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The plateauing of cesarean rates in industrialized countries



OBJECTIVE: There has been growing concern with the increase in cesarean rates in industrialized, transition, and developing countries,¹ a concern reflected in the recent consensus statement on “Safe prevention of the primary cesarean delivery.”² This letter updates an earlier paper³ that examined trends in cesarean rates in industrialized countries through 2007.

METHODS: To enhance comparability we included only the 21 countries that met 3 criteria: (1) $\geq 50,000$ births annually; (2) per capita gross domestic product of at least \$20,000 in 2013; and (3) consistent reporting of national cesarean rates from 1988 through 2013 (Table). Data were drawn from 3 public use sources: (1) the Organization for Economic Co-operation and Development; (2) the World Health Organization (WHO) European Health for All database; and (3) country reports where available. The analysis compared 5-year intervals to examine if the annual change in cesarean rates in a given interval differed from the annual change in the next period. The slope of each country's trend line for a 5-year interval was compared by calculating an exponentiated change in rate (multiplicative scale), which measures the ratio of annual rate of change during 1 period (eg, 2008 through 2013) compared to a prior period (eg, 2003 through 2008). We had complete data for all countries from 2000 through 2013. From 1988 through 1999 we had complete data on 13 countries. In the case of some countries, data reporting did not begin until after 1990 (Israel 1998; Austria 1995) or there was a period of missing data (eg, Switzerland 1992 through 1997). The Table presents data back to 1988 for descriptive purposes, but analysis focuses on the period from 1993 through 2013 where data were relatively complete. Since the United States had almost half of all births, weighted averages are presented with and without the United States. The methods are described in more detail elsewhere.³

RESULTS: There was a marked increase in cesarean rates in the decade from 1993 through 2003 with countries reporting an average increase of 40% (45% without the United States) in their cesarean rate, whereas the average increase from 2003 through 2013, with or without the United States, was 11%. Every country reported a smaller percent increase from 2003 through 2013 than from 1993 through 2003. In the most recent 5-year period, 2008 through 2013, the average increase was only 1.5% (data not shown), with 6 of the countries reporting declines in their cesarean rates. The exponentiated rates show none of the 21 countries experienced a significant increase from 2008 through 2013 compared to the prior period, while 10 experienced a significant decrease.

Of the 5 countries with rates $>30\%$ in 2008, Italy reported a decline, 3 (Portugal, United States, and Switzerland) remained essentially unchanged, and only Australia increased by more than a single percentage point. Only the Czech Republic and Slovak Republic reported recent rapid increases.

DISCUSSION: Cesarean rates in industrialized countries have generally plateaued, but at rates that are higher than recommended by WHO.⁴ Industrialized countries' efforts to control their cesarean rates can serve as a model for rapidly industrializing countries, such as Brazil and China, with high current cesarean rates.⁵ ■

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TABLE
Cesarean rates (per 1000 live births) in industrialized countries, 1988 through 2013

Country	1988	1993	1998	2003	2008	2013	Change 1993 through 2003	Change 2003 through 2013	Exponentiated change in rate 2003 through 2008 vs 1998 through 2003	Exponentiated change in rate 2008 through 2013 vs 2003 through 2008
Australia	167	188	213	287	305	327	52.3%	14.2%	0.94 ^a	1.00
Austria	^b	^b	146	207	271	288	^b	39.1%	0.98 ^a	0.96 ^a
Belgium	102	129	144	176	196	207	36.0%	17.8%	0.98 ^a	0.99
Canada	^b	175	188	248	264	273	41.5%	10.2%	0.95 ^a	0.99
Czech Republic	75	91	123	153	205	249	68.0%	62.7%	1.02 ^a	0.97 ^a
Denmark	129	125	137	192	209	221	53.1%	15.2%	0.94 ^a	0.98
Finland	138	146	153	162	165	158	10.8%	-2.3%	0.99 ^a	1.00
France	129	155	169	193	206	208	24.6%	7.8%	0.99 ^a	0.99 ^a
Germany	^b	166	191	248	294	306	49.7%	23.4%	0.98 ^a	0.97 ^a
Ireland	97	116	^b	234	256	285	101.7%	21.7%	0.97 ^a	1.00
Israel	^b	^b	134	156	169	158	^b	1.3%	1.00	0.97 ^a
Italy	188	241	291	378	386	361	56.9%	-4.4%	0.95 ^a	0.98 ^a
Netherlands	^b	84	111	135	143	164	60.3%	21.2%	0.97 ^a	1.03
New Zealand	112	138	182	223	230	256	61.6%	14.8%	0.96 ^a	1.02
Norway	128	125	137	155	169	164	24.1%	5.7%	0.99	0.98 ^a
Portugal	148	225	276	319	356	350	41.4%	9.9%	0.98	0.97 ^a
Slovak Republic	^b	106	133	181	233	307	71.2%	69.4%	0.97 ^a	1.02
Spain	129	173	205	238	247	252	37.2%	5.8%	0.97 ^a	0.99
Sweden	112	116	138	165	167	164	42.2%	-0.7%	0.96 ^a	0.99
Switzerland	171	^b	229	268	325	330	^b	23.2%	1.02	0.96 ^a
United Kingdom	^b	150	179	218	231	251	45.6%	14.9%	0.98 ^a	1.00
United States	247	216	210	292	322	325	35.5%	11.3%	0.96 ^a	0.97 ^a
Weighted average	202	186	199	261	285	289	40.1%	10.8%	0.97 ^a	0.98
Weighted average without United States	141	163	190	236	255	262	44.5%	11.1%	0.97	0.99

^a $P < .01$; ^b Data not available for that year.

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