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Supplementary information

Table S1: Global male MNC, SIDS, and prematurity rates.

Countries are divided into four cultural groups that differ in MNC practices: Anglophone, Ibero-American, Nordic, and other. The MNC was either obtained from the literature or calculated based on the proportion of Muslim and Jews in that country (in which case MNC birth cohort and samples size are not provided). Year-matched MNC and SIDS rates were available for 11/15 countries and nearly year-matched rates were available for 4/15 countries. Yearly SIDS mortality and prematurity rates are matched with each other (12/15 year-matched, 4/15 nearly year-matched) and the MNC rates.

Countries	Group	Male births[*1]		Preterm births			MNC[*2]			SIDS (R95)	
		Number	Year	%	Year	%	Year	Cohort[#]	Source	Rate	Year
Argentina	Ibero-American	356,110[1]	2005	8.69[2]	2005	2.95	2012/2013	E	2.5% Muslim + 0.45% Jews[*4]	0.49[3]	2005
Australia	Anglophone	130,015[1]	2005	8.1[4]	2005	12.6	2005	N	[5]	0.32[3]	2005
Austria	Other	38,876[1]	2008	11[6]	2008	5.81	2012/2013	E	5.7% Muslim + 0.11% Jews[*4]	0.28[3]	2008
Belgium	Other	58,024[1]	2004	8.1[6]	2004	10.48	2012/2013	E	10.2% Muslim + 0.28% Jews[*4]	0.44[7]	2004
Canada	Anglophone	171,088[1]	2005	7.8[8]	2005	31.9	2006/2007	N	[9]	0.33[3]	2005
UK	Anglophone	392,993[10]	2007	5.9[11]	2007-8	5.06	2012/2013	E	4.6% Muslim + 0.47% Jews[*4]	0.53[3*3]	2007
France	Other	392,993[1]	2007	6.6[6]	2008	8.26	2012/2013	E	7.5% Muslim + 0.76% Jews[*4]	0.26[3]	2007
Germany	Other	341,035[1]	2013	8.7[12]	2013	5.15	2012/2013	E	5% Muslim + 0.15% Jews[*4]	0.22[7]	2013
Ireland	Anglophone	35,695[1]	2007	5.9[6]	2008	0.93	2012/2013	E	0.9% Muslim + 0.03% Jews[*4]	0.41[3]	2007
Japan	Other	544,909[1]	2007	10.7[13]	2007	0	2012/2013	E	[14]	0.13[3]	2007
Netherlands	Other	93,955[1]	2005	7.4[6]	2008	5.68	2012/2013	E	5.5% Muslim + 0.18% Jews[*4]	0.06[3]	2006
New Zealand	Anglophone	28,873[1]	2005	7.1[15]	2005	30.2	2006	N	[16]	0.80[3]	2005
Norway	Nordic	28,476[1]	2004	7.1[6]	2004	3.03	2012/2013	E	3% Muslim + 0.03% Jews[*4]	0.30[7]	2005
Sweden	Nordic	50,673[1]	2005	6.3[6]	2004	5.06	2012/2013	E	4.9% Muslim + 0.16% Jews[*4]	0.23[3]	2005
US (NHW)	Anglophone	1,655,154[17]	2006	11.7[17]	2006	57.2	2006	N	[18] (Appendix 1)	0.49[19]	2006
US (NHB)	Anglophone	333,241[17]	2006	18.5[17]	2006	59.8	2006	N	[18] (Appendix 1)	1.15[19]	2006

[*1]The number of male births was estimated as half of all live births. Male birth data were only available for the US.

[*2]"Neonatal circumcision" is used to define any circumcision performed in newborns up to 1 year olds.

[*3]UK SIDS rates from Hauck et al.[3] were available for England/Wales and Scotland. The number in the table is the weighted average of those rates assuming that England and Wales consists of 91.5% of the general population and Scotland 8.5%.

[*4]The 2010 proportion of Muslims in various countries[20]. The 2012 proportion of Jews in various countries (Appendix; Core Jewish population)[21].

[#]MNC cohort type (E-estimated, N-Nationwide)

Table S2: US statewise male birth, MNC, and unexpected male mortality data

MNC, unexplained mortality, and unexplained gender bias were available for all states. Preterm births were available only for 2014.

	Male births[22,23]		Preterm births[24]			MNC[22,23]			Male ill-defined deaths (R95-R99)[19]			Male SIDS (R95)[19]	
State	Number	Year	Number	%	Year	Number	Rate	Year	Number	Rate	Year	Gender ratio	Year
Arizona	42619	2013	7819	9.01	2014	6708	0.16	2013	27	0.39	2013		2013
Arkansas	18149	2013	3845	9.99	2014	12179	0.67	2013	42	1.29	2013	1.49	2013
California	245503	2013	41594	8.28	2014	55735	0.23	2013	188	0.45	2013	1.29	2013
Colorado	29744	2013	5517	8.38	2014	16849	0.57	2013			2013		2013
Florida	106886	2013	21846	9.93	2014	33476	0.31	2013	80	0.39	2013	0.58	2013
Georgia	16395	2009	14058	10.75	2014	11701	0.71	2009	101	0.79	2009	1.25	2009
Hawaii	8256	2013	1862	10.04	2014	6389	0.77	2013			2013		2013
Illinois	76247	2013	16016	10.11	2014	48388	0.63	2013	70	0.48	2013	1.23	2013
Indiana	13476	2009	8142	9.69	2014	10508	0.78	2009	48	0.68	2009	1.9	2009
Iowa	19155	2013	3677	9.27	2014	15583	0.81	2013	10	0.57	2013		2013
Kansas	18653	2013	3423	8.73	2014	13722	0.74	2013	27	0.8	2013	1.61	2013
Kentucky	26330	2013	6033	10.74	2014	22592	0.86	2013	54	1.12	2013	2.49	2013
Louisiana	8722	2009	7925	12.29	2014	3748	0.43	2009	79	1.28	2009	1.05	2009
Maryland	34345	2013	7455	10.09	2014	22706	0.66	2013	31	1.24	2013	1.75	2013
Massachusetts	36321	2013	6177	8.61	2014	23900	0.66	2013	23	0.41	2013		2013
Michigan	56579	2013	11154	9.76	2014	47487	0.84	2013	41	0.32	2013	1.293	2013-2014
Minnesota	33548	2013	6054	8.67	2014	19788	0.59	2013			2013		2013
Missouri	37456	2013	7346	9.76	2014	28432	0.76	2013			2013		2013
Montana	1743	2009	1157	9.31	2014	844	0.48	2009	11	2.16	2009		2009
Nebraska	13150	2013	2439	9.11	2014	9856	0.75	2013			2013		2013
Nevada	17165	2013	3623	10.11	2014	1651	0.10	2013			2013		2013
New Jersey	50780	2013	9885	9.57	2014	33081	0.65	2013			2013		2013
New Mexico	3467	2009	2387	9.17	2014	1752	0.51	2009			2009		2009
New York	117985	2013	21114	8.85	2014	68904	0.58	2013	65	0.31	2013		2013
North Carolina	57109	2013	11781	9.74	2014	28816	0.50	2013	80	0.72	2013		2013
Ohio	22413	2009	14302	10.26	2014	17556	0.78	2009	181	1.31	2009	1.47	2009
Oklahoma	24697	2013	5492	10.31	2014	18508	0.75	2013	79	1.85	2013	1.288	2013-2014
Oregon	6541	2009	3510	7.71	2014	1339	0.20	2009	29	0.71	2009	1.54	2009
Pennsylvania	22714	2009	13291	9.36	2014	17132	0.75	2009	123	0.89	2009	1.16	2009
Rhode Island	5749	2013	932	8.62	2014	2507	0.44	2013			2013		
South Carolina	27091	2013	6212	10.78	2014	19628	0.72	2013	35	0.71	2013	0.85	2012-2013
South Dakota	1127	2009	1040	8.48	2014	819	0.73	2009			2009		2009
Tennessee	35403	2013	8780	10.77	2014	26223	0.74	2013	52	0.67	2013		2013
Texas	185421	2013	41345	10.35	2014	95441	0.51	2013	272	0.75	2013	1.54	2013
Utah	25494	2013	4678	9.14	2014	8482	0.33	2013	11	0.46	2013		2013
Vermont	2895	2013	486	7.93	2014	1939	0.67	2013			2013		2013
Washington	40262	2013	7125	8.05	2014	3830	0.10	2013	34	0.5	2013	1.2	2013
West Virginia	10026	2013	2198	10.83	2014	8777	0.88	2013	13	1.31	2013		2013
Wisconsin	32942	2013	6163	9.19	2014	26557	0.81	2013			2013		2013
Wyoming	3105	2013	884	11.6	2013	2266	0.73	2013			2013		2013

Table S3: Gender bias in SIDS cases in US states (1999-2016)

The ratio of male to female SIDS cases in Hispanic and non-Hispanic Whites and Blacks was calculated in US states that had over 12.5% Hispanics (Arizona, California, Colorado, Connecticut, Florida, Illinois, Nevada, New Jersey, New Mexico, Oregon, Rhode Island, Texas, and Utah). The average and standard deviation of the male bias are shown. SIDS data were obtained from CDC Wonder[19].

Year	Gender bias		
	Hispanic White (HW)	Not Hispanic White (NHW)	Not Hispanic Black (NHB)
1999	1.32	1.21	1.38
2000	1.31	1.30	1.53
2001	1.36	1.38	1.38
2002	1.39	1.31	1.45
2003	1.54	0.89	1.50
2004	1.32	1.32	1.35
2005	1.42	0.95	1.76
2006	1.42	1.22	1.64
2007	1.34	1.20	1.68
2008	1.03	1.43	1.52
2009	1.20	1.35	1.45
2010	1.33	1.23	1.46
2011	1.04	1.57	1.40
2012	1.16	1.35	1.32
2013	1.45	1.38	1.26
2014	1.05	1.13	1.32
2015	1.52	1.49	1.80
2016	1.66	0.90	1.42
Mean	1.33	1.25	1.48
(STD)	(0.17)	(0.18)	(0.15)

Table S4: US statewise unexplained male mortality rates and the proportion of Hispanics.

US statewise population size, mortality rates (ICD10 R95-R99), and the proportion of Hispanic people for four years between 2000 and 2015.

	2000			2010		2012		2015	
State/Territory	Population size	Unexplained Mortality	Hispanic	Unexplained Mortality	Hispanic	Unexplained Mortality	Hispanic	Unexplained Mortality	Hispanic
Alabama	4,447,100	1.87	0.02	1.54	0.04	1.58	0.04	1.98	0.04
Arizona	5,130,632	0.88	0.25	0.99	0.3	0.75	0.3	0.65	0.31
Arkansas	2,673,400	1.92	0.03	1.57	0.06	1.97	0.07	1.85	0.07
California	33,871,648	0.94	0.32	0.57	0.38	0.51	0.38	0.52	0.39
Colorado	4,301,261	1.18	0.17	0.65	0.21	0.39	0.21		0.21
Connecticut	3,405,565	0.6	0.09	0.56	0.13	0.64	0.14		0.15
DC	572,059	3.61	0.08		0.09		0.1		0.11
Florida	15,982,378	1	0.17	0.7	0.23	0.51	0.23	0.6	0.24
Georgia	8,186,453	1.34	0.05	1.34	0.09	0.97	0.09	1.03	0.09
Idaho	1,293,953		0.08	1.16	0.11		0.12		0.12
Illinois	12,419,293	1.03	0.12	0.77	0.16	0.72	0.16	0.7	0.17
Indiana	6,080,485	0.94	0.04	0.56	0.06	0.77	0.06	0.61	0.07
Iowa	2,926,324	1.22	0.03	1.2	0.05	0.66	0.05	1.03	0.06
Kansas	2,688,418	1.19	0.07	0.86	0.1	0.94	0.11	1.12	0.12
Kentucky	4,041,769	1.4	0.01	1.41	0.03	1.35	0.03	1.55	0.03
Louisiana	4,468,976	1.09	0.02	1.24	0.04	1.02	0.04	0.96	0.05
Maryland	5,296,486	0.96	0.04	0.74	0.08	0.84	0.09	1.04	0.1
Massachusetts	6,349,097	0.47	0.07	0.77	0.1	0.92	0.1	0.6	0.11
Michigan	9,938,444	1.06	0.03	0.55	0.04	0.43	0.05	0.48	0.05
Minnesota	4,919,479	0.89	0.03	0.45	0.05	0.51	0.05	0.48	0.05
Mississippi	2,844,658	1.81	0.01	2.58	0.03	1.18	0.03	1.21	0.03
Missouri	5,595,211	1.35	0.02	0.77	0.04	0.55	0.04	0.5	0.04
Montana	902,195		0.02	1.77	0.03	1.76	0.03	1.83	0.04
Nebraska	1,711,263	1.6	0.06		0.09	0.91	0.1	1.38	0.1
Nevada	1,998,257		0.2		0.27		0.27	0.54	0.28

New Jersey	8,414,350	0.96	0.13	0.45	0.18	0.19	0.18	0.76	0.2
New Mexico	1,819,046	0.81	0.42		0.46	0.88	0.47	0.93	0.48
New York	18,976,457	0.97	0.15	0.48	0.18	0.48	0.18	0.48	0.19
North Carolina	8,049,313	1.08	0.05	1	0.08	1.36	0.09	1.19	0.09
North Dakota	642,200		0.01		0.02	2.14	0.03		0.04
Ohio	11,353,140	1.3	0.02	1.11	0.03	0.71	0.03	0.75	0.04
Oklahoma	3,450,654	1.54	0.05	2.26	0.09	2.05	0.09	1.32	0.1
Oregon	3,421,399	1.76	0.08	0.8	0.12	0.91	0.12	0.76	0.13
Pennsylvania	12,281,054	0.91	0.03	0.97	0.06	0.91	0.06	1.07	0.07
South Carolina	4,012,012	1.19	0.02	1.28	0.05	0.79	0.05	0.98	0.06
South Dakota	754,844		0.01		0.03		0.03	1.75	0.04
Tennessee	5,689,283	1.64	0.02	1.48	0.05	1.7	0.05	1.47	0.05
Texas	20,851,820	1.09	0.32	0.96	0.38	0.91	0.38	0.92	0.39
Utah	2,233,169	0.86	0.09	0.48	0.13	1.09	0.13	0.81	0.14
Virginia	7,078,515	0.98	0.05	1.15	0.08	0.73	0.08	0.67	0.09
Washington	5,894,121	1.1	0.07	0.85	0.11	0.76	0.12	0.74	0.12
West Virginia	1,808,344		0.01	2.24	0.01	1.41	0.01	1.08	0.01
Wisconsin	5,363,675	1.03	0.04	0.67	0.06	0.55	0.06	0.65	0.07

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