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Supplementary appendix

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Global, regional, and subregional trends in unintended pregnancy and its outcomes from 1990 to 2014: estimates from a Bayesian hierarchical model – Supplementary material

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1 Technical details on the unintended pregnancy estimation model

1.1 Notation

In the model description, lower-case Greek letters refer to unknown parameters, whereas upper-case Greek letters refer to variables which are functions of unknown parameters (modeled estimates). Roman letters refer to variables that are known or fixed, including data (lowercase) and estimates provided by other sources or the literature (uppercase).

Truncated normal and log-normal distributions are used in the model specification, denoted as follows: if $a \sim \text{logN}(b, c)T(d, e)$, then $\log(a)$ follows a normal distribution with mean $\log(b)$, variance c, and a is constrained to values in between d and e.

1.2 Model summary

The proportion of births unintended for country c in calendar year t, denoted by $\Theta_{c,t}$, is the main quantity to be estimated. In each country-year, unintended births are attributed to subgroups of

women, with $\Omega_{c,t,f}$ referring to the number of unintended births in the subgroup indexed by f, and proportion of births unintended given by

$$\Theta_{c,t} = \frac{\sum_{f in \mathcal{F}^{all}} \Omega_{c,t,f}}{B_{c,t}},$$

where $\mathcal{F}^{all}$ captures all (mutually exclusive) subgroups of women with non-zero unintended birth rates, and $B_{c,t}$ is the total number of births, obtained from the 2015 World Population Prospects of the United Nations Population Division (UNPD).

The subgroups are based on dividing women aged 15–49 for each country-year, $W_{c,t}^{(15-49)}$, into the following groups:

$$W_{c,t}^{(15-49)} = W_{c,t,f_{unmarried}} + W_{c,t,f_{no.need}} + W_{c,t,f_{fail}} + W_{c,t,f_{no.fail}} + W_{c,t,f_{unmet}},$$

where $W_{c,t,f}$ refers to the number of women in the subgroup indexed by f who are aged 15–49 (leaving out the superscript to simplify notation), where index $f_{unmarried}$ refers to unmarried women, and among married women, those with no need for contraceptives are indexed by $f_{no.need}$, users are divided into users who experience a failure (f_{fail}) and users who do not experience a failure ($f_{no.fail}$), and married women with an unmet need for contraceptive are indexed with f_{unmet}. Note that, as per United Nations definitions and following the conventions within the literature, "married" includes (and "unmarried" excludes) all cohabiting women. Estimates of the proportions of married women with met and unmet need were obtained from the UNPD, and the proportion of married women with met need who experienced a contraceptive failure were previously estimated as inputs for the abortion incidence model (Alkema et al. 2013; Sedgh et al 2016). It was necessary to incorporate the estimated sizes of subgroups of women that were used in the estimation of abortion incidence, so that we could use the previously estimated abortion rates. Assuming that users who do not experience a failure have a zero pregnancy rate, the set of mutually exclusive subgroups with non-zero unintended birth rates is given by $\mathcal{F}^{all} = \{f_{unmarried}, f_{no.need}, f_{fail}, f_{unmet}\}$.

Subgroup-specific unintended births are obtained from the subgroup size and the subgroup-period specific unintended birth rate $\omega_{c,p,f}$:

$$\Omega_{c,t,f} = \omega_{c,p[t],f} \cdot W_{c,t,f},$$

where $\omega_{c,p,f}$ is defined for each 5-year period $p = 1, 2, \ldots, 5$ from 1990-1994 to 2010–2014, and $p[t]$ refers to the 5-year period that t is contained in. The next section discusses how the subgroup rates were modeled, followed by an explanation of the data models, and the construction of aggregate outcomes.

1.3 Modeling subgroup-specific unintended birth rates

We estimated $\omega_{c,p,f}$ for all country-period-subgroup combinations, except for married women with no need for contraception; these women were assumed not to have unintended births. In the model, the unintended birth rate for any subgroup was a function of the modeled unintended pregnancy rate for that subgroup, $\psi_{c,p,f}$, and the abortion rate for that subgroup, $a_{c,p,f}$:

$$\begin{aligned} \omega_{c,p,f} &= 0 && \text{for } f = f_{no.need} \\ \omega_{c,p,f} &= \frac{\psi_{c,p,f} - 1.1 a_{c,p,f}}{1.2} && \text{for } f \neq f_{no.need} \end{aligned}$$

This equation incorporates miscarriages (which are defined here to include all spontaneous fetal losses after five weeks of gestation, including stillbirths), using an approach derived from life tables of

pregnancy loss by gestational age, which indicate that these events are equal to about 20% of births plus 10% of induced abortions. Estimated abortion rates were obtained from Sedgh et al. 2016, and incorporated into this model as fixed inputs.

By modeling unintended pregnancy rates, which we describe in the next section, and then transforming these into unintended birth rates, this equation allows us to use the previously estimated abortion rates to inform the unintended pregnancies model.

1.4 Modeling subgroup-specific unintended pregnancy rates

We modeled $\psi_{c,p,f}$ for all country-period-subgroup combinations. In this section, we discuss how the rates were allowed to vary by subgroup as well as across countries and with time.

In the model, we assumed that pregnancies to married women with no need for contraception were intended. We also assumed that married women who experienced method failures would exhibit the highest rates of the four subgroups, because by definition every woman experiencing a contraceptive failure experienced an unintended pregnancy. User failure rates may vary across countries and over time, which is captured by allowing the subgroup rates to vary by country and five-year period.

$$\begin{aligned} \psi_{c,p,f_{no.need}} &= 0, \\ \psi_{c,p,f} &\leq \psi_{c,p,f_{fail}} \text{ for } f = f_{unmet}, f_{unmarried}. \end{aligned}$$

For the reference period p_0, which refers to 2005-2009, a hierarchical model was used to estimate the country and region-specific unintended pregnancy rates for married women with unmet need for contraception, married women who experienced a contraceptive failure, and unmarried women. For $f = f_{unmet}, f_{fail}, f_{unmarried}$:

$$\psi_{c,p_0,f} \sim \text{logN}\left(\psi^{(region)}_{r[c],p_0,f}, \eta^2_f\right) T(\psi^{(min)}_{c,p_0,f}, \psi^{(max)}_{c,p_0,f}), \quad (1)$$

$$\psi^{(region)}_{r,p_0,f} \sim \text{logN}\left(\psi^{(world)}_{f}, \eta^{2(region)}_f\right) T(0.0001, 5), \quad (2)$$

where the variance terms η^2_f and $\eta^{2(region)}_f$ capture the between-country and between-region variability, respectively, for subgroup f and $\psi^{(world)}_f$ refers to the global level mean unintended pregnancy rate parameter, and constraints are included such that the resulting unintended pregnancy rates for the unmet and unmarried groups are no higher than the unintended pregnancy rate for the failures group, no lower than the abortion rate, and so that the sum of unintended births does not exceed the birth rate. These constraints will be discussed in a subsequent section.

For period p before or after p_0, with neighboring period $p^*[p] = p - 1$ for $p > p_0$ and $p^*[p] = p + 1$ for $p < p_0$, we capture the relative change between $p^*[p]$ and p on the country and regional level, respectively, as follows:

$$\begin{aligned} \psi_{c,p,f} &\sim \text{logN}\left(\psi_{c,p^*[p],f} \cdot \frac{\psi^{(region)}_{r[c],p,f}}{\psi^{(region)}_{r[c],p^*[p],f}}, \upsilon^2_f\right) T\left(\psi^{(min)}_{c,p,f}, \psi^{(max)}_{c,p,f}\right) \text{ for } p \neq p_0, \\ \psi^{(region)}_{r,p,f} &\sim \text{logN}\left(\log \psi^{(region)}_{r[c],p^*[p],f}, \upsilon^{2(region)}_f\right) T(0.0001, 5) \text{ for } p \neq p_0. \end{aligned}$$

These are parameterized so that, at the regional level, the most likely subgroup rate is the subgroup rate from the neighboring period (i.e., no change), whereas at the country level, the most likely subgroup rate is equal to the product of the subgroup rate from the neighboring period and the relative regional change. The same constraints are applied as above, in the description of the equations for the reference period.

Including covariates The model described so far is extended to incorporate covariates that may be predictive of differences in unintended pregnancy rates across countries and/or within countries over time. In each country-period, we include a "multiplier" parameter, $\Gamma_{c,p,f}$. In the case of one covariate, $\Gamma_{c,p,f} = x_{c,p} \cdot \gamma_f$, where $x_{c,p}$ refers to the mean of the covariate in the country-period, centered around its mean over all country-periods, such that $x_{c,p} = 0$ refers to a country-period with an "average" covariate outcome, and γ_f is a subgroup-specific regression coefficient. For model fits where the effect of the covariate was assumed to be the same for a subset of subgroups f, e.g. f_1 and f_2, we set $\gamma_{f_1} = \gamma_{f_2}$. This is easily extended to multiple covariates, indexed by g, so that the multiplier for subgroup f in country-period c, p is given by,

$$\Gamma_{c,p,f} = \sum_{g in \mathcal{G}_f^{all}} \gamma_{f,g} \cdot x_{g,c,p},$$

where $\mathcal{G}_f^{all}$ captures all covariates used to predict the unintended pregnancy rate for a subgroup f.

For the reference period p_0, the hierarchical model (Eq.1) was extended by including this multiplier:

$$\psi_{c,p_0,f} \quad \sim \quad \text{logN}\left(\psi_{r[c],p_0,f}^{(region)} \cdot \exp(\Gamma_{c,p,f}), \eta_f^2\right) T\left(\psi_{c,p_0,f}^{(min)}, \psi_{c,p_0,f}^{(max)}\right). \tag{3}$$

In this extended set-up, $\psi_{r,p_0,f}^{(region)}$ represents the regional mean parameter for a country with covariates equal to 0, hence average covariates.

For periods p before or after p_0 (with $p^*[p] = p - 1$ for $p > p_0$ and $p^*[p] = p + 1$ for $p < p_0$), we divide the subgroup rate from the reference period, $\psi_{c,p^*[p],f}$, by $exp(\Gamma_{c,p^*[p],f})$, since the impact of the multiplier at $p^*[p]$ was incorporated into $\psi_{c,p^*[p],f}$ in Eq.3, and multiply by $exp(\Gamma_{c,p,f})$,:

$$\psi_{c,p,f} \quad \sim \quad \text{logN}\left(\frac{\psi_{c,p^*[p],f}}{\exp\left(\Gamma_{c,p^*[p],f}\right)} \cdot \frac{\psi_{r[c],p,f}^{(region)}}{\psi_{r[c],p^*[p],f}^{(region)}} \cdot \exp\left(\Gamma_{c,p,f}\right), \upsilon_f^2\right) T\left(\psi_{c,p,f}^{(min)}, \psi_{c,p,f}^{(max)}\right) \text{ for } p \neq p_0.$$

The lower and upper bounds are as before, satisfying the constraints such that the highest unintended pregnancy rate is among the failures subgroup, the unintended pregnancy rates are at least as high as the abortion rates, and such that the estimated unintended pregnancy rate does not exceed the total fertility rate.

This generalizes to the no-covariate scenario, as with no covariates, $\Gamma_{c,p,f} = 0$.

1.4.1 Subgroup unintended pregnancy rate constraints

We set minimum and maximum subgroup rates for every country-period, $\psi_{c,p,f}^{(min)}$ and $\psi_{c,p,f}^{(max)}$. Since we transform a modeled unintended pregnancy rate into an estimated unintended birth rate in Eq. 1 by subtracting abortions and miscarriages, we define the minimum rates to be equal to 1.1 times the estimated abortion rates for each subgroup, $a_{c,p,f}$. We multiply the abortion rates by 1.1 since, as noted earlier, we include miscarriages using an approach derived from life tables of pregnancy loss by gestational age, which indicates that these events are equal to about 20% of births plus 10% of induced abortions:

$$\begin{aligned}
\psi_{c,p,f_{fail}}^{(min)} &= 1.1 a_{c,p,f_{fail}}, \\
\psi_{c,p,f_{unmet}}^{(min)} &= 1.1 a_{c,p,f_{unmet}}, \\
\psi_{c,p,f_{unmarried}}^{(min)} &= 1.1 a_{c,p,f_{unmarried}}.
\end{aligned}$$

We also constrain the subgroup unintended *pregnancy* rates such that the sum of unintended *births*, $\Omega_{c,t}$, cannot exceed the total number of births as estimated by the UNPD, through a series of constraints to $\psi_{c,p,f}$. We set the $\psi_{c,p,f}^{(max)}$ such that the modeled number of unintended births to any subgroup f, and, moreover, the sum of unintended births across all subgroups, never exceeds the total fertility for any year in a country-period c, p.

The maximum unintended pregnancy rate $\psi_{c,p,f}^{(max)}$ for any subgroup f and period p is the sum of 1.2 times the maximum unintended birth rate, $\omega_{c,p,f}^{(max)}$, and 1.1 times the abortion rate, $a_{c,p,f}$. The maximum unintended birth rate, in turn, is defined as the ratio of two parameters, $\Omega_{c,p,f}^{(max)}$, the maximum possible number of unintended births, and $W_{c,p,f}^{(max)}$, which refers to the maximum size of the f-th subgroup in period p.

$$\begin{aligned}
\psi_{c,p,f}^{(max)} &= 1.2\omega_{c,p,f}^{(max)} + 1.1a_{c,p,f} \\
\omega_{c,p,f}^{(max)} &= \frac{\Omega_{c,p,f}^{(max)}}{W_{c,t_p^{(max)},f}}
\end{aligned}$$

The maximum used for the unintended birth rate is the ratio of the maximum possible number of unintended births to the maximum size of the f-th subgroup in period p because if we divided by the minimum size of the f-th subgroup in period p, then, in one of the years in the five-year period p, it would be theoretically possible to compute a number of unintended births that exceeded the total number of births. This would lead to a proportion of births unintended greater than 1. Although in practice the year-to-year variation in the sizes of the subgroups are small, and the estimated numbers of unintended births are nowhere near the total number of births that occurred in any year, these constraints are necessary in order for the model to initialize.

The maximum used for the number of unintended births summed across all subgroups is equal to the the lowest number of births in the period, $B_{c,p}^{(min)}$. We do not use $B_{c,p}^{(max)}$ because, if the maximum number of unintended births summed across all subgroups were equal to the maximum number of births observed in any of the years in the period, then, it would be theoretically possible to compute a number of unintended births higher than the total number of births observed. Although in practice this is a non-informative assumption because the estimated numbers of unintended births are nowhere near the total numbers of births, this is necessary for the model to initialize. The maximum number of unintended births, $\Omega_{c,p,f}^{(max)}$, for the different subgroups is obtained as follows:

$$\begin{aligned}
\Omega_{c,p,f_{fail}}^{(max)} &= 0.97B_{c,p}^{(min)}, \\
\Omega_{c,p,f_{unmet}}^{(max)} &= 0.98B_{c,p}^{(min)} - \omega_{c,p,f_{fail}} \cdot W_{c,t_p^{(max)},f_{fail}}, \\
\Omega_{c,p,f_{unmarried}}^{(max)} &= 0.99B_{c,p}^{(min)} - \omega_{c,p,f_{fail}} \cdot W_{c,t_p^{(max)},f_{fail}} - \omega_{c,p,f_{unmet}} \cdot W_{c,t_p^{(max)},f_{unmet}},
\end{aligned}$$

This set of equations is implemented such that the total estimated number of unintended births across all subgroups cannot, in effect, exceed 99% of total fertility in any country-year. To do so, we set the maximum number of unintended births, $\Omega_{c,p,f}^{(max)}$, for f_{fail} to 97% of all births. For f_{unmet}, we subtract from this quantity the estimated number of unintended births to f_{fail} and, since these could theoretically equal each other, to prevent a maximum of 0 births, we add 1% of all births; we do likewise with $f_{unmarried}$.

Since the subgroup sizes and birth rates vary by five-year periods p, whereas the sizes of the subgroups vary by year t, we first compute the maximum size of each subgroup, $W_{c,t_p^{(max)},f}$, and the lowest number of births, $B_{c,p}^{(min)}$, per year, within each five-year period:

$$\begin{aligned}
W_{c,t_p^{(max)},f} &= max(W_{c,t_{1_p},f}, W_{c,t_{2_p},f}, W_{c,t_{3_p},f}, W_{c,t_{4_p},f}, W_{c,t_{5_p},f}), \\
B_{c,p}^{(min)} &= min(B_{c,t_{1_p}}, B_{c,t_{2_p}}, B_{c,t_{3_p}}, B_{c,t_{4_p}}, B_{c,t_{5_p}}),
\end{aligned}$$

where t_{1_p}, t_{2_p}, t_{3_p}, t_{4_p} and t_{5_p}, indicate the first, second, third, fourth and fifth years, respectively, of five-year period p.

1.4.2 Priors

For the global mean unintended pregnancy rate parameters, prior distributions are given by

$$\begin{aligned}
\psi_{f_{fail}}^{(world)} &\sim U(0.0001, 5), \\
\psi_{f_{unmet}}^{(world)} &\sim U(0.0001, 5), \\
\psi_{f_{unmarried}}^{(world)} &\sim U(0.0001, 5).
\end{aligned}$$

For the variances for differences in levels and slopes across countries, priors are given by

$$\begin{aligned}
\eta_{f_{unmet}} &\sim U(0.01, \upsilon_{f_{unmet}}^{(region)}), \\
\eta_{f_{fail}} &\sim U(0.01, \upsilon_{f_{fail}}^{(region)}), \\
\eta_{f_{unmarried}} &\sim U(0.01, \upsilon_{f_{unmarried}}^{(region)}), \\
\upsilon_{f_{unmet}} &\sim U(0.01, \eta^{(region)}), \\
\upsilon_{f_{fail}} &\sim U(0.01, \eta^{(region)}). \\
\upsilon_{f_{unmarried}} &\sim U(0.01, \eta^{(region)}).
\end{aligned}$$

The variances across clusters are similarly specified, with the exception that the variances in levels across clusters are assumed to not vary by subgroup. We conducted a sensitivity analysis to confirm that the estimates and uncertainty intervals are robust to this assumption.

$$\begin{aligned}
\eta^{(region)} &\sim U(0.01, 3). \\
\upsilon_{f_{unmet}}^{(region)} &\sim U(0.01, 3), \\
\upsilon_{f_{fail}}^{(region)} &\sim U(0.01, 3), \\
\upsilon_{f_{unmarried}}^{(region)} &\sim U(0.01, 3),
\end{aligned}$$

Finally, diffuse priors were chosen for the coefficients for the covariate effects:

$$\gamma_g \sim N(0, 10).$$

1.5 Data

1.5.1 Data on the proportions of births or pregnancies unintended

We searched for data on the proportion of births or pregnancies that were unintended for every country and major territory in the world for 1990-2014. Data were compiled for as many country-years as possible in 1990-2014, and were computed from nationally representative survey microdata as well as taken from published or unpublished studies identified through literature searches (See Research in Context).

Survey data: In Demographic and Health Surveys (DHS), conducted periodically in developing countries, a birth is considered unintended if it occurred sooner than desired or if it was not wanted at all. In cases where a woman did not respond or reported that she was unsure, the data were treated as missing at random. Women reported on births in the past three or five years, and we computed

the percent of births unintended separately for each calendar year preceding the survey. The percent of births reported as unintended tended to decrease with each successive year preceding the survey, indicating that women may reclassify unintended births as intended births with the passage of time. A supplementary analysis (not shown) revealed that averages of all births in the five years preceding the date of a woman's interview results in data that are 12% lower, on average, than averages of all births in the year immediately preceding the interview. Therefore, in contrast to prior analyses of unintended pregnancy, we used women's reports for the year preceding the interview. In total, data were constructed from 219 of these surveys representing 72 countries. Twenty two surveys (10%) in five countries (7%) interviewed only women who had married at least once (regardless of their present marital status), and we classified these as non-representative surveys in the model.

For another fifty DHS and Reproductive Health Surveys (RHS) representing twenty-eight countries (including sixteen countries with no other data sources), the data files were not publicly available and estimates were taken from published reports. The reports presented the intention status of births in the past three or five years combined. For eleven surveys (39%) in six countries (21%), these estimates included pregnancies. Nine surveys (18%) in seven countries (25%) excluded women not in union, which we treated as non-representative in the model.

For the United States, three estimates of the proportion of births that were unintended in the previous five years were calculated from the National Survey for Family Growth (NSFG).

Other studies: Another twenty-nine observations for 17 countries were obtained from published studies. Seventeen observations (59%) from eleven countries (65%) were treated as non-representative in the model, because they came from subnational studies, or studies which focused on a specific subpopulation.

Six of these observations in five countries used the London Measure of Unplanned Pregnancy (LMUP) which used a 12-item scoring system to categorize pregnancies according to whether the woman said she planned the pregnancy, did not plan it, or was ambivalent about it. Because the LMUP distinguished births that were actively planned, whereas the other data sources treat births as intended if they were wanted (whether or not they were actively planned by the respondent prior to the conception), we computed the minimum and maximum percent of births that were unintended, excluding and including the percent for which the woman was ambivalent about the pregnancy according to the LMUP, respectively.

Some of these studies asked women attending antenatal clinics about the planning status of their current pregnancies. It can be expected that women who have abortions are underrepresented in these surveys, especially if the eligibility is limited to women who are in the second or third trimester of pregnancy. Findings from two surveys were treated as estimates the planning status of births instead of pregnancies, because the gestational age of all respondents' pregnancies was at least 5 months.

In total, we collected data on the proportion of births or pregnancies unintended from 298 surveys for 105 countries. Of these, 31 surveys were for 18 countries in Europe, 69 surveys for 25 countries in Asia, 60 for 15 countries in Latin America and the Caribbean, three surveys for one country in North America, six surveys for four countries in Oceania, and 129 for 42 countries in Africa. Of the 105 countries and territories for which data were available, 76 had data for two or more years. The number of countries and territories with at least one estimate of birth or pregnancy intention, by geographic area and time period, are in Table 1. The input data are enumerated in Table 8.

1.5.2 Data on the proportion of unintended births by marital status

For 195 DHS surveys representing 69 countries we calculated the proportion of unintended births to married and unmarried women. As the survey only asks the age at first marriage and it is not possible to confirm that a woman was married at the time of conception, we calculated both a maximum and minimum estimate for each survey based on the date of first marriage, the date of birth, and the respondent's marital status at the time of interview. For the maximum estimate, births are treated as following from marital pregnancies if they occurred after the date of first marriage plus 9 months, and for the minimum estimate, births are treated as following from non-marital pregnancies if the

	Countries	1990-1994	1995-1999	2000-2004	2005-2009	2010-2014	1990-2014
West and Middle Africa	25	8	13	10	13	18	22
East and Southern Africa	23	9	10	13	11	13	17
E. Mediterranean and N. Africa	20	6	4	4	3	3	6
South and Central Asia	14	3	7	5	7	6	12
East and Southeast Asia	23	2	4	6	7	5	10
Latin American Region	35	12	14	13	13	5	15
Former Soviet Bloc	23	4	7	5	8	4	10
Europe	17	3	4	2	7	8	11
US/Canada/Australia/NZ	4	0	1	2	2	2	2

Table 1: Number of countries for which data on intention status is available, by subregion and period.

respondent is either separated or remarried. To ensure that these values captured a pregnancy that occurred within a marriage, we lagged the births by nine months in the calculations. We also obtained the proportion of unintended births to married women for one data point for the United States.

1.5.3 Data on the proportion of unintended births by contraceptive use

From a survey in Japan, we obtained the percent of unintended births to women who used contraception, as well as the percent to women who had an unmet need. We also obtained data on the unintended births to women who used contraception from a survey in Iran. These data were classified as non-representative because they came from samples which excluded women not in union.

1.5.4 Data models

All data on observed proportions were combined across types (i.e. unintended pregnancies or births), across countries and indexed by $i = 1, 2, \ldots, I$; for proportion y_i, $c[i]$ refers to the country of the observation, $t_1[i], \ldots, t_I[i]$ refer to the calendar years of the observation period and $\mathcal{F}[i]$ denotes the subgroup that the observation refers to (which may be all women $\mathcal{F}[i] = \mathcal{F}^{all}$, or married women only $\mathcal{F}[i] = \{f_{unmet}, f_{fail}\}$).

For proportion data, we assume that the mode of the sampling model for the data is given by the true (modeled) proportion as follows:

$$y_i \sim N(\Xi_i, \sigma_i^2)T(0,1), \tag{4}$$

where mean Ξ_i is the true (modeled) proportion for the corresponding type-country-year-group combination, given by

$$\begin{aligned}
\Xi_i &= \frac{\sum_{t=t_1[i]}^{t_I[i]} \sum_{fin\mathcal{F}[i]} \Omega_{c,t,f}}{\sum_{t=t_1[i]}^{t_I[i]} B_{c,t}}, \text{ for data on proportions of unintended births,} \\
&= \frac{\sum_{t=t_1[i]}^{t_I[i]} \sum_{fin\mathcal{F}[i]} \Psi_{c,t,f}}{\sum_{t=t_1[i]}^{t_I[i]} (1.2B_{c,t} + 1.1\Phi c,t)}, \text{ for data on unintended pregnancies.}
\end{aligned}$$

Variance σ_i^2 is the sum of fixed and unknown variances which are defined as follows:

$$\sigma_i^2 = s_i^2 + (\lambda_{\mathcal{F}[i]}^{(non-sampling)} + r[i] \cdot \lambda^{(non-representative)}) y_i(1 - y_i), \tag{5}$$

where s_i^2 is the sampling error for the observed proportion, $\lambda^{(non-sampling)}$ is an unknown multiplied by the Bernoulli variance, $y_i(1 - y_i)$, to account for non-sampling error; and $r[i] = 1$ if the proportion was computed from a non-representative survey and 0 if the survey was representative, such that $\lambda^{(non-representative)}$ allows for additional uncertainty when incorporating proportions computed from non-representative surveys. Sampling error s_i^2 is calculated to take into account sample size and survey

design for those surveys where microdata were available. For other surveys, it is given by the product of the binomial variance and an inflation factor, computed as the ratio of the design-adjusted variance and the binomial variance from surveys where microdata were available.

For observed proportions that are to be treated as ranges, indexed by $i = I+1, \ldots, I+N$, notation is the same as described above and subscripts (min) and (max) denote the lower and upper bounds. These data were used to constrain the true (modeled) proportions that they refer to as follows:

$$y_i^{*(min)} \leq \quad \Xi_i \quad \leq y_i^{*(max)}, \tag{6}$$

where $y_i^{*(min)}$ and $y_i^{*(max)}$ account for uncertainty in the ranges:

$$\begin{aligned} y_i^{*(min)} &\sim N(y_i^{(min)}, \sigma_i^{2(min)})T(0,1), \\ y_i^{*(max)} &\sim N(y_i^{(max)}, \sigma_i^{2(max)})T(y_i^{*(min)}, 1), \end{aligned}$$

where $\sigma_i^{2(min)}$ and $\sigma_i^{2(max)}$ are given by Eq. 5, replacing y_i by $y_i^{(min)}$ and $y_i^{(max)}$.

Finally, the variance multipliers were given diffuse priors, with the non-sampling variance multipliers constrained such that there is one multiplier for data on the proportion of births or pregnancies unintended (i.e., where $f = \mathcal{F}^{all}$), and another for data on the percent distribution by subgroup.

$$\begin{aligned} \sqrt{\lambda_{\mathcal{F}^{all}}^{(non-sampling)}} &\sim U(0,10), \\ \sqrt{\lambda_{f_{fail}}^{(non-sampling)}} &\sim U(0,10), \\ \sqrt{\lambda_{f}^{(non-sampling)}} &= \sqrt{\lambda_{f_{fail}}^{(non-sampling)}} \text{ for } f = f_{unmet}, f_{unmarried}, \\ \sqrt{\lambda^{(non-representative)}} &\sim U(0,10). \end{aligned}$$

1.6 Reported estimates

Of 224 countries and territories, 25 are excluded because we do not have the number of women of reproductive age,[1] and 15 because we do not have data on the percent distribution of the population.[2] We estimate the incidence of unintended pregnancy and the proportion of these that end in abortion for the remaining 184 countries and territories, for every five-year period between 1990 and 2014.

The unintended pregnancy model is a Bayesian model whereby interest lies in the posterior distributions of the outcomes of interest, which summarizes all available information about the outcome of interest. We used a Markov Chain Monte Carlo (MCMC) algorithm to generate samples of the posterior distributions of all model parameters. The MCMC sampling algorithm was implemented using JAGS 4.2.0 open source software and the analysis was carried out in R 3.3.3. The sampling algorithm produced a set of trajectories of unintended pregnancy, unintended birth, and proportion of unintended pregnancies that end in abortion for each country, from which regional and subregional estimates were derived.

We computed point estimates by summing the posterior medians of the estimates for each country-year within the region-period. (We report posterior medians instead of means because the posterior distributions are right-skewed.) We computed 90% uncertainty intervals (UIs) using the 5th and 95th percentiles of the posterior distributions. The interpretation of such intervals is that there is a 5% chance that the true outcome is below the interval, and there is a 5% chance that the true outcome is above the interval.

[1] Countries and territories with missing data on numbers of women of reproductive age: American Samoa, Anguilla, Bermuda, British Virgin Islands, Cayman Islands, Cook Islands, Dominica, Faeroe Islands, Falkland Islands, Gibraltar, Greenland, Liechtenstein, Marshall Islands, Montserrat, Nauru, Netherlands Antilles, Northern Mariana Islands, Palau, Saint Kitts and Nevis, Saint-Pierre-et-Miquelon, San Marino, Tokelau, Turks and Caicos Islands, Tuvalu, and Wallis and Futuna Islands.

[2] Countries and territories with missing data on distribution of population across subgroups: Aruba, Brunei Darussalam, Channel Islands, Macao Special Administrative Region, Curacao, Cyprus, French Guiana, French Polynesia, Iceland, Luxembourg, Mayotte, Micronesia, New Caledonia, Seychelles, and Western Sahara.

Aggregate outcomes (for the world and world regions) are based on the total number of unintended births, $\Omega_{\mathcal{R},p}^{(region)}$, and abortions, $\Phi_{\mathcal{R},p}^{(region)}$, for a 5-year period p for a region $\mathcal{R}$ which contains countries $c \in \mathcal{R}$, defined as:

$$\Phi_{\mathcal{R},p}^{(region)} = \sum_{c \in \mathcal{R}} \sum_{t^*=t_1[p]}^{t_5[p]} \Phi_{c,t^*}, \tag{7}$$

$$\Omega_{\mathcal{R},p}^{(region)} = \sum_{c \in \mathcal{R}} \sum_{t^*=t_1[p]}^{t_5[p]} \Omega_{c,t^*}, \tag{8}$$

where $t_1[p]$ and $t_5[p]$ refer to the start and end year of period p, respectively. Point estimates are obtained from Eq.7 after substituting $\Phi_{c,t} = \widehat{\Phi}_{c,t}$, where $\widehat{\Phi}_{c,t}$ refers to the posterior median estimate of the number of abortions in the respective country-year, and from Eq. 8, after substituting $\Omega_{c,t} = \widehat{\Omega}_{c,t}$, where $\widehat{\Omega}_{c,t}$ refers to the posterior median estimate of the number of unintended births in the respective country-year, such that the aggregate estimates for the number of events in the different world regions add up to the total number of events globally for the respective period. This produces conservative estimates relative to the posterior median.

The point estimates for the number of unintended pregnancies, $\Psi_{\mathcal{R},p}^{(region)}$, and the proportion of unintended pregnancies that end in abortion, $\Upsilon_{\mathcal{R},p}^{(region)}$, are functions of these which account for miscarriages using the formula described earlier:

$$\Psi_{\mathcal{R},p}^{(region)} = 1.1 \cdot \Phi_{\mathcal{R},p}^{(region)} + 1.2 \cdot \Omega_{\mathcal{R},p}^{(region)}, \tag{9}$$

$$\Upsilon_{\mathcal{R},p}^{(region)} = \frac{\Phi_{\mathcal{R},p}^{(region)}}{\Psi_{\mathcal{R},p}^{(region)}}. \tag{10}$$

For the calculation of uncertainty intervals, posterior samples are used: for each sample $j = 1, 2, \ldots, J$

$$\Phi_{\mathcal{R},p}^{(region,j)} = \sum_{c \in \mathcal{R}} \sum_{t^*=t_1[p]}^{t_5[p]} \Phi_{c,t^*}^{(j)}, \tag{11}$$

$$\Omega_{\mathcal{R},p}^{(region,j)} = \sum_{c \in \mathcal{R}} \sum_{t^*=t_1[p]}^{t_5[p]} \Phi_{c,t^*}^{(j)}, \tag{12}$$

$$\Psi_{\mathcal{R},p}^{(region,j)} = 1.2 \cdot \Omega_{\mathcal{R},p}^{(region,j)} + 1.1 \cdot \Phi_{\mathcal{R},p}^{(region,j)}, \tag{13}$$

$$\Upsilon_{\mathcal{R},p}^{(region,j)} = \frac{\Phi_{\mathcal{R},p}^{(region,j)}}{\Psi_{\mathcal{R},p}^{(region,j)}}. \tag{14}$$

and the lower and upper bound for $\Phi_{\mathcal{R},p}^{(region)}$ are given by the highest posterior density intervals of the resulting samples.

Although the subgroups of women were based on estimates for women 15-49, we present rates for women 15-44 to maintain consistency with past estimates of unintended pregnancy and abortion. Rates are reported for 5-year periods and among women aged 15–44, defined as follows:

$$\psi_{\mathcal{R},p}^{(region,15-44)} = \frac{\Psi_{\mathcal{R},p}^{(region)}}{\sum_{c \in \mathcal{R}} \sum_{t^*=t_1[p]}^{t_5[p]} W_{c,t}^{(15-44)}},$$

$$\omega_{\mathcal{R},p}^{(region,15-44)} = \frac{\Omega_{\mathcal{R},p}^{(region)}}{\sum_{c \in \mathcal{R}} \sum_{t^*=t_1[p]}^{t_5[p]} W_{c,t}^{(15-44)}}.$$

where $\Psi_{\mathcal{R},p}^{(region)}$ and $\Omega_{\mathcal{R},p}^{(region)}$ are replaced by point estimates and corresponding bounds to obtain point estimates for rates and corresponding bounds, respectively.

2 Model choice and validation

2.1 Choice of covariates

We performed a number of exploratory exercises to compare models with different combinations of predictors. We used the age structure of the population (the percent of women who were 20-24 years old) as an indicator of their fecundity and coital frequency. Female education (the percent of women aged 15 and over who had completed secondary school) was used as a proxy for the strength of women's motivation to avoid having a child, and their unreported use of fertility control measures such as the rhythm method. Gross domestic product (GDP) per capita was used as an indicator of women's motivation and ability to act on their fertility preferences. We evaluated whether the inclusion of a covariate reduced the unexplained variances in levels among countries and subregions, η_f, reduced the unexplained variances of changes within countries and subregions, υ_f, or affected estimates and uncertainty intervals in plots of predicted unintended pregnancy rates (shown in Section 2.4), and we compared how well the models performed using out-of-sample and in-sample validation exercises (as described in Sections 2.2 and 2.3).

These analyses indicated that the hierarchical time series model without covariates performed well in both sets of validation exercises, and that among the candidate models that included covariates, none meaningfully improved upon the no-covariate model. Moreover, implied associations between unintended pregnancy rates and one of the main predictors used, which was GDP per capita, were in different directions depending on which subgroup rate GDP was used to predict. Lastly, as shown in Figure 1, point estimates and uncertainty intervals for major regions were similar across models. Based on these findings, we chose the no-covariate model as the basis for the model-based estimates.

The next sections provide the results of in-sample and out-of-sample validation exercises for candidate models that informed the model choice decision.

2.2 In-sample validation exercise

Based on the final estimates and all data, we compared (final or data-driven) estimated percentages of births unintended $\psi_{c,t}$ to an alternative set of estimated percentages of births unintended $\widetilde{\psi}_{c,t}$, referred to as "typical-country" percentages. The typical-country percentages of births unintended are obtained by dividing typical-country unintended birth rates by the fertility rate, where the typical-country unintended birth rates for country c are obtained from subgroup rates for a typical country (without data) within region $r[c]$; the typical-subgroup rates represent the subgroup-country-period rates that would be obtained for an additional country in the same region without any data but with the same country-period-specific covariates.

We compared final and typical-country percentages, in country-years with observations, to check whether the typical-country percentages provide unbiased estimates of the final percentages (that are informed by the data) and whether the uncertainty associated with the typical-country rates is sufficiently large to include the final rates for those countries with data. The goal of these comparisons is to assess whether the typical-country rates provide unbiased estimates and an appropriate uncertainty assessment for countries without any data: we cannot carry out such checks for countries without data so we cannot do an exact assessment, but doing the checks for countries with data provides an alternative approximate validation. The validation is only approximate because all data were used to obtain the typical country estimates (but of interest nonetheless because the typical-country estimates are not driven solely by country-specific information) and because we cannot verify whether the subgroup rates of countries without data differ systematically from the subgroup rates of countries with data, within subregions. We address the former limitation in Section 2.3.

There is no difference between coverage of the uncertainty intervals with respect to unintended birth rates or percentages of births unintended, because our model does not incorporate uncertainty associated with the fertility rates, which we take from the UNPD and treat as a fixed quantity. We present relative and absolute errors with respect to the percentages of births unintended because, although the hierarchical structure of the model exchanged information on unintended pregnancy rates, the percentages of births unintended were the unknown quantities to be estimated.

We summarized differences between $\Theta_{c,t}$ and $\widetilde{\Theta}_{c,t}$ at the country and the subregional level. To summarize findings at the country level, we first defined and calculated country-specific "errors" as the average difference between the posterior median outcomes for the two percentages, $e_c = 100/T \sum_{t \in \mathcal{T}} \left(\Theta_{c,t} - \widetilde{\Theta}_{c,t} \right)$ for all years $t \in \mathcal{T}$ for which birth intention was observed in country c, and calculated median (relative/absolute) country-specific errors. We also assessed which fraction of the final proportions of births unintended $\Theta_{c,t}$ were outside the 90% credible intervals constructed from the typical-country proportions; we first calculated the average percentage of point estimates of the final birth intention estimates that fall above/below their respective credible intervals within a country (based on observation years), and then take the median of those percentages across countries. Validation results are presented in Table 2 for various model specifications.

	# of countries	error in percentage ME	MAE	relative error (%) MRE	MARE	outside 90% UI % Below	% Above
No covariates model:							
	104	-0.2	4.0	-0.9	17.3	1.7	1.0
Model in which Gross Domestic Product Affects Subgroup Rates:							
	104	-0.8	3.7	-2.1	16.7	1.3	1.2
Model in which the Proportion of Women with a Secondary Education Affects Subgroup Rates:							
	104	-0.1	3.7	-0.8	16.4	1.2	1.0
Model in which the Proportion of Women 20-24 Affects Subgroup Rates:							
	104	-0.5	4.0	-2.7	15.9	1.7	1.0
Expected/preferred	*Close to zero*					*≤5.0*	

Table 2: Validation results based on comparing typical-country estimates to data-driven estimates, for all countries with data, averaging within countries. The outcome measures are: median error (ME), absolute error (MAE), relative error (MRE) and absolute relative error (MARE) for the percentage of births unintended, as well as the % of final estimates below and above the 90% uncertainty interval (UI) based on the typical-country estimates.

To summarize findings at the subregional level, we calculated subregional unintended pregnancy rates among those countries with birth intention data, hence among a subset of countries. Two sets of "subregional-based-on-countries-with-data" rates were constructed: the first set was based on final country-specific estimates, and the second set was based on typical-country estimates. Hence, the second set can be considered (approximately) as estimates that would have been obtained in the absence of country-specific data. Similarly to the country-level estimates, we then defined and calculated errors as the difference between the two sets of estimates and assessed the coverage of the credible intervals (i.e., the percentage of final subregional estimates that are outside the intervals constructed based on typical-country estimates). Validation results are presented in Table 3.

Comparing results across models in Tables 2 and 3, we note some differences across models but differences are generally small and in different directions. We concluded that there is no model with covariates that shows a clear improvement upon the no-covariate model. Nonetheless, we supplemented these exercises with out-of-sample validation exercises, described in the subsequent subsection.

2.3 Out-of-sample validation exercises

Model performance was also assessed for various models through out-of-sample validation exercises, whereby 20% of the observations were excluded at random. To quantify model performance, we calculated various validation measures based on the excluded observations. The considered measures were based on prediction errors for the percent of births unintended, where a prediction error refers to the difference between the excluded observation and the median of its posterior predictive distribution based on the training set: error $e_i = 100 \cdot (p_i - \tilde{p}_i)$, where $\tilde{p}_i$ denotes the posterior median of the predictive distribution (based on the training set) for the excluded datum on the proportion of births unintended p_i. Relative errors are given by $e_i/\tilde{p}_i$. We also assessed the coverage of 90% prediction intervals (to quantify the calibration of the prediction intervals). Coverage is given by $1/N \sum 1[p_i \geq l_i] \cdot 1[p_i \leq u_i]$, where N denotes the total number of left-out observations considered and l_i and u_i the lower and upper bound of the 90% predictions interval for the i-th excluded observation.

Period	error in percentage		relative error (%)		outside 90% UI	
	ME	MAE	MRE	MARE	% Below	% Above
No covariates model:						
	-0.6	1.5	-1.7	6.0	0.0	0.0
Model in which Gross Domestic Product Affects Subgroup Rates:						
	-0.5	1.3	-2.1	5.2	0.0	0.0
Model in which the Proportion of Women with a Secondary Education Affects Subgroup Rates:						
	-0.6	1.4	-3.6	7.2	0.0	0.0
Model in which the Proportion of Women 20-24 Affects Subgroup Rates:						
	-0.3	0.9	-1.1	5.3	0.0	0.0
Expected/preferred	*Close to zero*				*≤5.0*	

Table 3: Validation results based on comparing typical-subregion estimates to data-driven estimates, based on country estimates for countries with data, summarized by period. The outcome measures are: median error (ME), absolute error (MAE), relative error (MRE) and absolute relative error (MARE) for the percentage of births unintended, as well as the % of final estimates below and above the 90% uncertainty interval (UI) based on typical-subregion estimates.

Validation results for the models average across all countries with data, and are shown in Table 4. Again, differences in model performance are small. We find that the no-covariate model performs satisfactory in this out-of-sample validation exercise. Left-out data fall outside the prediction intervals of the no-covariates model 9.1% of the time. In the models in which covariates predict the subgroup rates, there is no substantive difference.

To assess how confident one can be about the model-based estimates, we also compared the model-based estimates (based on the full data set) to the model-based estimates and uncertainty bounds based on the training set. The goal is to check that additional data does not change the current model-based estimates significantly; if more data becomes available, we expect model-based estimates produced from a larger dataset to lie well within the previously constructed uncertainty intervals. The smaller the proportion of estimates that fall outside their respective uncertainty intervals, the better (contrary to the previously described measure of calibration). Therefore, in Table 5, we compared the model-based estimates from the training set not to the observations, but, to the model-based estimates produced when all data were included in the model. In only 2.2% of cases did the final estimate fall outside the uncertainty intervals from the training set, in the no-covariates model.

	# of	error in percentage		relative error (%)		outside 90% PI	
	observations	ME	MAE	MRE	MARE	% Below	% Above
No covariates model:							
	59	0.5	4.1	1.6	13.4	6.3	2.8
GDP affects Subgroup Rates:							
	59	0.4	4.1	1.3	13.4	6.5	3.1
Model in which the Proportion of Women with a Secondary Education Affects Subgroup Rates:							
	59	0.5	4.0	1.5	13.4	6.4	2.8
Model in which the Proportion of Women 20-24 Affects Subgroup Rates:							
	59	0.5	4.1	1.5	13.5	6.3	3.1
Expected/preferred		*Close to zero*				*≈5.0*	

Table 4: Validation results comparing model-based predictions to the excluded data, when leaving out 20% of birth intention data at random. The outcome measures are: median error (ME), absolute error (MAE), relative error (MRE) and absolute relative error (MARE) for the percentage of births unintended, as well as the % of left-out observations below and above the 90% prediction interval (PI) based on the training set. The results presented are averages over 40 validation runs.

	# of observations	error in percentage ME	MAE	relative error (%) MRE	MARE	outside 90% UI % Below	% Above
No covariates model:							
	59	-0.1	2.2	-0.3	7.3	1.3	0.9
GDP affects Subgroup Rates:							
	59	-0.0	2.2	-0.1	7.3	1.4	1.1
Model in which the Proportion of Women with a Secondary Education Affects Subgroup Rates:							
	59	-0.1	2.2	-0.3	7.3	1.7	0.8
Model in which the Proportion of Women 20-24 Affects Subgroup Rates:							
	59	-0.0	2.2	-0.2	7.2	1.7	0.8
Expected/preferred		*Close to zero*				*≤5.0*	

Table 5: Validation results comparing model-based estimates from the training set and full dataset, when leaving out 20% of birth intention data at random. The outcome measures are: median error (ME), absolute error (MAE), relative error (MRE) and absolute relative error (MARE) for the percentage of births unintended, as well as the % of left-out estimates below and above the 90% uncertainty interval (UI) based on the training set. The results presented are averages over 40 validation runs.

2.3.1 Leave-one-country-out validations

To further quantify the performance of our final model, we also performed leave-one-country-out validations. In these exercises, we re-estimated the model once for each of the countries with survey data on the proportion of births unintended, and, in each of these runs, we excluded all birth intention data from a country. We weighted countries equally, such that countries with multiple data points were not weighted more heavily than countries with one data point. Validation results are presented in Table 6. We found that, in the no-covariates model, the excluded countries fell outside the prediction intervals from the training set 13.8% of the time, and observed no substantial differences between models.

As noted above, in order to assess our confidence in the model-based estimates, we perform validation exercises which compare the model-based estimates from the full dataset to model-based estimates from training sets. Therefore, we also compared the estimated proportions of births unintended from the left-out-country models to the estimates from the model with all the data. Results are presented in Table 7. Treating the "final" estimates as the truth reduces by 43%, from 13.8% to 7.8%, the percent of countries which fell outside the credible intervals, in the no-covariates model.

	error in percentage ME	MAE	relative error (%) MRE	MARE	outside 90% PI % Below	% Above
No covariates model:						
	-0.5	9.8	5.1	35.6	10.3	3.5
GDP affects Subgroup Rates:						
	0.0	10.0	6.7	36.8	10.2	5.5
Model in which the Proportion of Women with a Secondary Education Affects Subgroup Rates:						
	-0.4	9.9	6.1	36.8	10.4	4.8
Model in which the Proportion of Women 20-24 Affects Subgroup Rates:						
	-0.2	9.7	5.7	35.5	9.6	4.4
Expected/preferred	*Close to zero*				*≈5.0*	

Table 6: Validation results comparing model-based predictions to excluded data, from leave-one-country-out validations of the birth intention data. The outcome measures are: median error (ME), absolute error (MAE), relative error (MRE) and absolute relative error (MARE) for the percentage of births unintended, as well as the % of left-out countries below and above the 90% prediction interval (PI) based on the training set. The results presented are averages over 98 validation runs.

	error in percentage		relative error (%)		outside 90% UI	
	ME	MAE	MRE	MARE	% Below	% Above
No covariates model:						
	-0.9	8.2	1.5	28.5	5.6	2.2
GDP affects Subgroup Rates:						
	-0.3	8.3	3.2	29.4	5.1	3.7
Model in which the Proportion of Women with a Secondary Education Affects Subgroup Rates:						
	-0.8	8.3	2.0	29.5	5.6	2.7
Model in which the Proportion of Women 20-24 Affects Subgroup Rates:						
	-0.5	7.9	2.0	27.9	5.1	1.3
Expected/preferred	*Close to zero*				*≤5.0*	

Table 7: Validation results comparing model-based estimates from the training set and full dataset, from leave-one-country-out validations of the birth intention data. The outcome measures are: median error (ME), absolute error (MAE), relative error (MRE) and absolute relative error (MARE) for the unintended pregnancy rate (per 1,000 women aged 15-44), as well as the % of left-out observations below and above the 90% uncertainty interval (UI) based on the training set. The results presented are averages over 98 validation runs.

2.4 Comparison of estimates across candidate models

As a check on the sensitivity of our estimates to the choice of covariates, we also examined how the inclusion covariates affected the estimated unintended pregnancy rates at each time period. Estimates of the four models discussed above are given in Figure 1. The figure indicates that regional results are generally similar in models with and without covariates.

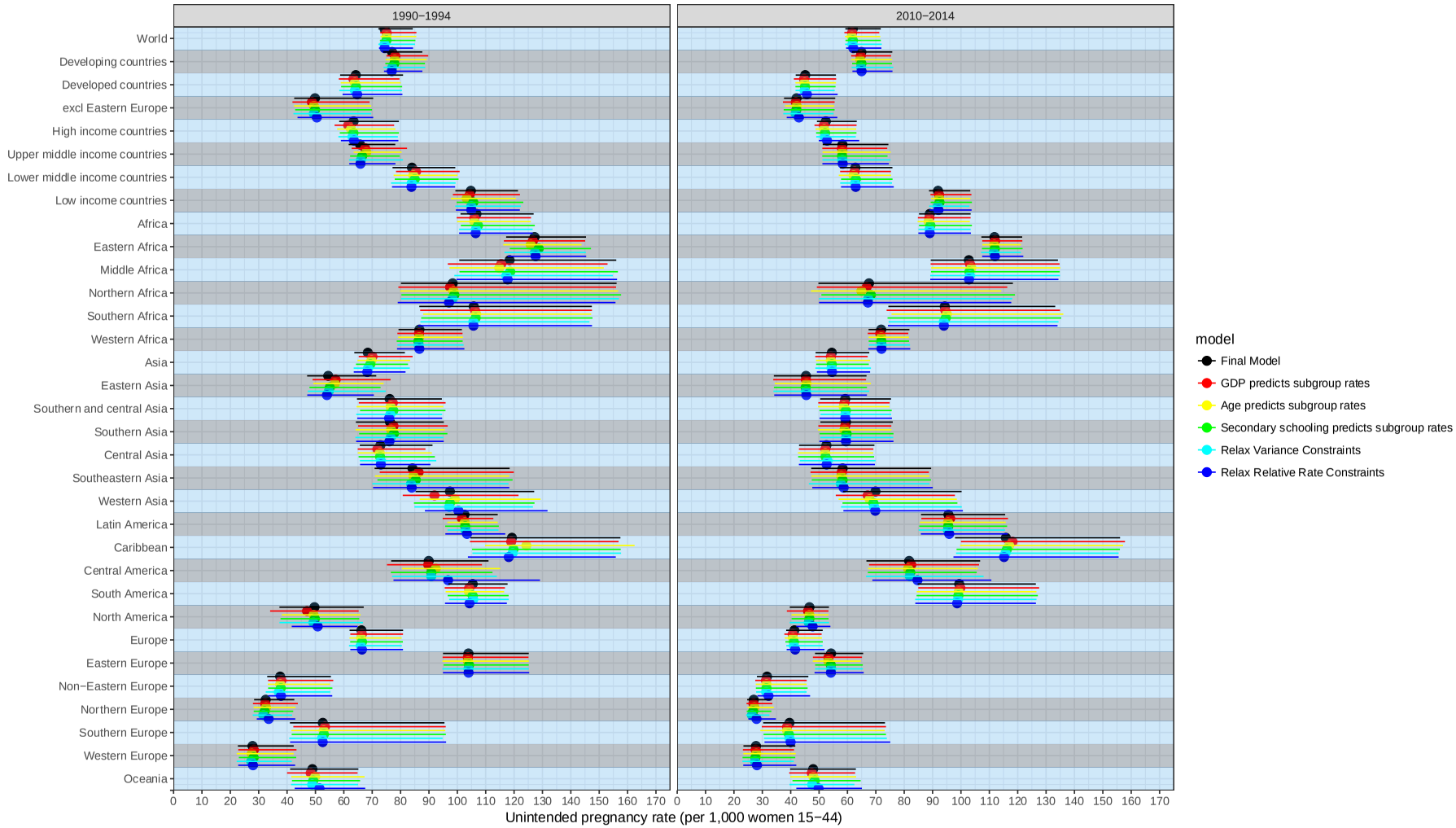

Figure 1: Estimated unintended pregnancy rates in models with and without covariates, for 1990-1994 and 2010-2014.

3 Table of birth and pregnancy intention data

Table 8: Data on the proportions of births and pregnancies unintended, as input into the model.

UNPD Subregion	Country	Years	Representative	Event	Measure	Percent	Reference
Caribbean	Dominican Republic	1991–1991	yes	births	unintended	44.4	DHS micro-data
Caribbean	Dominican Republic	1996–1996	yes	births	unintended	38.8	DHS micro-data
Caribbean	Dominican Republic	1999–1999	yes	births	unintended	50.9	DHS micro-data
Caribbean	Dominican Republic	2002–2002	yes	births	unintended	47.5	DHS micro-data
Caribbean	Dominican Republic	2007–2007	yes	births	unintended	48.2	DHS micro-data
Caribbean	Dominican Republic	2013–2013	yes	births	unintended	52.5	DHS micro-data
Caribbean	Dominican Republic	1991–1991	yes	unintended births	married	51.0–94.3	DHS micro-data
Caribbean	Dominican Republic	1996–1996	yes	unintended births	married	52.7–89.7	DHS micro-data
Caribbean	Dominican Republic	1999–1999	yes	unintended births	married	54.7–85.7	DHS micro-data
Caribbean	Dominican Republic	2002–2002	yes	unintended births	married	45.8–88.9	DHS micro-data
Caribbean	Dominican Republic	2007–2007	yes	unintended births	married	42.1–85.8	DHS micro-data
Caribbean	Dominican Republic	2013–2013	yes	unintended births	married	40.7–78.6	DHS micro-data
Caribbean	Haiti	1994–1995	yes	births	unintended	56.1	DHS micro-data
Caribbean	Haiti	2000–2000	yes	births	unintended	61.9	DHS micro-data
Caribbean	Haiti	2005–2006	yes	births	unintended	54.2	DHS micro-data
Caribbean	Haiti	2012–2012	yes	births	unintended	49.2	DHS micro-data
Caribbean	Haiti	1994–1995	yes	unintended births	married	56.5–96.0	DHS micro-data
Caribbean	Haiti	2000–2000	yes	unintended births	married	53.9–91.0	DHS micro-data
Caribbean	Haiti	2005–2006	yes	unintended births	married	54.9–91.9	DHS micro-data
Caribbean	Haiti	2012–2012	yes	unintended births	married	56.0–82.8	DHS micro-data
Caribbean	Jamaica	1993–1997	yes	births	unintended	64.1	RHS report
Caribbean	Jamaica	1998–2003	yes	births	unintended	60.6	RHS report
Caribbean	Jamaica	2004–2009	yes	births	unintended	47.1	RHS report
Central America	Belize	1990–1991	no	births	unintended	33.2	RHS report
Central America	Belize	1995–1999	yes	births	unintended	25.8	RHS report
Central America	El Salvador	1990–1993	no	births	unintended	14.6	RHS report
Central America	El Salvador	2004–2008	yes	births	unintended	38.6	RHS report
Central America	El Salvador	1998–2003	yes	births	unintended	42.3	RHS report
Central America	El Salvador	1994–1998	yes	births	unintended	35.3	RHS report
Central America	Guatemala	1995–1995	yes	births	unintended	33.0	DHS micro-data
Central America	Guatemala	1998–1999	yes	births	unintended	33.8	DHS micro-data
Central America	Guatemala	2000–2002	yes	births	unintended	31.6	RHS report
Central America	Guatemala	2006–2009	yes	births	unintended	37.6	RHS report
Central America	Guatemala	1995–1995	yes	unintended births	married	79.8–93.6	DHS micro-data

Table 8: Data on the proportions of births and pregnancies unintended, as input into the model.

UNPD Subregion	Country	Years	Representative	Event	Measure	Percent	Reference
Central America	Guatemala	1998–1999	yes	unintended births	married	74.5–90.6	DHS micro-data
Central America	Honduras	2005–2006	yes	births	unintended	50.0	DHS micro-data
Central America	Honduras	2011–2012	yes	births	unintended	42.8	DHS micro-data
Central America	Honduras	1992–1996	yes	births	unintended	35.6	RHS report
Central America	Honduras	1999–2001	yes	births	unintended	49.1	RHS report
Central America	Honduras	2005–2006	yes	unintended births	married	56.0–86.7	DHS micro-data
Central America	Honduras	2011–2012	yes	unintended births	married	48.4–78.7	DHS micro-data
Central America	Nicaragua	1998–1998	yes	births	unintended	36.3	DHS micro-data
Central America	Nicaragua	2001–2001	yes	births	unintended	49.4	DHS micro-data
Central America	Nicaragua	1990–1993	no	births	unintended	14.7	RHS report
Central America	Nicaragua	2002–2007	yes	births	unintended	36.7	RHS report
Central America	Nicaragua	1998–1998	yes	unintended births	married	51.7–96.3	DHS micro-data
Central America	Nicaragua	2001–2001	yes	unintended births	married	53.0–88.4	DHS micro-data
Eastern Africa	Burundi	2010–2010	yes	births	unintended	36.7	DHS micro-data
Eastern Africa	Burundi	2010–2010	yes	unintended births	married	82.1–93.1	DHS micro-data
Eastern Africa	Comoros	1996–1996	yes	births	unintended	57.8	DHS micro-data
Eastern Africa	Comoros	2012–2012	yes	births	unintended	38.7	DHS micro-data
Eastern Africa	Comoros	1996–1996	yes	unintended births	married	66.9–96.2	DHS micro-data
Eastern Africa	Comoros	2012–2012	yes	unintended births	married	72.6–97.2	DHS micro-data
Eastern Africa	Eritrea	1993–1996	yes	births	unintended	18.5	DHS report
Eastern Africa	Eritrea	1998–2002	yes	births	unintended	25.6	DHS report
Eastern Africa	Ethiopia	2000–2000	yes	births	unintended	41.2	DHS micro-data
Eastern Africa	Ethiopia	2005–2005	yes	births	unintended	41.1	DHS micro-data
Eastern Africa	Ethiopia	2011–2011	yes	births	unintended	34.6	DHS micro-data
Eastern Africa	Ethiopia	2000–2000	yes	unintended births	married	64.7–96.3	DHS micro-data
Eastern Africa	Ethiopia	2005–2005	yes	unintended births	married	75.6–97.5	DHS micro-data
Eastern Africa	Ethiopia	2011–2011	yes	unintended births	married	72.8–95.6	DHS micro-data
Eastern Africa	Kenya	1993–1993	yes	births	unintended	57.5	DHS micro-data
Eastern Africa	Kenya	1998–1998	yes	births	unintended	51.2	DHS micro-data
Eastern Africa	Kenya	2003–2003	yes	births	unintended	49.9	DHS micro-data
Eastern Africa	Kenya	2008–2009	yes	births	unintended	48.6	DHS micro-data
Eastern Africa	Kenya	2014–2014	yes	births	unintended	41.0	DHS micro-data
Eastern Africa	Kenya	1993–1993	yes	unintended births	married	70.7–80.8	DHS micro-data
Eastern Africa	Kenya	1998–1998	yes	unintended births	married	69.2–78.2	DHS micro-data
Eastern Africa	Kenya	2003–2003	yes	unintended births	married	67.7–79.7	DHS micro-data
Eastern Africa	Kenya	2008–2009	yes	unintended births	married	63.8–76.2	DHS micro-data
Eastern Africa	Kenya	2014–2014	yes	unintended births	married	58.6–71.8	DHS micro-data

Table 8: Data on the proportions of births and pregnancies unintended, as input into the model.

UNPD Subregion	Country	Years	Representative	Event	Measure	Percent	Reference
Eastern Africa	Madagascar	2004–2004	yes	births	unintended	18.5	DHS micro-data
Eastern Africa	Madagascar	1992–1992	yes	births	unintended	27.8	DHS micro-data
Eastern Africa	Madagascar	1997–1997	yes	births	unintended	29.1	DHS micro-data
Eastern Africa	Madagascar	2008–2009	yes	births	unintended	15.7	DHS micro-data
Eastern Africa	Madagascar	2004–2004	yes	unintended births	married	56.1–84.7	DHS micro-data
Eastern Africa	Madagascar	1992–1992	yes	unintended births	married	55.0–86.5	DHS micro-data
Eastern Africa	Madagascar	1997–1997	yes	unintended births	married	57.3–86.3	DHS micro-data
Eastern Africa	Madagascar	2008–2009	yes	unintended births	married	55.9–83.8	DHS micro-data
Eastern Africa	Malawi	1992–1992	yes	births	unintended	44.5	DHS micro-data
Eastern Africa	Malawi	2000–2000	yes	births	unintended	47.7	DHS micro-data
Eastern Africa	Malawi	2004–2004	yes	births	unintended	46.8	DHS micro-data
Eastern Africa	Malawi	2010–2010	yes	births	unintended	47.9	DHS micro-data
Eastern Africa	Malawi	1992–1992	yes	unintended births	married	60.4–88.6	DHS micro-data
Eastern Africa	Malawi	2000–2000	yes	unintended births	married	64.4–88.6	DHS micro-data
Eastern Africa	Malawi	2004–2004	yes	unintended births	married	63.9–89.5	DHS micro-data
Eastern Africa	Malawi	2010–2010	yes	unintended births	married	63.0–89.5	DHS micro-data
Eastern Africa	Mozambique	1997–1997	yes	births	unintended	22.3	DHS micro-data
Eastern Africa	Mozambique	2003–2003	yes	births	unintended	23.5	DHS micro-data
Eastern Africa	Mozambique	2011–2011	yes	births	unintended	17.0	DHS micro-data
Eastern Africa	Mozambique	1997–1997	yes	unintended births	married	56.6–81.7	DHS micro-data
Eastern Africa	Mozambique	2003–2003	yes	unintended births	married	51.6–79.3	DHS micro-data
Eastern Africa	Mozambique	2011–2011	yes	unintended births	married	55.7–75.1	DHS micro-data
Eastern Africa	Rwanda	1992–1992	yes	births	unintended	53.0	DHS micro-data
Eastern Africa	Rwanda	2000–2000	yes	births	unintended	37.4	DHS micro-data
Eastern Africa	Rwanda	2005–2005	yes	births	unintended	47.2	DHS micro-data
Eastern Africa	Rwanda	2007–2008	yes	births	unintended	43.7	DHS micro-data
Eastern Africa	Rwanda	2010–2010	yes	births	unintended	43.1	DHS micro-data
Eastern Africa	Rwanda	2014–2015	yes	births	unintended	41.3	DHS micro-data
Eastern Africa	Rwanda	1992–1992	yes	unintended births	married	77.2–92.9	DHS micro-data
Eastern Africa	Rwanda	2000–2000	yes	unintended births	married	74.6–94.1	DHS micro-data
Eastern Africa	Rwanda	2005–2005	yes	unintended births	married	73.3–91.4	DHS micro-data
Eastern Africa	Rwanda	2010–2010	yes	unintended births	married	64.9–81.6	DHS micro-data
Eastern Africa	Rwanda	2014–2015	yes	unintended births	married	60.6–75.2	DHS micro-data
Eastern Africa	Tanzania	1991–1992	yes	births	unintended	28.9	DHS micro-data
Eastern Africa	Tanzania	1996–1996	yes	births	unintended	26.7	DHS micro-data
Eastern Africa	Tanzania	1999–1999	yes	births	unintended	28.3	DHS micro-data
Eastern Africa	Tanzania	2004–2005	yes	births	unintended	28.0	DHS micro-data

Table 8: Data on the proportions of births and pregnancies unintended, as input into the model.

UNPD Subregion	Country	Years	Representative	Event	Measure	Percent	Reference
Eastern Africa	Tanzania	2010–2010	yes	births	unintended	30.9	DHS micro-data
Eastern Africa	Tanzania	1991–1992	yes	unintended births	married	60.8–85.2	DHS micro-data
Eastern Africa	Tanzania	1996–1996	yes	unintended births	married	64.2–84.1	DHS micro-data
Eastern Africa	Tanzania	1999–1999	yes	unintended births	married	56.8–82.9	DHS micro-data
Eastern Africa	Tanzania	2004–2005	yes	unintended births	married	65.3–84.4	DHS micro-data
Eastern Africa	Tanzania	2010–2010	yes	unintended births	married	59.0–80.6	DHS micro-data
Eastern Africa	Uganda	1996–1996	yes	births	unintended	32.7	DHS micro-data
Eastern Africa	Uganda	2000–2001	yes	births	unintended	48.2	DHS micro-data
Eastern Africa	Uganda	2006–2006	yes	births	unintended	54.3	DHS micro-data
Eastern Africa	Uganda	2011–2011	yes	births	unintended	52.0	DHS micro-data
Eastern Africa	Uganda	1996–1996	yes	unintended births	married	65.7–87.7	DHS micro-data
Eastern Africa	Uganda	2000–2001	yes	unintended births	married	65.4–89.7	DHS micro-data
Eastern Africa	Uganda	2006–2006	yes	unintended births	married	66.4–88.8	DHS micro-data
Eastern Africa	Uganda	2011–2011	yes	unintended births	married	63.8–86.8	DHS micro-data
Eastern Africa	Zambia	1992–1992	yes	births	unintended	39.0	DHS micro-data
Eastern Africa	Zambia	1996–1996	yes	births	unintended	42.0	DHS micro-data
Eastern Africa	Zambia	2001–2002	yes	births	unintended	47.8	DHS micro-data
Eastern Africa	Zambia	2007–2007	yes	births	unintended	49.0	DHS micro-data
Eastern Africa	Zambia	2013–2014	yes	births	unintended	44.0	DHS micro-data
Eastern Africa	Zambia	1992–1992	yes	unintended births	married	61.0–82.2	DHS micro-data
Eastern Africa	Zambia	1996–1996	yes	unintended births	married	66.5–84.7	DHS micro-data
Eastern Africa	Zambia	2001–2002	yes	unintended births	married	61.4–81.0	DHS micro-data
Eastern Africa	Zambia	2007–2007	yes	unintended births	married	61.6–80.6	DHS micro-data
Eastern Africa	Zambia	2013–2014	yes	unintended births	married	55.0–73.6	DHS micro-data
Eastern Africa	Zimbabwe	1994–1994	yes	births	unintended	46.2	DHS micro-data
Eastern Africa	Zimbabwe	1999–1999	yes	births	unintended	39.8	DHS micro-data
Eastern Africa	Zimbabwe	2005–2006	yes	births	unintended	33.4	DHS micro-data
Eastern Africa	Zimbabwe	2010–2011	yes	births	unintended	35.7	DHS micro-data
Eastern Africa	Zimbabwe	1994–1994	yes	unintended births	married	64.2–83.3	DHS micro-data
Eastern Africa	Zimbabwe	1999–1999	yes	unintended births	married	54.4–70.9	DHS micro-data
Eastern Africa	Zimbabwe	2005–2006	yes	unintended births	married	55.9–74.4	DHS micro-data
Eastern Africa	Zimbabwe	2010–2011	yes	unintended births	married	54.8–76.1	DHS micro-data
Eastern Asia	Japan	1997–1997	no	births	unintended	41.8	Iwasawa 2001
Eastern Asia	Japan	1997–1997	no	births	unmet	13.2	Iwasawa 2001
Eastern Asia	Japan	1997–1997	no	births	users	28.6	Iwasawa 2001
Eastern Asia	Republic of Korea	2004–2004	no	births	unintended	48.0	Han et al. 2005
Eastern Europe	Czech Republic	1990–1993	yes	births	unintended	12.7	RHS report

Table 8: Data on the proportions of births and pregnancies unintended, as input into the model.

UNPD Subregion	Country	Years	Representative	Event	Measure	Percent	Reference
Eastern Europe	Republic of Moldova	2005–2005	yes	births	unintended	19.3	DHS micro-data
Eastern Europe	Republic of Moldova	1993–1997	yes	births	unintended	12.5	RHS report
Eastern Europe	Republic of Moldova	2005–2005	yes	unintended births	married	80.6–91.8	DHS micro-data
Eastern Europe	Romania	2002–2004	yes	births	unintended	26.9	RHS report
Eastern Europe	Romania	1990–1993	no	births	unintended	16.9	RHS report
Eastern Europe	Romania	1995–1999	yes	births	unintended	11.8	RHS report
Eastern Europe	Russian Federation	2007–2011	yes	births	unintended	16.2	RHS report
Eastern Europe	Russian Federation	1992–1996	no	births	unintended	10.3	RHS report
Eastern Europe	Russian Federation	1992–1996	no	births	unintended	8.6	RHS report
Eastern Europe	Russian Federation	1992–1996	no	births	unintended	10.0	RHS report
Eastern Europe	Ukraine	2007–2007	yes	births	unintended	13.8	DHS micro-data
Eastern Europe	Ukraine	1995–1999	yes	births	unintended	17.6	RHS report
Eastern Europe	Ukraine	2007–2007	yes	unintended births	married	55.1–72.2	DHS micro-data
Middle Africa	Cameroon	1991–1991	yes	births	unintended	24.3	DHS micro-data
Middle Africa	Cameroon	1998–1998	yes	births	unintended	27.7	DHS micro-data
Middle Africa	Cameroon	2004–2004	yes	births	unintended	26.0	DHS micro-data
Middle Africa	Cameroon	2011–2011	yes	births	unintended	28.9	DHS micro-data
Middle Africa	Cameroon	1991–1991	yes	unintended births	married	63.8–80.7	DHS micro-data
Middle Africa	Cameroon	1998–1998	yes	unintended births	married	62.9–85.1	DHS micro-data
Middle Africa	Cameroon	2004–2004	yes	unintended births	married	58.9–79.0	DHS micro-data
Middle Africa	Cameroon	2011–2011	yes	unintended births	married	61.1–80.9	DHS micro-data
Middle Africa	Central African Republic	1994–1995	yes	births	unintended	24.8	DHS micro-data
Middle Africa	Central African Republic	1994–1995	yes	unintended births	married	54.0–87.5	DHS micro-data
Middle Africa	Chad	1996–1996	yes	births	unintended	10.7	DHS micro-data
Middle Africa	Chad	2004–2004	yes	births	unintended	19.6	DHS micro-data
Middle Africa	Chad	2014–2015	yes	births	unintended	14.0	DHS micro-data
Middle Africa	Chad	1996–1996	yes	unintended births	married	78.9–96.2	DHS micro-data
Middle Africa	Chad	2004–2004	yes	unintended births	married	81.6–95.9	DHS micro-data
Middle Africa	Chad	2014–2015	yes	unintended births	married	80.2–91.4	DHS micro-data
Middle Africa	Congo	2007–2007	yes	births	unintended	35.7	DHS micro-data
Middle Africa	Congo	2013–2014	yes	births	unintended	35.9	DHS micro-data
Middle Africa	Congo	2007–2007	yes	unintended births	married	66.8–88.6	DHS micro-data
Middle Africa	Congo	2013–2014	yes	unintended births	married	63.3–82.9	DHS micro-data
Middle Africa	Congo	2005–2005	yes	births	unintended	38.5	DHS micro-data
Middle Africa	Congo	2011–2012	yes	births	unintended	32.5	DHS micro-data
Middle Africa	Congo	2005–2005	yes	unintended births	married	47.7–70.0	DHS micro-data
Middle Africa	Congo	2011–2012	yes	unintended births	married	46.7–74.9	DHS micro-data

Table 8: Data on the proportions of births and pregnancies unintended, as input into the model.

UNPD Subregion	Country	Years	Representative	Event	Measure	Percent	Reference
Middle Africa	Gabon	2000–2000	yes	births	unintended	52.5	DHS micro-data
Middle Africa	Gabon	2012–2012	yes	births	unintended	43.9	DHS micro-data
Middle Africa	Gabon	2000–2000	yes	unintended births	married	43.2–68.4	DHS micro-data
Middle Africa	Gabon	2012–2012	yes	unintended births	married	40.8–61.1	DHS micro-data
Middle Africa	Sao Tome and Principe	2008–2009	yes	births	unintended	51.4	DHS micro-data
Middle Africa	Sao Tome and Principe	2008–2009	yes	unintended births	married	50.0–87.9	DHS micro-data
Northern Africa	Egypt	1992–1992	yes	births	unintended	37.8	DHS micro-data
Northern Africa	Egypt	1995–1995	yes	births	unintended	32.6	DHS micro-data
Northern Africa	Egypt	2000–2000	yes	births	unintended	18.0	DHS micro-data
Northern Africa	Egypt	2005–2005	yes	births	unintended	19.6	DHS micro-data
Northern Africa	Egypt	2008–2008	yes	births	unintended	14.1	DHS micro-data
Northern Africa	Egypt	2014–2014	yes	births	unintended	17.2	DHS micro-data
Northern Africa	Egypt	1992–1992	yes	unintended births	married	93.7–99.7	DHS micro-data
Northern Africa	Egypt	1995–1995	yes	unintended births	married	95.0–99.6	DHS micro-data
Northern Africa	Egypt	2000–2000	yes	unintended births	married	92.6–99.1	DHS micro-data
Northern Africa	Egypt	2005–2005	yes	unintended births	married	94.8–98.0	DHS micro-data
Northern Africa	Egypt	2008–2008	yes	unintended births	married	96.5–98.4	DHS micro-data
Northern Africa	Egypt	2014–2014	yes	unintended births	married	93.4–98.3	DHS micro-data
Northern Africa	Morocco	1992–1992	yes	births	unintended	34.6	DHS micro-data
Northern Africa	Morocco	2003–2004	yes	births	unintended	31.5	DHS micro-data
Northern Africa	Morocco	1992–1992	yes	unintended births	married	90.7–98.9	DHS micro-data
Northern Africa	Morocco	2003–2004	yes	unintended births	married	92.2–98.8	DHS micro-data
Northern Africa	Sudan	1990–1990	yes	births	unintended	25.8	DHS report
Northern America	United States	1998–2002	yes	births	unintended	34.9	National Survey for Family Growth
Northern America	United States	2002–2010	yes	births	unintended	39.3	National Survey for Family Growth
Northern America	United States	2007–2013	yes	births	unintended	34.2	National Survey for Family Growth
Northern America	United States	2007–2013	yes	unintended births	married	66.0	National Survey for Family Growth
Northern Europe	Denmark	2008–2010	no	births	unintended	12.9	Lukasse et al. 2015
Northern Europe	Denmark	2012–2012	no	pregnancies	unintended	2.0–23.0	Backhausen et al. 2014
Northern Europe	Estonia	2008–2010	no	births	unintended	22.8	Lukasse et al. 2015
Northern Europe	Norway	2008–2010	no	births	unintended	21.1	Lukasse et al. 2015
Northern Europe	Sweden	2008–2010	no	births	unintended	23.2	Lukasse et al. 2015
Northern Europe	Sweden	2010–2010	no	pregnancies	unintended	10.0–24.8	Tyden et al. 2011
Northern Europe	Sweden	2012–2013	no	pregnancies	unintended	12.0–26.0	Stern et al. 2016
Northern Europe	United Kingdom	2010–2012	yes	births	unintended	5.7–33.7	Wellings et al. 2013
Oceania	Australia	2006–2008	yes	births	unintended	32.9	Melbourne Institute 2008
Oceania	Australia	2003–2005	yes	births	unintended	32.5	Melbourne Institute 2005

Table 8: Data on the proportions of births and pregnancies unintended, as input into the model.

UNPD Subregion	Country	Years	Representative	Event	Measure	Percent	Reference
Oceania	Australia	2011–2011	no	pregnancies	unintended	2.4–32.4	Rassi et al. 2013
Oceania	Samoa	2005–2009	yes	births	unintended	14.9	DHS report
Oceania	Solomon Islands	2002–2007	yes	births	unintended	57.6	DHS report
Oceania	Vanuatu	2009–2013	yes	births	unintended	29.3	DHS report
South America	Bolivia	1994–1994	yes	births	unintended	55.6	DHS micro-data
South America	Bolivia	1998–1998	yes	births	unintended	54.4	DHS micro-data
South America	Bolivia	2003–2003	yes	births	unintended	63.7	DHS micro-data
South America	Bolivia	2008–2008	yes	births	unintended	63.1	DHS micro-data
South America	Bolivia	1994–1994	yes	unintended births	married	81.0–89.3	DHS micro-data
South America	Bolivia	1998–1998	yes	unintended births	married	75.2–87.4	DHS micro-data
South America	Bolivia	2003–2003	yes	unintended births	married	72.2–83.0	DHS micro-data
South America	Bolivia	2008–2008	yes	unintended births	married	70.0–81.1	DHS micro-data
South America	Brazil	1996–1996	yes	births	unintended	51.7	DHS micro-data
South America	Brazil	2002–2007	yes	births	unintended	45.9	DHS report
South America	Brazil	1996–1996	yes	unintended births	married	56.2–75.1	DHS micro-data
South America	Colombia	1990–1990	yes	births	unintended	39.2	DHS micro-data
South America	Colombia	1995–1995	yes	births	unintended	48.7	DHS micro-data
South America	Colombia	2000–2000	yes	births	unintended	57.0	DHS micro-data
South America	Colombia	2005–2005	yes	births	unintended	56.0	DHS micro-data
South America	Colombia	2010–2010	yes	births	unintended	52.9	DHS micro-data
South America	Colombia	1990–1990	yes	unintended births	married	66.4–84.8	DHS micro-data
South America	Colombia	1995–1995	yes	unintended births	married	58.2–80.3	DHS micro-data
South America	Colombia	2000–2000	yes	unintended births	married	49.9–69.3	DHS micro-data
South America	Colombia	2005–2005	yes	unintended births	married	44.8–71.7	DHS micro-data
South America	Colombia	2010–2010	yes	unintended births	married	40.0–65.8	DHS micro-data
South America	Ecuador	1990–1994	no	births	unintended	35.6	RHS report
South America	Ecuador	2000–2004	yes	births	unintended	36.3	RHS report
South America	Ecuador	1995–1999	yes	births	unintended	37.5	RHS report
South America	Guyana	2009–2009	yes	births	unintended	42.1	DHS micro-data
South America	Guyana	2009–2009	yes	unintended births	married	55.8–73.8	DHS micro-data
South America	Paraguay	1990–1990	yes	births	unintended	25.4	DHS micro-data
South America	Paraguay	1996–1998	yes	births	unintended	18.1	RHS report
South America	Paraguay	2004–2008	yes	births	unintended	30.9	RHS report
South America	Paraguay	2000–2004	yes	births	unintended	27.9	RHS report
South America	Paraguay	1991–1996	yes	births	unintended	21.3	RHS report
South America	Paraguay	1990–1990	yes	unintended births	married	74.8–86.1	DHS micro-data
South America	Peru	1991–1992	yes	births	unintended	59.8	DHS micro-data

Table 8: Data on the proportions of births and pregnancies unintended, as input into the model.

UNPD Subregion	Country	Years	Representative	Event	Measure	Percent	Reference
South America	Peru	1996–1996	yes	births	unintended	59.4	DHS micro-data
South America	Peru	2000–2000	yes	births	unintended	56.2	DHS micro-data
South America	Peru	2004–2004	yes	births	unintended	56.6	DHS micro-data
South America	Peru	2009–2009	yes	births	unintended	55.0	DHS micro-data
South America	Peru	2010–2010	yes	births	unintended	58.6	DHS micro-data
South America	Peru	2011–2011	yes	births	unintended	58.1	DHS micro-data
South America	Peru	2012–2012	yes	births	unintended	56.2	DHS micro-data
South America	Peru	2014–2014	yes	births	unintended	55.1	DHS micro-data
South America	Peru	1991–1992	yes	unintended births	married	74.1–86.5	DHS micro-data
South America	Peru	1996–1996	yes	unintended births	married	75.4–85.7	DHS micro-data
South America	Peru	2000–2000	yes	unintended births	married	66.2–78.3	DHS micro-data
South America	Peru	2004–2004	yes	unintended births	married	64.2–77.1	DHS micro-data
South America	Peru	2009–2009	yes	unintended births	married	69.7–73.7	DHS micro-data
South America	Peru	2010–2010	yes	unintended births	married	61.0–74.4	DHS micro-data
South America	Peru	2011–2011	yes	unintended births	married	62.9–76.4	DHS micro-data
South America	Peru	2012–2012	yes	unintended births	married	60.5–72.7	DHS micro-data
South America	Peru	2014–2014	yes	unintended births	married	58.4–72.5	DHS micro-data
South and central Asia	Bangladesh	1993–1994	no	births	unintended	33.8	DHS micro-data
South and central Asia	Bangladesh	1996–1997	no	births	unintended	31.3	DHS micro-data
South and central Asia	Bangladesh	1999–2000	no	births	unintended	34.0	DHS micro-data
South and central Asia	Bangladesh	2004–2004	no	births	unintended	32.2	DHS micro-data
South and central Asia	Bangladesh	2007–2007	no	births	unintended	30.3	DHS micro-data
South and central Asia	Bangladesh	2011–2011	no	births	unintended	29.7	DHS micro-data
South and central Asia	Bangladesh	2014–2014	no	births	unintended	24.1	DHS micro-data
South and central Asia	India	1992–1993	no	births	unintended	24.0	DHS micro-data
South and central Asia	India	1998–1999	no	births	unintended	21.6	DHS micro-data
South and central Asia	India	2005–2006	yes	births	unintended	21.8	DHS micro-data
South and central Asia	India	2005–2006	yes	unintended births	married	95.1–98.1	DHS micro-data
South and central Asia	Iran	2009–2009	no	pregnancies	unintended	20.8	Erfani 2013
South and central Asia	Iran	2000–2000	no	pregnancies	unintended	32.3	Erfani 2013
South and central Asia	Iran	2005–2009	no	pregnancies	unintended	24.1	Erfani 2013
South and central Asia	Iran	2013–2014	no	births	unintended	11.1–33.7	Roshanaei et al. 2015
South and central Asia	Iran	2005–2009	no	pregnancies	users	68.3	Erfani 2013
South and central Asia	Kazakhstan	1999–1999	yes	births	unintended	20.5	DHS micro-data
South and central Asia	Kazakhstan	1995–1995	yes	births	unintended	17.9	DHS micro-data
South and central Asia	Kazakhstan	1999–1999	yes	unintended births	married	94.4–97.6	DHS micro-data
South and central Asia	Kazakhstan	1995–1995	yes	unintended births	married	79.2–91.6	DHS micro-data

Table 8: Data on the proportions of births and pregnancies unintended, as input into the model.

UNPD Subregion	Country	Years	Representative	Event	Measure	Percent	Reference
South and central Asia	Kyrgyzstan	1997–1997	yes	births	unintended	14.1	DHS micro-data
South and central Asia	Kyrgyzstan	2012–2012	yes	births	unintended	3.7	DHS micro-data
South and central Asia	Kyrgyzstan	1997–1997	yes	unintended births	married	94.4–98.1	DHS micro-data
South and central Asia	Kyrgyzstan	2012–2012	yes	unintended births	married	92.3–100	DHS micro-data
South and central Asia	Maldives	2009–2009	yes	births	unintended	23.5	DHS micro-data
South and central Asia	Maldives	2009–2009	yes	unintended births	married	72.3–96.5	DHS micro-data
South and central Asia	Nepal	1996–1996	yes	births	unintended	39.8	DHS micro-data
South and central Asia	Nepal	2001–2001	yes	births	unintended	40.2	DHS micro-data
South and central Asia	Nepal	2006–2006	yes	births	unintended	35.9	DHS micro-data
South and central Asia	Nepal	2011–2011	yes	births	unintended	29.0	DHS micro-data
South and central Asia	Nepal	1996–1996	yes	unintended births	married	90.7–99.1	DHS micro-data
South and central Asia	Nepal	2001–2001	yes	unintended births	married	91.1–98.6	DHS micro-data
South and central Asia	Nepal	2006–2006	yes	unintended births	married	88.8–94.8	DHS micro-data
South and central Asia	Nepal	2011–2011	yes	unintended births	married	88.4–95.7	DHS micro-data
South and central Asia	Pakistan	1990–1991	yes	births	unintended	21.3	DHS micro-data
South and central Asia	Pakistan	2006–2007	yes	births	unintended	26.8	DHS micro-data
South and central Asia	Pakistan	2012–2013	yes	births	unintended	18.9	DHS micro-data
South and central Asia	Pakistan	1990–1991	yes	unintended births	married	98.2–99.9	DHS micro-data
South and central Asia	Pakistan	2006–2007	yes	unintended births	married	98.3–99.3	DHS micro-data
South and central Asia	Pakistan	2012–2013	yes	unintended births	married	98.4–100	DHS micro-data
South and central Asia	Sri Lanka	2002–2007	yes	births	unintended	17.3	DHS report
South and central Asia	Tajikistan	2012–2012	yes	births	unintended	5.6	DHS micro-data
South and central Asia	Tajikistan	2012–2012	yes	unintended births	married	93.0–99.3	DHS micro-data
South and central Asia	Turkmenistan	1996–2000	yes	births	unintended	3.5	DHS report
South and central Asia	Uzbekistan	1996–1996	yes	births	unintended	4.9	DHS micro-data
South and central Asia	Uzbekistan	1996–1996	yes	unintended births	married	100	DHS micro-data
South-Eastern Asia	Cambodia	2000–2000	yes	births	unintended	35.5	DHS micro-data
South-Eastern Asia	Cambodia	2005–2005	yes	births	unintended	30.0	DHS micro-data
South-Eastern Asia	Cambodia	2010–2010	yes	births	unintended	16.6	DHS micro-data
South-Eastern Asia	Cambodia	2014–2014	yes	births	unintended	17.8	DHS micro-data
South-Eastern Asia	Cambodia	2000–2000	yes	unintended births	married	89.3–98.8	DHS micro-data
South-Eastern Asia	Cambodia	2005–2005	yes	unintended births	married	87.8–98.5	DHS micro-data
South-Eastern Asia	Cambodia	2010–2010	yes	unintended births	married	88.1–97.4	DHS micro-data
South-Eastern Asia	Cambodia	2014–2014	yes	unintended births	married	82.2–94.2	DHS micro-data
South-Eastern Asia	Indonesia	1991–1991	no	births	unintended	23.5	DHS micro-data
South-Eastern Asia	Indonesia	1994–1994	no	births	unintended	19.4	DHS micro-data
South-Eastern Asia	Indonesia	1997–1997	no	births	unintended	17.9	DHS micro-data

Table 8: Data on the proportions of births and pregnancies unintended, as input into the model.

UNPD Subregion	Country	Years	Representative	Event	Measure	Percent	Reference
South-Eastern Asia	Indonesia	2002–2003	no	births	unintended	17.1	DHS micro-data
South-Eastern Asia	Indonesia	2007–2007	no	births	unintended	20.7	DHS micro-data
South-Eastern Asia	Indonesia	2012–2012	yes	births	unintended	15.1	DHS micro-data
South-Eastern Asia	Indonesia	2012–2012	yes	unintended births	married	85.6–94.3	DHS micro-data
South-Eastern Asia	Philippines	1993–1993	yes	births	unintended	50.5	DHS micro-data
South-Eastern Asia	Philippines	1998–1998	yes	births	unintended	51.1	DHS micro-data
South-Eastern Asia	Philippines	2003–2003	yes	births	unintended	50.0	DHS micro-data
South-Eastern Asia	Philippines	2008–2008	yes	births	unintended	40.7	DHS micro-data
South-Eastern Asia	Philippines	2013–2013	yes	births	unintended	35.1	DHS micro-data
South-Eastern Asia	Philippines	1993–1993	yes	unintended births	married	89.0–94.8	DHS micro-data
South-Eastern Asia	Philippines	1998–1998	yes	unintended births	married	87.7–93.2	DHS micro-data
South-Eastern Asia	Philippines	2003–2003	yes	unintended births	married	81.4–89.0	DHS micro-data
South-Eastern Asia	Philippines	2008–2008	yes	unintended births	married	76.2–86.7	DHS micro-data
South-Eastern Asia	Philippines	2013–2013	yes	unintended births	married	66.3–79.5	DHS micro-data
South-Eastern Asia	Timor-Leste	2009–2010	yes	births	unintended	16.6	DHS micro-data
South-Eastern Asia	Timor-Leste	2009–2010	yes	unintended births	married	94.4–97.5	DHS micro-data
South-Eastern Asia	Vietnam	1997–1997	yes	births	unintended	25.9	DHS micro-data
South-Eastern Asia	Vietnam	2002–2002	yes	births	unintended	24.9	DHS micro-data
South-Eastern Asia	Vietnam	1997–1997	yes	unintended births	married	93.7–96.6	DHS micro-data
South-Eastern Asia	Vietnam	2002–2002	yes	unintended births	married	87.7–92.0	DHS micro-data
Southern Africa	Lesotho	2004–2004	yes	births	unintended	56.5	DHS micro-data
Southern Africa	Lesotho	2009–2009	yes	births	unintended	59.1	DHS micro-data
Southern Africa	Lesotho	2014–2014	yes	births	unintended	49.2	DHS micro-data
Southern Africa	Lesotho	2004–2004	yes	unintended births	married	52.7–66.6	DHS micro-data
Southern Africa	Lesotho	2009–2009	yes	unintended births	married	58.5–65.9	DHS micro-data
Southern Africa	Lesotho	2014–2014	yes	unintended births	married	49.9–60.4	DHS micro-data
Southern Africa	Namibia	1992–1992	yes	births	unintended	38.2	DHS micro-data
Southern Africa	Namibia	2000–2000	yes	births	unintended	50.2	DHS micro-data
Southern Africa	Namibia	2006–2007	yes	births	unintended	56.3	DHS micro-data
Southern Africa	Namibia	2013–2013	yes	births	unintended	54.5	DHS micro-data
Southern Africa	Namibia	1992–1992	yes	unintended births	married	27.3–38.3	DHS micro-data
Southern Africa	Namibia	2000–2000	yes	unintended births	married	25.7–38.4	DHS micro-data
Southern Africa	Namibia	2006–2007	yes	unintended births	married	29.4–39.1	DHS micro-data
Southern Africa	Namibia	2013–2013	yes	unintended births	married	25.9–29.8	DHS micro-data
Southern Africa	South Africa	1998–1998	yes	births	unintended	55.8	DHS micro-data
Southern Africa	South Africa	1999–2004	yes	births	unintended	48.6	DHS report
Southern Africa	South Africa	1998–1998	yes	unintended births	married	32.5–40.1	DHS micro-data

Table 8: Data on the proportions of births and pregnancies unintended, as input into the model.

UNPD Subregion	Country	Years	Representative	Event	Measure	Percent	Reference
Southern Africa	Swaziland	2006–2007	yes	births	unintended	71.5	DHS micro-data
Southern Europe	Albania	2008–2009	yes	births	unintended	13.4	DHS micro-data
Southern Europe	Albania	1998–2002	yes	births	unintended	8.0	RHS report
Southern Europe	Albania	2008–2009	yes	unintended births	married	97.5–98.5	DHS micro-data
Southern Europe	Italy	1990–1995	yes	births	unintended	21.0	UNECE 2000
Southern Europe	Portugal	2007–2011	yes	births	unintended	29.5	Branco et al. 2011
Southern Europe	Portugal	1996–1996	yes	births	unintended	39.4	Tavares & Barros 1996
Southern Europe	Spain	1990–2003	no	births	unintended	21.6	Font-Ribera et al. 2008
Western Africa	Benin	1996–1996	yes	births	unintended	29.7	DHS micro-data
Western Africa	Benin	2001–2001	yes	births	unintended	27.2	DHS micro-data
Western Africa	Benin	2006–2006	yes	births	unintended	23.3	DHS micro-data
Western Africa	Benin	2011–2012	yes	births	unintended	22.6	DHS micro-data
Western Africa	Benin	1996–1996	yes	unintended births	married	72.1–92.1	DHS micro-data
Western Africa	Benin	2001–2001	yes	unintended births	married	68.6–88.3	DHS micro-data
Western Africa	Benin	2006–2006	yes	unintended births	married	73.7–86.5	DHS micro-data
Western Africa	Benin	2011–2012	yes	unintended births	married	71.3–83.8	DHS micro-data
Western Africa	Burkina Faso	1993–1993	yes	births	unintended	28.2	DHS micro-data
Western Africa	Burkina Faso	1998–1999	yes	births	unintended	25.1	DHS micro-data
Western Africa	Burkina Faso	2003–2003	yes	births	unintended	27.2	DHS micro-data
Western Africa	Burkina Faso	2010–2010	yes	births	unintended	10.3	DHS micro-data
Western Africa	Burkina Faso	1993–1993	yes	unintended births	married	81.4–95.2	DHS micro-data
Western Africa	Burkina Faso	1998–1999	yes	unintended births	married	81.5–96.7	DHS micro-data
Western Africa	Burkina Faso	2003–2003	yes	unintended births	married	83.0–95.3	DHS micro-data
Western Africa	Burkina Faso	2010–2010	yes	unintended births	married	72.1–86.8	DHS micro-data
Western Africa	Cabo Verde	2001–2005	no	births	unintended	56.4	DHS report
Western Africa	Cote d'Ivoire	1994–1994	yes	births	unintended	29.9	DHS micro-data
Western Africa	Cote d'Ivoire	1998–1999	yes	births	unintended	33.6	DHS micro-data
Western Africa	Cote d'Ivoire	2011–2012	yes	births	unintended	28.5	DHS micro-data
Western Africa	Cote d'Ivoire	1994–1994	yes	unintended births	married	61.9–78.7	DHS micro-data
Western Africa	Cote d'Ivoire	1998–1999	yes	unintended births	married	46.6–69.5	DHS micro-data
Western Africa	Cote d'Ivoire	2011–2012	yes	unintended births	married	51.6–65.9	DHS micro-data
Western Africa	Gambia	2013–2013	yes	births	unintended	16.1	DHS micro-data
Western Africa	Gambia	2013–2013	yes	unintended births	married	75.1–85.9	DHS micro-data
Western Africa	Ghana	1993–1993	yes	births	unintended	43.4	DHS micro-data
Western Africa	Ghana	1998–1998	yes	births	unintended	41.3	DHS micro-data
Western Africa	Ghana	2003–2003	yes	births	unintended	45.5	DHS micro-data
Western Africa	Ghana	2008–2008	yes	births	unintended	43.5	DHS micro-data

Table 8: Data on the proportions of births and pregnancies unintended, as input into the model.

UNPD Subregion	Country	Years	Representative	Event	Measure	Percent	Reference
Western Africa	Ghana	2014–2014	yes	births	unintended	36.2	DHS micro-data
Western Africa	Ghana	1993–1993	yes	unintended births	married	58.0–88.3	DHS micro-data
Western Africa	Ghana	1998–1998	yes	unintended births	married	64.3–93.0	DHS micro-data
Western Africa	Ghana	2003–2003	yes	unintended births	married	63.4–89.8	DHS micro-data
Western Africa	Ghana	2008–2008	yes	unintended births	married	60.1–83.6	DHS micro-data
Western Africa	Ghana	2014–2014	yes	unintended births	married	61.1–80.0	DHS micro-data
Western Africa	Guinea	1999–1999	yes	births	unintended	22.2	DHS micro-data
Western Africa	Guinea	2005–2005	yes	births	unintended	18.1	DHS micro-data
Western Africa	Guinea	2012–2012	yes	births	unintended	21.8	DHS micro-data
Western Africa	Guinea	1999–1999	yes	unintended births	married	73.3–90.7	DHS micro-data
Western Africa	Guinea	2005–2005	yes	unintended births	married	66.7–79.4	DHS micro-data
Western Africa	Guinea	2012–2012	yes	unintended births	married	65.1–78.8	DHS micro-data
Western Africa	Liberia	2007–2007	yes	births	unintended	34.5	DHS micro-data
Western Africa	Liberia	2013–2013	yes	births	unintended	35.2	DHS micro-data
Western Africa	Liberia	2007–2007	yes	unintended births	married	48.9–74.9	DHS micro-data
Western Africa	Liberia	2013–2013	yes	unintended births	married	40.3–63.9	DHS micro-data
Western Africa	Mali	1995–1996	yes	births	unintended	24.3	DHS micro-data
Western Africa	Mali	2001–2001	yes	births	unintended	23.4	DHS micro-data
Western Africa	Mali	2006–2006	yes	births	unintended	20.3	DHS micro-data
Western Africa	Mali	2012–2013	yes	births	unintended	15.6	DHS micro-data
Western Africa	Mali	1995–1996	yes	unintended births	married	77.9–90.1	DHS micro-data
Western Africa	Mali	2001–2001	yes	unintended births	married	77.9–90.8	DHS micro-data
Western Africa	Mali	2006–2006	yes	unintended births	married	78.1–93.8	DHS micro-data
Western Africa	Mali	2012–2013	yes	unintended births	married	85.3–90.6	DHS micro-data
Western Africa	Mauritania	2001–2001	yes	births	unintended	31.7	DHS micro-data
Western Africa	Mauritania	2001–2001	yes	unintended births	married	71.0–97.7	DHS micro-data
Western Africa	Niger	1992–1992	yes	births	unintended	14.6	DHS micro-data
Western Africa	Niger	1998–1998	yes	births	unintended	13.2	DHS micro-data
Western Africa	Niger	2006–2006	yes	births	unintended	12.5	DHS micro-data
Western Africa	Niger	2012–2012	yes	births	unintended	10.0	DHS micro-data
Western Africa	Niger	1992–1992	yes	unintended births	married	72.9–94.7	DHS micro-data
Western Africa	Niger	1998–1998	yes	unintended births	married	67.4–94.6	DHS micro-data
Western Africa	Niger	2006–2006	yes	unintended births	married	79.4–97.0	DHS micro-data
Western Africa	Niger	2012–2012	yes	unintended births	married	79.3–98.3	DHS micro-data
Western Africa	Nigeria	1990–1990	yes	births	unintended	13.4	DHS micro-data
Western Africa	Nigeria	2003–2003	yes	births	unintended	17.5	DHS micro-data
Western Africa	Nigeria	2008–2008	yes	births	unintended	12.5	DHS micro-data

Table 8: Data on the proportions of births and pregnancies unintended, as input into the model.

UNPD Subregion	Country	Years	Representative	Event	Measure	Percent	Reference
Western Africa	Nigeria	2013–2013	yes	births	unintended	11.1	DHS micro-data
Western Africa	Nigeria	1997–1999	yes	births	unintended	19.5	DHS report
Western Africa	Nigeria	1990–1990	yes	unintended births	married	73.8–91.4	DHS micro-data
Western Africa	Nigeria	2003–2003	yes	unintended births	married	66.9–78.5	DHS micro-data
Western Africa	Nigeria	2008–2008	yes	unintended births	married	67.9–79.4	DHS micro-data
Western Africa	Nigeria	2013–2013	yes	unintended births	married	64.1–74.6	DHS micro-data
Western Africa	Senegal	1992–1993	yes	births	unintended	33.9	DHS micro-data
Western Africa	Senegal	1997–1997	yes	births	unintended	38.5	DHS micro-data
Western Africa	Senegal	2005–2005	yes	births	unintended	33.0	DHS micro-data
Western Africa	Senegal	2010–2011	yes	births	unintended	31.5	DHS micro-data
Western Africa	Senegal	2012–2013	yes	births	unintended	30.0	DHS micro-data
Western Africa	Senegal	2014–2014	yes	births	unintended	23.3	DHS micro-data
Western Africa	Senegal	1992–1993	yes	unintended births	married	69.9–87.3	DHS micro-data
Western Africa	Senegal	1997–1997	yes	unintended births	married	85.8–88.7	DHS micro-data
Western Africa	Senegal	2005–2005	yes	unintended births	married	77.1–93.7	DHS micro-data
Western Africa	Senegal	2010–2011	yes	unintended births	married	75.6–88.5	DHS micro-data
Western Africa	Senegal	2012–2013	yes	unintended births	married	77.1–90.2	DHS micro-data
Western Africa	Senegal	2014–2014	yes	unintended births	married	70.4–87.5	DHS micro-data
Western Africa	Sierra Leone	2008–2008	yes	births	unintended	31.2	DHS micro-data
Western Africa	Sierra Leone	2013–2013	yes	births	unintended	15.1	DHS micro-data
Western Africa	Sierra Leone	2008–2008	yes	unintended births	married	55.0–79.2	DHS micro-data
Western Africa	Sierra Leone	2013–2013	yes	unintended births	married	44.2–57.7	DHS micro-data
Western Africa	Togo	1998–1998	yes	births	unintended	43.3	DHS micro-data
Western Africa	Togo	2013–2014	yes	births	unintended	32.8	DHS micro-data
Western Africa	Togo	1998–1998	yes	unintended births	married	64.1–83.8	DHS micro-data
Western Africa	Togo	2013–2014	yes	unintended births	married	64.7–80.4	DHS micro-data
Western Asia	Armenia	2000–2000	yes	births	unintended	18.0	DHS micro-data
Western Asia	Armenia	2005–2005	yes	births	unintended	16.0	DHS micro-data
Western Asia	Armenia	2010–2010	yes	births	unintended	5.6	DHS micro-data
Western Asia	Armenia	2000–2000	yes	unintended births	married	92.1–99.0	DHS micro-data
Western Asia	Armenia	2005–2005	yes	unintended births	married	99.8–100	DHS micro-data
Western Asia	Armenia	2010–2010	yes	unintended births	married	85.0–100	DHS micro-data
Western Asia	Azerbaijan	2006–2006	yes	births	unintended	20.1	DHS micro-data
Western Asia	Azerbaijan	1997–2001	yes	births	unintended	14.4	RHS report
Western Asia	Azerbaijan	2006–2006	yes	unintended births	married	93.9–93.9	DHS micro-data
Western Asia	Georgia	2001–2005	yes	births	unintended	4.9	RHS report
Western Asia	Georgia	1995–2000	yes	births	unintended	5.8	RHS report

Table 8: Data on the proportions of births and pregnancies unintended, as input into the model.

UNPD Subregion	Country	Years	Representative	Event	Measure	Percent	Reference
Western Asia	Georgia	2006–2011	yes	births	unintended	5.9	RHS report
Western Asia	Jordan	1990–1990	no	births	unintended	36.0	DHS micro-data
Western Asia	Jordan	1997–1997	no	births	unintended	42.9	DHS micro-data
Western Asia	Jordan	2002–2002	no	births	unintended	31.0	DHS micro-data
Western Asia	Jordan	2007–2007	no	births	unintended	28.7	DHS micro-data
Western Asia	Jordan	2012–2012	no	births	unintended	25.2	DHS micro-data
Western Asia	Turkey	1993–1993	no	births	unintended	31.7	DHS micro-data
Western Asia	Turkey	1998–1998	no	births	unintended	28.9	DHS micro-data
Western Asia	Turkey	2003–2003	no	births	unintended	32.8	DHS micro-data
Western Asia	Turkey	2008–2008	yes	births	unintended	28.2	DHS micro-data
Western Asia	Turkey	2008–2008	yes	unintended births	married	95.5–97.5	DHS micro-data
Western Asia	Yemen	2013–2013	yes	births	unintended	39.5	DHS micro-data
Western Asia	Yemen	1993–1997	yes	births	unintended	45.1	DHS report
Western Asia	Yemen	2013–2013	yes	unintended births	married	92.4–97.7	DHS micro-data
Western Europe	Belgium	2008–2010	no	births	unintended	10.0	Lukasse et al. 2015
Western Europe	France	1990–2010	no	pregnancies	unintended	29.4	Moreau et al. 2014
Western Europe	France	1990–1992	yes	births	unintended	20.0	Toulemon 1997
Western Europe	Germany	2010–2012	yes	births	unintended	21.5	Fiala & Schweiger 2012
Western Europe	Netherlands	2007–2009	yes	pregnancies	unintended	18.1	Bakker et al. 2009

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4 Appendix Tables

Appendix Table 1. Countries by UNPD subregions and subregions used in analsysis

UNPD subregion	Country	Subregion for analysis
Caribbean	Antigua and Barbuda	Latin American Region
Caribbean	Bahamas	Latin American Region
Caribbean	Barbados	Latin American Region
Caribbean	Cuba	Latin American Region
Caribbean	Dominican Republic	Latin American Region
Caribbean	Grenada	Latin American Region
Caribbean	Guadeloupe	Latin American Region
Caribbean	Haiti	Latin American Region
Caribbean	Jamaica	Latin American Region
Caribbean	Martinique	Latin American Region
Caribbean	Puerto Rico	Latin American Region
Caribbean	Saint Lucia	Latin American Region
Caribbean	Saint Vincent and the Grena	Latin American Region
Caribbean	Trinidad and Tobago	Latin American Region
Caribbean	United States Virgin Islands	Latin American Region
Central America	Belize	Latin American Region
Central America	Costa Rica	Latin American Region
Central America	El Salvador	Latin American Region
Central America	Guatemala	Latin American Region
Central America	Honduras	Latin American Region
Central America	Mexico	Latin American Region
Central America	Nicaragua	Latin American Region
Central America	Panama	Latin American Region
Eastern Africa	Burundi	East and Southern Africa
Eastern Africa	Comoros	East and Southern Africa
Eastern Africa	Djibouti	East and Southern Africa
Eastern Africa	Eritrea	East and Southern Africa
Eastern Africa	Ethiopia	East and Southern Africa
Eastern Africa	Kenya	East and Southern Africa
Eastern Africa	Madagascar	East and Southern Africa
Eastern Africa	Malawi	East and Southern Africa
Eastern Africa	Mauritius	East and Southern Africa
Eastern Africa	Mozambique	East and Southern Africa
Eastern Africa	Reunion	East and Southern Africa
Eastern Africa	Rwanda	East and Southern Africa
Eastern Africa	Somalia	East and Southern Africa
Eastern Africa	South Sudan	East and Southern Africa
Eastern Africa	Tanzania	East and Southern Africa
Eastern Africa	Uganda	East and Southern Africa
Eastern Africa	Zambia	East and Southern Africa
Eastern Africa	Zimbabwe	East and Southern Africa
Eastern Asia	China	East and Southeast Asia
Eastern Asia	China, Hong Kong SAR	East and Southeast Asia
Eastern Asia	Democratic People's Republi	East and Southeast Asia
Eastern Asia	Japan	East and Southeast Asia
Eastern Asia	Mongolia	East and Southeast Asia
Eastern Asia	Republic of Korea	East and Southeast Asia
Eastern Europe	Belarus	Former Soviet Bloc
Eastern Europe	Bulgaria	Former Soviet Bloc
Eastern Europe	Czech Republic	Former Soviet Bloc
Eastern Europe	Hungary	Former Soviet Bloc
Eastern Europe	Poland	Former Soviet Bloc
Eastern Europe	Republic of Moldova	Former Soviet Bloc
Eastern Europe	Romania	Former Soviet Bloc
Eastern Europe	Russian Federation	Former Soviet Bloc
Eastern Europe	Slovakia	Former Soviet Bloc
Eastern Europe	Ukraine	Former Soviet Bloc
Middle Africa	Angola	West and Middle Africa
Middle Africa	Cameroon	West and Middle Africa
Middle Africa	Central African Republic	West and Middle Africa
Middle Africa	Chad	West and Middle Africa
Middle Africa	Congo	West and Middle Africa
Middle Africa	Congo	West and Middle Africa
Middle Africa	Equatorial Guinea	West and Middle Africa
Middle Africa	Gabon	West and Middle Africa
Middle Africa	Sao Tome and Principe	West and Middle Africa
Northern Africa	Algeria	Eastern Mediterranean and North Africa
Northern Africa	Egypt	Eastern Mediterranean and North Africa
Northern Africa	Libya	Eastern Mediterranean and North Africa
Northern Africa	Morocco	Eastern Mediterranean and North Africa
Northern Africa	Sudan	Eastern Mediterranean and North Africa
Northern Africa	Tunisia	Eastern Mediterranean and North Africa

UNPD subregion	Country	Subregion for analysis
Northern America	Canada	UnitedStates/Canada/Australia/NewZealand
Northern America	United States	UnitedStates/Canada/Australia/NewZealand
Northern Europe	Denmark	Europe
Northern Europe	Estonia	Former Soviet Bloc
Northern Europe	Finland	Europe
Northern Europe	Ireland	Europe
Northern Europe	Latvia	Former Soviet Bloc
Northern Europe	Lithuania	Former Soviet Bloc
Northern Europe	Norway	Europe
Northern Europe	Sweden	Europe
Northern Europe	United Kingdom	Europe
Oceania	Australia	UnitedStates/Canada/Australia/NewZealand
Oceania	Fiji	East and Southeast Asia
Oceania	Guam	East and Southeast Asia
Oceania	Kiribati	East and Southeast Asia
Oceania	New Zealand	UnitedStates/Canada/Australia/NewZealand
Oceania	Papua New Guinea	East and Southeast Asia
Oceania	Samoa	East and Southeast Asia
Oceania	Solomon Islands	East and Southeast Asia
Oceania	Vanuatu	East and Southeast Asia
South America	Argentina	Latin American Region
South America	Bolivia	Latin American Region
South America	Brazil	Latin American Region
South America	Chile	Latin American Region
South America	Colombia	Latin American Region
South America	Ecuador	Latin American Region
South America	Guyana	Latin American Region
South America	Paraguay	Latin American Region
South America	Peru	Latin American Region
South America	Suriname	Latin American Region
South America	Uruguay	Latin American Region
South America	Venezuela (Bolivarian Repub	Latin American Region
South and central Asia	Afghanistan	South and Central Asia
South and central Asia	Bangladesh	South and Central Asia
South and central Asia	Bhutan	South and Central Asia
South and central Asia	India	South and Central Asia
South and central Asia	Iran	South and Central Asia
South and central Asia	Kazakhstan	South and Central Asia
South and central Asia	Kyrgyzstan	South and Central Asia
South and central Asia	Maldives	South and Central Asia
South and central Asia	Nepal	South and Central Asia
South and central Asia	Pakistan	South and Central Asia
South and central Asia	Sri Lanka	South and Central Asia
South and central Asia	Tajikistan	South and Central Asia
South and central Asia	Turkmenistan	South and Central Asia
South and central Asia	Uzbekistan	South and Central Asia
South-Eastern Asia	Cambodia	East and Southeast Asia
South-Eastern Asia	Indonesia	East and Southeast Asia
South-Eastern Asia	Lao People's Democratic Rep	East and Southeast Asia
South-Eastern Asia	Malaysia	East and Southeast Asia
South-Eastern Asia	Myanmar	East and Southeast Asia
South-Eastern Asia	Philippines	East and Southeast Asia
South-Eastern Asia	Singapore	East and Southeast Asia
South-Eastern Asia	Thailand	East and Southeast Asia
South-Eastern Asia	Timor-Leste	East and Southeast Asia
South-Eastern Asia	Vietnam	East and Southeast Asia
Southern Africa	Botswana	East and Southern Africa
Southern Africa	Lesotho	East and Southern Africa
Southern Africa	Namibia	East and Southern Africa
Southern Africa	South Africa	East and Southern Africa
Southern Africa	Swaziland	East and Southern Africa
Southern Europe	Albania	Former Soviet Bloc
Southern Europe	Bosnia and Herzegovina	Former Soviet Bloc
Southern Europe	Croatia	Former Soviet Bloc
Southern Europe	Greece	Europe
Southern Europe	Italy	Europe
Southern Europe	Malta	Europe
Southern Europe	Montenegro	Former Soviet Bloc
Southern Europe	Portugal	Europe
Southern Europe	Serbia	Former Soviet Bloc
Southern Europe	Slovenia	Former Soviet Bloc
Southern Europe	Spain	Europe
Southern Europe	The former Yugoslav Republi	Former Soviet Bloc
Western Africa	Benin	West and Middle Africa

UNPD subregion	Country	Subregion for analysis
Western Africa	Burkina Faso	West and Middle Africa
Western Africa	Cabo Verde	West and Middle Africa
Western Africa	Cote d'Ivoire	West and Middle Africa
Western Africa	Gambia	West and Middle Africa
Western Africa	Ghana	West and Middle Africa
Western Africa	Guinea	West and Middle Africa
Western Africa	Guinea-Bissau	West and Middle Africa
Western Africa	Liberia	West and Middle Africa
Western Africa	Mali	West and Middle Africa
Western Africa	Mauritania	West and Middle Africa
Western Africa	Niger	West and Middle Africa
Western Africa	Nigeria	West and Middle Africa
Western Africa	Senegal	West and Middle Africa
Western Africa	Sierra Leone	West and Middle Africa
Western Africa	Togo	West and Middle Africa
Western Asia	Armenia	Former Soviet Bloc
Western Asia	Azerbaijan	Former Soviet Bloc
Western Asia	Bahrain	Eastern Mediterranean and North Africa
Western Asia	Georgia	Former Soviet Bloc
Western Asia	Iraq	Eastern Mediterranean and North Africa
Western Asia	Israel	Eastern Mediterranean and North Africa
Western Asia	Jordan	Eastern Mediterranean and North Africa
Western Asia	Kuwait	Eastern Mediterranean and North Africa
Western Asia	Lebanon	Eastern Mediterranean and North Africa
Western Asia	Oman	Eastern Mediterranean and North Africa
Western Asia	Qatar	Eastern Mediterranean and North Africa
Western Asia	Saudi Arabia	Eastern Mediterranean and North Africa
Western Asia	State of Palestine	Eastern Mediterranean and North Africa
Western Asia	Syrian Arab Republic	Eastern Mediterranean and North Africa
Western Asia	Turkey	Eastern Mediterranean and North Africa
Western Asia	United Arab Emirates	Eastern Mediterranean and North Africa
Western Asia	Yemen	Eastern Mediterranean and North Africa
Western Europe	Austria	Europe
Western Europe	Belgium	Europe
Western Europe	France	Europe
Western Europe	Germany	Europe
Western Europe	Netherlands	Europe
Western Europe	Switzerland	Europe

Appendix Table 2. Estimated unintended pregnancies in millions, by geographic area and time period

	1990-1994	90% UI	1995-1999	90% UI	2000-2004	90% UI	2005-2009	90% UI	2010-2014	90% UI	change	90% UI	% change	90% UI	prob. of change*
World	92.489	(89.762 to 104.884)	93.698	(91.262 to 105.342)	96.134	(93.386 to 108.288)	97.638	(94.407 to 111.289)	99.11	(94.869 to 114.886)	6.6	(-3.0 to 17.8)	7.2	(-3.0 to 18.9)	88.5
Developing countries	76.057	(73.029 to 86.597)	78.574	(75.692 to 88.707)	82.303	(79.157 to 93.184)	85.128	(81.517 to 97.333)	88.044	(83.564 to 102.831)	12	(3.4 to 23.6)	15.8	(4.0 to 30.4)	98.8
Developed countries	16.431	(15.017 to 20.693)	15.121	(14.016 to 18.604)	13.821	(12.924 to 16.905)	12.492	(11.707 to 15.234)	11.039	(10.218 to 13.686)	-5.4	(-8.1 to -3.9)	-32.8	(-41.3 to -24.5)	100
Excluding Eastern Europe	9.345	(7.970 to 13.192)	9.077	(7.994 to 12.230)	8.687	(7.823 to 11.391)	8.251	(7.487 to 10.765)	7.655	(6.850 to 10.136)	-1.7	(-4.0 to -0.3)	-18.1	(-33.2 to -3.7)	97.7
Africa	14.935	(14.151 to 17.756)	16.724	(15.859 to 19.546)	18.575	(17.679 to 21.525)	20.27	(19.390 to 23.367)	21.601	(20.683 to 25.097)	6.7	(5.3 to 8.6)	44.6	(31.9 to 57.4)	100
Eastern Africa	5.518	(5.083 to 6.304)	6.277	(5.862 to 7.017)	7.311	(6.955 to 8.019)	8.255	(7.898 to 8.957)	8.848	(8.484 to 9.622)	3.3	(2.7 to 4.0)	60.4	(43.3 to 76.4)	100
Middle Africa	1.831	(1.557 to 2.413)	2.161	(1.846 to 2.810)	2.506	(2.168 to 3.226)	2.746	(2.417 to 3.515)	2.987	(2.596 to 3.900)	1.2	(0.8 to 1.7)	63.1	(39.1 to 93.1)	100
Northern Africa	3.119	(2.541 to 4.951)	3.091	(2.469 to 5.003)	3	(2.325 to 4.983)	3.202	(2.423 to 5.420)	3.407	(2.509 to 5.964)	0.3	(-0.5 to 1.5)	9.2	(-13.8 to 42.8)	75.2
Southern Africa	1.093	(0.895 to 1.524)	1.22	(1.014 to 1.649)	1.273	(1.051 to 1.735)	1.354	(1.100 to 1.842)	1.396	(1.101 to 1.972)	0.3	(0.0 to 0.7)	27.7	(3.5 to 57.9)	97.1
Western Africa	3.383	(3.096 to 3.968)	3.987	(3.700 to 4.563)	4.499	(4.182 to 5.130)	4.728	(4.422 to 5.352)	4.98	(4.672 to 5.670)	1.6	(1.1 to 2.1)	47.2	(29.9 to 65.6)	100
Asia	52.294	(48.656 to 62.269)	51.978	(48.431 to 61.326)	52.766	(49.053 to 62.541)	52.969	(48.699 to 64.142)	53.848	(48.205 to 66.896)	1.6	(-7.6 to 12.3)	3	(-13.0 to 23.6)	61.6
Eastern Asia	18.588	(16.052 to 24.362)	17.036	(14.411 to 22.728)	16.155	(13.096 to 22.330)	16.472	(12.998 to 23.668)	16.368	(12.283 to 24.062)	-2.2	(-8.2 to 4.3)	-11.9	(-38.2 to 23.5)	75.1
Southern and central Asia	21.286	(18.066 to 26.426)	21.836	(19.012 to 26.248)	23.372	(20.851 to 27.177)	24.028	(21.193 to 28.491)	25.157	(21.401 to 32.007)	3.9	(-2.1 to 11.0)	18.2	(-8.6 to 54.8)	86.5
Southern Asia	20.433	(17.205 to 25.505)	21.033	(18.207 to 25.408)	22.602	(20.100 to 26.353)	23.245	(20.434 to 27.613)	24.316	(20.631 to 31.059)	3.9	(-2.0 to 10.9)	19	(-8.2 to 56.8)	86.8
Central Asia	0.852	(0.767 to 1.066)	0.801	(0.748 to 0.928)	0.769	(0.682 to 0.953)	0.78	(0.650 to 1.013)	0.838	(0.684 to 1.108)	0	(-0.2 to 0.2)	-1.6	(-25.3 to 25.9)	52.5
Southeastern Asia	9.228	(7.765 to 12.982)	9.522	(8.167 to 13.267)	9.553	(8.120 to 13.464)	8.81	(7.278 to 12.921)	8.6	(6.969 to 13.204)	-0.6	(-2.6 to 1.8)	-6.8	(-24.8 to 19.0)	65.2
Western Asia	3.283	(2.875 to 4.284)	3.698	(3.224 to 4.822)	3.811	(3.345 to 5.018)	3.791	(3.275 to 5.176)	3.865	(3.232 to 5.544)	0.6	(-0.0 to 1.7)	17.7	(-1.3 to 47.2)	93.7
Latin America	11.187	(10.448 to 12.467)	12.011	(11.186 to 13.488)	12.806	(11.925 to 14.589)	13.43	(12.277 to 15.760)	13.987	(12.573 to 16.913)	2.8	(1.1 to 5.5)	25	(9.4 to 50.0)	99.7
Caribbean	0.971	(0.852 to 1.283)	1.028	(0.912 to 1.347)	1.09	(0.958 to 1.427)	1.106	(0.952 to 1.452)	1.098	(0.928 to 1.479)	0.1	(-0.1 to 0.3)	13	(-6.4 to 33.4)	86.8
Central America	2.5	(2.132 to 3.085)	2.687	(2.283 to 3.351)	2.916	(2.473 to 3.696)	3.13	(2.667 to 3.964)	3.298	(2.690 to 4.307)	0.8	(0.3 to 1.6)	31.9	(10.3 to 62.4)	99.1
South America	7.716	(7.090 to 8.616)	8.296	(7.540 to 9.411)	8.8	(7.985 to 10.219)	9.194	(8.075 to 11.201)	9.591	(8.179 to 12.198)	1.9	(0.3 to 4.4)	24.3	(3.3 to 58.0)	96.9
North America	3.294	(2.474 to 4.445)	3.284	(2.735 to 3.870)	3.501	(3.165 to 3.910)	3.481	(3.152 to 3.860)	3.243	(2.762 to 3.722)	-0.1	(-1.2 to 0.9)	-1.5	(-29.6 to 34.1)	53.5
Europe	10.479	(9.816 to 12.802)	9.367	(8.800 to 11.391)	8.121	(7.599 to 10.046)	7.102	(6.650 to 8.702)	6.061	(5.636 to 7.528)	-4.4	(-5.9 to -3.5)	-42.2	(-48.7 to -34.0)	100
Eastern Europe	7.102	(6.490 to 8.555)	6.06	(5.593 to 7.402)	5.149	(4.693 to 6.299)	4.255	(3.903 to 5.087)	3.4	(3.046 to 4.110)	-3.7	(-4.8 to -3.0)	-52.1	(-58.6 to -44.7)	100
Northern Europe	0.639	(0.558 to 0.837)	0.606	(0.532 to 0.800)	0.554	(0.490 to 0.740)	0.54	(0.487 to 0.688)	0.533	(0.487 to 0.658)	-0.1	(-0.3 to -0.0)	-16.6	(-31.4 to -2.1)	96.7
Southern Europe	1.675	(1.306 to 3.040)	1.58	(1.248 to 2.771)	1.374	(1.081 to 2.444)	1.279	(1.008 to 2.344)	1.164	(0.892 to 2.154)	-0.5	(-1.3 to -0.1)	-30.5	(-48.9 to -5.3)	97.5
Western Europe	1.069	(0.871 to 1.626)	1.126	(0.915 to 1.625)	1.05	(0.849 to 1.558)	1.034	(0.844 to 1.544)	0.97	(0.815 to 1.454)	-0.1	(-0.4 to 0.1)	-9.2	(-29.6 to 12.9)	76.3
Oceania	0.306	(0.257 to 0.407)	0.336	(0.287 to 0.439)	0.369	(0.316 to 0.473)	0.381	(0.327 to 0.485)	0.372	(0.309 to 0.490)	0.1	(-0.0 to 0.1)	21.7	(-1.9 to 46.5)	93.5

* Posterior probability of a change in the estimated direction

Appendix Table 3A. Percent of pregnancies unintended, by geographic area and time period

	1990-1994	90% UI	1995-1999	90% UI	2000-2004	90% UI	2005-2009	90% UI	2010-2014	90% UI	change	90% UI	% change	90% UI	prob. of change*
World	43	(42 to 47)	45	(44 to 48)	46	(45 to 50)	45	(44 to 49)	44	(42 to 48)	1	(-2 to 4)	3	(-4 to 10)	71.7
Developing countries	41	(39 to 45)	43	(42 to 47)	45	(43 to 49)	44	(43 to 48)	43	(42 to 48)	3	(-1 to 6)	7	(-1 to 15)	91.5
Developed countries	54	(51 to 62)	56	(53 to 62)	54	(52 to 61)	50	(48 to 56)	46	(43 to 52)	-8	(-14 to -4)	-15	(-24 to -7)	99.9
Excluding Eastern Europe	49	(43 to 59)	50	(46 to 59)	50	(46 to 57)	47	(44 to 55)	45	(41 to 52)	-4	(-13 to 2)	-9	(-22 to 5)	86.9
Africa	40	(38 to 44)	41	(39 to 45)	41	(40 to 45)	41	(39 to 44)	39	(38 to 43)	-1	(-4 to 2)	-2	(-8 to 4)	71.8
Eastern Africa	43	(41 to 48)	44	(42 to 48)	46	(44 to 49)	47	(46 to 50)	46	(44 to 49)	3	(-1 to 6)	6	(-3 to 15)	86.1
Middle Africa	38	(33 to 46)	39	(34 to 46)	40	(35 to 47)	39	(36 to 46)	38	(35 to 45)	0	(-5 to 6)	1	(-12 to 17)	56.1
Northern Africa	46	(41 to 58)	46	(40 to 59)	43	(36 to 57)	42	(35 to 56)	41	(34 to 56)	-5	(-12 to 3)	-11	(-25 to 6)	83.9
Southern Africa	58	(51 to 67)	63	(57 to 70)	63	(57 to 71)	66	(59 to 74)	66	(57 to 75)	8	(-1 to 17)	14	(-1 to 31)	92.4
Western Africa	30	(28 to 34)	32	(30 to 35)	32	(30 to 35)	30	(28 to 33)	28	(26 to 31)	-2	(-6 to 0)	-8	(-17 to 2)	92.1
Asia	39	(37 to 45)	42	(40 to 47)	43	(41 to 49)	43	(40 to 48)	42	(39 to 48)	2	(-3 to 8)	6	(-6 to 20)	79.7
Eastern Asia	39	(35 to 48)	44	(39 to 54)	46	(40 to 57)	44	(38 to 56)	43	(35 to 54)	4	(-6 to 13)	9	(-15 to 34)	71.8
Southern and central Asia	36	(31 to 43)	37	(33 to 43)	39	(36 to 45)	40	(36 to 45)	40	(36 to 47)	4	(-4 to 12)	10	(-9 to 35)	79.1
Southern Asia	36	(31 to 43)	37	(33 to 43)	39	(35 to 45)	40	(36 to 45)	40	(36 to 47)	4	(-4 to 12)	10	(-9 to 36)	79.6
Central Asia	34	(31 to 42)	36	(34 to 40)	37	(33 to 43)	34	(30 to 41)	33	(29 to 40)	-1	(-8 to 6)	-2	(-22 to 17)	56.7
Southeastern Asia	47	(41 to 57)	49	(45 to 59)	50	(45 to 60)	46	(41 to 57)	45	(39 to 56)	-2	(-9 to 6)	-4	(-18 to 12)	62.9
Western Asia	46	(41 to 54)	49	(44 to 58)	49	(44 to 57)	47	(43 to 56)	46	(40 to 57)	0	(-6 to 8)	1	(-13 to 18)	57.4
Latin America	59	(55 to 64)	61	(58 to 66)	64	(61 to 69)	67	(63 to 72)	69	(64 to 76)	10	(5 to 17)	17	(8 to 29)	99.9
Caribbean	63	(59 to 71)	67	(63 to 74)	72	(67 to 78)	73	(68 to 79)	73	(68 to 80)	10	(3 to 15)	16	(5 to 25)	99.2
Central America	50	(42 to 61)	51	(44 to 62)	55	(47 to 68)	58	(49 to 73)	60	(50 to 77)	11	(3 to 21)	21	(5 to 42)	98.4
South America	62	(58 to 67)	65	(61 to 69)	67	(64 to 71)	70	(66 to 75)	72	(67 to 79)	10	(3 to 18)	16	(5 to 29)	99.4
North America	46	(35 to 63)	48	(40 to 57)	51	(46 to 57)	50	(46 to 56)	48	(40 to 54)	1	(-16 to 14)	2	(-27 to 39)	54.1
Europe	54	(53 to 60)	56	(54 to 61)	53	(50 to 60)	47	(45 to 53)	43	(40 to 49)	-12	(-16 to -8)	-22	(-28 to -14)	100
Eastern Europe	64	(61 to 69)	66	(64 to 71)	65	(62 to 73)	57	(54 to 62)	50	(46 to 56)	-14	(-19 to -9)	-22	(-29 to -15)	100
Northern Europe	33	(29 to 43)	34	(30 to 44)	32	(29 to 43)	30	(27 to 38)	29	(27 to 36)	-4	(-11 to 1)	-12	(-27 to 2)	91.9
Southern Europe	53	(47 to 68)	54	(48 to 68)	50	(43 to 65)	47	(40 to 64)	44	(37 to 61)	-9	(-18 to 1)	-17	(-31 to 2)	93.3
Western Europe	35	(30 to 46)	38	(32 to 49)	35	(29 to 46)	35	(29 to 46)	33	(29 to 43)	-2	(-10 to 4)	-6	(-24 to 13)	71.1
Oceania	40	(34 to 52)	42	(36 to 53)	45	(39 to 55)	43	(38 to 53)	41	(34 to 51)	1	(-8 to 7)	1	(-18 to 20)	51.9

* Posterior probability of a change in the estimated direction

Appendix Table 3B. Percent of births unintended, by geographic area and time period

	1990-1994	90% UI	1995-1999	90% UI	2000-2004	90% UI	2005-2009	90% UI	2010-2014	90% UI	change	90% UI	% change	90% UI	prob. of change*
World	23	(21 to 27)	26	(24 to 29)	27	(25 to 30)	26	(24 to 29)	23	(22 to 26)	0	(-3 to 3)	-1	(-13 to 12)	56.8
Developing countries	24	(22 to 28)	26	(24 to 29)	27	(25 to 30)	26	(24 to 29)	23	(22 to 27)	0	(-4 to 3)	-2	(-14 to 12)	60.9
Developed countries	21	(16 to 29)	25	(21 to 30)	27	(24 to 34)	25	(23 to 30)	23	(20 to 28)	3	(-6 to 9)	12	(-22 to 53)	65.7
Excluding Eastern Europe	24	(18 to 35)	28	(24 to 35)	30	(26 to 36)	28	(25 to 34)	26	(22 to 32)	2	(-9 to 11)	8	(-28 to 57)	59.3
Africa	31	(29 to 33)	31	(29 to 33)	30	(29 to 32)	30	(29 to 32)	27	(26 to 29)	-3	(-5 to -1)	-11	(-17 to -4)	99.5
Eastern Africa	36	(32 to 39)	36	(33 to 39)	37	(35 to 40)	39	(37 to 41)	37	(35 to 39)	1	(-3 to 5)	3	(-8 to 14)	65.7
Middle Africa	30	(25 to 36)	31	(26 to 36)	31	(27 to 36)	30	(27 to 34)	28	(25 to 32)	-2	(-7 to 3)	-6	(-21 to 13)	71.8
Northern Africa	32	(28 to 38)	30	(24 to 37)	25	(20 to 31)	22	(18 to 30)	21	(16 to 29)	-11	(-17 to -3)	-33	(-49 to -10)	99
Southern Africa	48	(42 to 55)	53	(48 to 57)	51	(46 to 56)	55	(48 to 63)	54	(45 to 64)	6	(-5 to 17)	12	(-9 to 36)	80.1
Western Africa	22	(20 to 24)	23	(21 to 25)	22	(20 to 24)	20	(19 to 22)	17	(15 to 19)	-5	(-7 to -2)	-22	(-32 to -11)	99.9
Asia	19	(15 to 24)	21	(18 to 26)	22	(19 to 27)	20	(18 to 25)	17	(14 to 22)	-2	(-6 to 3)	-8	(-29 to 20)	71.8
Eastern Asia	8	(3 to 19)	11	(6 to 23)	12	(7 to 27)	11	(5 to 25)	10	(5 to 22)	2	(-7 to 12)	27	(-50 to 221)	67.4
Southern and central Asia	22	(17 to 29)	22	(18 to 28)	23	(19 to 29)	22	(19 to 25)	18	(14 to 23)	-4	(-12 to 2)	-20	(-43 to 14)	85.9
Southern Asia	22	(17 to 30)	23	(18 to 29)	24	(19 to 30)	22	(19 to 26)	18	(14 to 23)	-4	(-12 to 3)	-20	(-43 to 14)	85.3
Central Asia	9	(5 to 18)	10	(8 to 13)	10	(7 to 15)	9	(5 to 14)	6	(4 to 11)	-3	(-12 to 2)	-31	(-69 to 35)	80.7
Southeastern Asia	26	(21 to 34)	29	(24 to 36)	30	(26 to 37)	25	(20 to 33)	22	(18 to 28)	-4	(-12 to 3)	-15	(-37 to 15)	81.6
Western Asia	31	(25 to 38)	34	(27 to 41)	32	(26 to 39)	31	(25 to 38)	29	(22 to 37)	-2	(-10 to 6)	-7	(-29 to 22)	67.9
Latin America	45	(40 to 51)	47	(43 to 52)	49	(45 to 55)	51	(45 to 57)	53	(46 to 61)	7	(0 to 16)	17	(0 to 36)	95.5
Caribbean	43	(38 to 52)	48	(42 to 56)	54	(48 to 62)	54	(48 to 61)	55	(48 to 62)	11	(2 to 19)	26	(5 to 47)	97.7
Central America	40	(31 to 53)	40	(31 to 54)	43	(33 to 60)	45	(33 to 64)	46	(33 to 68)	6	(-4 to 20)	16	(-9 to 48)	85.5
South America	48	(42 to 53)	50	(45 to 54)	52	(47 to 56)	53	(48 to 59)	55	(48 to 64)	8	(-1 to 17)	16	(-1 to 38)	93.3
North America	29	(13 to 50)	32	(22 to 44)	38	(31 to 45)	37	(31 to 44)	35	(27 to 44)	7	(-16 to 24)	23	(-34 to 167)	70.9
Europe	15	(12 to 21)	17	(14 to 23)	18	(14 to 27)	16	(13 to 22)	15	(12 to 20)	0	(-6 to 5)	0	(-32 to 39)	54.4
Eastern Europe	11	(7 to 19)	12	(8 to 18)	19	(12 to 35)	15	(11 to 21)	14	(9 to 20)	3	(-7 to 10)	27	(-38 to 121)	68.8
Northern Europe	12	(7 to 24)	13	(8 to 26)	12	(7 to 24)	10	(6 to 19)	11	(8 to 18)	-1	(-10 to 5)	-8	(-48 to 60)	59
Southern Europe	21	(16 to 28)	24	(18 to 34)	22	(15 to 32)	22	(15 to 34)	19	(13 to 31)	-2	(-11 to 10)	-9	(-43 to 54)	63.2
Western Europe	19	(14 to 28)	23	(16 to 32)	18	(12 to 27)	17	(12 to 25)	16	(13 to 21)	-4	(-12 to 4)	-19	(-47 to 23)	79.1
Oceania	27	(20 to 40)	29	(22 to 40)	32	(24 to 42)	31	(24 to 41)	29	(21 to 38)	1	(-9 to 9)	5	(-26 to 41)	55.8

* Posterior probability of a change in the estimated direction

Appendix Table 4. Estimated unintended birth rates per 1,000 women 15-44 years old, by geographic area and time period

	1990-1994	90% UI	1995-1999	90% UI	2000-2004	90% UI	2005-2009	90% UI	2010-2014	90% UI	change	90% UI	% change	90% UI	prob. of change*
World	25	(23 to 29)	25	(23 to 28)	24	(23 to 27)	22	(21 to 25)	20	(19 to 23)	-5	(-9 to -3)	-21	(-31 to -11)	99.8
Developing countries	29	(26 to 34)	28	(26 to 31)	26	(25 to 30)	24	(23 to 27)	21	(20 to 24)	-8	(-12 to -4)	-27	(-36 to -16)	100
Developed countries	12	(9 to 17)	13	(11 to 16)	14	(12 to 18)	14	(12 to 17)	13	(11 to 16)	2	(-4 to 5)	13	(-22 to 55)	67.4
Excluding Eastern Europe	14	(10 to 20)	16	(13 to 20)	16	(14 to 20)	16	(14 to 20)	15	(13 to 19)	2	(-5 to 6)	11	(-26 to 61)	64.3
Africa	59	(56 to 63)	56	(53 to 59)	52	(50 to 55)	50	(48 to 52)	43	(41 to 46)	-15	(-19 to -12)	-26	(-31 to -21)	100
Eastern Africa	76	(70 to 85)	74	(69 to 80)	74	(70 to 78)	73	(69 to 77)	63	(59 to 67)	-14	(-22 to -6)	-18	(-27 to -9)	100
Middle Africa	69	(57 to 82)	69	(58 to 81)	67	(58 to 78)	62	(56 to 70)	54	(48 to 61)	-15	(-28 to -4)	-22	(-35 to -6)	98.5
Northern Africa	45	(39 to 53)	35	(28 to 43)	26	(21 to 32)	23	(18 to 30)	22	(16 to 30)	-23	(-30 to -15)	-52	(-63 to -34)	100
Southern Africa	59	(51 to 68)	56	(51 to 61)	51	(46 to 56)	51	(44 to 59)	47	(39 to 56)	-12	(-23 to -2)	-20	(-35 to -3)	96.7
Western Africa	47	(42 to 52)	47	(43 to 50)	44	(41 to 49)	39	(36 to 43)	32	(29 to 35)	-15	(-20 to -9)	-32	(-40 to -22)	100
Asia	20	(17 to 26)	19	(17 to 24)	18	(16 to 23)	16	(14 to 19)	13	(11 to 17)	-7	(-12 to -3)	-36	(-50 to -16)	99.5
Eastern Asia	6	(3 to 14)	6	(3 to 14)	6	(3 to 14)	6	(3 to 13)	6	(3 to 13)	0	(-7 to 5)	-7	(-64 to 136)	54.4
Southern and central Asia	31	(24 to 42)	28	(22 to 35)	26	(20 to 32)	21	(18 to 25)	16	(12 to 21)	-15	(-25 to -7)	-49	(-64 to -28)	99.9
Southern Asia	32	(24 to 43)	29	(23 to 36)	26	(21 to 33)	22	(19 to 25)	16	(13 to 21)	-16	(-26 to -7)	-49	(-64 to -28)	99.9
Central Asia	12	(7 to 23)	10	(8 to 14)	9	(6 to 13)	8	(5 to 12)	6	(3 to 10)	-6	(-17 to -0)	-50	(-77 to -2)	95.4
Southeastern Asia	28	(22 to 37)	27	(23 to 33)	26	(22 to 31)	20	(17 to 27)	17	(14 to 22)	-11	(-20 to -4)	-40	(-55 to -18)	99.6
Western Asia	43	(35 to 53)	41	(34 to 51)	35	(28 to 44)	32	(26 to 39)	28	(21 to 36)	-16	(-25 to -7)	-36	(-51 to -17)	99.7
Latin America	49	(44 to 55)	46	(42 to 51)	44	(40 to 49)	41	(37 to 46)	40	(34 to 46)	-9	(-16 to -3)	-19	(-30 to -6)	98.7
Caribbean	44	(39 to 53)	44	(39 to 52)	47	(42 to 53)	44	(39 to 50)	42	(37 to 48)	-2	(-10 to 5)	-5	(-21 to 11)	71.1
Central America	51	(39 to 67)	46	(36 to 61)	44	(34 to 61)	41	(31 to 59)	39	(28 to 57)	-12	(-21 to -1)	-23	(-39 to -2)	95.9
South America	49	(43 to 55)	46	(42 to 50)	44	(40 to 47)	40	(36 to 45)	40	(34 to 46)	-9	(-16 to -2)	-19	(-31 to -4)	97.5
North America	19	(9 to 34)	21	(14 to 28)	24	(20 to 29)	25	(21 to 30)	24	(18 to 29)	4	(-11 to 16)	22	(-35 to 165)	70.2
Europe	8	(6 to 11)	8	(7 to 11)	9	(7 to 13)	8	(7 to 11)	8	(7 to 11)	0	(-3 to 3)	0	(-31 to 40)	52.8
Eastern Europe	6	(4 to 11)	5	(3 to 8)	8	(5 to 15)	7	(5 to 10)	7	(5 to 10)	1	(-4 to 5)	23	(-41 to 113)	65.5
Northern Europe	7	(4 to 15)	8	(5 to 15)	7	(4 to 13)	6	(4 to 11)	7	(5 to 11)	-1	(-6 to 3)	-9	(-49 to 59)	59.9
Southern Europe	10	(8 to 14)	11	(8 to 16)	10	(7 to 15)	11	(7 to 17)	10	(7 to 16)	0	(-5 to 6)	-3	(-39 to 63)	55.8
Western Europe	10	(8 to 15)	12	(9 to 17)	9	(6 to 14)	9	(7 to 13)	9	(7 to 12)	-2	(-6 to 2)	-15	(-44 to 30)	72.8
Oceania	23	(17 to 33)	24	(18 to 33)	26	(20 to 35)	26	(20 to 34)	23	(17 to 31)	0	(-9 to 7)	2	(-28 to 37)	50

* Posterior probability of a change in the estimated direction

Appendix Table 5. Estimated intended birth rates per 1,000 women 15-44 years old, by geographic area and time period

	1990-1994	90% UI	1995-1999	90% UI	2000-2004	90% UI	2005-2009	90% UI	2010-2014	90% UI	change	90% UI	% change	90% UI	prob. of change*
World	83	(79 to 85)	72	(69 to 73)	66	(63 to 67)	65	(62 to 66)	66	(64 to 68)	-17	(-20 to -14)	-20	(-23 to -17)	100
Developing countries	93	(88 to 96)	79	(76 to 81)	72	(68 to 73)	69	(66 to 71)	70	(67 to 72)	-23	(-26 to -19)	-24	(-28 to -21)	100
Developed countries	45	(40 to 48)	39	(36 to 41)	38	(35 to 40)	41	(39 to 43)	44	(41 to 46)	-1	(-5 to 4)	-2	(-10 to 10)	59.4
Excluding Eastern Europe	44	(37 to 48)	40	(36 to 43)	39	(36 to 42)	41	(38 to 43)	44	(40 to 46)	0	(-5 to 6)	0	(-11 to 17)	52.5
Africa	134	(130 to 137)	125	(121 to 128)	120	(117 to 122)	116	(113 to 118)	116	(113 to 118)	-18	(-22 to -14)	-14	(-16 to -11)	100
Eastern Africa	139	(130 to 145)	132	(126 to 138)	124	(119 to 127)	113	(109 to 117)	109	(105 to 112)	-30	(-37 to -21)	-21	(-26 to -16)	100
Middle Africa	162	(149 to 174)	157	(145 to 168)	151	(140 to 160)	144	(137 to 151)	138	(131 to 144)	-24	(-36 to -11)	-15	(-21 to -8)	99.9
Northern Africa	95	(87 to 102)	82	(74 to 88)	78	(71 to 83)	79	(72 to 84)	80	(72 to 86)	-15	(-23 to -8)	-16	(-24 to -9)	100
Southern Africa	64	(55 to 72)	51	(46 to 56)	49	(44 to 54)	42	(35 to 49)	41	(32 to 49)	-24	(-34 to -13)	-37	(-51 to -22)	100
Western Africa	167	(162 to 171)	158	(154 to 162)	154	(150 to 158)	154	(150 to 157)	156	(153 to 159)	-11	(-16 to -6)	-7	(-10 to -3)	99.9
Asia	88	(82 to 92)	73	(68 to 75)	64	(60 to 67)	62	(58 to 64)	63	(60 to 65)	-25	(-29 to -20)	-28	(-32 to -24)	100
Eastern Asia	71	(62 to 74)	51	(44 to 54)	44	(37 to 47)	46	(38 to 49)	51	(44 to 54)	-20	(-26 to -13)	-28	(-36 to -21)	100
Southern and central Asia	112	(101 to 119)	97	(90 to 103)	85	(78 to 90)	77	(73 to 80)	74	(70 to 78)	-37	(-46 to -27)	-33	(-39 to -27)	100
Southern Asia	112	(101 to 119)	98	(90 to 104)	85	(78 to 90)	77	(73 to 80)	74	(69 to 78)	-38	(-46 to -27)	-34	(-39 to -27)	100
Central Asia	116	(105 to 122)	93	(90 to 95)	80	(76 to 84)	83	(79 to 86)	87	(83 to 90)	-29	(-35 to -19)	-25	(-29 to -17)	99.9
Southeastern Asia	80	(71 to 86)	66	(60 to 70)	59	(53 to 63)	61	(54 to 64)	60	(55 to 63)	-20	(-27 to -12)	-25	(-32 to -16)	100
Western Asia	96	(86 to 104)	82	(73 to 90)	76	(67 to 83)	71	(63 to 76)	68	(60 to 74)	-28	(-37 to -19)	-29	(-37 to -21)	100
Latin America	60	(53 to 65)	52	(47 to 56)	45	(40 to 49)	40	(34 to 44)	36	(29 to 41)	-24	(-31 to -18)	-40	(-50 to -31)	100
Caribbean	58	(50 to 64)	49	(41 to 54)	40	(33 to 44)	37	(31 to 42)	35	(30 to 41)	-23	(-29 to -14)	-39	(-49 to -27)	100
Central America	76	(60 to 87)	68	(53 to 78)	58	(41 to 68)	51	(33 to 62)	45	(27 to 56)	-31	(-42 to -21)	-41	(-58 to -30)	100
South America	54	(48 to 59)	47	(43 to 51)	41	(37 to 45)	36	(32 to 40)	32	(25 to 37)	-22	(-29 to -15)	-41	(-52 to -29)	100
North America	48	(33 to 58)	44	(36 to 50)	40	(36 to 45)	42	(37 to 46)	43	(37 to 49)	-5	(-16 to 10)	-10	(-29 to 30)	72.2
Europe	46	(43 to 48)	39	(37 to 41)	39	(35 to 41)	43	(40 to 44)	46	(44 to 48)	0	(-2 to 4)	1	(-5 to 9)	62.3
Eastern Europe	49	(44 to 51)	38	(35 to 39)	34	(27 to 37)	41	(38 to 43)	45	(42 to 48)	-3	(-7 to 2)	-7	(-14 to 4)	86.3
Northern Europe	55	(47 to 58)	51	(43 to 54)	49	(42 to 52)	53	(48 to 55)	55	(50 to 57)	0	(-3 to 6)	0	(-6 to 12)	52
Southern Europe	39	(35 to 41)	35	(31 to 38)	37	(32 to 40)	39	(32 to 42)	42	(36 to 45)	3	(-3 to 8)	8	(-7 to 22)	83.3
Western Europe	43	(38 to 46)	41	(36 to 44)	43	(39 to 46)	44	(40 to 47)	47	(44 to 49)	4	(0 to 9)	10	(1 to 24)	96.3
Oceania	60	(50 to 67)	59	(49 to 64)	56	(47 to 62)	57	(49 to 63)	58	(50 to 64)	-3	(-9 to 6)	-4	(-15 to 12)	67.6

* Posterior probability of a change in the estimated direction

Appendix Table 6. Estimated abortion rates per 1,000 women 15-44 years old, by geographic area and time period

	1990-1994	90% UI	1995-1999	90% UI	2000-2004	90% UI	2005-2009	90% UI	2010-2014	90% UI	change	90% UI	prob. of change*
World	40	(39 to 48)	37	(35 to 43)	34	(33 to 41)	34	(32 to 41)	35	(32 to 43)	-5	(-11 to -0)	95.4
Developing countries	39	(37 to 47)	36	(34 to 43)	35	(32 to 41)	34	(32 to 42)	36	(33 to 45)	-3	(-9 to 4)	74.8
Developed countries	46	(41 to 59)	40	(36 to 51)	34	(31 to 44)	30	(28 to 40)	27	(24 to 36)	-19	(-26 to -15)	100
Excluding Eastern Europe	30	(25 to 47)	27	(22 to 41)	25	(21 to 37)	23	(19 to 34)	22	(18 to 33)	-9	(-17 to -4)	99.9
Africa	33	(28 to 50)	33	(29 to 48)	34	(30 to 47)	33	(29 to 45)	34	(31 to 46)	1	(-8 to 7)	50.9
Eastern Africa	33	(26 to 46)	33	(28 to 44)	34	(30 to 44)	32	(29 to 40)	34	(31 to 41)	1	(-9 to 8)	54.4
Middle Africa	32	(21 to 62)	34	(22 to 64)	35	(24 to 64)	33	(23 to 60)	35	(24 to 62)	3	(-10 to 14)	64.5
Northern Africa	41	(25 to 92)	39	(24 to 84)	37	(23 to 79)	38	(23 to 79)	38	(23 to 82)	-3	(-25 to 13)	66.6
Southern Africa	32	(17 to 68)	33	(18 to 65)	34	(19 to 66)	33	(18 to 64)	34	(19 to 69)	2	(-16 to 19)	59
Western Africa	28	(23 to 41)	29	(25 to 40)	30	(26 to 39)	29	(25 to 37)	31	(28 to 39)	3	(-7 to 9)	68.3
Asia	41	(37 to 50)	37	(33 to 45)	34	(31 to 42)	34	(30 to 43)	36	(31 to 46)	-5	(-13 to 4)	82.8
Eastern Asia	43	(38 to 56)	38	(32 to 49)	34	(27 to 47)	34	(26 to 48)	36	(26 to 53)	-8	(-22 to 7)	83.3
Southern and central Asia	35	(28 to 48)	33	(27 to 42)	32	(28 to 38)	33	(27 to 42)	37	(30 to 50)	1	(-11 to 15)	56.6
Southern Asia	35	(27 to 47)	32	(26 to 41)	32	(28 to 38)	33	(27 to 42)	37	(29 to 50)	2	(-11 to 16)	59.1
Central Asia	54	(49 to 63)	47	(44 to 55)	41	(36 to 52)	39	(32 to 52)	42	(33 to 56)	-12	(-22 to -0)	95.3
Southeastern Asia	46	(35 to 74)	42	(32 to 67)	37	(28 to 62)	35	(26 to 60)	35	(25 to 62)	-11	(-25 to 1)	93.1
Western Asia	42	(33 to 65)	42	(34 to 66)	41	(33 to 63)	35	(28 to 59)	34	(25 to 59)	-8	(-18 to 4)	87.2
Latin America	40	(37 to 47)	40	(36 to 50)	41	(36 to 52)	43	(37 to 57)	44	(36 to 61)	4	(-6 to 19)	74.9
Caribbean	60	(48 to 94)	60	(49 to 92)	59	(46 to 92)	60	(46 to 93)	59	(44 to 95)	-1	(-19 to 17)	53.5
Central America	27	(23 to 34)	28	(23 to 37)	29	(24 to 38)	32	(29 to 38)	33	(25 to 45)	6	(-3 to 17)	83.9
South America	43	(38 to 52)	43	(36 to 55)	44	(36 to 58)	46	(37 to 65)	48	(35 to 71)	5	(-10 to 27)	69.1
North America	25	(24 to 25)	22	(21 to 22)	20	(20 to 21)	19	(18 to 20)	17	(16 to 18)	-7	(-9 to -6)	100
Europe	52	(48 to 64)	45	(42 to 56)	38	(35 to 48)	34	(31 to 42)	29	(27 to 37)	-23	(-30 to -18)	100
Eastern Europe	88	(80 to 107)	75	(69 to 93)	61	(55 to 75)	51	(47 to 62)	42	(37 to 51)	-47	(-60 to -38)	100
Northern Europe	22	(20 to 25)	20	(19 to 24)	19	(18 to 22)	19	(18 to 21)	18	(17 to 20)	-4	(-6 to -3)	99.9
Southern Europe	37	(26 to 76)	33	(24 to 67)	29	(21 to 58)	26	(19 to 55)	26	(18 to 55)	-11	(-32 to -1)	95.6
Western Europe	14	(11 to 26)	14	(11 to 25)	15	(12 to 27)	16	(12 to 28)	16	(12 to 28)	2	(-3 to 6)	77.8
Oceania	20	(18 to 27)	21	(19 to 29)	21	(18 to 30)	20	(17 to 29)	19	(15 to 28)	-1	(-4 to 3)	72.3

* Posterior probability of a change in the estimated direction
Note: Estimates of abortion incidence have been updated since publication in Sedgh et al.