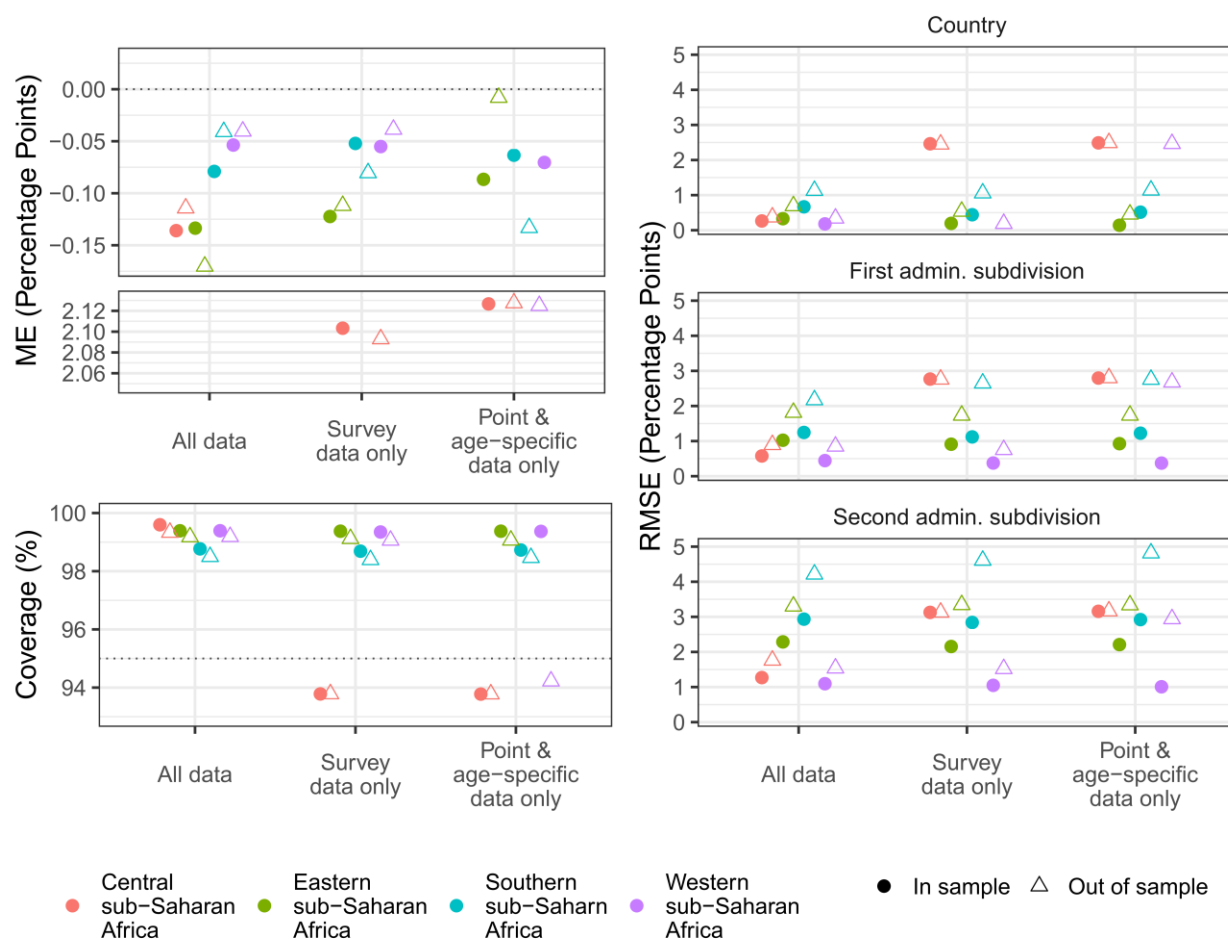


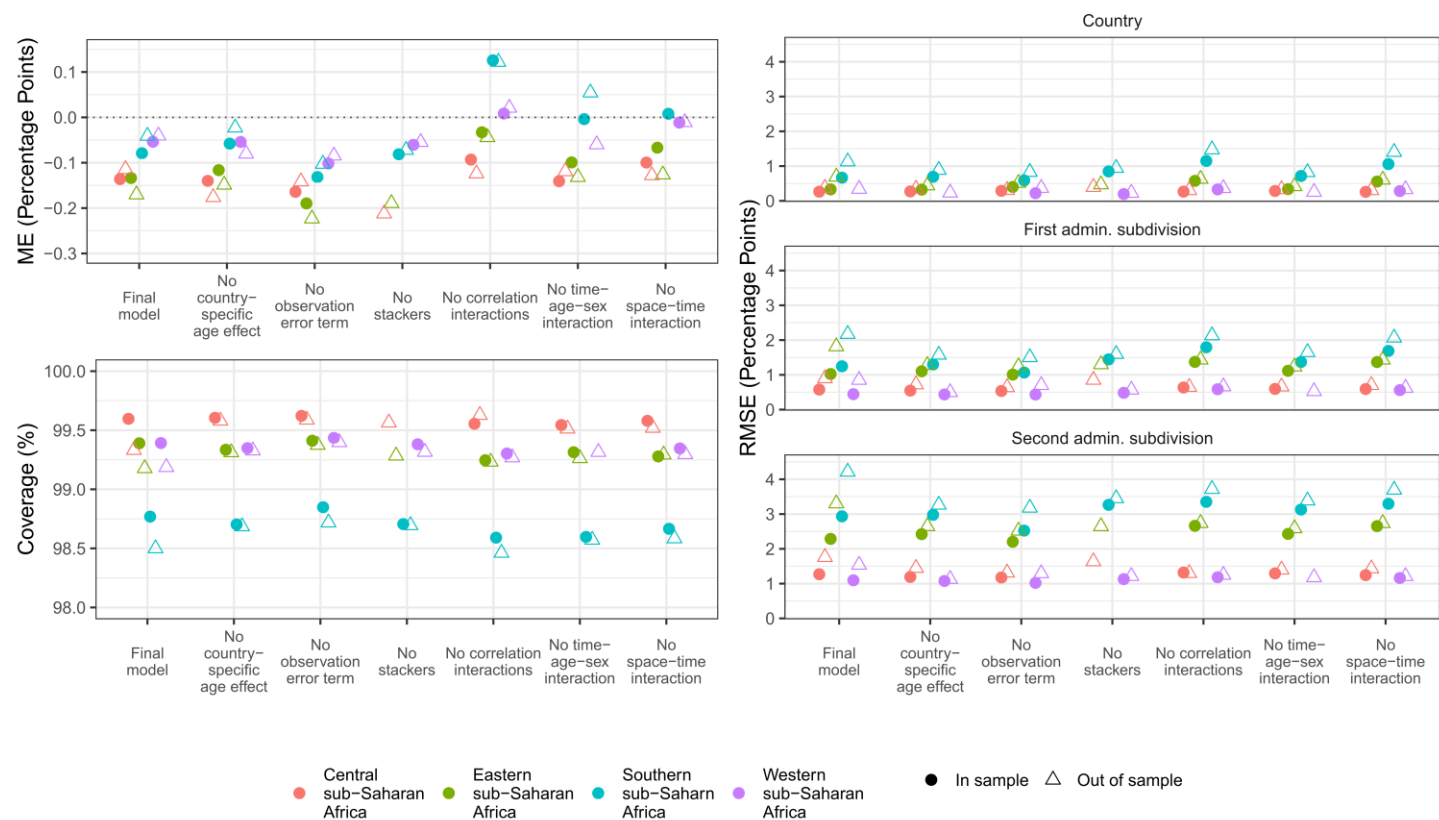
Figure S13: Age- and sex-specific vs. adult prevalence modeling. Mean error (ME; top left), 95% prediction interval coverage ('coverage'; bottom left), and root-mean-square error by administrative level of aggregation (RMSE; right) for comparing the results of the final age- and sex-specific model, the results of the same model re-aggregated to the adult level, the results of HIV prevalence modeled at the adult level, and the results of HIV prevalence modeled at the adult level, using polygon resampling techniques. Results are presented by modeling region (indicated by color) and for in- and out-of-sample results (indicated by shape). Note that for the Central sub-Saharan Africa "Adult model", out-of-sample estimates were based on the results of four folds rather than five, due to non-convergence in one out-of-sample model.

157 Figure S14: Data sensitivity



158
 159 **Figure S14: Data sensitivity.** Mean error (ME; top left), 95% prediction interval coverage ('coverage';
 160 bottom left), and root-mean-square error by administrative level of aggregation (RMSE; right) for
 161 comparing the results of the final model with all data included, with only location- and age-specific data
 162 included, and with only survey data included. Results are presented by modeling region (indicated by
 163 color) and for in- and out-of-sample results (indicated by shape).

164 Figure S15: Model specification validation



166
 167 **Figure S15: Model specification validation.** Mean error (ME; top left), 95% prediction interval coverage ('coverage'; bottom left), and root-mean-square
 168 error by administrative level of aggregation (RMSE; right) comparing the results of the final model configuration with that of models with individual terms
 169 missing. Results are presented by modeling region (indicated by color) and for in- and out-of-sample results (indicated by shape). Note that for the
 170 Central sub-Saharan Africa "No stackers" model, no in-sample results are presented, and out-of-sample estimates were based on the results of three
 171 folds rather than five, due to non-convergence in the in-sample model and two out-of-sample models. Eastern sub-Saharan Africa also experienced non-
 172 convergence in one out-of-sample "No stackers" model, as well as in the in-sample "No observation error term" model.

Figure S16: Modeled and re-aggregated adult prevalence comparison

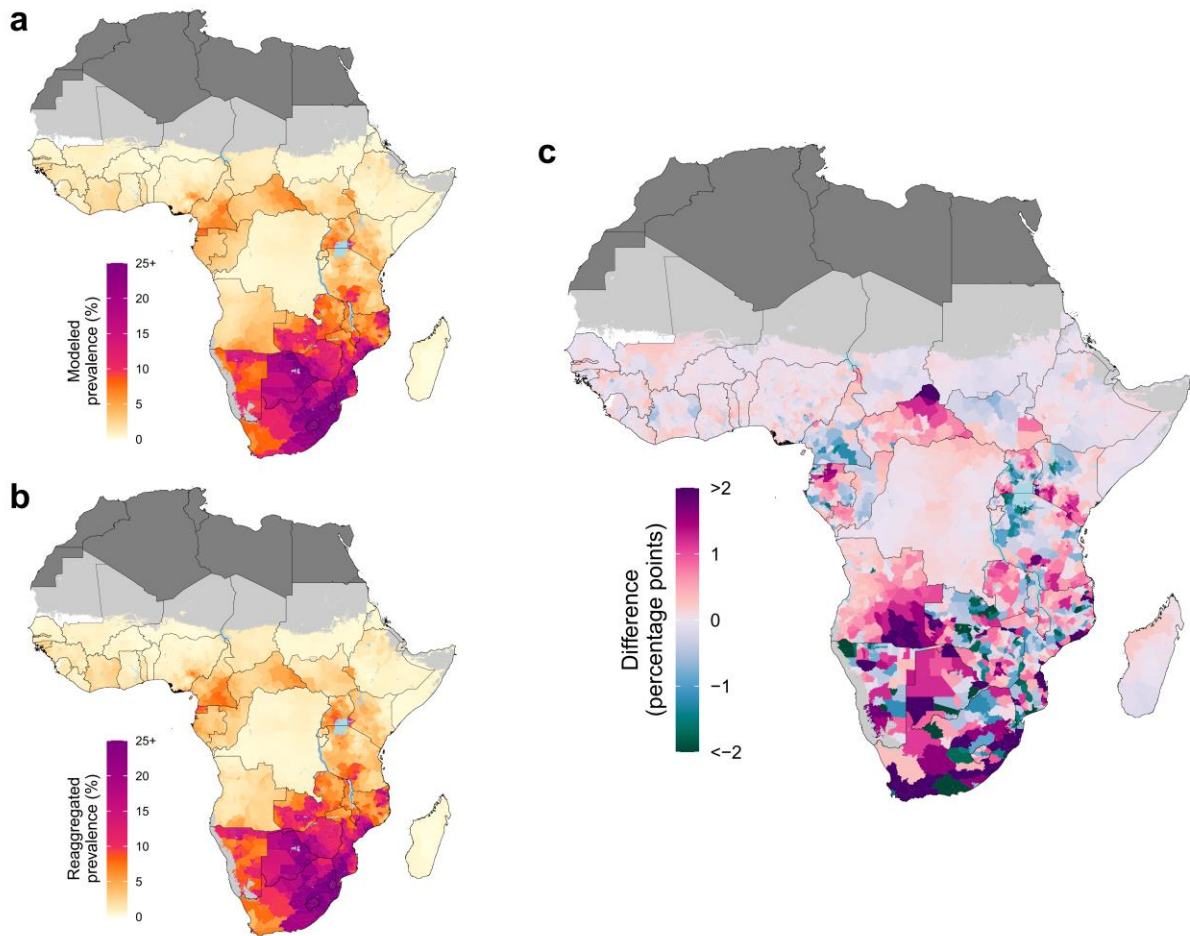
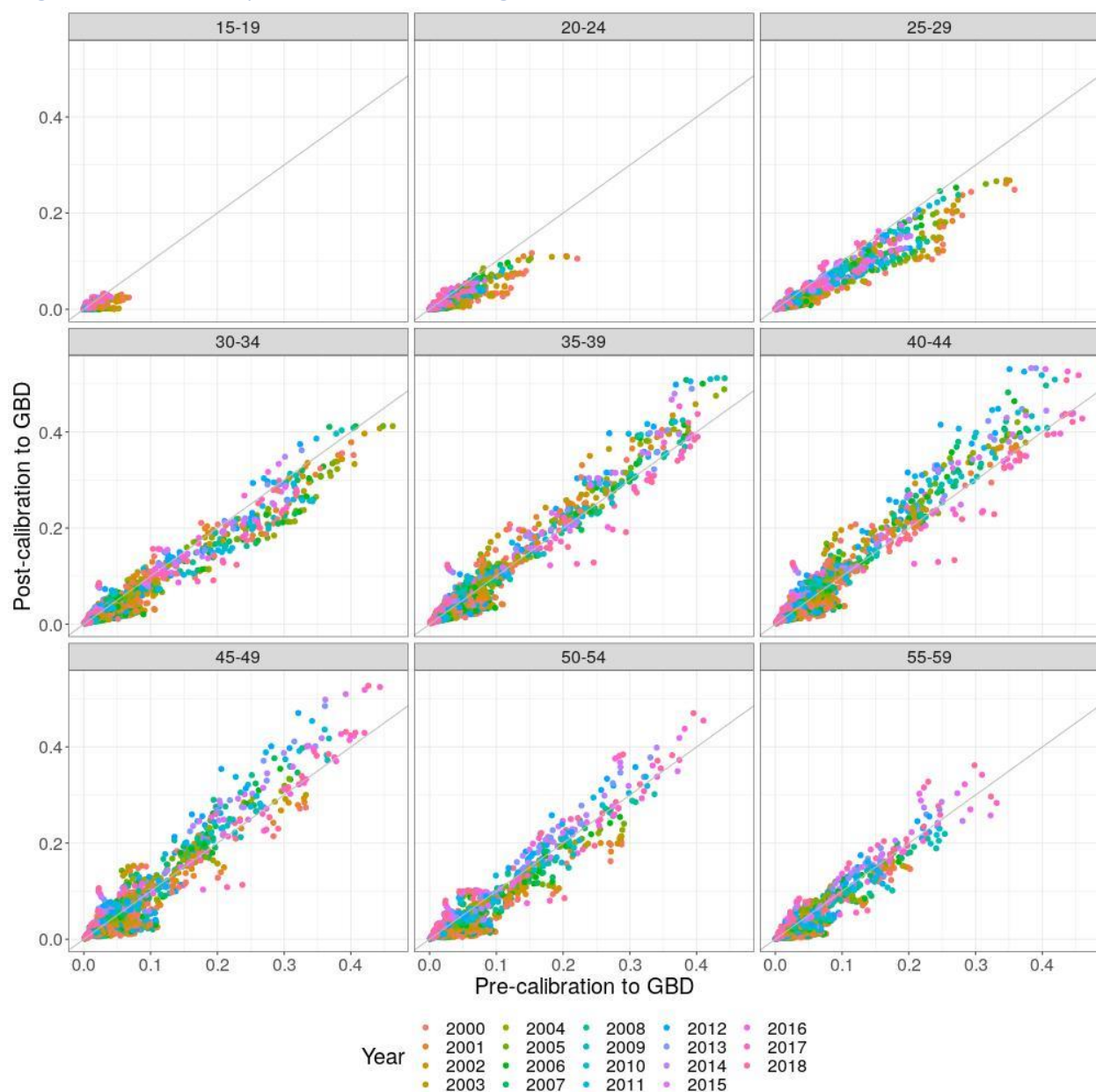


Figure S16: Modeled and re-aggregated adult prevalence comparison. A comparison of HIV prevalence estimates at the second administrative level in 2018 for adults 15–49 years when modeled (a) at the adult level versus (b) modeled at the age- and sex-specific level, and subsequently re-aggregated for adults 15–49 years. (c) The difference between modeled prevalence and re-aggregated prevalence. Both modeled and re-aggregated prevalence estimates were calibrated to GBD 2019 estimates[1]. Maps reflect administrative boundaries, land cover, lakes, and population; grid cells with fewer than ten people per 1 x 1-km and classified as “barren or sparsely vegetated” are colored in light grey. Countries colored in dark grey were not included in the analysis.

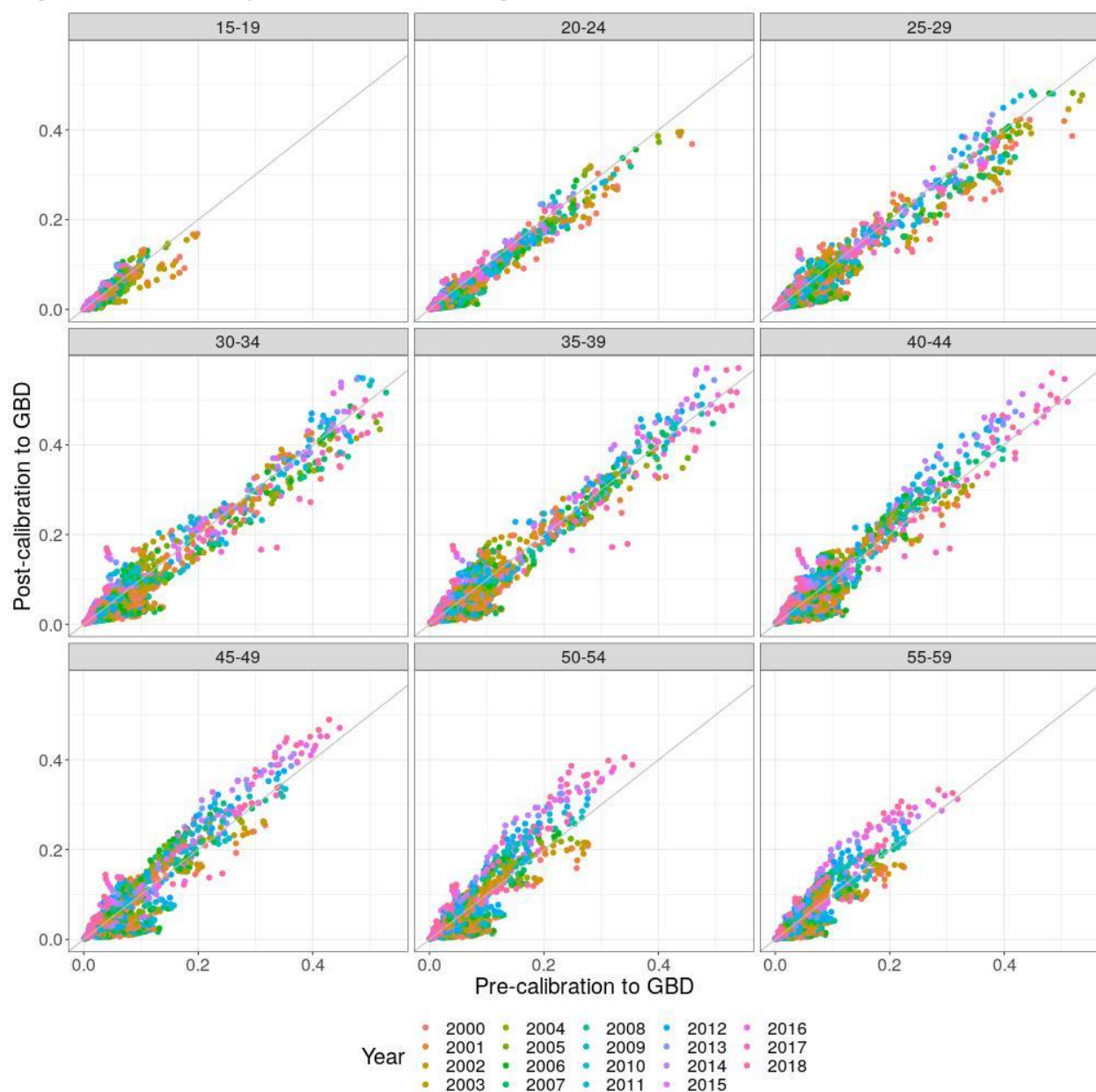
1. GBD 2019 Diseases and Injuries Collaborators. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet. 2020; 396:1204–22.

187 Figure S17: HIV prevalence raking factors for males



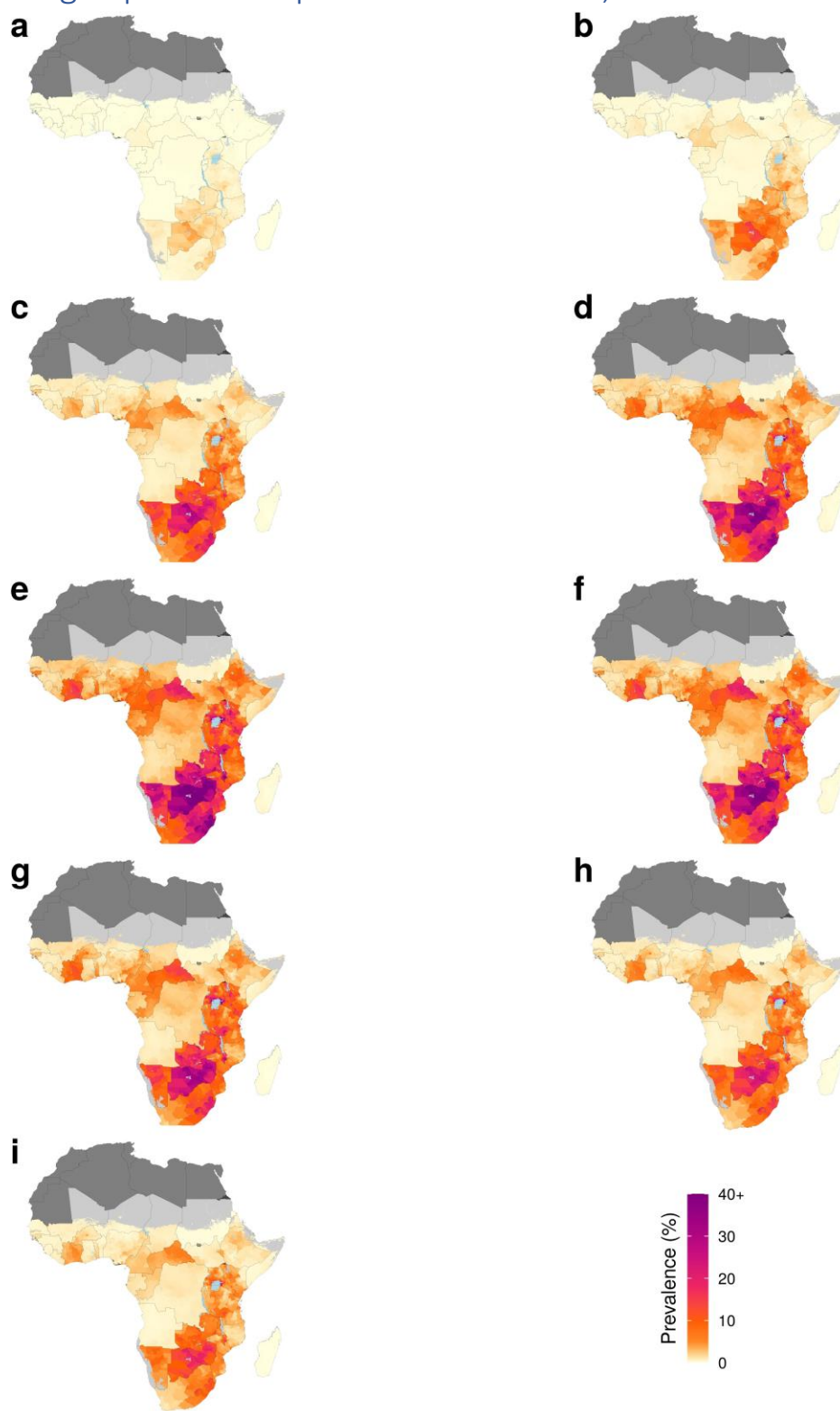
188
189 **Figure S17: HIV prevalence raking factors for males.** Comparison of country-level, age-specific HIV
190 prevalence estimates for males, derived by population-weighting 5 x 5-km grid cell estimates before (x-
191 axis) and after (y-axis) calibration to GBD 2019 by age group (panel), year (color) and country (individual
192 point).

193 Figure S18: HIV prevalence raking factors for females



194
195
196 **Figure S18: HIV prevalence raking factors for females.** Comparison of country-level, age-specific HIV
197 prevalence estimates for females derived by population-weighting 5 x 5-km grid cell estimates before (x-
198 axis) and after (y-axis) calibration to GBD 2019 by age group (panel), year (color) and country (individual
199 point).

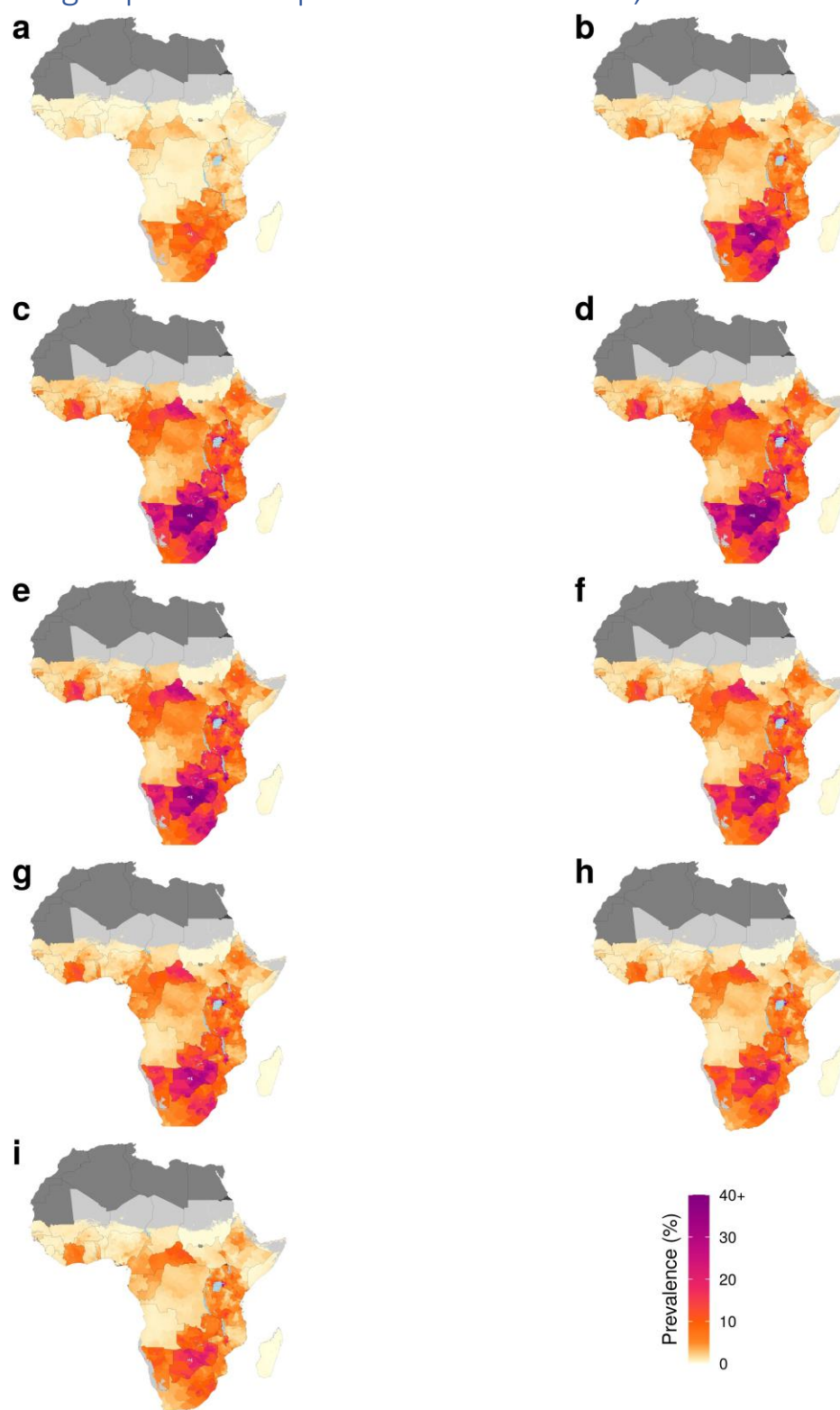
200 Figure S19: Age-specific HIV prevalence in males, 2000



201
202 Figure S19: Age-specific HIV prevalence in males, 2000. Male HIV prevalence estimates in the year 2000, at
203 the second administrative level, for (a) ages 15–19 years; (b) ages 20–24 years; (c) ages 25–29 years; (d)

204 ages 30-34 years; (e) ages 35-39 years; (f) ages 40-44 years; (g) ages 45-49 years; (h) ages 50-54 years;
205 and (i) ages 55-59 years. Maps reflect national boundaries, land cover, lakes, and population; areas with
206 fewer than ten people per 1 × 1 km, and classified as barren or sparsely vegetated, are colored light grey.
207 Countries colored in dark grey were not included in the analysis.

208 Figure S20: Age-specific HIV prevalence in females, 2000

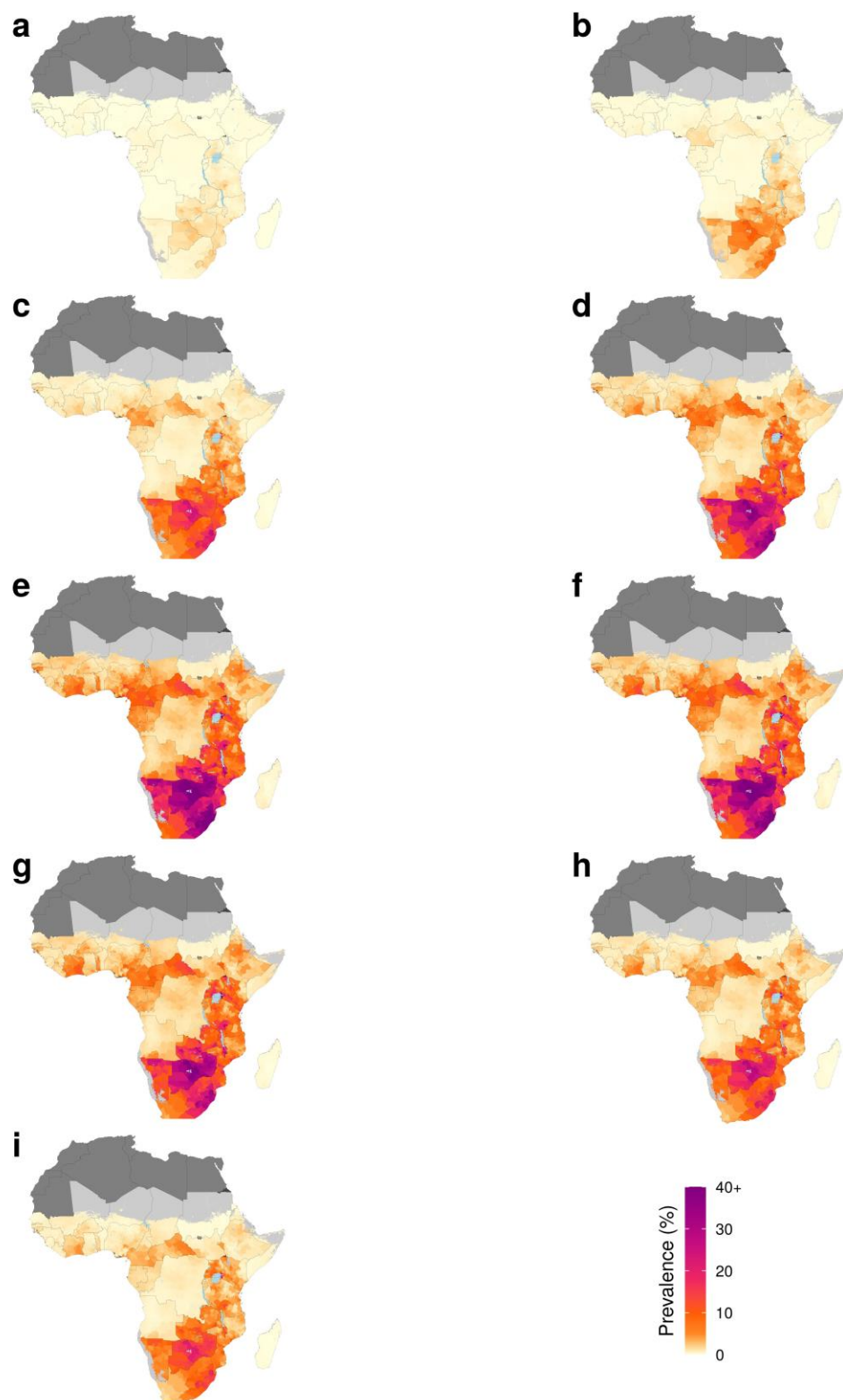


209
210 Figure S20: Age-specific HIV prevalence in females, 2000. Female HIV prevalence estimates in the year
211 2000, at the second administrative level, for (a) ages 15–19 years; (b) ages 20–24 years; (c) ages 25–29

212 years; (d) ages 30-34 years; (e) ages 35-39 years; (f) ages 40-44 years; (g) ages 45-49 years; (h) ages 50-54
213 years; and (i) ages 55-59 years. Maps reflect national boundaries, land cover, lakes, and population; areas
214 with fewer than ten people per 1 × 1 km, and classified as barren or sparsely vegetated, are colored light
215 grey. Countries colored in dark grey were not included in the analysis.

216

217 Figure S21: Age-specific HIV prevalence in males, 2005
218

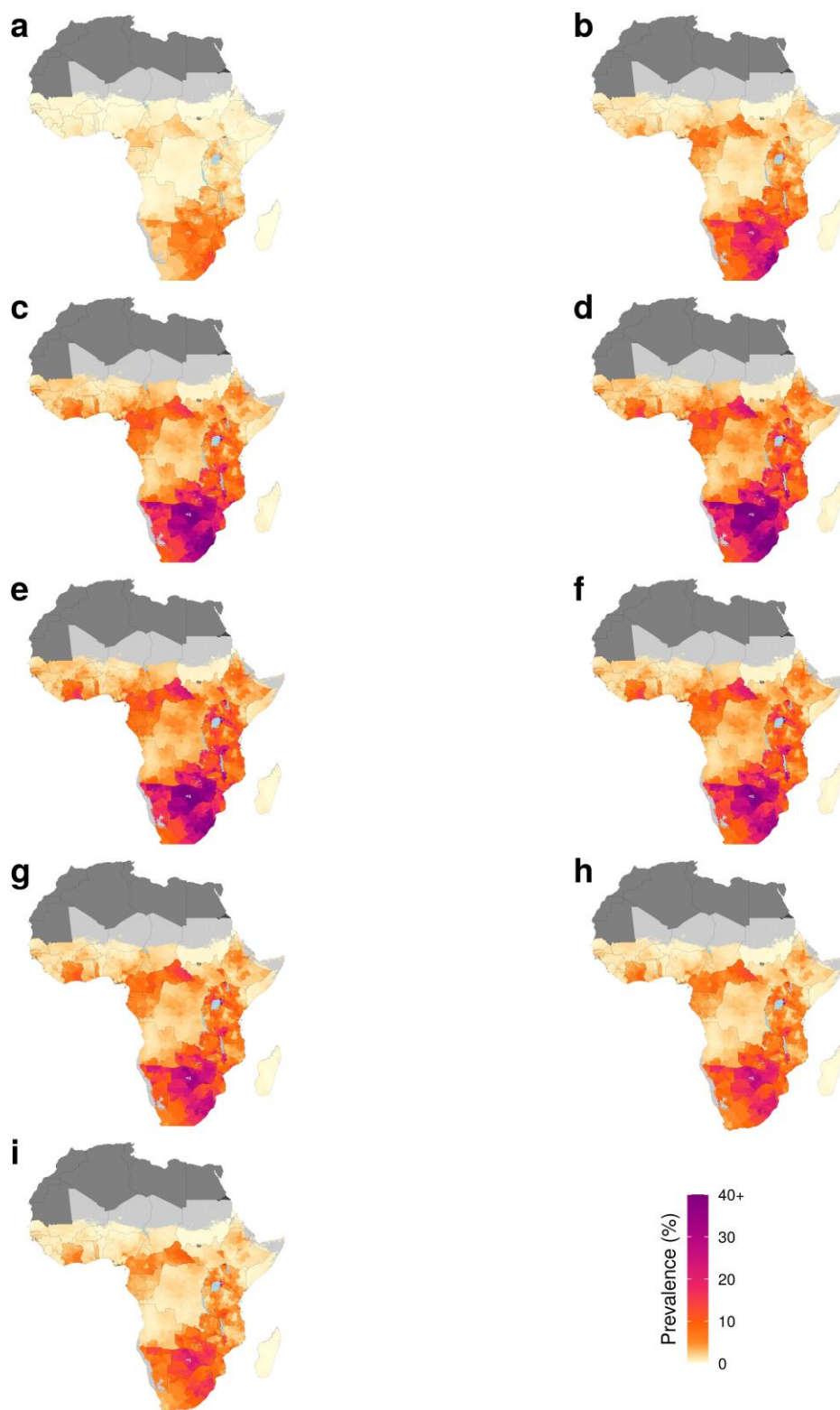


219

220 **Figure S21: Age-specific HIV prevalence in males, 2005.** Male HIV prevalence estimates in the year 2005, at
221 the second administrative level, for (a) ages 15–19 years; (b) ages 20-24 years; (c) ages 25-29 years; (d)
222 ages 30-34 years; (e) ages 35-39 years; (f) ages 40-44 years; (g) ages 45-49 years; (h) ages 50-54 years;
223 and (i) ages 55-59 years. Maps reflect national boundaries, land cover, lakes, and population; areas with
224 fewer than ten people per 1 × 1 km, and classified as barren or sparsely vegetated, are colored light grey.
225 Countries colored in dark grey were not included in the analysis.

226 Figure S22: Age-specific HIV prevalence in females, 2005

227

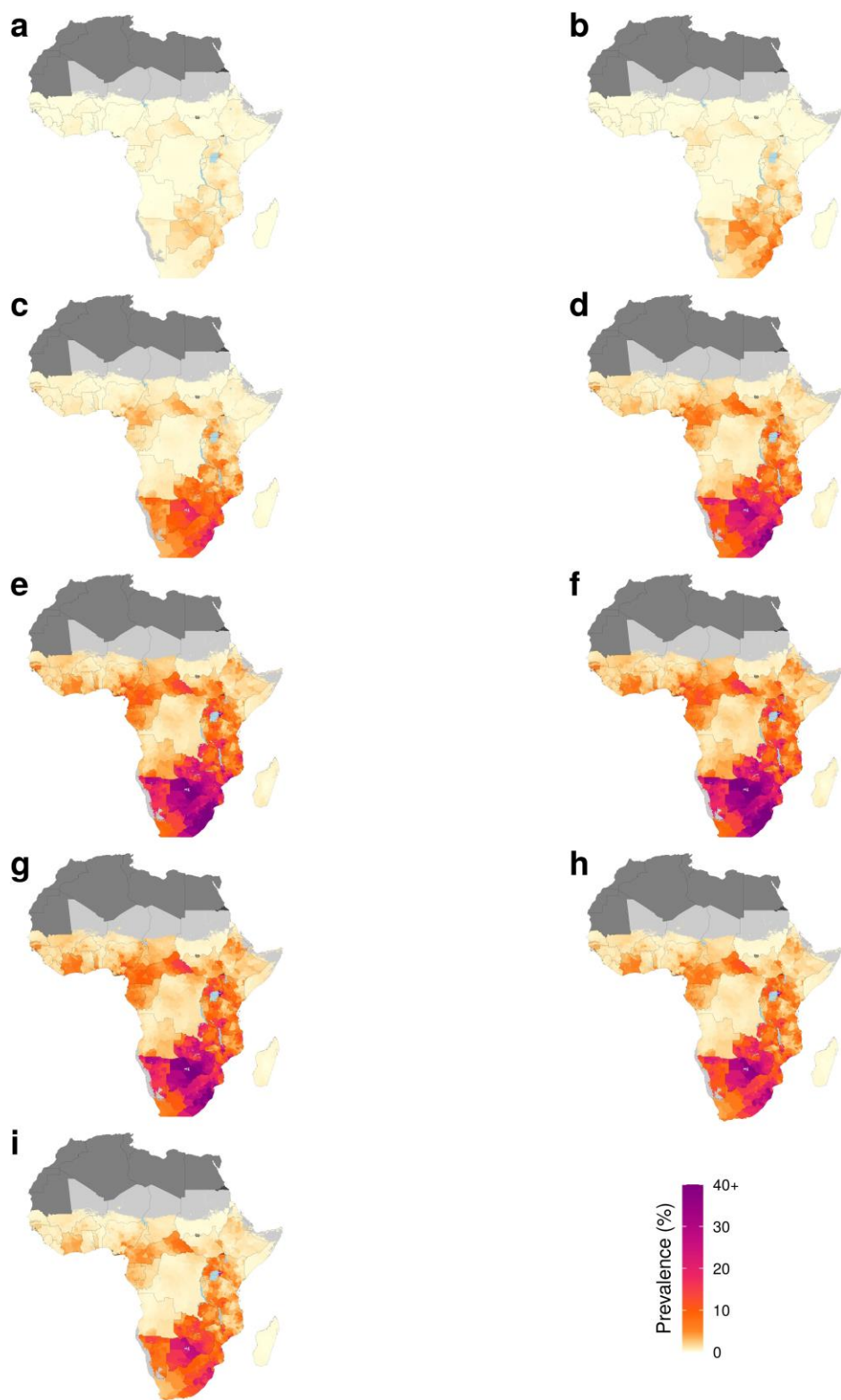


228

Figure S22: Age-specific HIV prevalence in females, 2005. Female HIV prevalence estimates in the year 2005, at the second administrative level, for (a) ages 15–19 years; (b) ages 20-24 years; (c) ages 25-29 years; (d) ages 30-34 years; (e) ages 35-39 years; (f) ages 40-44 years; (g) ages 45-49 years; (h) ages 50-54 years; and (i) ages 55-59 years. Maps reflect national boundaries, land cover, lakes, and population; areas with fewer than ten people per 1 × 1 km, and classified as barren or sparsely vegetated, are colored light grey. Countries colored in dark grey were not included in the analysis.

235
236

Figure S23: Age-specific HIV prevalence in males, 2010

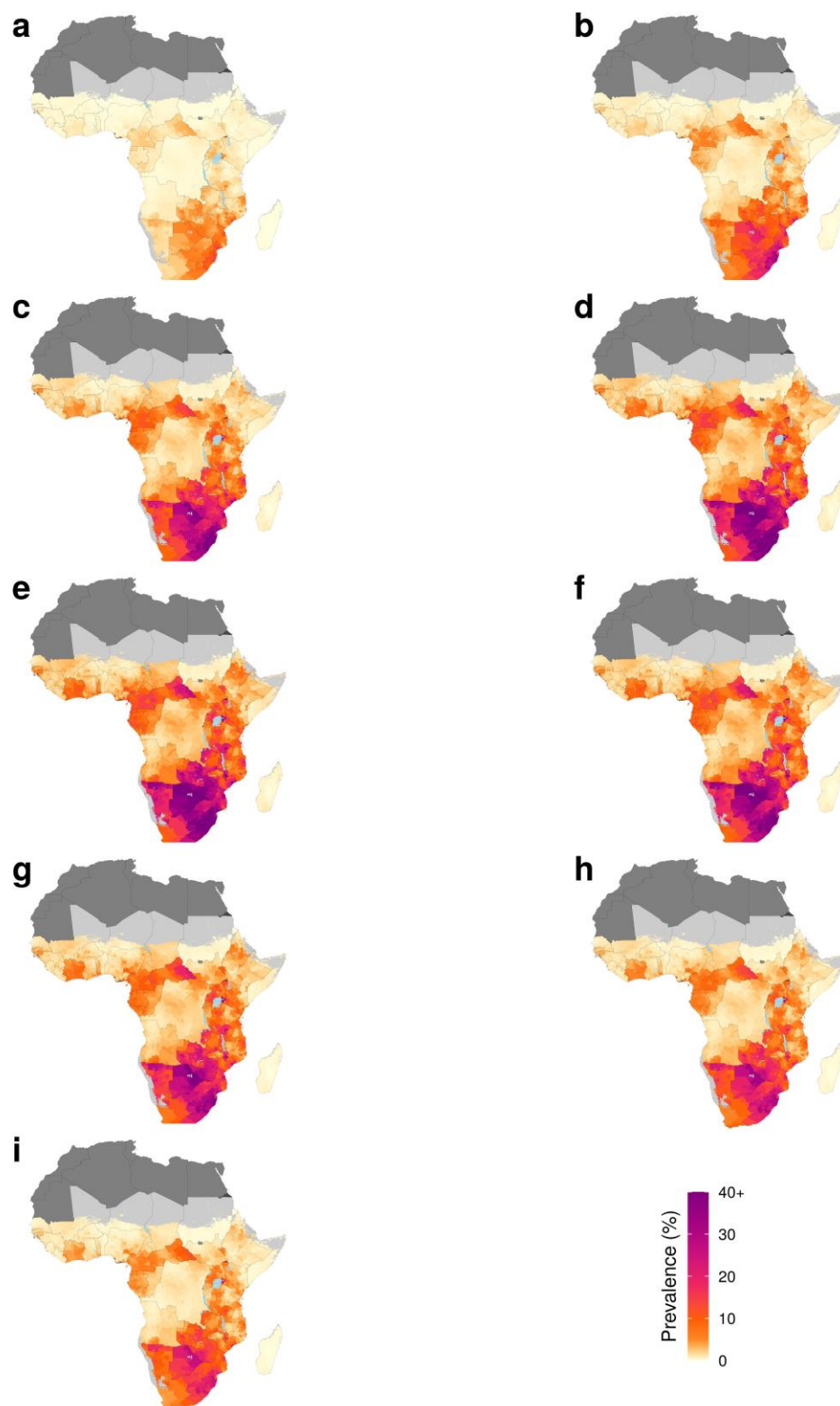


237

238 **Figure S23: Age-specific HIV prevalence in males, 2010.** Male HIV prevalence estimates in the year 2010, at
239 the second administrative level, for (a) ages 15–19 years; (b) ages 20-24 years; (c) ages 25-29 years; (d)
240 ages 30-34 years; (e) ages 35-39 years; (f) ages 40-44 years; (g) ages 45-49 years; (h) ages 50-54 years;
241 and (i) ages 55-59 years. Maps reflect national boundaries, land cover, lakes, and population; areas with
242 fewer than ten people per 1 × 1 km, and classified as barren or sparsely vegetated, are colored light grey.
243 Countries colored in dark grey were not included in the analysis.

244
245

Figure S24: Age-specific HIV prevalence in females, 2010

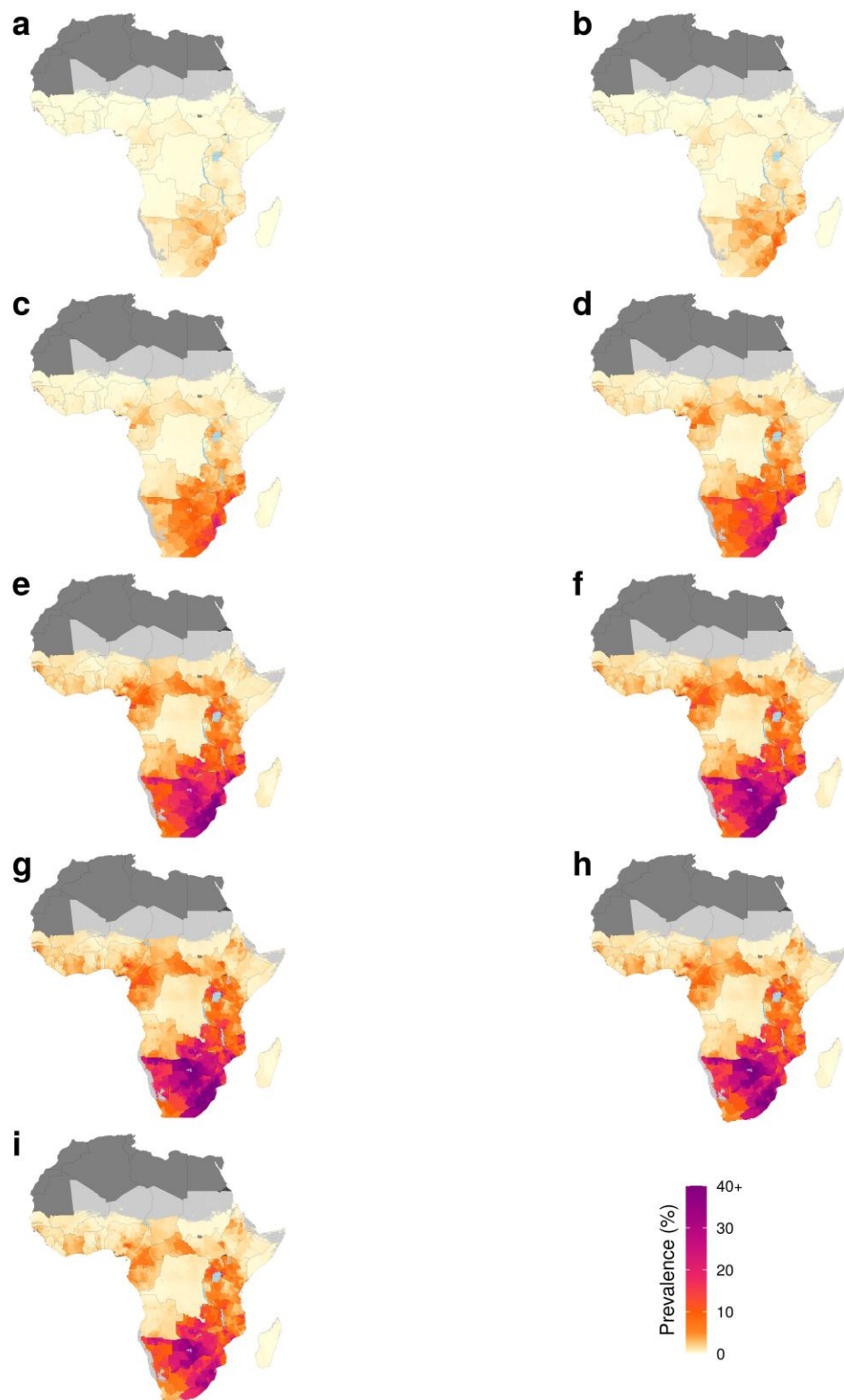


246

247 **Figure S24: Age-specific HIV prevalence in females, 2010.** Female HIV prevalence estimates in the year
248 2010, at the second administrative level, for (a) ages 15–19 years; (b) ages 20-24 years; (c) ages 25-29
249 years; (d) ages 30-34 years; (e) ages 35-39 years; (f) ages 40-44 years; (g) ages 45-49 years; (h) ages 50-54
250 years; and (i) ages 55-59 years. Maps reflect national boundaries, land cover, lakes, and population; areas
251 with fewer than ten people per 1×1 km, and classified as barren or sparsely vegetated, are colored light
252 grey. Countries colored in dark grey were not included in the analysis.

253 Figure S25: Age-specific HIV prevalence in males, 2018

254



255

256 **Figure S25: Age-specific HIV prevalence in males, 2018.** Male HIV prevalence estimates in the year 2018, at
257 the second administrative level, for (a) ages 15–19 years; (b) ages 20-24 years; (c) ages 25-29 years; (d)
258 ages 30-34 years; (e) ages 35-39 years; (f) ages 40-44 years; (g) ages 45-49 years; (h) ages 50-54 years;
259 and (i) ages 55-59 years. Maps reflect national boundaries, land cover, lakes, and population; areas with
260 fewer than ten people per 1 × 1 km, and classified as barren or sparsely vegetated, are colored light grey.
261 Countries colored in dark grey were not included in the analysis.

Figure S26: Age-specific HIV prevalence in females, 2018

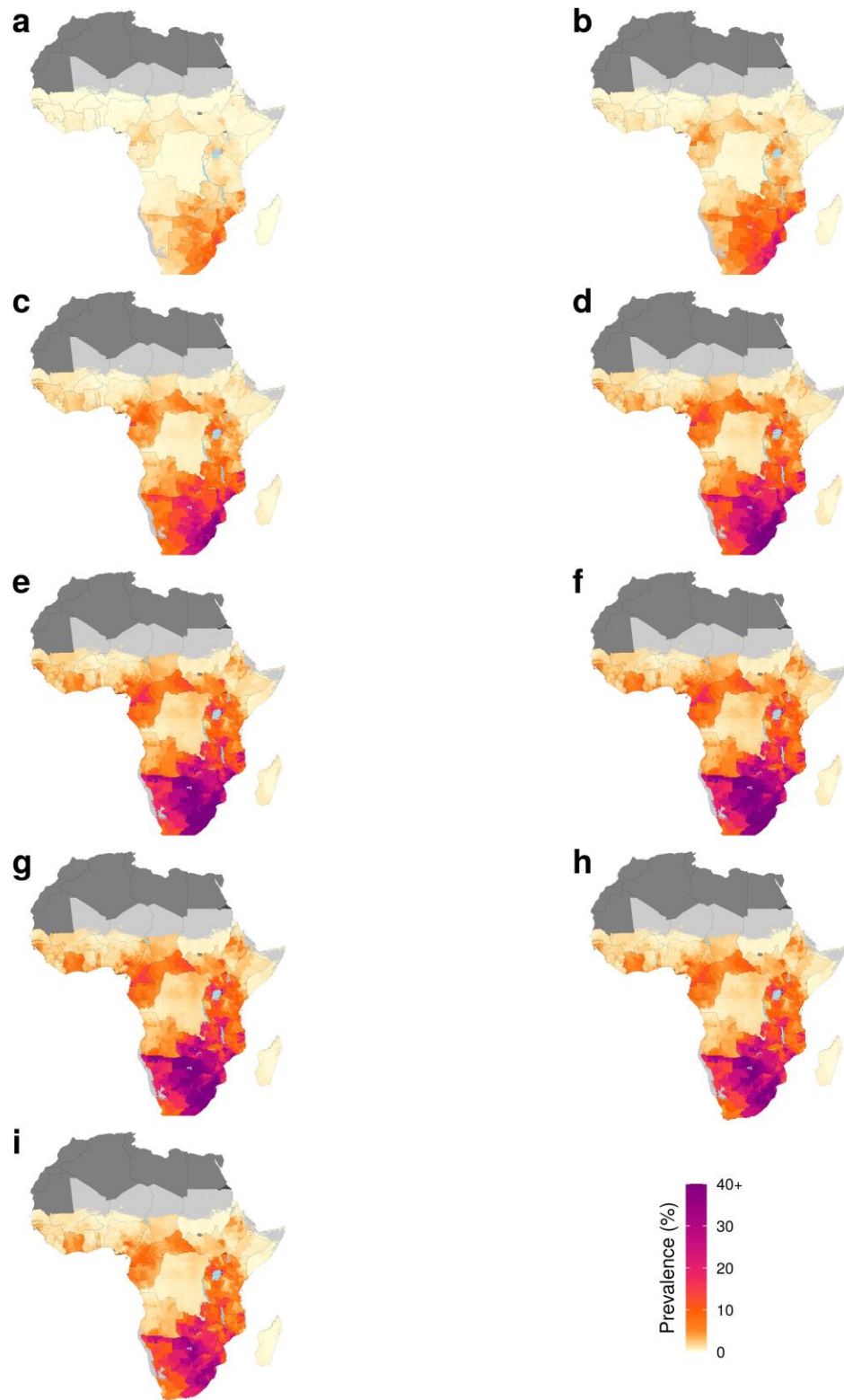
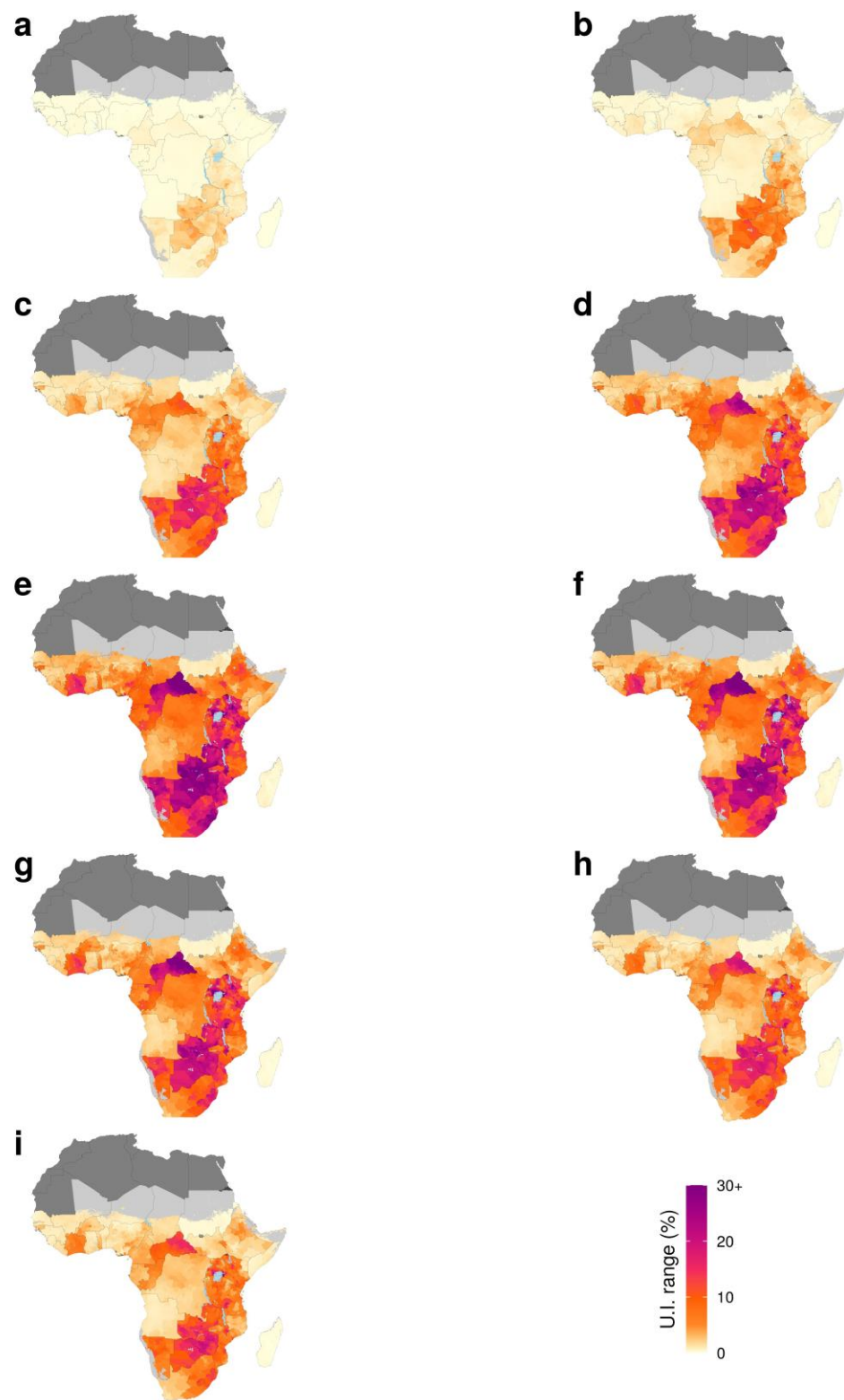


Figure S26: Age-specific HIV prevalence in females, 2018. Female HIV prevalence estimates in the year 2018, at the second administrative level, for (a) ages 15–19 years; (b) ages 20-24 years; (c) ages 25-29 years; (d) ages 30-34 years; (e) ages 35-39 years; (f) ages 40-44 years; (g) ages 45-49 years; (h) ages 50-54 years; and (i) ages 55-59 years. Maps reflect national boundaries, land cover, lakes, and population; areas with fewer than ten people per 1 × 1 km, and classified as barren or sparsely vegetated, are colored light grey. Countries colored in dark grey were not included in the analysis.

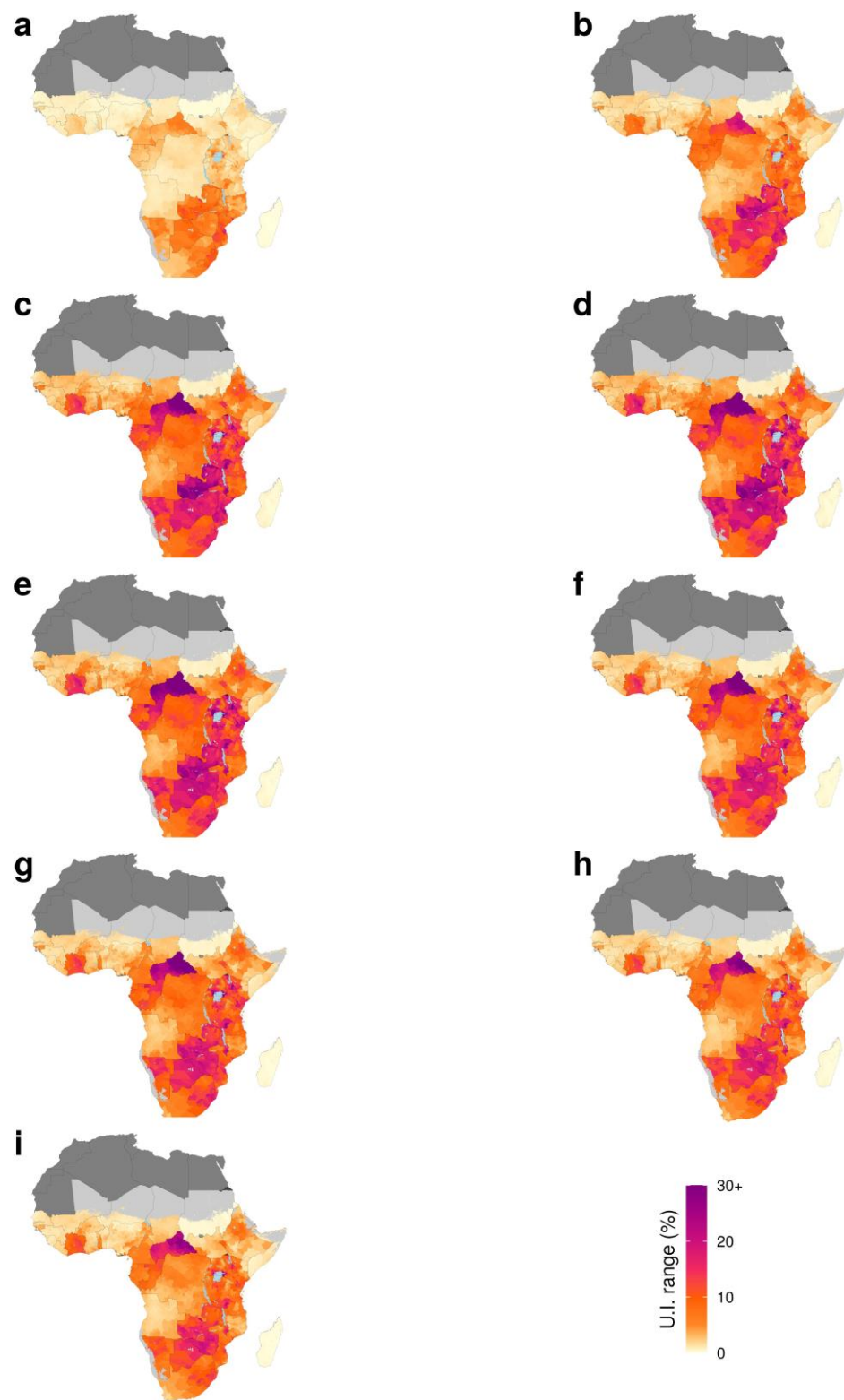
271 Figure S27: Age-specific uncertainty interval range estimates in males,
272 2000



273

274 **Figure S27: Age-specific uncertainty interval range estimates in males, 2000.** Uncertainty interval range for
275 male HIV prevalence estimates in the year 2000, at the second administrative level, for **(a)** ages 15–19
276 years; **(b)** ages 20–24 years; **(c)** ages 25–29 years; **(d)** ages 30–34 years; **(e)** ages 35–39 years; **(f)** ages 40–44
277 years; **(g)** ages 45–49 years; **(h)** ages 50–54 years; and **(i)** ages 55–59 years. Maps reflect national
278 boundaries, land cover, lakes, and population; areas with fewer than ten people per 1 × 1 km, and
279 classified as barren or sparsely vegetated, are colored light grey. Countries colored in dark grey were not
280 included in the analysis.

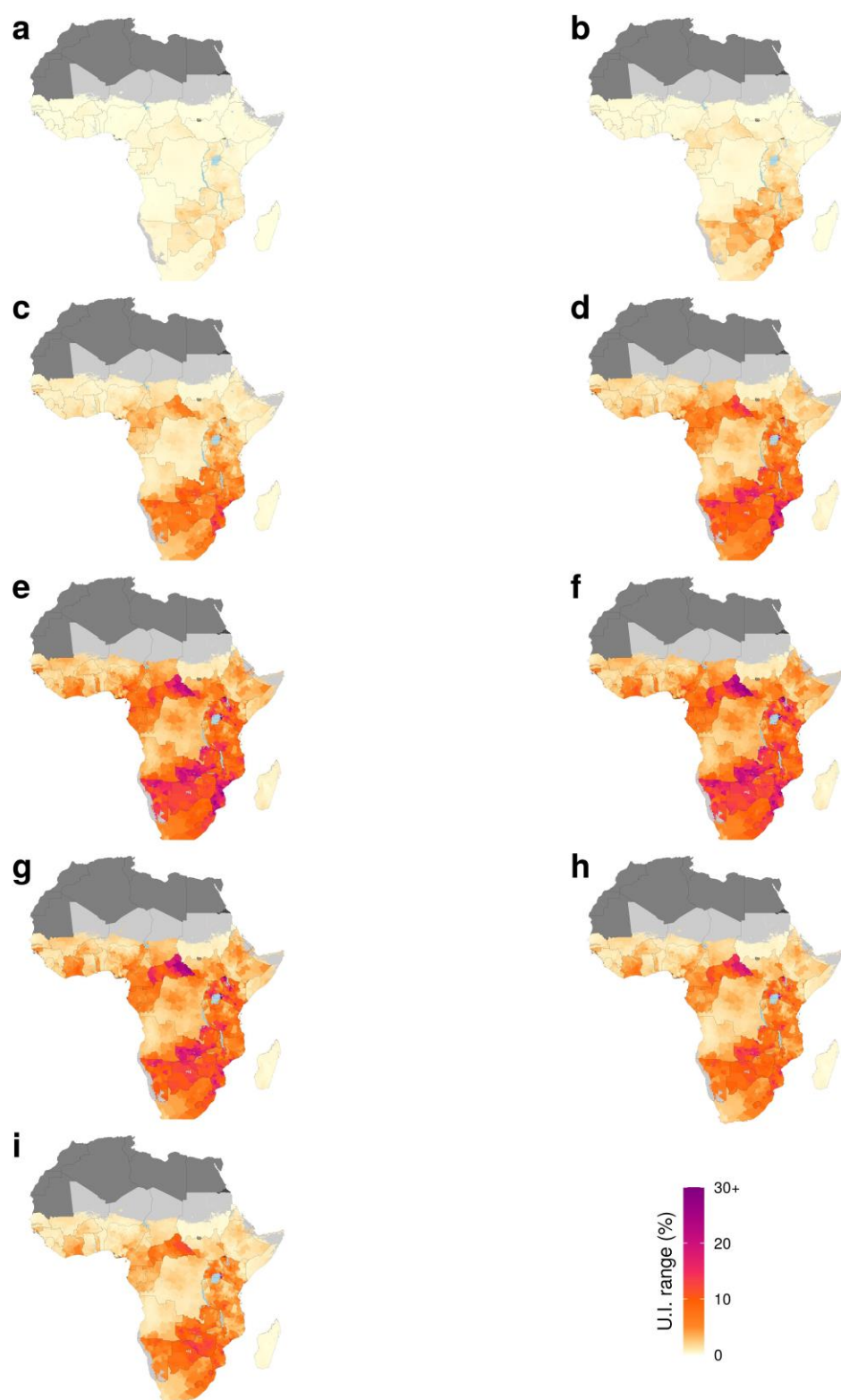
281 Figure S28: Age-specific uncertainty interval range estimates in females,
282 2000



283

284 **Figure S28: Age-specific uncertainty interval range estimates in females, 2000.** Uncertainty interval range
285 for female HIV prevalence estimates in the year 2000, at the second administrative level, for (a) ages 15–
286 19 years; (b) ages 20-24 years; (c) ages 25-29 years; (d) ages 30-34 years; (e) ages 35-39 years; (f) ages 40-
287 44 years; (g) ages 45-49 years; (h) ages 50-54 years; and (i) ages 55-59 years. Maps reflect national
288 boundaries, land cover, lakes, and population; areas with fewer than ten people per 1 × 1 km, and
289 classified as barren or sparsely vegetated, are colored light grey. Countries colored in dark grey were not
290 included in the analysis.

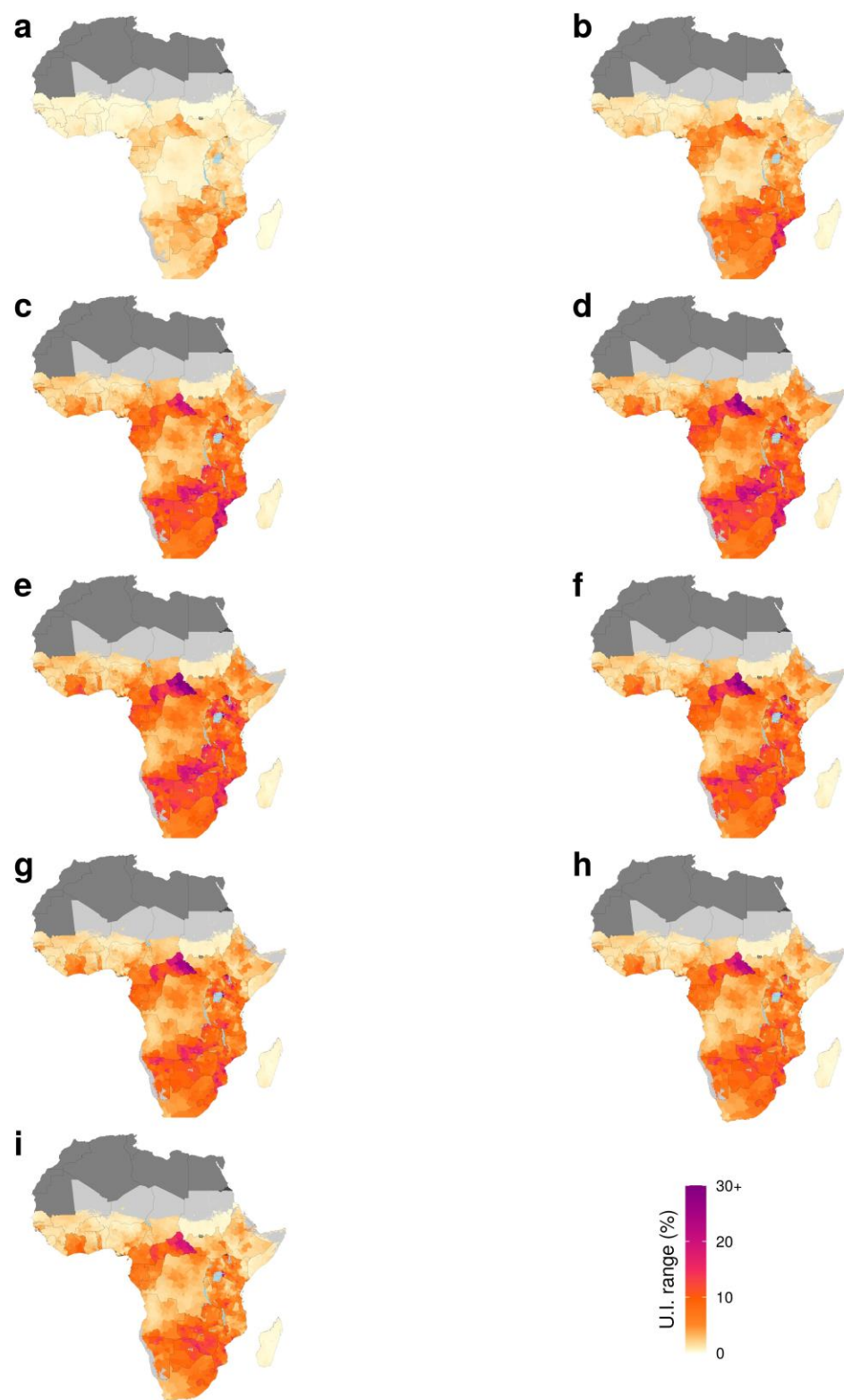
291 Figure S29: Age-specific uncertainty interval range estimates in males,
292 2005



293

Figure S29: Age-specific uncertainty interval range estimates in males, 2005. Uncertainty interval range for male HIV prevalence estimates in the year 2005, at the second administrative level, for (a) ages 15–19 years; (b) ages 20–24 years; (c) ages 25–29 years; (d) ages 30–34 years; (e) ages 35–39 years; (f) ages 40–44 years; (g) ages 45–49 years; (h) ages 50–54 years; and (i) ages 55–59 years. Maps reflect national boundaries, land cover, lakes, and population; areas with fewer than ten people per 1 × 1 km, and classified as barren or sparsely vegetated, are colored light grey. Countries colored in dark grey were not included in the analysis.

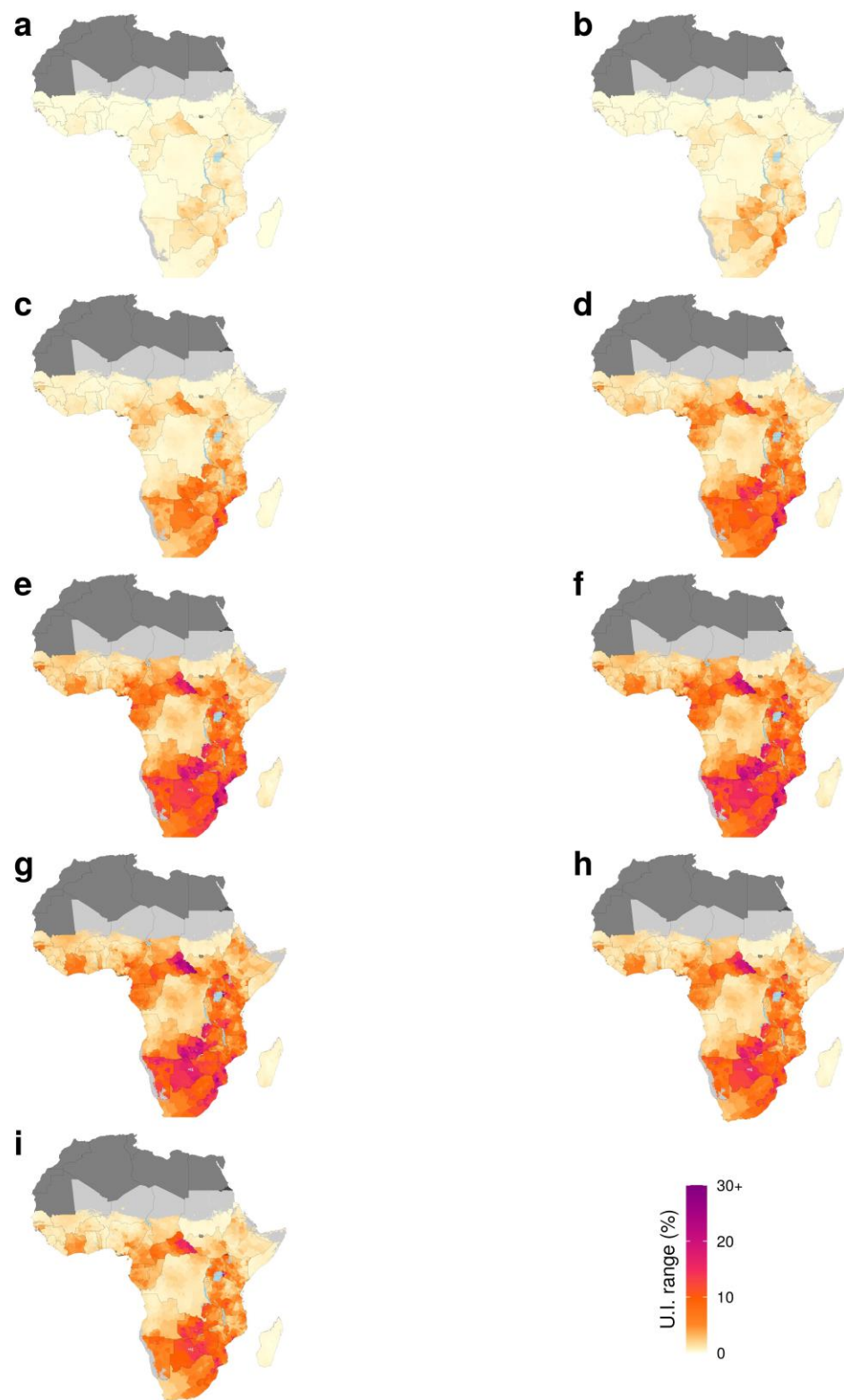
301 Figure S30: Age-specific uncertainty interval range estimates in females,
302 2005



303

Figure S30: Age-specific uncertainty interval range estimates in females, 2005. Uncertainty interval range for female HIV prevalence estimates in the year 2005, at the second administrative level, for (a) ages 15–19 years; (b) ages 20–24 years; (c) ages 25–29 years; (d) ages 30–34 years; (e) ages 35–39 years; (f) ages 40–44 years; (g) ages 45–49 years; (h) ages 50–54 years; and (i) ages 55–59 years. Maps reflect national boundaries, land cover, lakes, and population; areas with fewer than ten people per 1 × 1 km, and classified as barren or sparsely vegetated, are colored light grey. Countries colored in dark grey were not included in the analysis.

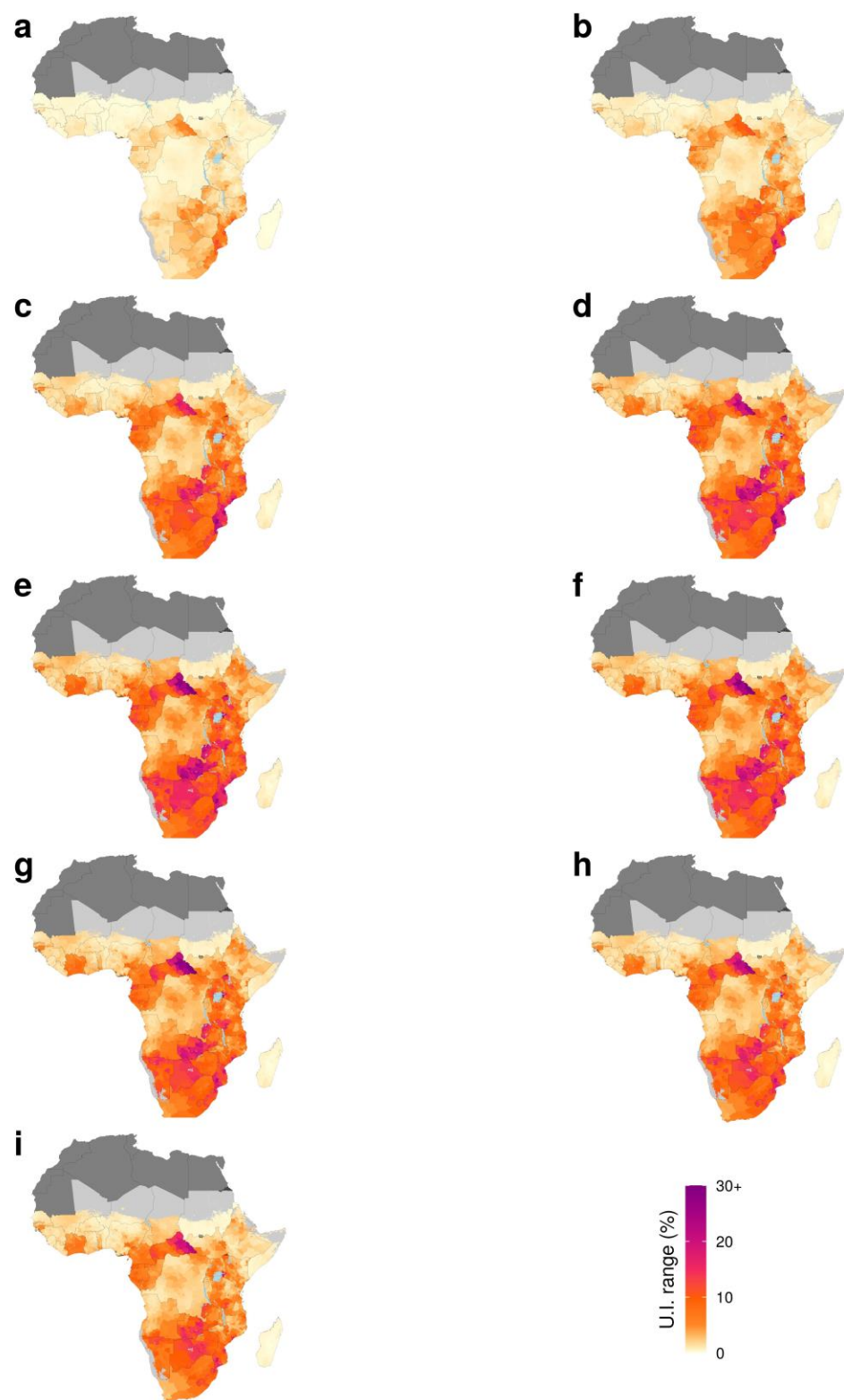
311 Figure S31: Age-specific uncertainty interval range estimates in males,
312 2010



313

314 **Figure S31: Age-specific uncertainty interval range estimates in males, 2010.** Uncertainty interval range for
315 male HIV prevalence estimates in the year 2010, at the second administrative level, for (a) ages 15–19
316 years; (b) ages 20–24 years; (c) ages 25–29 years; (d) ages 30–34 years; (e) ages 35–39 years; (f) ages 40–44
317 years; (g) ages 45–49 years; (h) ages 50–54 years; and (i) ages 55–59 years. Maps reflect national
318 boundaries, land cover, lakes, and population; areas with fewer than ten people per 1 × 1 km, and
319 classified as barren or sparsely vegetated, are colored light grey. Countries colored in dark grey were not
320 included in the analysis.

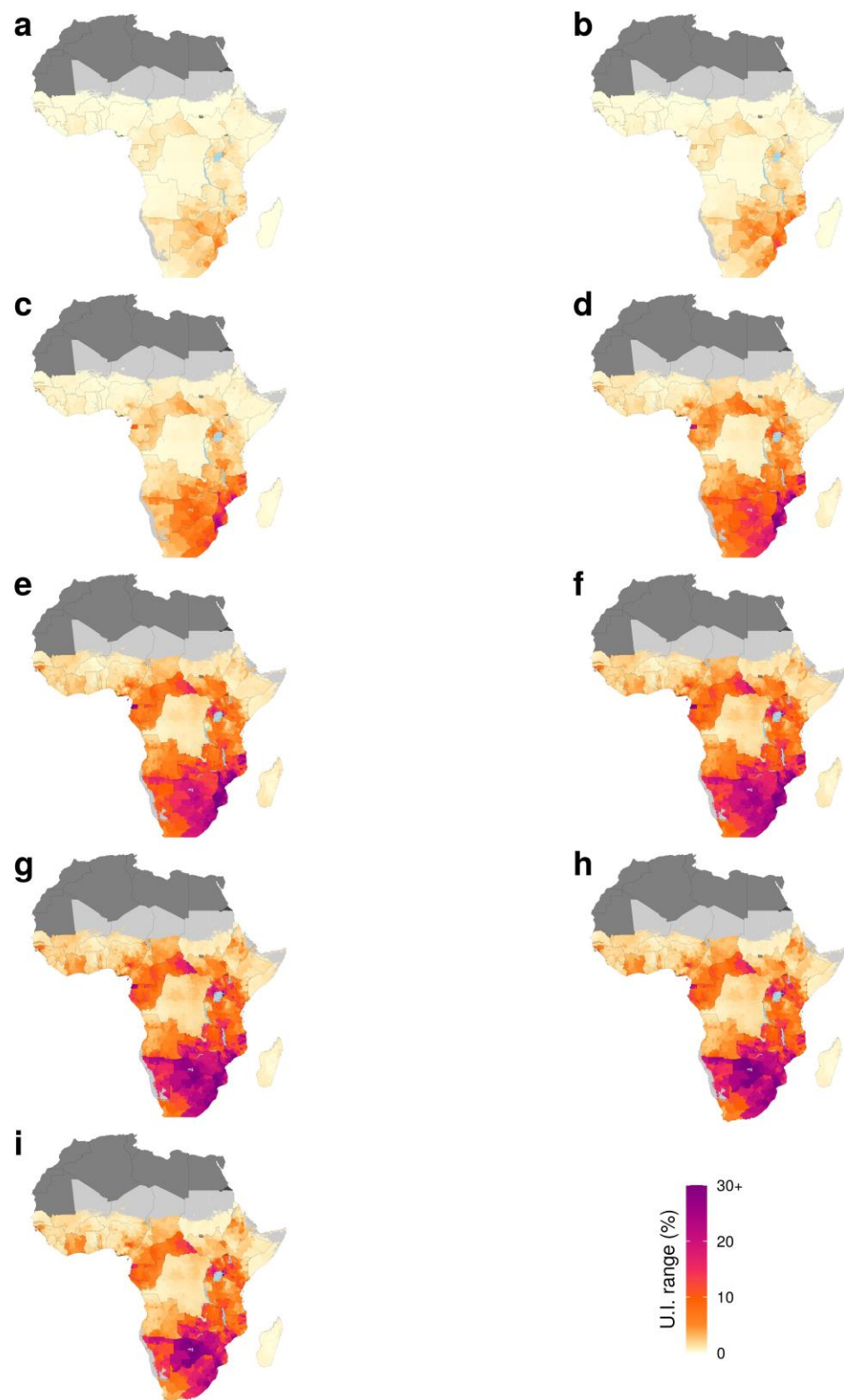
321 Figure S32: Age-specific uncertainty interval range estimates in females,
322 2010



323

324 **Figure S32: Age-specific uncertainty interval range estimates in females, 2010.** Uncertainty interval range
325 for female HIV prevalence estimates in the year 2010, at the second administrative level, for **(a)** ages 15–
326 19 years; **(b)** ages 20-24 years; **(c)** ages 25-29 years; **(d)** ages 30-34 years; **(e)** ages 35-39 years; **(f)** ages 40-
327 44 years; **(g)** ages 45-49 years; **(h)** ages 50-54 years; and **(i)** ages 55-59 years. Maps reflect national
328 boundaries, land cover, lakes, and population; areas with fewer than ten people per 1 × 1 km, and
329 classified as barren or sparsely vegetated, are colored light grey. Countries colored in dark grey were not
330 included in the analysis.

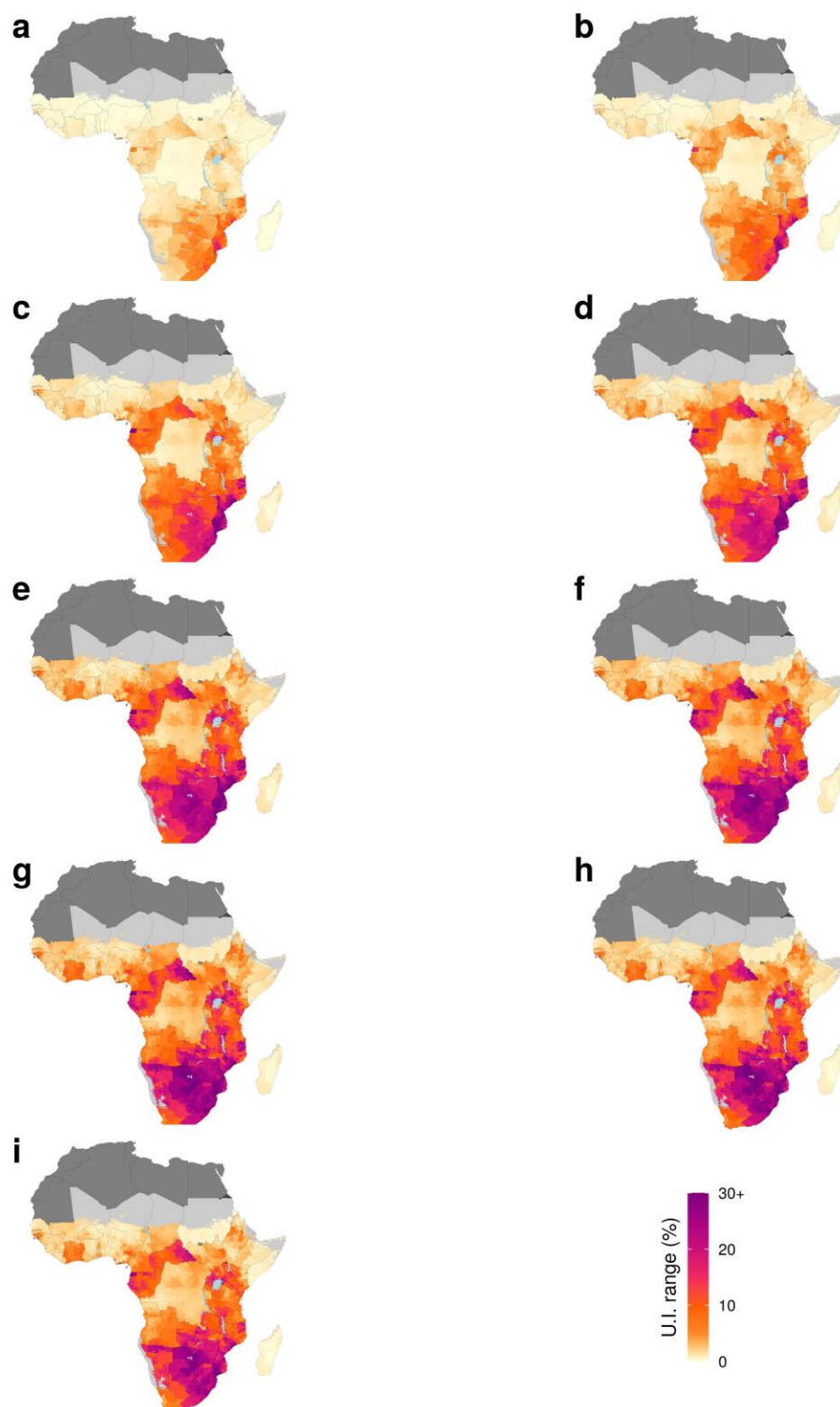
331 Figure S33: Age-specific uncertainty interval range estimates in males,
332 2018



333

Figure S33: Age-specific uncertainty interval range estimates in males, 2018. Uncertainty interval range for male HIV prevalence estimates in the year 2018, at the second administrative level, for (a) ages 15–19 years; (b) ages 20–24 years; (c) ages 25–29 years; (d) ages 30–34 years; (e) ages 35–39 years; (f) ages 40–44 years; (g) ages 45–49 years; (h) ages 50–54 years; and (i) ages 55–59 years. Maps reflect national boundaries, land cover, lakes, and population; areas with fewer than ten people per 1 × 1 km, and classified as barren or sparsely vegetated, are colored light grey. Countries colored in dark grey were not included in the analysis.

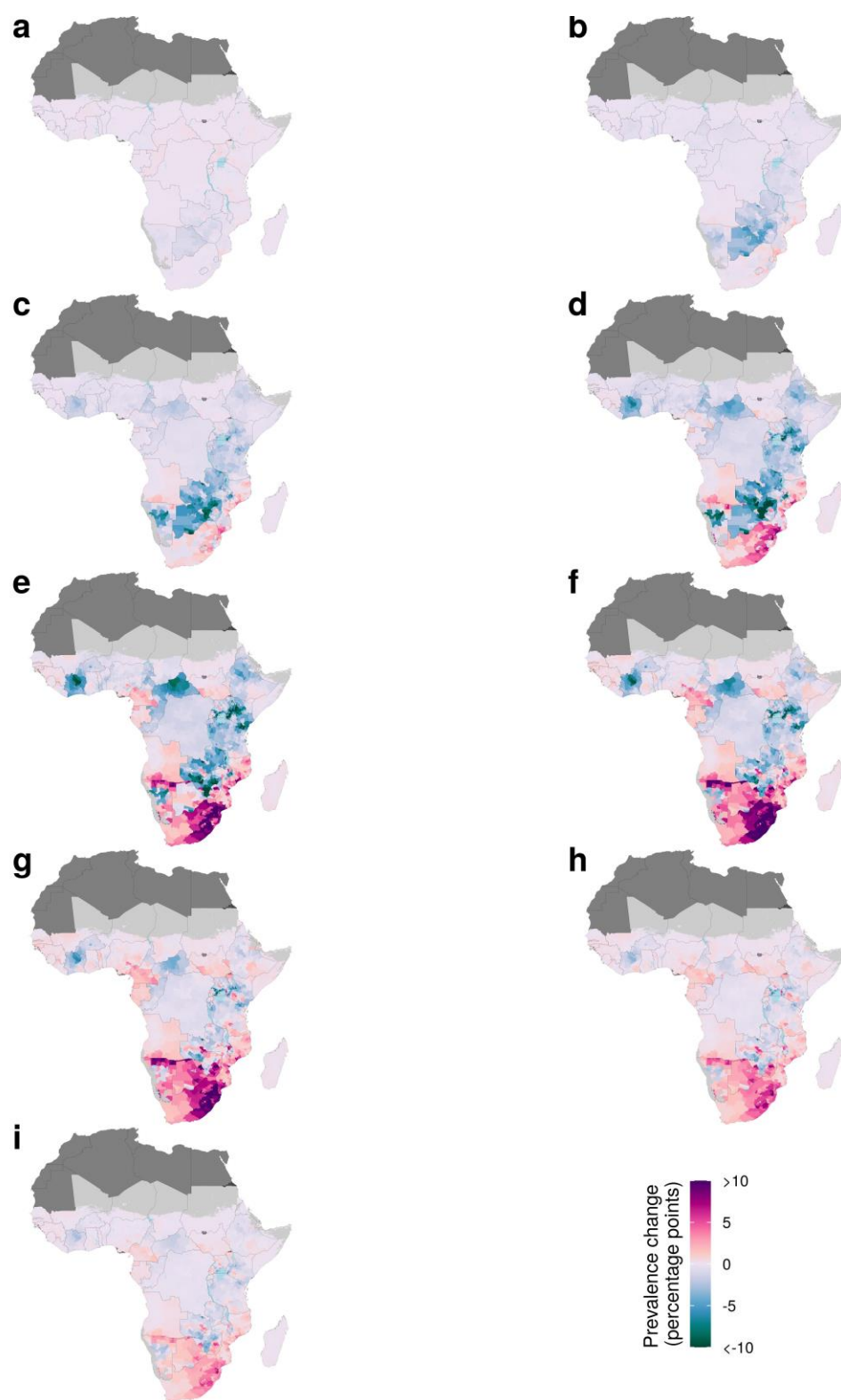
341 Figure S34: Age-specific uncertainty interval range estimates in females,
342 2018



343

Figure S34: Age-specific uncertainty interval range estimates in females, 2018. Uncertainty interval range for female HIV prevalence estimates in the year 2010, at the second administrative level, for (a) ages 15–19 years; (b) ages 20–24 years; (c) ages 25–29 years; (d) ages 30–34 years; (e) ages 35–39 years; (f) ages 40–44 years; (g) ages 45–49 years; (h) ages 50–54 years; and (i) ages 55–59 years. Maps reflect national boundaries, land cover, lakes, and population; areas with fewer than ten people per 1 × 1 km, and classified as barren or sparsely vegetated, are colored light grey. Countries colored in dark grey were not included in the analysis.

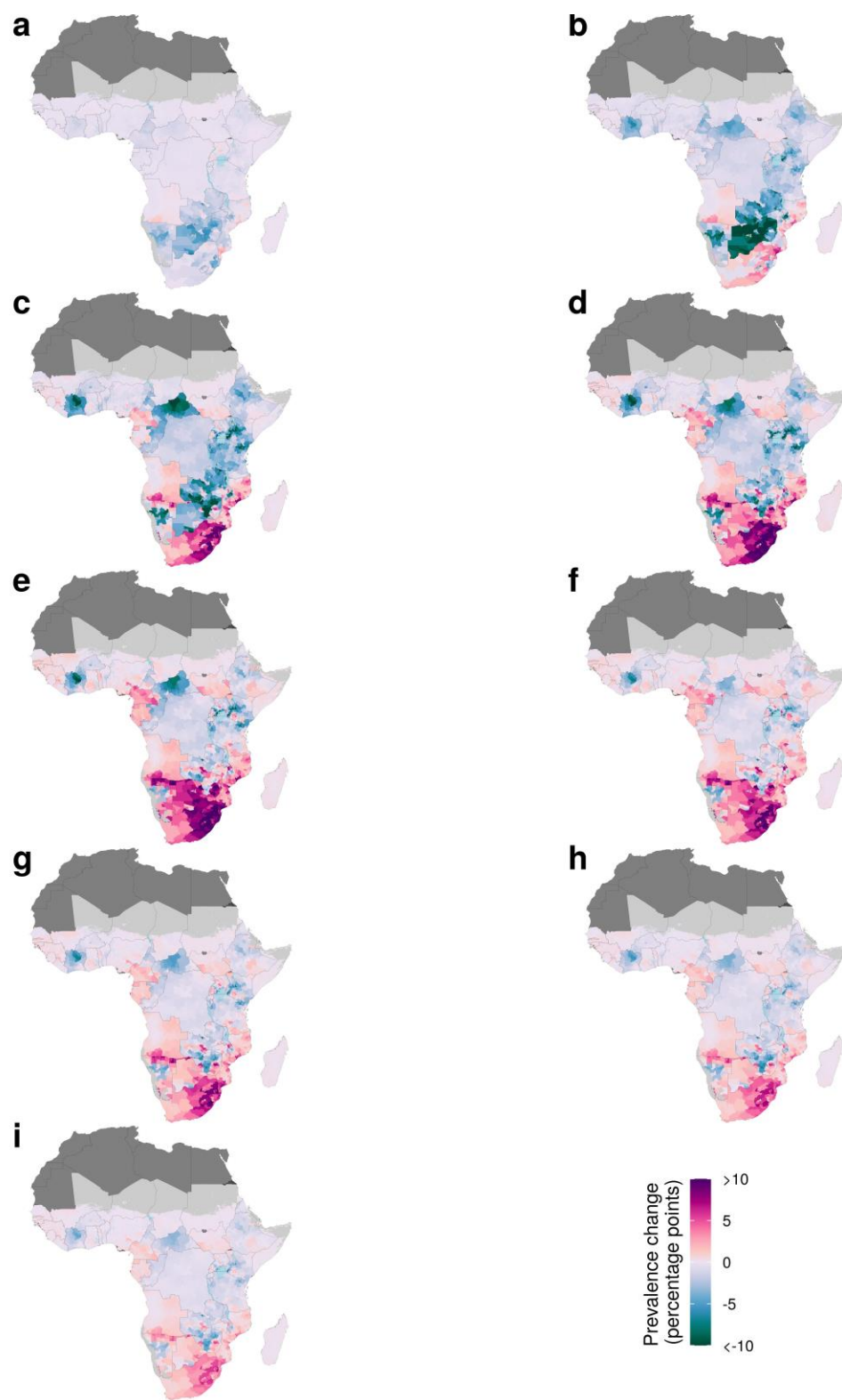
351 Figure S35: Change in HIV prevalence in males, 2000–2005



352

353 **Figure S35: Change in HIV prevalence in males, 2000-2005.** Absolute change in male HIV prevalence at the
354 second administrative level for (a) ages 15–19 years; (b) ages 20-24 years; (c) ages 25-29 years; (d) ages
355 30-34 years; (e) ages 35-39 years; (f) ages 40-44 years; (g) ages 45-49 years; (h) ages 50-54 years; and (i)
356 ages 55-59 years. Maps reflect national boundaries, land cover, lakes, and population; areas with fewer
357 than ten people per 1 × 1 km, and classified as barren or sparsely vegetated, are colored light grey.
358 Countries colored in dark grey were not included in the analysis.

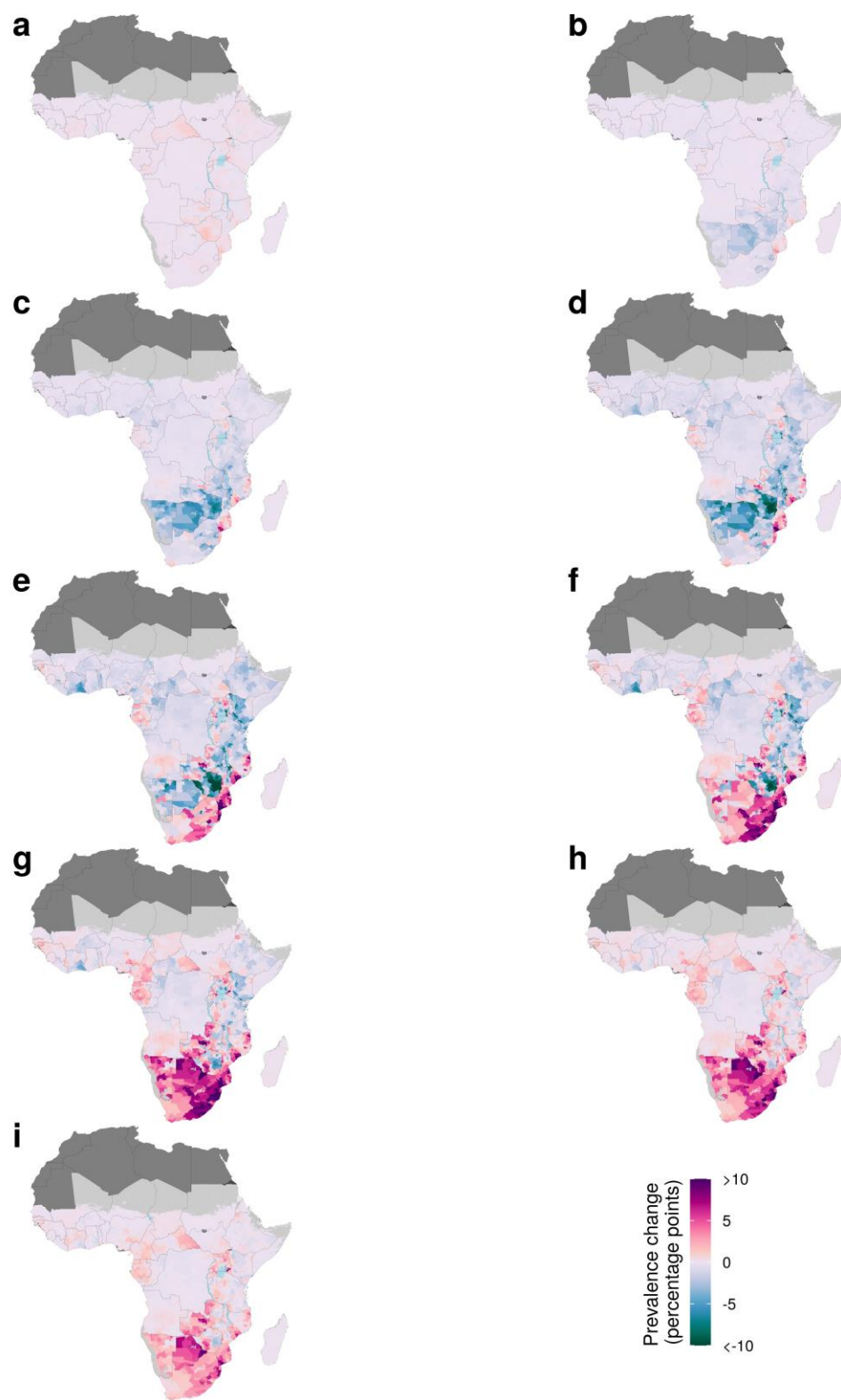
359 Figure S36: Change in HIV prevalence in females, 2000–2005



360

361 **Figure S36: Change in HIV prevalence in females, 2000-2005.** Absolute change in female HIV prevalence at
362 the second administrative level for (a) ages 15–19 years; (b) ages 20-24 years; (c) ages 25-29 years; (d)
363 ages 30-34 years; (e) ages 35-39 years; (f) ages 40-44 years; (g) ages 45-49 years; (h) ages 50-54 years;
364 and (i) ages 55-59 years. Maps reflect national boundaries, land cover, lakes, and population; areas with
365 fewer than ten people per 1×1 km, and classified as barren or sparsely vegetated, are colored light grey.
366 Countries colored in dark grey were not included in the analysis.

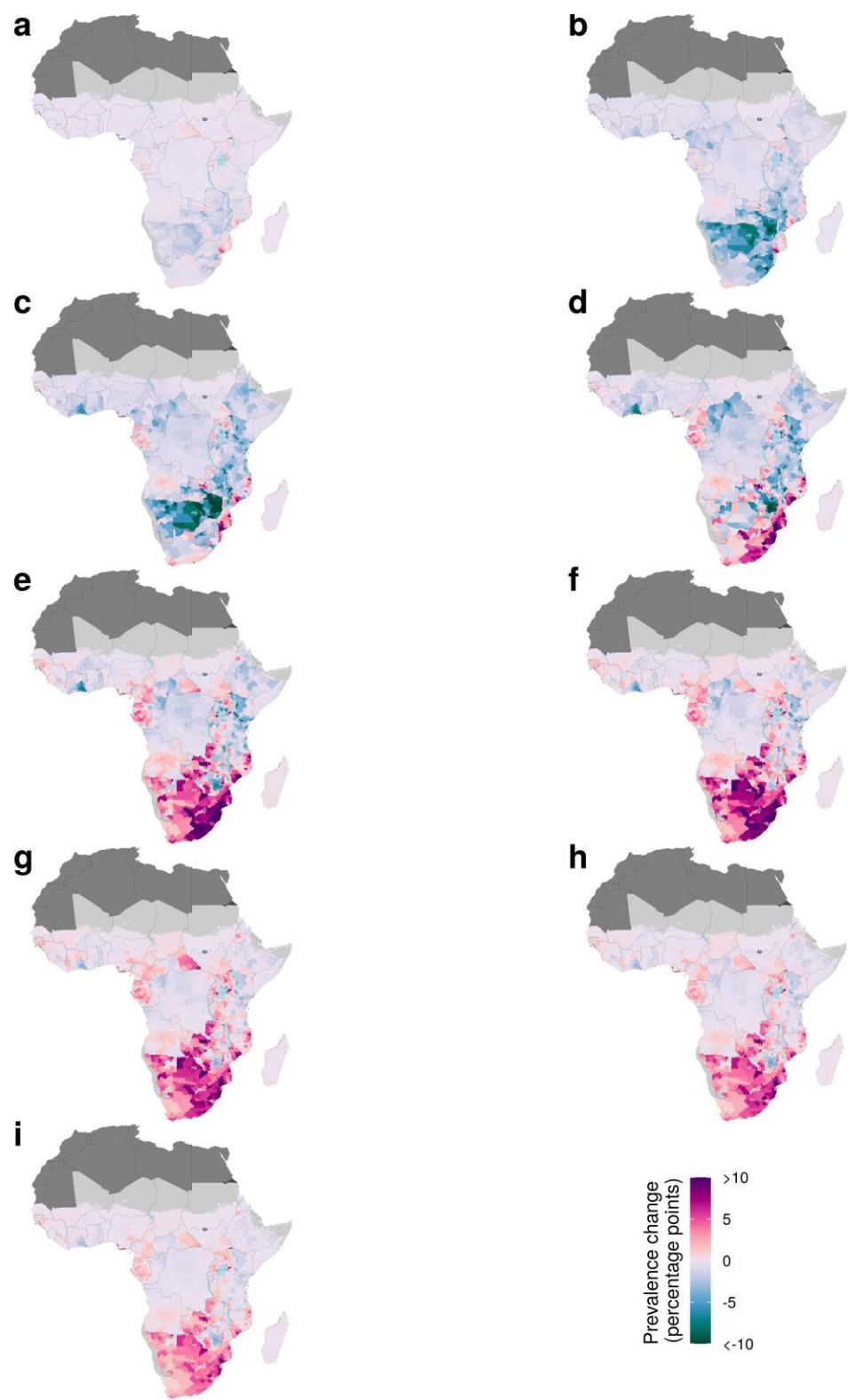
367 Figure S37: Change in HIV prevalence in males, 2005–2010



368

369 **Figure S37: Change in HIV prevalence in males, 2005-2010.** Absolute change in male HIV prevalence at the
370 second administrative level for (a) ages 15–19 years; (b) ages 20-24 years; (c) ages 25-29 years; (d) ages
371 30-34 years; (e) ages 35-39 years; (f) ages 40-44 years; (g) ages 45-49 years; (h) ages 50-54 years; and (i)
372 ages 55-59 years. Maps reflect national boundaries, land cover, lakes, and population; areas with fewer
373 than ten people per 1 × 1 km, and classified as barren or sparsely vegetated, are colored light grey.
374 Countries colored in dark grey were not included in the analysis.

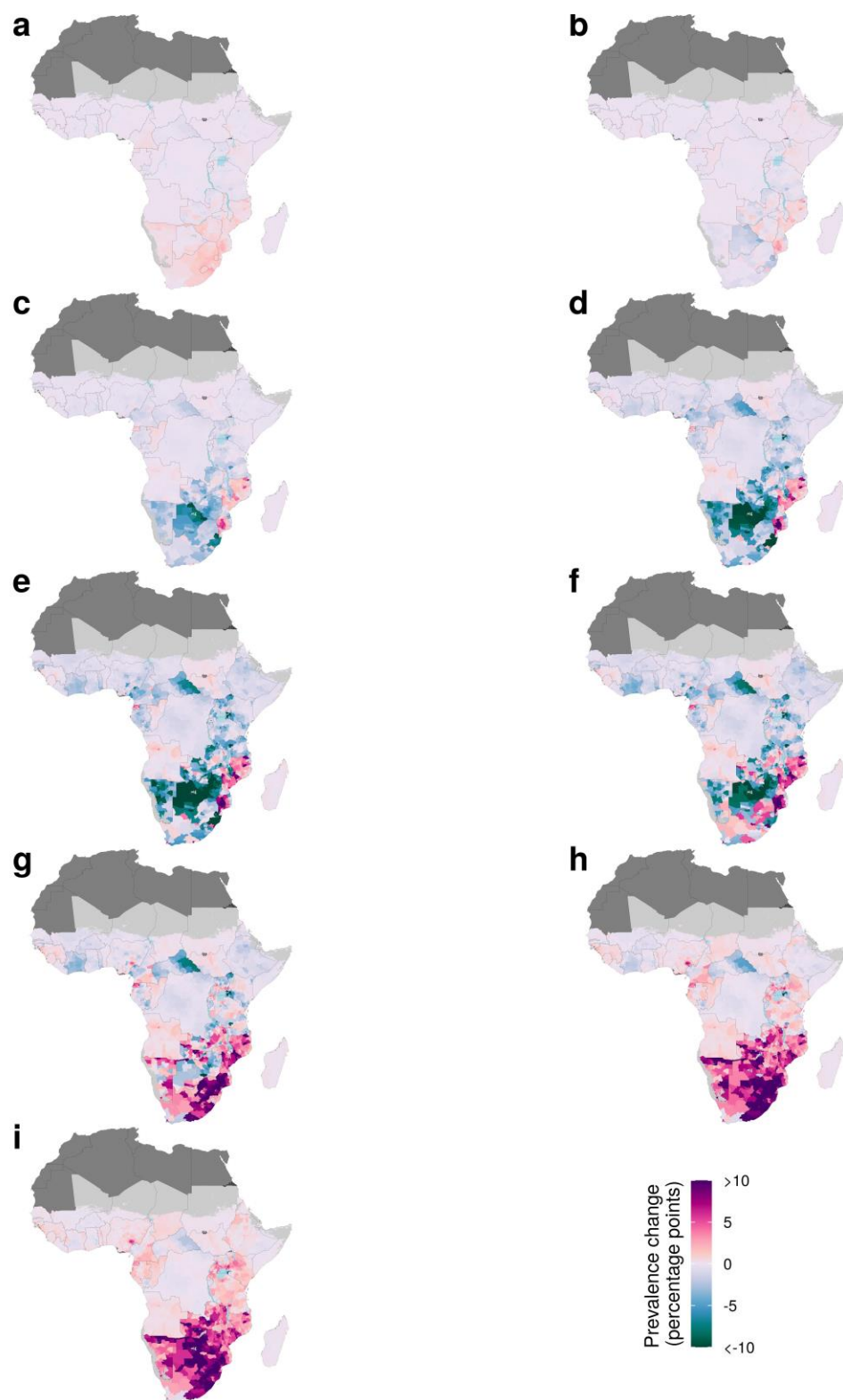
375 Figure S38: Change in HIV prevalence in females, 2005–2010



376

377 **Figure S38: Change in HIV prevalence in females, 2005-2010.** Absolute change in female HIV prevalence at
378 the second administrative level for (a) ages 15–19 years; (b) ages 20-24 years; (c) ages 25-29 years; (d)
379 ages 30-34 years; (e) ages 35-39 years; (f) ages 40-44 years; (g) ages 45-49 years; (h) ages 50-54 years;
380 and (i) ages 55-59 years. Maps reflect national boundaries, land cover, lakes, and population; areas with
381 fewer than ten people per 1 × 1 km, and classified as barren or sparsely vegetated, are colored light grey.
382 Countries colored in dark grey were not included in the analysis.

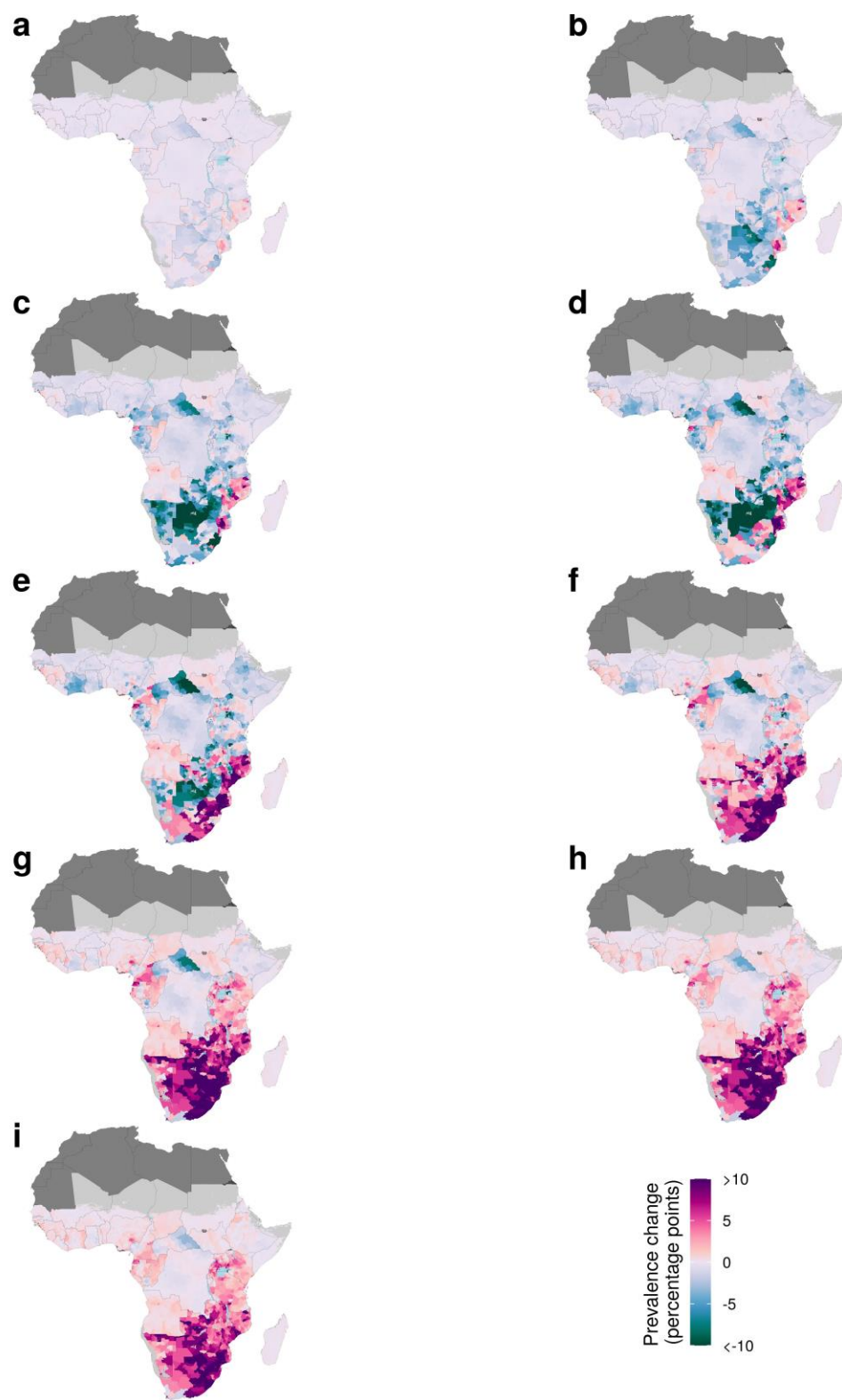
383 Figure S39: Change in HIV prevalence in males, 2010–2018



384

385 **Figure S39: Change in HIV prevalence in males, 2010-2018.** Absolute change in male HIV prevalence at the
386 second administrative level for (a) ages 15–19 years; (b) ages 20-24 years; (c) ages 25-29 years; (d) ages
387 30-34 years; (e) ages 35-39 years; (f) ages 40-44 years; (g) ages 45-49 years; (h) ages 50-54 years; and (i)
388 ages 55-59 years. Maps reflect national boundaries, land cover, lakes, and population; areas with fewer
389 than ten people per 1 × 1 km, and classified as barren or sparsely vegetated, are colored light grey.
390 Countries colored in dark grey were not included in the analysis.

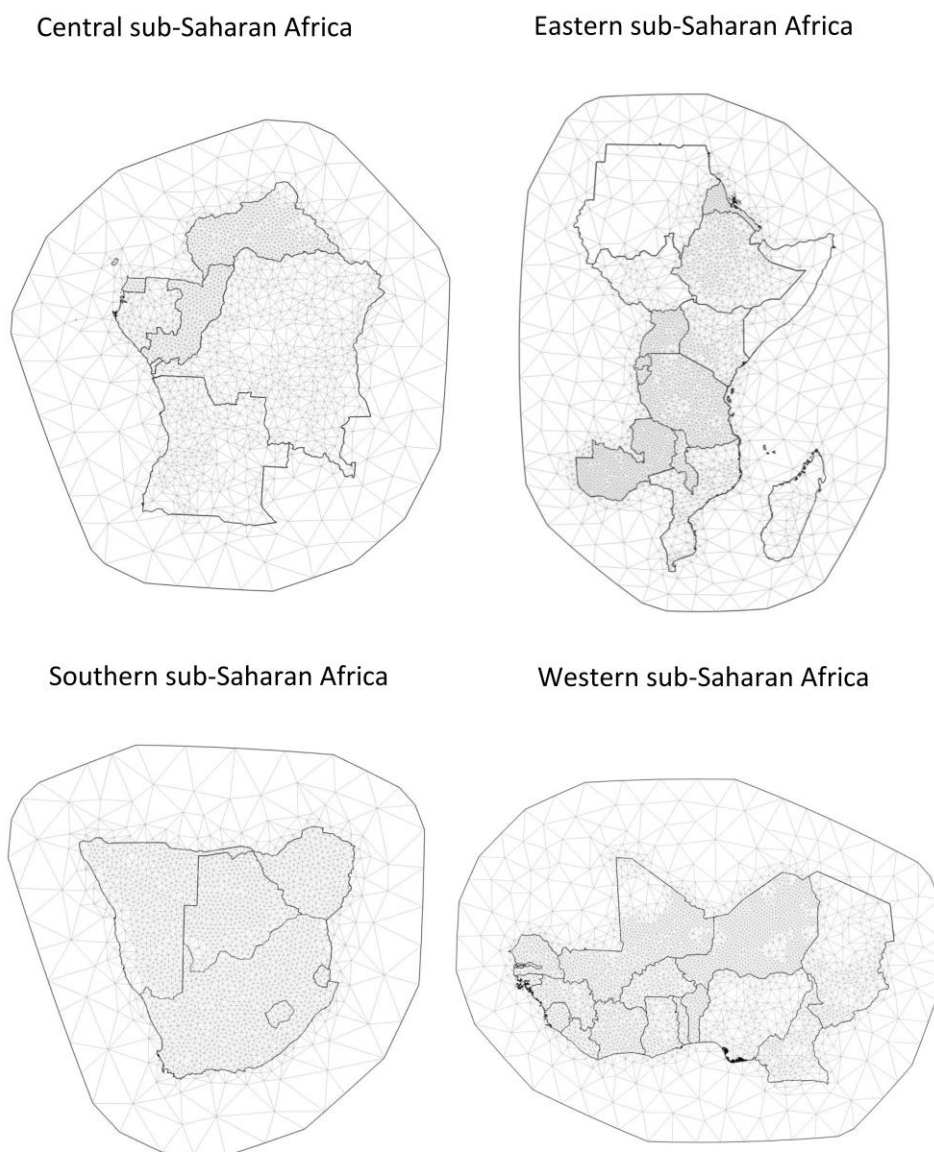
391 Figure S40: Change in HIV prevalence in females, 2010–2018



392

393 **Figure S40: Change in HIV prevalence in females, 2010-2018.** Absolute change in female HIV prevalence at
394 the second administrative level for (a) ages 15–19 years; (b) ages 20-24 years; (c) ages 25-29 years; (d)
395 ages 30-34 years; (e) ages 35-39 years; (f) ages 40-44 years; (g) ages 45-49 years; (h) ages 50-54 years;
396 and (i) ages 55-59 years. Maps reflect national boundaries, land cover, lakes, and population; areas with
397 fewer than ten people per 1 × 1 km, and classified as barren or sparsely vegetated, are colored light grey.
398 Countries colored in dark grey were not included in the analysis.

399 Figure S41: Spatial mesh for geostatistical models



400
401 **Figure S41: Space mesh for geostatistical models.** The finite elements mesh used to fit the space-time
402 correlated error for each region, overlaid on the countries in that region. Both the fine-scale mesh over
403 land in the modeling region and the coarser buffer region mesh are shown.