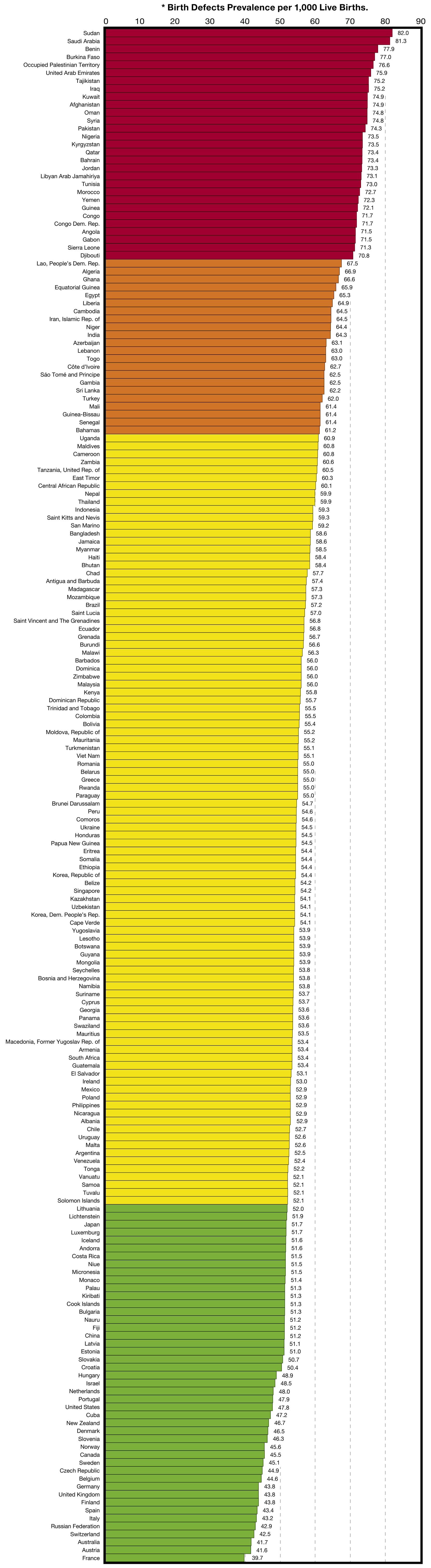
March of Dimes

MARCH OF DIMES
GLOBAL REPORT ON BIRTH DEFECTS
THE HIDDEN TOLL OF DYING AND DISABLED CHILDREN



* Rankings are determined by prevalence rates, which have been calculated to the third decimal place, but are stated to the first decimal place, due to space limitations.

Every year, an estimated 7.9 million children—6 percent of total births worldwide—are born with a serious birth defect of genetic or partially genetic origin.

About 3.3 million children under the age of five die each year from birth defects. For those who survive, these disorders can cause lifelong mental, physical, auditory, or visual disability.

Hundreds of thousands more are born with serious birth defects of post-conception origin, the result of exposure to environmental factors, including alcohol, rubella, syphilis, and iodine deficiency.

The MOD Global Report on Birth Defects identifies for the first time the severe, and previously hidden, toll of birth defects, highlighting the extent of this serious and vastly underappreciated global public health problem.

The report shows that birth defects exact a particularly harsh toll in middle- and low-income countries where 94 percent of the births with serious birth defects and 95 percent of the deaths of these children occur.

Also, the report provides the first systematic, country-by-country summary of annual births of infants with serious birth defects of genetic or partially genetic origin.

Besides poverty, the main reasons for the variations among rich and poor countries in birth prevalence rates of serious birth defects include (1) survival advantage against malaria for carriers of sickle cell and thalassemia genes; (2) frequency of consanguineous marriages; (3) differences in the percentage of older mothers; and (4) sharp disparities in maternal and child health services.

Five common serious birth defects of genetic or partially genetic origin in 2001 were:

- ❖ Congenital heart defects—1,040,835 births
- ❖ Neural tube defects—323,904 births
- ❖ Hemoglobin disorders (thalassemia and sickle cell disease)—307,897 births
- ❖ Down syndrome (trisomy 21)—217,293 births
- ❖ Glucose-6-phosphate dehydrogenase (G6PD) deficiency—177,032 births

Combined, these five conditions accounted for about 25 percent of all of birth defects of genetic or partially genetic origin. To date, more than 7,000 different birth defects of genetic or partially genetic origin have been identified.

Countries have been grouped by Gross National Income (GNI) per capita:

Low-Income Countries have a GNI per capita per year of less than $826 and accounted for an estimated 4.75 million serious birth defects in 2001, 60.2 percent of the world's total.

Middle-Income Countries have a GNI per capita per year of $826-$10,065 and accounted for an estimated 2.67 million serious birth defects, 33.5 percent of the world's total.

High-Income Countries have a GNI per capita per year of more than $10,065 and accounted for an estimated 0.50 million serious birth defects, 6.3 percent of the world's total.

LOW-INCOME COUNTRIES[4]

Country	Children Born with Birth Defects Annually[1]	2001 Annual Births (000s)	Birth Defects of the Cardiovascular System[2]	Neural Tube Defects	Pathological Hemoglobin Disorders	Down Syndrome	G6PD Deficiency[3]	TOTAL[1]
			Prevalence (per 1,000 live births)					
Afghanistan	80,741	1,078	7.9	2.0	0.6	2.1	3.1	74.9
Angola	49,865	697	7.9	2.0	15.6	2.1	1.8	71.5
Armenia	1,922	36	7.9	2.0	0.1	1.1	0.0	53.4
Azerbaijan	6,753	107	7.9	3.1	1.2	1.3	0.1	63.1
Bangladesh	251,221	4,284	7.9	4.7	0.7	1.6	1.0	58.6
Benin	20,962	269	7.9	2.7	23.1	2.1	1.3	77.9
Bhutan	4,378	75	7.9	4.7	0.0	2.1	2.1	58.4
Burkina Faso	42,951	558	7.9	2.7	22.4	2.1	1.0	77.0
Burundi	16,066	284	7.9	1.3	2.5	2.1	0.7	56.6
Cambodia	30,905	479	7.9	1.9	6.1	2.1	5.9	64.5
Cameroon	33,921	558	7.9	2.0	5.6	2.1	1.1	60.8
Central African Republic	8,661	144	7.9	2.0	3.6	2.1	2.4	60.1
Chad	22,857	396	7.9	2.0	2.5	2.1	1.1	57.7
Comoros	1,528	28	7.9	1.3	0.4	2.1	0.8	54.6
Congo	9,965	139	7.9	2.0	15.6	2.1	2.0	71.7
Congo, Dem. Republic of the	179,639	2,507	7.9	2.0	15.6	2.1	2.0	71.7
Côte d'Ivoire	36,418	581	7.9	2.7	6.6	2.1	2.5	62.7
East Timor	140	2	7.9	0.7	1.0	2.1	10.5	60.3
Equatorial Guinea	1,318	20	7.9	2.0	10.0	2.1	1.8	65.9
Eritrea	8,270	152	7.9	2.2	0.0	2.1	0.1	54.4
Ethiopia	154,944	2,848	7.9	2.2	0.0	2.1	0.1	54.4
Gambia	3,186	51	7.9	2.7	7.9	2.1	1.0	62.5
Georgia	3,002	56	7.9	2.0	0.2	1.2	0.0	53.6
Ghana	43,460	653	7.9	2.7	11.4	2.1	1.6	66.6
Guinea	26,300	365	7.9	2.7	16.9	2.1	1.6	72.1
Guinea-Bissau	3,375	55	7.9	2.7	6.2	2.1	1.6	61.4
Haiti	14,942	256	7.9	1.8	4.5	2.1	1.2	58.4
India	1,613,502	25,112	7.9	4.7	1.2	1.6	2.4	64.3
Indonesia	263,154	4,440	7.9	0.7	0.8	1.4	0.9	59.3
Kenya	60,283	1,080	7.9	1.3	1.2	2.1	1.2	55.8
Korea, Dem. People's Rep.	20,925	387	7.9	4.7	0.0	0.8	0.1	54.1
Kyrgyzstan	7,424	101	7.9	2.0	0.0	1.4	0.0	73.5
Lao, People's Dem. Rep.	13,299	197	7.9	1.9	9.5	2.1	5.5	67.5
Lesotho	3,663	68	7.9	2.3	0.0	2.1	0.7	53.9
Liberia	11,155	172	7.9	2.8	9.6	2.1	1.6	64.9
Madagascar	39,903	696	7.9	1.3	2.5	2.1	1.4	57.3
Malawi	29,567	525	7.9	1.3	1.6	2.1	1.3	56.3
Mali	35,793	583	7.9	2.7	6.5	2.1	1.3	61.4
Mauritania	6,620	120	7.9	2.7	0.6	2.1	1.0	55.2
Moldova, Republic of	2,760	50	7.9	2.7	0.0	1.1	0.0	55.2
Mongolia	3,053	57	7.9	1.3	0.0	1.4	0.0	53.9
Mozambique	45,526	795	7.9	1.3	2.5	2.1	1.4	57.3
Myanmar	68,587	1,173	7.9	0.7	4.0	1.7	3.1	58.5
Nepal	49,180	821	7.9	4.7	0.2	2.1	3.4	59.9
Nicaragua	9,144	173	7.9	2.5	0.0	1.5	0.1	52.9
Niger	40,232	625	7.9	2.7	9.8	2.1	1.0	64.4
Nigeria	345,753	4,702	7.9	2.7	18.0	2.1	2.0	73.5
Pakistan	396,920	5,340	7.9	2.0	1.2	1.9	2.4	74.3
Papua New Guinea	9,762	180	7.9	1.5	0.3	2.1	1.8	54.5
Rwanda	17,598	320	7.9	1.3	1.2	2.1	0.4	55.0
Sáo Tomé and Principe	375	6	7.9	2.0	6.4	2.1	2.0	62.5
Senegal	22,400	369	7.9	2.7	6.3	2.1	0.9	61.4
Sierra Leone	16,734	232	7.9	2.7	16.7	2.1	1.7	71.3
Solomon Islands	938	18	7.9	1.5	0.0	2.1	0.0	52.1
Somalia	26,169	481	7.9	2.2	0.0	2.1	0.1	54.4
Sudan	89,997	1,098	7.9	2.2	1.9	2.1	3.0	82.0
Tajikistan	11,205	149	7.9	2.0	1.3	1.3	0.0	75.2
Tanzania, United Rep. of	84,344	1,393	7.9	1.3	5.6	2.1	1.5	60.5
Togo	11,461	182	7.9	2.7	7.5	2.1	1.9	63.0
Tuvalu	16	0	7.8	1.5	0.0	2.1	0.0	52.1
Uganda	74,468	1,222	7.9	1.3	6.4	2.1	1.1	60.9
Ukraine	21,800	400	7.9	2.1	0.0	1.0	0.0	54.5
Uzbekistan	28,836	533	7.9	2.0	0.2	1.1	0.0	54.1
Viet Nam	87,333	1,586	7.9	1.9	0.9	1.7	2.1	55.1
Yemen	68,881	953	7.9	1.2	1.6	2.1	0.9	72.3
Zambia	27,130	448	7.9	1.3	5.6	2.1	1.6	60.6
Zimbabwe	25,694	459	7.9	2.3	0.4	2.0	1.3	56.0
Low-Income[4]	4,749,269	73,924	7.9 584,002 births	3.1 225,482 births	3.8 283,127 births	1.8 133,186 births	1.9 137,506 births	64.2
WORLD	7,881,603	131,751	7.9 1,040,835 births	2.5 323,904 births	2.3 307,897 births	1.7 217,293 births	1.3 177,032 births	59.8

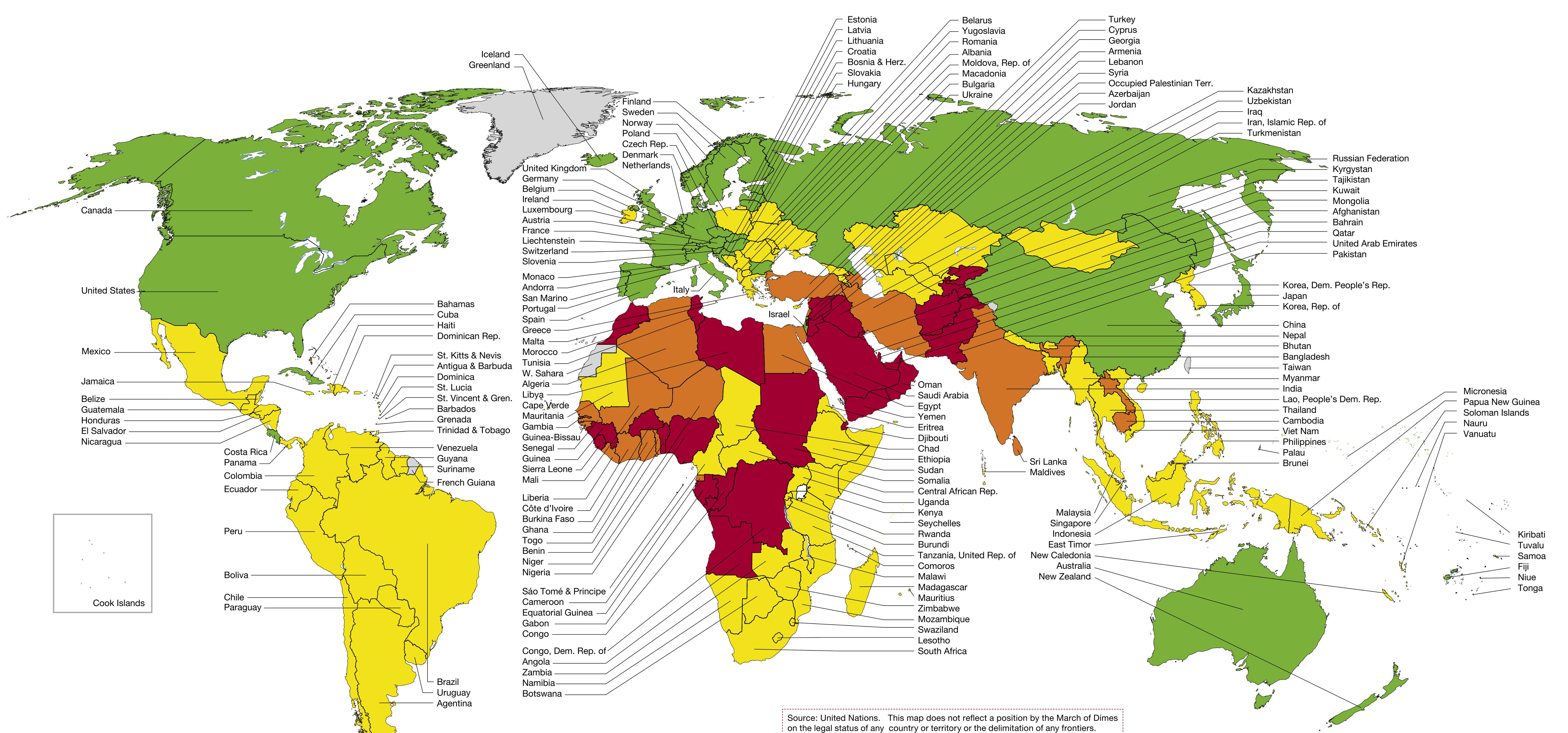
MIDDLE-INCOME COUNTRIES[5]

Country	Children Born with Birth Defects Annually[1]	2001 Annual Births (000s)	Birth Defects of the Cardiovascular System[2]	Neural Tube Defects	Pathological Hemoglobin Disorders	Down Syndrome	G6PD Deficiency[3]	TOTAL[1]
			Prevalence (per 1,000 live births)					
Albania	3,050	59	7.9	1.5	1.6	1.3	0.0	52.9
Algeria	50,207	750	7.9	2.0	0.5	2.9	0.9	66.9
Antigua and Barbuda	57	1	7.9	1.8	4.0	1.6	1.0	57.4
Argentina	37,976	724	7.9	2.1	0.0	1.7	0.1	52.5
Barbados	168	3	7.9	1.8	3.0	1.4	1.3	56.0
Belarus	5,005	91	7.9	2.6	0.0	1.0	0.0	55.0
Belize	325	6	7.9	2.5	0.9	1.3	0.7	54.2
Boliva	14,779	267	7.9	2.0	0.1	1.8	0.1	55.4
Bosnia and Herzegovina	2,100	39	7.9	1.0	0.0	1.1	0.4	53.8
Botswana	2,639	49	7.9	2.3	0.0	2.1	0.7	53.9
Brazil	192,260	3,363	7.9	1.9	0.5	1.3	0.6	57.2
Bulgaria	3,179	62	7.9	1.9	0.2	0.9	0.9	51.3
Cape Verde	702	13	7.9	2.7	0.9	1.7	0.0	54.1
Chile	15,125	287	7.9	1.9	0.0	1.8	0.0	52.7
China	963,997	18,841	7.9	1.3	0.0	1.0	0.4	51.2
Colombia	54,347	979	7.9	2.0	0.0	1.1	0.3	55.5
Cook Islands	23	0	7.9	1.5	0.0	1.3	0.0	51.3
Costa Rica	4,739	92	7.9	0.5	0.0	1.5	0.2	51.5
Croatia	2,721	54	7.9	0.6	0.0	1.5	0.4	50.4
Cuba	6,329	134	7.9	1.8	2.5	1.0	0.5	47.2
Czech Republic	4,043	90	7.9	0.8	0.0	1.0	0.0	44.9
Djibouti	1,771	25	7.9	2.2	0.0	2.1	0.0	70.8
Dominica	56	1	7.9	1.8	3.1	1.1	1.0	56.0
Dominican Republic	11,189	201	7.9	1.8	2.8	1.1	1.2	55.7
Ecuador	17,497	308	7.9	2.0	0.1	1.6	0.2	56.8
Egypt	109,209	1,672	7.9	2.2	0.3	1.9	2.9	65.3
El Salvador	8,870	167	7.9	2.5	0.0	1.4	0.2	53.1
Estonia	612	12	7.9	1.0	0.0	1.3	0.0	51.0
Fiji	1,024	20	7.9	1.5	0.0	1.2	0.0	51.2
Gabon	3,432	48	7.9	2.0	15.6	2.1	1.8	71.5
Grenada	113	2	7.9	1.8	4.0	1.4	1.0	56.7
Guatemala	21,821	409	7.9	2.5	0.0	1.8	0.1	53.4
Guyana	915	17	7.9	2.0	0.9	1.5	0.7	53.9
Honduras	11,109	204	7.9	2.5	0.0	2.1	0.1	54.5
Hungary	4,348	89	7.9	2.8	0.0	1.1	0.0	48.9
Iran, Islamic Republic of	102,681	1,592	7.9	2.0	0.6	1.8	3.4	64.5
Iraq	61,862	823	7.9	1.8	1.5	2.0	3.4	75.2
Jamaica	3,163	54	7.9	1.8	5.6	1.2	1.2	58.6
Jordan	12,388	169	7.9	3.3	0.8	2.1	0.6	73.3
Kazakhstan	14,229	263	7.9	2.0	0.0	1.3	0.0	54.1
Kiribati	154	3	7.9	1.5	0.0	1.3	0.0	51.3
Latvia	920	18	7.9	1.0	0.0	1.4	0.0	51.1
Lebanon	4,350	69	7.9	1.8	0.6	1.9	1.7	63.0
Libyan Arab Jamahiriya	10,673	146	7.9	2.2	0.6	2.6	1.4	73.1
Lithuania	1,716	33	7.9	2.0	0.0	1.3	0.0	52.0
Macedonia, Former Yugoslav Rep. of	1,336	25	7.9	1.0	0.0	1.0	0.0	53.4
Malaysia	29,214	522	7.9	1.9	1.4	2.1	2.1	56.0
Maldives	670	11	7.9	2.0	6.4	1.7	1.7	60.8
Malta	263	5	7.9	1.1	0.2	1.8	0.8	52.6
Mauritius	1,017	19	7.9	1.3	0.4	1.4	0.4	53.5
Mexico	121,464	2,296	7.9	2.5	0.0	1.4	0.1	52.9
Micronesia, Federated States of	206	4	7.9	1.5	0.0	1.5	0.0	51.5
Morocco	56,321	775	7.9	2.2	1.1	2.3	0.8	72.7
Namibia	3,387	63	7.9	2.3	0.2	2.1	0.4	53.8
Nauru	12	0	7.9	1.5	0.0	1.2	0.0	51.2
Niue	2	0	7.9	1.5	0.0	1.5	0.0	51.5
Occupied Palestinian Territory	10,105	132	7.9	5.5	0.8	2.1	1.1	76.6
Oman	7,032	94	7.9	1.2	1.6	2.1	3.4	74.8
Palau	13	0	7.9	1.5	0.0	1.3	0.0	51.3
Panama	3,268	61	7.9	2.5	0.2	1.4	0.7	53.6
Paraguay	9,342	170	7.9	2.0	0.0	1.7	0.1	55.0
Peru	33,090	606	7.9	2.0	0.0	1.8	0.1	54.6
Philippines	109,239	2,065	7.9	1.9	0.6	1.9	0.0	52.9
Poland	19,573	370	7.9	2.7	0.0	1.5	0.0	52.9
Romania	12,825	233	7.9	2.5	0.0	0.9	0.2	55.0
Russian Federation	52,721	1,230	7.9	2.5	0.0	1.1	0.0	42.9
Saint Kitts and Nevis	44	1	7.9	1.8	5.8	1.7	1.3	59.3
Saint Lucia	171	3	7.9	1.8	4.5	1.2	1.0	57.0
Saint Vincent and the Grenadines	115	2	7.9	1.8	3.4	1.6	1.5	56.8
Samoa	208	4	7.9	1.5	0.0	2.1	0.0	52.1
Saudi Arabia	58,108	715	7.9	1.2	3.6	2.1	6.7	81.3
Seychelles	162	3	7.9	1.3	0.1	1.3	1.0	53.8
Slovakia	2,789	55	7.9	1.0	0.0	1.0	0.0	50.7
South Africa	58,962	1,105	7.9	2.3	0.0	2.1	0.2	53.4
Sri Lanka	20,652	332	7.9	2.0	0.6	1.9	1.9	62.2
Suriname	430	8	7.9	2.0	0.9	1.3	0.8	53.7
Swaziland	1,714	32	7.9	2.3	0.0	2.1	0.4	53.6
Syria	37,008	495	7.9	1.8	1.6	2.1	2.8	74.8
Thailand	70,045	1,170	7.9	0.7	5.6	1.5	3.6	59.9
Tonga	104	2	7.9	1.5	0.0	2.2	0.0	52.2
Trinidad and Tobago	944	17	7.9	1.8	2.8	1.6	0.8	55.5
Tunisia	12,857	176	7.9	2.2	1.4	2.2	0.9	73.0
Turkey	88,288	1,424	7.9	3.0	0.6	1.3	0.0	62.0
Turkmenistan	6,998	127	7.9	2.0	0.0	1.4	0.0	55.1
Uruguay	3,051	58	7.9	1.0	0.0	1.7	0.0	52.6
Vanuatu	313	6	7.9	1.5	0.0	2.1	0.0	52.1
Venezuela	30,212	577	7.9	2.0	0.1	1.5	0.3	52.4
Yugoslavia	6,474	120	7.9	1.0	0.0	1.2	0.4	53.9
Middle-Income[5]	2,638,614	47,363	7.9 374,165 births	1.8 83,468 births	0.5 21,719 births	1.4 66,268 births	0.8 38,155 births	55.7
WORLD	7,881,603	131,751	7.9 1,040,835 births	2.5 323,904 births	2.3 307,897 births	1.7 217,293 births	1.3 177,032 births	59.8

HIGH-INCOME COUNTRIES[6]

Country	Children Born with Birth Defects Annually[1]	2001 Annual Births (000s)	Birth Defects of the Cardiovascular System[2]	Neural Tube Defects	Pathological Hemoglobin Disorders	Down Syndrome	G6PD Deficiency[3]	Total[1]
			Prevalence (per 1000 live births)					
Andorra	52	1	7.9	1.0	0.0	1.9	0.0	51.6
Australia	10,387	249	7.9	0.6	0.0	1.9	0.2	41.7
Austria	2,956	71	7.9	0.8	0.0	1.5	0.1	41.6
Bahamas	367	6	7.9	1.8	7.7	1.7	1.2	61.2
Bahrain	807	11	7.9	1.2	5.1	2.3	5.1	73.4
Belgium	4,552	102	7.9	1.2	0.1	1.2	0.0	44.6
Brunei Darussalam	382	7	7.9	1.9	0.4	1.8	2.0	54.7
Canada	15,545	342	7.9	1.6	0.2	1.8	0.0	45.5
Cyprus	590	11	7.9	1.2	6.4	1.6	2.4	53.7
Denmark	2,835	61	7.9	1.2	0.1	1.6	0.1	46.5
Finland	2,276	52	7.9	0.9	0.0	1.2	0.0	43.8
France	29,084	733	7.9	1.2	0.3	1.9	0.1	39.7
Germany	30,543	697	7.9	1.5	0.0	1.8	0.1	43.8
Greece	5,280	96	7.9	1.5	2.3	1.6	2.7	55.0
Iceland	206	4	7.9	1.0	0.0	1.9	0.0	51.6
Ireland	3,021	57	7.9	2.0	0.0	2.3	0.0	53.0
Israel	6,106	126	7.9	1.4	0.0	1.9	0.7	48.5
Italy	21,838	505	7.9	0.5	0.6	1.9	0.0	43.2
Japan	61,668	1,192	7.9	0.7	0.0	1.5	0.0	51.7
Korea, Republic of	33,220	611	7.9	4.7	0.0	1.1	0.1	54.4
Kuwait	2,624	35	7.9	1.2	0.8	2.1	4.7	74.9
Liechtenstein	24	0	7.9	1.0	0.0	2.2	0.0	51.9
Luxembourg	259	5	7.9	1.0	0.1	1.9	0.0	51.7
Monaco	26	1	7.9	1.0	0.0	1.7	0.0	51.4
Netherlands	8,399	175	7.9	1.1	0.2	2.0	0.1	48.0
New Zealand	2,473	53	7.9	1.7	2.2	2.0	0.1	46.7
Norway	2,417	53	7.9	0.8	0.0	1.8	0.0	45.6
Portugal	5,413	113	7.9	0.6	0.1	1.5	0.5	47.9
Qatar	734	10	7.9	1.2	1.5	2.3	3.4	73.4
San Marino	17	0	7.9	1.0	0.0	1.9	0.0	59.2
Singapore	2,601	48	7.9	1.3	1.2	2.1	1.1	54.2
Slovenia	788	17	7.9	1.0	0.0	1.3	0.0	46.3
Spain	15,586	359	7.9	1.1	0.0	2.0	0.2	43.4
Sweden	3,382	75	7.9	1.0	0.1	1.8	0.1	45.1
Switzerland	2,763	65	7.9	1.0	0.0	1.9	0.0	42.5
United Arab Emirates	3,114	41	7.9	1.2	1.2	2.1	3.4	75.9
United Kingdom	28,602	653	7.9	1.7	0.3	1.8	0.1	43.8
United States	182,786	3,827	7.9	1.4	0.4	1.7	0.0	47.8
High-Income[6]	493,720	10,464	7.9 82,668 births	1.4 14,954 births	0.3 3,051births	1.7[7] 17,840 births	0.1 1,371 births	47.2
WORLD	7,881,603	131,751	7.9 1,040,835 births	2.5 323,904 births	2.3 307,897 births	1.7 217,293 births	1.3 177,032 births	59.8

1 All birth defects, including those not specifically listed in the table. Totals are adjusted for the effects of known preventive strategies.
2 The birth prevalence of cardiovascular defects is estimated in the model to be the same for all countries (7.9 per 1,000 live births). The estimates for specific countries are expected to change as additional empirical data become available and in countries that apply preventive strategies.
3 Glucose-6-phosphate dehydrogenase deficiency predisposing to neonatal jaundice or hemolytic anemia.
4 Low-income: These countries have a gross national income (GNI) per capita per year of less than $826.
5 Middle-income: These countries have a gross national income (GNI) per capita per year of $826 - $10,065.
6 High-income: These countries have a gross national income (GNI) per capita per year of more than $10,065.
7 Birth prevalence without the application of known preventive strategies. Refer to Box 2 in the text.



Source: United Nations. This map does not reflect a position by the March of Dimes on the legal status of any country or territory or the delimitation of any frontiers.

Red: Highest Rates of Birth Defects—greater than 69.9 birth defects per 1,000 live births. **Orange:** High Rates of Birth Defects—between 61-69.9 birth defects per 1,000 live births. **Yellow:** Moderate Rates of Birth Defects—between 52.1-60.9 birth defects per 1,000 live births. **Green:** Lowest Rates of Birth Defects—less than 52.1 birth defects per 1,000 live births. **Gray:** No data.

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