
Comparison of Abortion Worldwide Report figures to published estimates of global abortions

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Abstract: The Abortion Worldwide Report (AWR) figures are intentionally limited to reported data and well-constrained estimates. Our figures consequently do not address the substantial numbers of illegal or unreported legal abortions that have occurred and continue to occur worldwide. The Guttmacher Institute and the World Health Organization have published estimates for total worldwide abortions that are typically 2-4 times higher than our figures. This report examines these differences.

Using reported data, the Abortion Worldwide Report (Jacobson and Johnston, 2017) shows a current rate of 12.5 million abortions per year globally. Figures in the AWR are intentionally limited to reported data and well-constrained estimates. These figures consequently do not address the substantial numbers of illegal or unreported legal abortions that have occurred and continue to occur worldwide. The discussion here considers this report's global estimate compared to other published estimates.

Estimates addressing unreported abortions are necessarily problematic. Global abortion estimates by the Guttmacher Institute (GI) and World Health Organization (WHO) largely utilize studies based on limited samples extrapolated to country or regional populations. Samples include surveys of women regarding their reproductive practices and hospital data on women presenting themselves for complications from abortion, both spontaneous and induced. Sample sizes may be in the thousands or even hundreds. To develop country- and regional-level estimates, such samples must be extrapolated with assumptions regarding uniformity in reproductive practices, adjustments for underreporting, and relative numbers and medical complications for spontaneous vs. induced abortions. Unfortunately these estimation methods are easily biased by researchers' perspectives regarding the legitimacy of abortion. The inherent problems with such estimates are reviewed by Antkowiak and O'Bannon (2003) and more recently in Koch et al. (2012a, 2012b, 2012c). In countries where abortion is legal but the government does not collect data (e.g. Nepal, Ethiopia), such estimates have more statistical grounding (although we may still consider uncertainties to be too high for our compilation).

Table 1 summarizes published estimates (mostly GI and/or WHO studies) of global abortions in comparison to the figures in our work (AWR), identified by source publication. Published estimates may address some or all of the following:

- legal and reported abortions (most analogous to our work),
- legal abortions (including those unreported),
- illegal abortions,
- “unsafe” abortions (those deemed particularly hazardous to women by the researchers, typically similar in numbers to illegal abortions), and
- total abortions.

Some of these estimates as published include confidence intervals (in parentheses in Table 1) in addition to a nominal estimate. Several figures for legal abortions are totals of country-level abortion data reported in the source publication, making these totals a lower limit to world abortions (and thus indicated by “>”). The last column gives, for each published source, the ratio of the claimed or implied total abortions to our figures for the same year.

Figure 1 shows our figures for 1955-2015 and published estimates with error bars. Note that Sedgh et al. (2016) (hereafter S16) significantly revised their estimates upward relative to prior estimates by the same authors. These new estimates notably were reported with large error bars on the high side but not the low side. As these are the global estimates currently preferred by the pro-abortion community, we will address these estimates in particular.

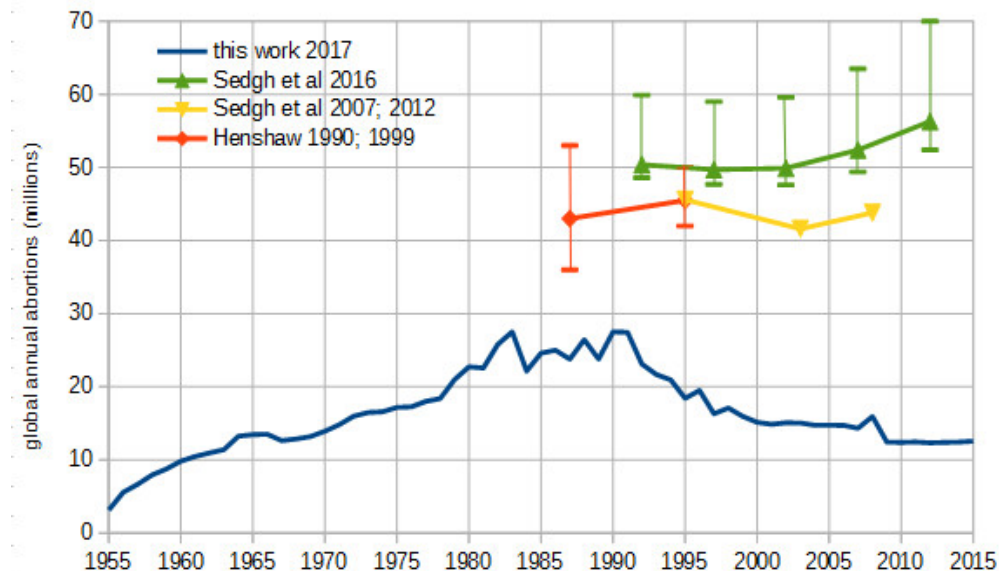


Figure 1. Main published estimates of global abortions (with error bars) compared to figures from this work (AWR).

It is beyond the scope of this work and the AWR to review the estimation methodologies employed in the GI and WHO studies. For now we suggest that the criticisms by Antkowiak and O’Bannon (2003), while addressing earlier work such as Henshaw et al. (1999), largely apply as well to the later studies up to and including S16. However, we can provide some insight on the plausibility of the S16 claims in light of the AWR database.

Table 1. Published estimates of global abortions compared to figures from AWR.

year	legal abortions, AWR figures (millions)	Published estimates of global abortions (millions)						ratio of claimed total to AWR figures
		legal and reported abortions	legal abortions	illegal abortions	unsafe abortions	total abortions	source	
1985	24.60							
1986	25.01		33 (30-40)					
1987	23.79	22	28 (26-31)	15 (10-22)		43 (36-53)	Henshaw (1990)	1.81 (1.51-2.23)
1988	26.44							
1989	23.79							
1990	27.52							
1991	27.46							
1992	23.11					50.4 (48.6-59.9)	Sedgh et al. (2016)	2.18 (2.10-2.59)
1993	21.67				19-20		WHO (2007)	>1.90 (1.88-
1994	20.94							
1995	18.41		25.6	19.9		45.5 (42-50)	Henshaw et al. (1999)	2.47 (2.28-2.72)
					19		Grimes et al.	>2.03
					20	45.6	Sedgh et al. (2012)	2.48
1996	19.50		>16.6				Sedgh et al.	
1997	16.31					49.7 (47.7-59.0)	Sedgh et al. (2016)	3.05 (2.93-3.62)
1998	17.10							
1999	15.96							
2000	15.14				19		WHO (2004)	>2.25
2001	14.86							
2002	15.08					49.9 (47.6-59.6)	Sedgh et al. (2016)	3.31 (3.16-3.95)
2003	15.05				19.7	41.6	Sedgh et al.	2.76
					19.7		WHO (2007)	>2.31
			>16				Sedgh et al.	
2004	14.74							
2005	14.75							
2006	14.71							
2007	14.32					52.4 (49.4-63.5)	Sedgh et al. (2016)	3.66 (3.45-4.43)
2008	15.93				21.6 (20.8-22.3)		WHO (2008)	>2.36 (2.31-
			>15.4				Sedgh et al. (2011)	
					21.5	43.8	Sedgh et al. (2012)	2.75

2009	12.44							
2010	12.39							
2011	12.45							
2012	12.33					56.3 (52.4-70.0)	Sedgh et al. (2016)	4.57 (4.25-5.68)
2013	12.40							
2014	12.43							
2015	12.55							

First, we review our general findings on abortion trends over time at the country level (Jacobson and Johnston, 2017):

- When a country authorizes abortion, the rise in abortion numbers to near-peak levels is typically rapid, occurring within 5-25 years;
- In the 3-4 decades after peak (or near-peak) levels are attained, some countries exhibit significant drops in abortion levels (40-70%) while others maintain near-peak levels;
- Following the fall of communism in the Warsaw Pact countries (i.e., former Soviet republics and eastern European nations), abortions fell dramatically (70-90%) and usually consistently to the present day.

These findings may be compared to the model of abortion level trends during demographic/fertility transition given in WHO (2011), based on that of Requena (1970). For background, demographic transition describes the typical changes in population dynamics in a country during development:

- similarly high birth and death rates in the pre-development economy, yielding low population growth;
- high birth rate and low death rate in the developing economy, yielding high population growth;
- similarly low birth and death rates in the developed economy, yielding low (or negative) population growth.

In the WHO model of fertility dynamics, the transition in birth rates typically involves:

- low fertility controls (including low abortion rates) and consequent high birth rates in the early stage,
- increase in abortion to a peak as the primary initial means of reducing fertility in the intermediate stage, and
- subsequent decrease in abortions as other contraceptive methods become the primary means of fertility control, sustaining low fertility in the late stage.

This model relies on assumptions regarding the importance of contraception methods as promoted by organizations advocating artificial fertility control. Significantly, the post-peak drop in abortions as optimistically portrayed in the model is only seen to occur in reported

country data in about 40% of the non-communist countries for which we could examine trends. This slight prevalence for sustained high abortion levels holds for both developed and developing country groups alike, tending to refute the claim that access to modern contraceptives is a decisive factor in leading to eventual declines in abortion levels. Note that countries that are currently or formerly communist show trends of their own, in exhibiting some of the highest abortion levels during communism followed by drops in levels (those drops being most dramatic in countries where communism is repudiated).

Consistent with the optimistic WHO model, many authors from Sachdev (1988) to S16 suggest that developing countries have demonstrated post-peak declines in abortion levels. Again, we do not find post-peak declines to be the typical trend for countries, developed or not. S16 in particular claims that abortion rates are declining in recent decades in developed countries, but this is an artifact of their combining former communist countries with western democracies in their analysis.

S16 addresses abortion trends since 1990 with regional abortion estimates for five 5-year periods: 1990-94, 1995-99, 2000-04, 2005-09, and 2010-14. We calculated trends for countries in the AWR database for the same periods and regions, in terms of raw abortion rates (annual abortions per 1000 total population).

We first present results using country groupings based on similarities in trends identified in this report along with common socio-economic factors. The six country groups, with AWR-included countries or country counts in parentheses, are:

- **Developed, East Asia**—developed economies (Republic of China [Taiwan], Hong Kong, Japan, Republic of Korea, Singapore)
- **Developed, North America, Oceania, West Asia**—developed economies outside Europe or East Asia (Australia, Bermuda, Canada, Greenland, Israel, New Zealand, United States)
- **Developing, non-communist**—developing countries in Asia, Africa, Latin America, and Oceania (27 countries/territories)
- **Developing, communist**—developing countries currently or formerly communist (P.R. China, Cuba, Mongolia, Vietnam)
- **Western Europe**—developed economies (22 countries/territories)
- **Former Warsaw Pact**—formerly communist countries of the former Soviet Union and Eastern Europe (31 countries/other areas)

Of the total 2014 population of countries in these groups, the percentage that is in countries covered by the AWR database are:

- Developing, non-communist: 38%
- Developing, communist: 87%
- Remaining groups: >99% each (Developed, East Asia; Developed, North America, Oceania, West Asia; Western Europe; Former Warsaw Pact)

Thus, five of the six groups are well represented in the AWR database. Of the countries not represented in the database, about 90% of their total population is in non-communist developing countries. For that country group, the database includes most of the countries with more permissive abortion policies; most of the countries not covered have restrictive policies. Consequently we have high confidence in results for collective groups apart from developing countries.

For developing groups, the rates calculated here have larger uncertainties: these countries with available abortion data tend to be those with the greatest suspected levels of underreporting, although they do include most of the developing nations with broadly authorized abortion. Table 2 summarizes known abortions, total population, and raw abortion rates for these groups. For each group, two rows of data are shown: the first is for countries and territories included in the AWR data set, and the second is for countries not included in AWR.

Table 2. Known abortions, populations, and raw abortion rates for world groups, from AWR data

Group	Number of countries and territories	Total known abortions (millions)	Total population (millions)		Raw abortion rate (abortions/1000 total pop./year)			Change in raw abortion rate
		1990-2015	1990	2014	1990	2000	2010	1990 to 2015
Developed, East Asia	5 AWR	16.1	195.3	212.2	4.81	3.16	2.08	-56.8%
	1 non-AWR	0.0	0.4	0.6	N/A	N/A	N/A	N/A
Developed, North America, Oceania, West Asia	7 AWR	38.6	302.9	388.6	5.98	4.51	3.52	-41.1%
	9 non-AWR	0.0	0.4	0.6	N/A	N/A	N/A	N/A
Developing, non-communist	27 AWR	25.2	1,067.6	1,557.1	0.84	0.81	0.60	-28.6%
	129 non-AWR	0.0	1,576.0	2,517.6	N/A	N/A	N/A	N/A
Developing, communist	4 AWR	230.7	1,215.2	1,463.1	12.09	5.48	4.77	-60.5%
	7 non-AWR	0.0	123.9	209.5	N/A	N/A	N/A	N/A
Western Europe	22 AWR	23.3	378.0	417.2	2.40	2.27	2.36	-1.7%
	17 non-AWR	0.0	1.2	2.2	N/A	N/A	N/A	N/A
Former Warsaw Pact	31 AWR	95.5	410.5	409.1	20.10	8.77	4.83	-76.0%
	2 non-AWR	0.0	0.0	0.2	N/A	N/A	N/A	N/A
All countries	96 AWR	429.4	3,569.4	4,447.3	7.70	3.80	2.88	-62.6%
	165 non-AWR	0.0	1,701.9	2,730.7	N/A	N/A	N/A	N/A
World total	261	429.4	5,271.3	7,177.9	N/A	N/A	N/A	N/A

Figure 2 shows raw abortion rates for these groups for 1990-2015. By far the highest abortion rates are for those groups formerly or currently communist, and these groups have also shown

the larger percentage declines in abortion rates in this time period: 76% for the former Warsaw Pact group and 61% for the developing communist group. The next greatest decline is in developed countries outside Europe, followed by a moderate decline in the available non-communist developing nation data; these groups show declines of 29% to 57%. Western Europe, however, is unique among groups in having a stable cumulative raw abortion rate for the last 25 years. Group-level raw abortion rates in 2015 vary by a factor of eight, or by a factor of 2.4 apart from the developing non-communist group. Rates at the country level vary to even greater degrees. (Note that relative differences in raw abortion rates will differ from differences in abortion rates per female population of child-bearing age; however, the effect on the comparisons from use of raw abortion rate is less than a factor of 2.)

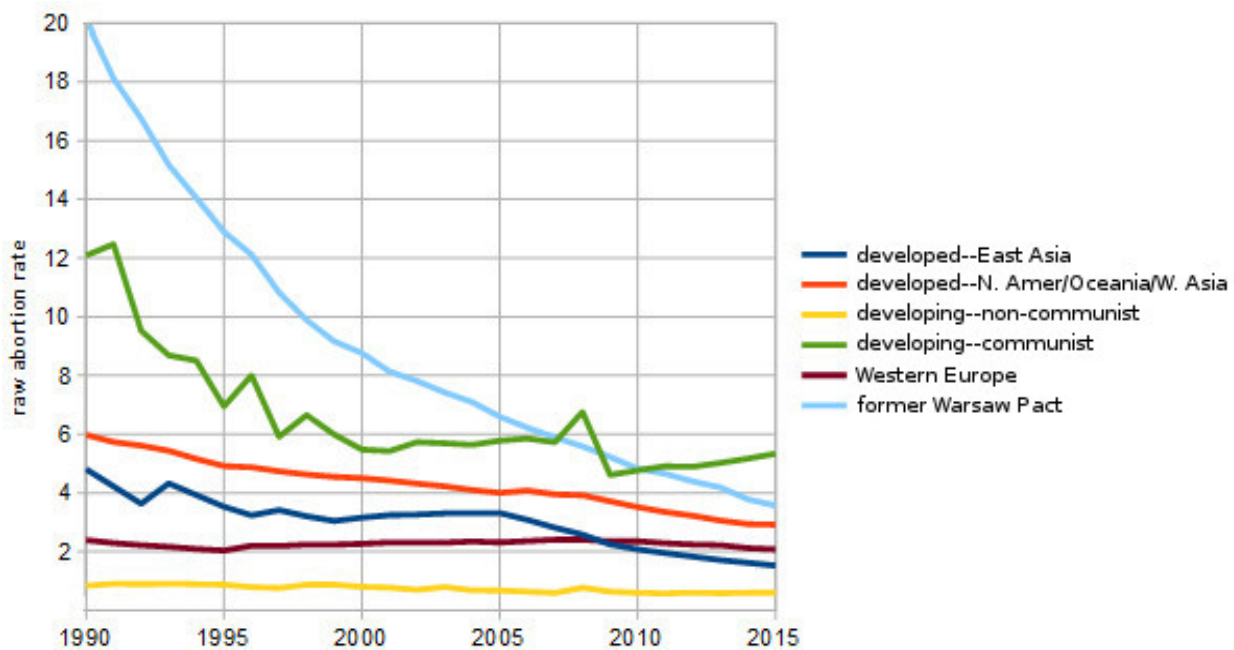


Figure 2. Raw abortion rates from AWR data for groups used in Table 2.

The S16 study divides the world into 18 regions based more on geography, and estimates each region’s abortions for 5 time periods of 5-years each, collectively spanning from 1990 to 2014. Ten of these regions are mostly developing non-communist regions; these ten regions accounted for 53% of the world’s population in 2012, but account for 58% of the world’s 2012 abortions as estimated by S16. For these 18 regions, Table 3 gives raw abortion rates for five years based on the AWR database abortion figures and based on the S16 abortion estimates. For each region, the table also gives the count of countries (or territories) represented in the AWR database and included in the AWR region. The range from the lowest to highest raw abortion rate for these regions is only 1.66, a phenomenal degree of uniformity given that these regions include the widely varying economic, cultural, and religious backgrounds of Africa, Latin America, the Middle East, and south central Asia. Further, the average change in abortion rate for these regions from 1992 to 2012, as estimated by S16, is an 11% increase, with a range from a 16% decrease to a 35% increase.

Table 3. Raw abortion rates for regions used in S16, based on AWR and on S16 estimates.

Regions used in S16	Raw abortion rates based on AWR database						Raw abortion rates derived from S16					
	Country count	1992	1997	2002	2007	2012	Country count	1992	1997	2002	2007	2012
AFRICA-EAST	4	0.86	0.98	0.98	1.11	0.81	18	6.93	6.95	7.57	7.30	7.61
AFRICA-MIDDLE	0	N/A	N/A	N/A	N/A	N/A	9	6.54	6.84	7.00	6.94	7.48
AFRICA-NORTH	1	2.35	1.96	1.54	1.45	1.37	6	8.54	8.26	8.37	8.70	9.23
AFRICA-SOUTH	1	0.03	0.54	1.44	1.88	1.67	5	6.56	8.04	7.56	9.01	8.87
AFRICA-WEST	0	N/A	N/A	N/A	N/A	N/A	16	5.73	5.93	6.05	6.43	6.88
AMER-CARIBBEAN	8	5.65	5.19	4.38	4.13	4.33	15	14.66	13.83	13.14	15.01	14.45
AMER-CENTRAL	4	0.09	0.14	0.13	0.16	0.24	8	6.80	6.97	7.19	8.08	8.21
AMER-NORTH	4	5.68	4.77	4.33	3.95	3.23	2	5.60	4.95	4.38	3.89	3.44
AMER-SOUTH	3	0.20	0.47	0.39	0.27	0.17	12	10.09	10.49	10.62	11.25	11.44
ASIA-EAST	6	8.98	5.64	5.05	5.30	4.61	6	10.78	9.22	8.23	8.37	8.24
ASIA-SOUTH/CENTRAL	7	1.34	0.95	0.90	0.76	0.67	14	7.78	7.44	7.53	7.83	8.83
ASIA-SOUTHEAST	2	17.07	16.83	9.26	6.32	3.52	10	11.15	10.47	9.37	8.57	8.35
ASIA-WEST	8	5.48	4.36	1.70	1.67	1.48	18	9.53	10.16	9.62	8.21	7.98
EUROPE-EAST	11	18.73	12.64	9.31	6.91	5.00	10	19.33	16.88	13.58	11.51	8.91
EUROPE-NORTH	14	4.06	3.53	3.36	3.38	3.08	9	4.30	4.24	4.18	4.12	3.00
EUROPE-SOUTH	13	3.43	2.36	2.02	2.05	1.85	12	8.33	7.58	6.14	5.40	5.14
EUROPE-WEST	6	2.09	2.04	2.16	2.07	2.02	6	2.78	2.72	3.21	3.17	3.17
OCEANIA	4	4.56	4.63	4.41	4.06	3.30	9	3.65	3.40	3.18	2.97	2.79

Table 4 gives cumulative results for several overlapping collections of S16 regions. These collections are (with numbers of S16 regions in parentheses):

- Africa (5), Latin America (3), and Asia (4)—these include mostly developing countries and contribute the most to S16 total world estimates;
- mostly developing (12) or developed (6);
- mostly communist or ex-communist (3); and
- world total (18).

The range of abortion rates between these collected regions is far greater in the AWR results than in the S16 estimates.

Table 4. Raw abortion rates for groupings of regions used in S16, based on AWR and on S16 estimates.

Groupings of regions used in S16	Raw abortion rates based on AWR database						Raw abortion rates derived from S16					
	Country count	1992	1997	2002	2007	2012	Country count	1992	1997	2002	2007	2012
Africa	6	0.49	0.81	1.39	1.70	1.48	54	6.88	7.01	7.23	7.39	7.75
Latin America	15	1.11	1.06	0.89	0.84	0.90	35	9.59	9.82	9.91	10.69	10.80
Asia	23	6.22	4.13	3.42	3.35	2.81	48	9.60	8.74	8.19	8.17	8.49
Mostly developing	38	2.45	2.09	1.45	1.18	0.94	131	8.46	8.30	8.20	8.27	8.72
Mostly developed	41	4.10	3.48	3.25	3.08	2.67	38	5.21	4.76	4.36	3.99	3.62
Mostly communist or ex-communist	17	10.79	6.88	5.77	5.57	4.67	16	12.35	10.56	9.13	8.87	8.35
World total	96	6.59	4.52	3.70	3.43	2.83	185	9.23	8.52	7.99	7.91	8.02

The S16 estimated raw abortion rates for Africa, Latin America, and south central-southwest Asia are shown in Figure 2 (dotted lines), compared to those from the AWR database (solid lines) for the six groups described above. Note that the S16 estimated rates are similar for the three very different developing regions, as well as far greater than the known current rates for any of the six regions described above—even higher than the rates in communist or formerly communist regions in the last decade. To be clear: for the S16 estimates for developing regions to be true, they would require regional abortion rates greater than the documented abortion rates for any major world region. In fact, they would have to exceed on average all but the highest 5% of known country-level rates for the last 5 years (see Figure 4). Further, these rates in regions where abortion is mostly illegal would have to be higher than rates in regions where abortion is authorized and even encouraged or subsidized.

There is no doubt that illegal or unreported abortions, not represented in the AWR database, are occurring in substantial numbers in the developing world. However, comparison to the very wide range of abortion behaviors for the 100 countries in the AWR database shows that the S16 estimates are extremely implausible, both by having too little variation between regions and by being too high in an absolute sense. These conclusions are consistent with other studies that yield much lower abortion rates in some developing nations based on more empirical data and fewer subjective assumptions than the GI and WHO studies (e.g. Koch et al., 2012b).

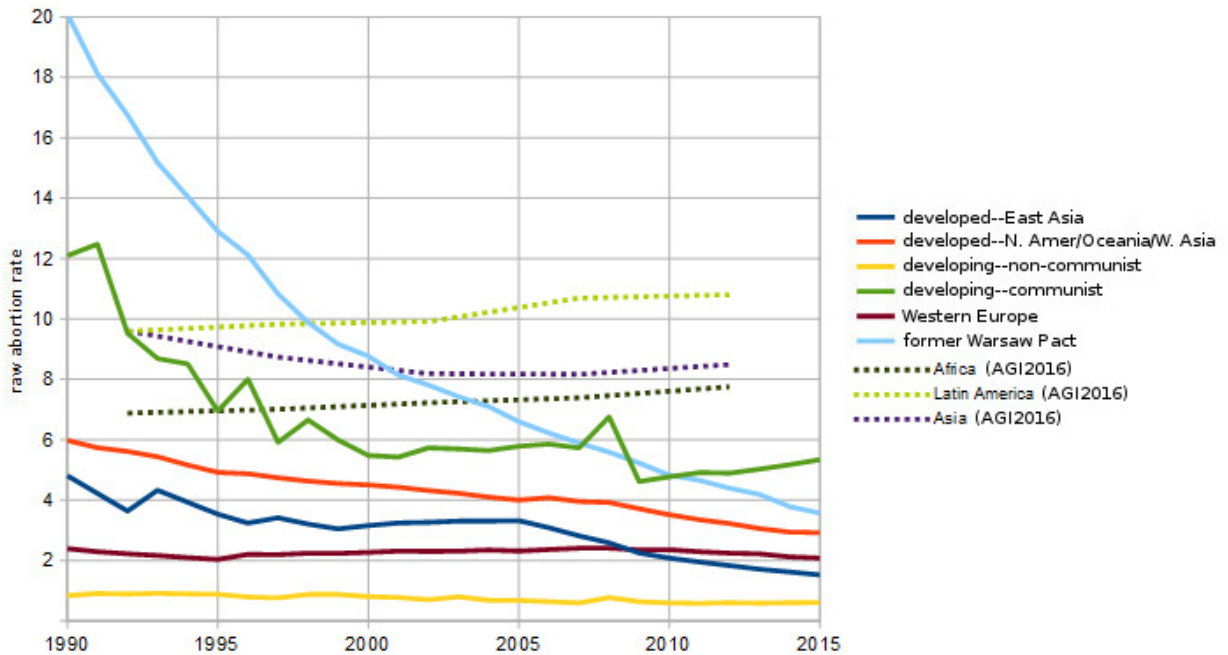


Figure 3. Raw abortion rates from AWR data (solid lines) for the six country groups in Table 2, and S16 estimates for developing regions (dotted lines) in Table 4.

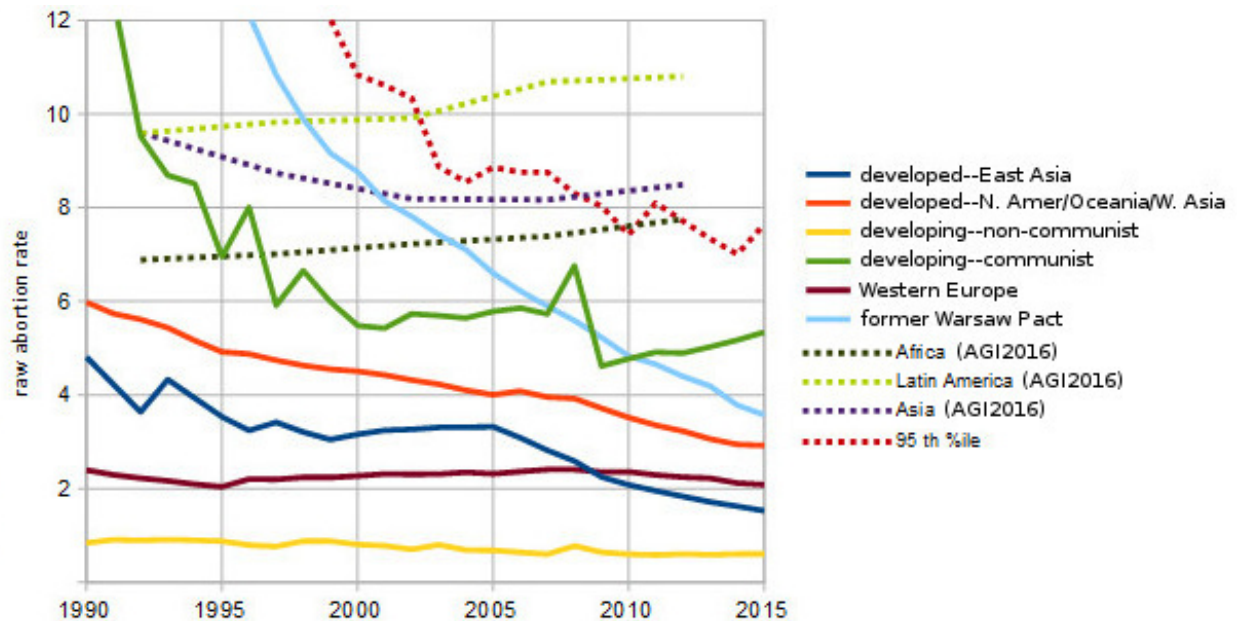


Figure 4. Same as Fig. 3, expanding the abortion rate range 0-12 and showing the 95th percentile raw abortion rate for countries in the AWR database.

The limited variations of S16's estimated abortion rates across developing regions also results from insufficient samples, forcing the authors to use data from other regions or time periods to build estimates:

- Middle Africa estimates are based on 2 studies covering 2010-2014, with no observations for the other four time periods;
- Of the five Africa regions, no observations for 1990-1994 are used outside Northern Africa (likely most or all of these are for Tunisia);
- No observations are used for Central America or South America for 2010-2014;
- Of the 50 time period/geographic region combinations corresponding mostly to non-communist developing countries (5 time periods for each of the 10 regions), 13 have no observations and 8 have only 1-2 observations.

It is highly likely that the assumptions used by S16 to turn small samples into global estimates are tainted by an underlying assumption that abortion is practiced at similar levels by women regardless of accessibility, legality, or culture.

Finally, in Table 5 we illustrate several possible values of global annual abortions given different applications of AWR-derived rates. We do not advocate these alternate figures as estimates, but we do note that they offer possible limits of plausibility, all outside the range of estimates in S16.

Table 5: Annual global abortions in 2015 (in millions)

(1) AWR results for countries in the AWR database; no contribution from non-AWR countries	12.5
(2) AWR results for AWR countries; for non-AWR countries, use the average raw abortion rate for the Table 1 group of country membership	15.2
(3) same as (2), except for the non-communist developing group (both AWR and non-AWR countries), use world average rate	21.3
(3) same as (2), except for the non-communist developing group use the highest rate for any of the other 5 groups	34.5
S16 estimate	56.3 (52.4-70.0)

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