

Population Growth and the Global Health Workforce Crisis

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With an estimated shortage of more than four million health workers worldwide, the global health workforce crisis is possibly the greatest health system constraint on countries seeking to meet their 2015 Millennium Development Goals (World Health Organization 2006). The World Health Organization and global health advocates have called attention to this crisis by monitoring the number of health workers (doctors, nurses, and midwives) per 1,000 population, an access measure commonly referred to as the health worker density ratio. The global health community is committed to supporting countries in addressing their health workforce crises; however, planning and policy efforts to improve the health worker density ratio have disproportionately focused on increasing the ratio's numerator (health workers), while paying scant attention to the ratio's denominator (population size).

In this technical brief, we discuss the potential impact of population growth on countries' efforts to improve their populations' access to skilled health workers. Careful attention must be given to how population size interplays with health worker production to determine the desired health worker density ratio. An increasing rate of population growth could negate important gains in health worker production, preventing improvements in and possibly worsening the health workforce crisis in many countries. Conversely, countries that have significant declines in their rates of population growth could reach desired health service coverage more quickly than would otherwise be the case. We conclude by highlighting the need to address both health worker production and population growth to mitigate the health workforce crisis.

Background

In 2006, the World Health Organization published *The world health report 2006: Working together for health* to highlight the global health workforce crisis. Building on prior work by the Joint Learning Initiative, the WHO determined that 2.3 doctors, nurses, and midwives per 1,000 people is the minimum threshold needed to adequately cover the population with essential health services. Unless countries met this threshold, they were unlikely to achieve the Millennium Development Goals (World Health Organization 2006). Using this standard and the total population estimates for each country in 2006, the WHO determined the threshold number of health workers needed and compared this value with the best available data on the actual number of health workers. This comparison resulted in 57 countries being identified as human resources for health crisis countries, since they did not have sufficient numbers of health workers to meet the threshold density ratio. Across these 57 countries, the health worker deficit was then estimated to include 2.4 million doctors, nurses, and midwives. As of 2010, none of the 57 crisis countries had reached the prescribed health worker density ratio (Global Health Workforce Alliance 2011). Thirty-six of these countries are in sub-Saharan Africa (Figure 1).

The health worker production–population growth dynamic

Recent health workforce projections have focused on the year 2015, since this is the end date for achievement of the Millennium Development Goals. However, the United Nations' publication of *World population prospects: The 2010 revision* (2011a) brought heightened attention to population growth over the coming decades. Previously, the UN projected that the global population would peak around midcentury at 9.1 billion and then stabilize through the end of the century (United Nations 2009). However, due to persistently high and, in some cases, increasing fertility rates in some countries and somewhat lower mortality rates than those used in the 2008 revision (United Nations 2011b), the 2010 revision projects that the population will continue climbing



Figure 1: Countries with a Critical Shortage of Health Service Providers (Doctors, Nurses, and Midwives)



Source: World Health Organization. 2006. The world health report 2006: Working together for health. Geneva, Switzerland: World Health Organization. <http://www.who.int/whr/2006/en/> (accessed August 30, 2011).

through the end of the 21st century and beyond. By 2100, the world's population is estimated to reach 10.1 billion.

A country's rate of population growth is the critical variable in health workforce planning that seeks to meet minimum thresholds for health worker density. Many of the 57 crisis countries have high and, in some cases, increasing annual rates of population growth. As a result, in the absence of concerted efforts to slow their population growth, these countries will require significant increases in the number of additional health workers needed over the coming decades. Small changes in a country's annual rate of population growth can have an important impact on the total number of health workers required to achieve desired population coverage with essential health services. This effect is illustrated by the hypothetical example provided in Table 1.

As evidenced in Table 1, a country with a population of 100 million in 2000 requires 230,000 health workers to meet the threshold health worker density ratio. If the population continues to grow at its current rate of 2.4%, it will require an additional 533,600 health workers (assuming no loss of health workers over time) to meet the threshold density ratio in 2050. This corresponds to more than a 200% increase over the number required (230,000) in the year 2000. The other two population growth scenarios demonstrate the health workforce requirements in 2050 if the annual rate of population growth decreases or increases by 0.4 percentage points. An annual population growth rate

of 2.0% will require a 172% increase in health workers over the time period, whereas an annual rate of population growth of 2.8% will require a 306% increase in health workers to meet threshold density requirements.

The complete picture for the 57 crisis countries

To illustrate the importance of population growth in health workforce planning, we estimated health workforce requirements in the year 2050 under two different population growth scenarios presented in the 2010 UN revisions: the high and the low variant projections. It is important to keep in mind that the fertility, mortality, and migration assumptions underlying the 2010 UN projections were not the same for all the crisis countries.

For example, the UN classified countries in one of three groups (United Nations 2011c):

1. *High-fertility countries*: Countries that until 2010 had no fertility reduction or only an incipient decline
2. *Medium-fertility countries*: Countries where fertility has been declining but whose estimated level was still above 2.1 children per woman in 2005–2010
3. *Low-fertility countries*: Countries with total fertility at or below 2.1 children per woman in 2005–2010. Each group has different fertility assumptions underlying the population growth projections for the time period.

Table 1: Impact of Population Growth on Health Workers Needed (2000–2050): A Hypothetical Example

Crisis country X: Year: 2000 Population: 100 million Health workers needed: 230,000 Population growth rate: 2.4%	Population 2050	Health workers needed 2050	Additional health workers needed 2000–2050	% increase in health workers needed 2000–2050
Annual population growth rate 2000–2050: 2.0%	272 million	625,200	395,200	172%
Annual population growth rate 2000–2050: 2.4%	332 million	763,600	533,600	232%
Annual population growth rate 2000–2050: 2.8%	406 million	932,700	702,700	306%

Table 2: Demographic Characteristics of Human Resources for Health Crisis Countries Also Identified under the UN 2010 Revision As Having Slower Than Expected Fertility Declines

Country	Population growth rate¹	Total fertility rate²	Contraceptive use (modern methods) among currently married women (15–49)³	Unmet need for family planning among currently married women ages 15–49⁴
Burkina Faso	3.0%	5.8	13%	29%
Congo	2.5%	4.7	13%	16%
Guinea	2.2%	5.3	6%	21%
Guinea-Bissau	2.1%	5.1	14%	25% ⁵
Kenya	2.6%	4.7	39%	26%
Malawi	3.1%	5.7	42%	28%
Mali	3.0%	6.4	6%	31%
Niger	3.5%	7.0	5%	16%
Nigeria	2.5%	5.7	10%	20%
Rwanda	3.0%	4.6	45%	38%
Somalia	2.3%	6.4	1%	26% ⁵
Tanzania	3.0%	5.4	26%	22%
Yemen	3.1%	5.3	19%	24% ⁵
Zambia	1.6%	6.3	27%	27%

1. The World Bank. Population growth (annual %). <http://data.worldbank.org/indicator/SP.POP.GROW> (accessed September 22, 2011).

2. Population Reference Bureau. Total fertility rate. <http://www.prb.org/DataFinder/Topic/Rankings.aspx?ind=17> (accessed September 22, 2011).

3. Population Reference Bureau. Contraceptive use among married women ages 15–49, by method type. <http://www.prb.org/DataFinder/Topic/Rankings.aspx?ind=42> (accessed September 22, 2011).

4. Unless otherwise noted, source is: Measure DHS StatCompiler. <http://statcompiler.com/> (accessed September 22, 2011).

5. The World Bank. Unmet need for contraception (% of married women ages 15–49). <http://data.worldbank.org/indicator/SP.UWT.TFRT> (accessed September 22, 2011).

Similarly, countries highly affected by HIV/AIDS had different sets of mortality assumptions than those less affected. For this reason, comparisons of data across countries should be undertaken with caution. All data used in the estimations, as well as the source or method of calculation of each data element, are provided in the appendix.

For all countries, regardless of their population size, their populations are growing, which will necessitate increased production of health workers to meet the populations' health needs. However, if countries are able to implement policies and programs that result in smaller population growth rates over the coming decades, the number of new health workers they would have to produce could be significantly smaller. For example, across the 57 crisis countries, approximately 9.5 million health workers are needed in 2050 to achieve the threshold health worker density ratio under the low variant projection. By contrast, approximately 12.4 million health workers are needed in 2050 to meet the threshold under the high variant projection—a difference of 31% between the high and low variant projections. Among individual countries, Somalia has the lowest percent difference (21%) of additional health workers needed between the two projections, while Lesotho has the highest percent difference (41%).

Conclusion and recommendation

As this technical brief has demonstrated, when high and low variants of population growth are taken into account, it becomes apparent that the health workforce crisis could worsen in a significant number of countries over the coming decades. However, this negative outcome is far from a *fait accompli*.

Many of the 57 crisis countries, particularly those in West and Central Africa, have very high levels of unmet need for family planning and very low levels of modern method contraceptive use among married women. These demographics are consistent with the UN's observation under the 2010 revision that for a small set of 16 countries, "fertility decline has been much slower than typically experienced in the past decades by other countries at similar levels of fertility" (United Nations 2011c). Among the 16 countries in this set, 14 are human resources for health crisis countries. Table 2 provides values for these countries' annual rates of population growth, total fertility rate, contraceptive prevalence, and unmet need for family planning.

Although the population size of countries with high fertility and low contraceptive use will continue to grow, the rate at which these populations grow can be slowed. High rates of unmet need for family

planning, which exist in many of the crisis countries listed in Table 2, provide an opportunity for intervention. Addressing factors associated with meeting men's and women's needs for family planning can significantly impact population growth as a result of lower fertility rates. Decreases in the annual rate of population growth can, in turn, result in fewer additional health workers needed to reach the threshold health worker density ratio.

In conclusion, we recommend that policy-makers and planners combine efforts to meet the family planning needs of the population through the provision of quality reproductive health services with a simultaneous investment in the health workforce. Doing so will have synergistic effects in meeting the health needs of families and mitigating the health workforce crisis in individual countries around the world.

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Appendix: Projected Population and Health Worker Needs in 2050 for the 57 Human Resources for Health Crisis Countries

Country	Projected population (thousands) in 2050, low variant ¹	Projected # of health workers needed in 2050, low variant ²	Projected population (thousands) in 2050, high variant ¹	Projected # of health workers needed in 2050, high variant ³	Difference in # of health workers needed in 2050 between low and high variant ⁴	% increase in health workers needed in 2050 between low and high variant ⁵
Afghanistan	68,141	156,724	84,826	195,100	38,376	24%
Angola	37,095	85,319	47,971	110,333	25,015	29%
Bangladesh	165,966	381,722	226,325	520,548	138,826	36%
Benin	19,284	44,353	24,340	55,982	11,629	26%
Bhutan	826	1,900	1,114	2,562	662	35%
Burkina Faso	41,885	96,336	51,832	119,214	22,878	24%
Burundi	11,933	27,446	15,607	35,896	8,450	31%
Cambodia	16,234	37,338	21,964	50,517	13,179	35%
Cameroon	33,588	77,252	43,744	100,611	23,359	30%
Central African Republic	7,340	16,882	9,529	21,917	5,035	30%
Chad	24,207	55,676	30,494	70,136	14,460	26%
Comoros	1,502	3,455	1,911	4,395	941	27%
Congo	7,720	17,756	9,965	22,920	5,164	29%
Côte d'Ivoire	35,655	82,007	46,056	105,929	23,922	29%
Democratic Republic of the Congo	131,208	301,778	167,040	384,192	82,414	27%
Djibouti	1,418	3,261	1,837	4,225	964	30%
El Salvador	6,428	14,784	8,934	20,548	5,764	39%
Equatorial Guinea	1,316	3,027	1,683	3,871	844	28%
Eritrea	10,143	23,329	13,090	30,107	6,778	29%
Ethiopia	125,834	289,418	166,036	381,883	92,465	32%
Gambia	3,548	8,160	4,557	10,481	2,321	28%
Ghana	43,149	99,243	55,488	127,622	28,380	29%
Guinea	20,398	46,915	25,782	59,299	12,383	26%
Guinea-Bissau	2,831	6,511	3,561	8,190	1,679	26%
Haiti	12,200	28,060	16,316	37,527	9,467	34%
Honduras	11,151	25,647	14,907	34,286	8,639	34%
India	1,457,433	3,352,096	1,952,664	4,491,127	1,139,031	34%
Indonesia	252,677	581,157	338,518	778,591	197,434	34%

Iraq	73,817	169,779	93,533	215,126	45,347	27%
Kenya	84,975	195,443	109,699	252,308	56,865	29%
Lao People's Democratic Republic	7,152	16,450	9,736	22,393	5,943	36%
Lesotho	2,331	5,361	3,290	7,567	2,206	41%
Liberia	8,558	19,683	10,833	24,916	5,233	27%
Madagascar	47,021	108,148	60,605	139,392	31,243	29%
Malawi	44,531	102,421	55,207	126,976	24,555	24%
Mali	37,719	86,754	46,794	107,626	20,873	24%
Mauritania	6,252	14,380	7,972	18,336	3,956	28%
Morocco	33,813	77,770	44,953	103,392	25,622	33%
Mozambique	43,862	100,883	56,982	131,059	30,176	30%
Myanmar	47,592	109,462	63,608	146,298	36,837	34%
Nepal	39,578	91,029	54,213	124,690	33,661	37%
Nicaragua	6,640	15,272	9,201	21,162	5,890	39%
Niger	50,183	115,421	60,956	140,199	24,778	22%
Nigeria	348,396	801,311	433,229	996,427	195,116	24%
Pakistan	238,538	548,637	314,272	722,826	174,188	32%
Papua New Guinea	11,887	27,340	15,330	35,259	7,919	29%
Peru	33,575	77,223	44,573	102,518	25,295	33%
Rwanda	23,105	53,142	29,074	66,870	13,729	26%
Senegal	25,150	57,845	32,298	74,285	16,440	28%
Sierra Leone	9,716	22,347	12,553	28,872	6,525	29%
Somalia	25,575	58,823	30,992	71,282	12,459	21%
United Republic of Tanzania	122,813	282,470	154,836	356,123	73,653	26%
Togo	9,703	22,317	12,665	29,130	6,813	31%
Uganda	83,580	192,234	105,617	242,919	50,685	26%
Yemen	54,390	125,097	69,227	159,222	34,125	27%
Zambia	40,485	93,116	49,841	114,634	21,519	23%
Zimbabwe	17,515	40,285	24,009	55,221	14,936	37%

Total # of health workers needed in 2050 across 57 crisis countries, low variant	9,497,993
Total # of health workers needed in 2050 across 57 crisis countries, high variant	12,425,035
Total % increase in health workers needed in 2050 across 57 crisis countries from low variant to high variant	31%

1. United Nations. Population. Department of Economic and Social Affairs, Population Division. http://esa.un.org/wpp/unpp/panel_population.htm (accessed September 16, 2011). Parameters selected: Population, all variants, start year of 2050, and end year of 2050.
2. Calculated by applying the ratio of 2.3 health workers per 1,000 population to the UN population projections for 2050, low variant.
3. Calculated by applying the ratio of 2.3 health workers per 1,000 population to the UN population projections for 2050, high variant.
4. Difference between projected requirement of health workers in 2050 under high variant and projected requirement of health workers in 2050 under low variant.
5. [Difference between projected requirement of health workers in 2050 under high variant and projected requirement of health workers in 2050 under low variant] / Requirement of health workers in 2050 under low variant