Baby 'boom' and 'bust': Nations' rates of childbirth vary significantly

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Baby on mother's belly right after birth. Credit: Tom Adriaenssen/Wikipedia, CC BY-SA 2.0

Ninety-one nations are not producing enough children to maintain their current populations, while the opposite is true in 104 countries where high birth rates are driving population increases, according to a new scientific study.

Total fertility rates (TFR), a summary measurement representing the average number of children a woman would deliver over her lifetime, have declined since 1950. In 2017, the lowest TFR was in Cyprus, where on average, a woman would give birth to one child throughout her life, as opposed to the highest, in Niger, where a woman would give birth to seven children.

In addition to Niger, Mali, Chad, and South Sudan were among the 104 nations with fertility rates exceeding two births per woman, as compared to 91 countries, including Singapore, Spain, Portugal, Norway and South Korea, along with Cyprus, with rates lower than two.

"These statistics represent both a 'baby boom' for some nations and a 'baby bust' for others," said Dr. Christopher Murray, Director of the Institute for Health Metrics and Evaluation (IHME) at the University of Washington. "The lower rates of women's fertility clearly reflect not only access to and availability of reproductive health services, but also many women choosing to delay or forgo giving birth, as well as having more opportunities for education and employment."

The findings are included in the annual Global Burden of Disease (GBD) study, to which 3,676 collaborators from 146 countries and territories contribute. This year's study includes more than 38 billion estimates of 359 diseases and injuries and 84 risk factors in 195 countries and territories.

This version of the GBD study, published today in the international medical journal *The Lancet*, marks the first time the study has produced its own population and fertility estimates. The global population increased by 197% since 1950, from 2.6 billion to 7.6 billion in 2017.

"To our knowledge, this is the first study to provide transparent and replicable estimates of population and fertility that can be used to inform

decision-making and to monitor nations' economic progress," Murray said. "Although total fertility rates are decreasing, the global population continues to grow as death rates decline and because of population 'momentum' in previous decades."

From 2007 to 2017, the world's population has grown annually by 87.2 million people, compared with 81.5 million annually from 1997 to 2007. In 1950, high-income countries accounted for 24% of the global population, but in 2017, the population of these countries accounted for 14%.

Among countries whose populations grew annually more than 2% from 2010 to 2017, 33 were in sub-Saharan Africa. In addition to Niger, those nations include Nigeria, Ethiopia, and Mali. Outside of Africa, India, Pakistan, Papua New Guinea, and Haiti are among others with growing populations. By comparison, 33 countries had declining populations between 2010 and 2017, most of which were located in Central, Eastern, and Western Europe—including Georgia, Poland, Romania, Greece, Spain, Portugal—as well as Japan, Cuba, and Puerto Rico.

In addition to population and fertility, this year's GBD, with results described in seven scientific papers, covers mortality and life expectancy, causes of death and years of healthy life lost, years lived with disability, overall burden of disease, risk factors, and the chances of each nation meeting 41 of the health-related indicators that are part of the United Nations Sustainable Development Goals (SDGs) for 2030.

Analysis of UN Sustainable Development Goals

Among the findings on the SDGs:

- Among the highest scores for availability of health care workers—physicians, nurses, midwives, and pharmacists—were

in Cuba, Qatar, and many European countries, while most of the lowest were in sub-Saharan Africa.
- Several Latin American nations had the worst scores for sexual violence by non-intimate partners, while many countries in Central Asia, Eastern Europe, and South Asia had the best scores.
- Most nations have a 95% likelihood of meeting SDG targets for malaria incidence, as well as those for deaths of children under age 5, neonatal mortality, and maternal mortality.
- Most nations will fail to meet their targets for reducing deaths from non-communicable diseases, such as diabetes or stroke, or for suicide.
- No nation has yet met the SDG target for overweight children, which is at or less than 0.5% of children ages 2 to 4 years.
- Males are more likely than females to die from non-communicable diseases and smoking, among other health problems.
- Rates of male suicide far exceed rates for females (13.8 per 100,000 as compared to 4.0 per 100,000).
- It is unlikely the goal of eliminating new HIV infections will be met.

"HIV remains a massive public health threat, particularly because global financing has plateaued, domestic health spending has stayed low among high-burden countries, and its incidence has not declined as quickly in younger as in older populations," Murray said. "How best to galvanize accelerated action against HIV, as well as the world's other great health challenges, is far from clear. Going forward, the annual GBD study offers international agencies, nations' health officials, and other stakeholders a platform through which strategies and programs can be tested and analyzed."

Leading Causes of Death and Health Risk Factors

The study finds that each of the following caused more than 1 million deaths worldwide in 2017: ischemic heart disease, neonatal disorders, stroke, lower respiratory infections, diarrhea, road injuries, and chronic obstructive pulmonary disease (COPD).

- The highest age-adjusted death rates for ischemic heart disease were in Uzbekistan, Ukraine, and Azerbaijan; lowest in South Korea, Japan, and France.
- Highest rates for neonatal disorders were in Central African Republic, Pakistan, and Mali; lowest in Singapore, Japan, and Iceland.
- Highest rates for stroke were in Marshall Islands, Papua New Guinea, and Montenegro; lowest in Switzerland, France, and Singapore.
- Highest rates for lower respiratory infections were in Central African Republic, Solomon Islands, and Chad; lowest in Austria, Finland, and Macedonia.
- Highest rates for diarrhea-related diseases were in Central African Republic, Chad, and South Sudan; lowest in Montenegro, Belarus, and Estonia.
- Highest rates for road injury-related deaths were in Central African Republic, Somalia, and United Arab Emirates; lowest were in Switzerland, Singapore, and Sweden.
- Highest rates for COPD were in Papua New Guinea, North Korea, and India; lowest in Kuwait, Iraq, and Japan.

In addition, there have been rapid increases in death rates for which antibiotic use or resistance is a major factor, such as tuberculosis and cellulitis, a common skin infection.

"An unintended consequence of increased access to health care globally is the dramatic increases in mortality from diseases and disorders linked to pharmaceuticals, specifically antibiotic resistance and opioid use,"

Murray said.

He noted that over the past decade, deaths from opioid use disorders globally increased by more than 75%, from 61,859 in 2007 to 109,520 in 2017.

Regarding health loss (measured in disability-adjusted life years, or DALYs) due to other risk factors, many of the most common, such as high blood pressure and smoking, have changed little in rankings of the top 15 between 2007 and 2017. However, looking back 27 years to the top risks in 1990, major differences emerge, when child wasting, short gestation for birthweight, and low birthweight ranked first through third. Those three rank ninth, fifth, and sixth, respectively, in 2017.

Other highlights regarding rankings risk factors based on the number of all-ages DALYs include:

Increases

- High blood pressure in 1990 ranked fifth; in 2017 it was first
- Smoking in 1990 ranked fourth; in 2017 it was second
- High blood sugar in 1990 ranked 11th; in 2017 it was third
- High body mass index in 1990 ranked 16th; in 2017 it was fourth

Decreases

- Unsafe water source in 1990 ranked sixth; in 2017 it was 14th
- Household air pollution in 1990 ranked seventh; in 2017 it was 16th
- Unsafe sanitation in 1990 ranked ninth; in 2017 it was 20th

"The world has seen several health success stories," Murray said.

"Investments made in poor countries addressing prenatal care and water and sanitation problems clearly have made a significant difference in people's lives. Conversely, the combination of increasing metabolic risks and population aging will continue driving problematic trends in non-communicable diseases. This represents both a challenge and opportunity, and highlights the value of the GBD study to inform good policy decisions and strategic health planning."

Years of Life Lost and Nations with Healthy Life Expectancy

Those decisions and health planning efforts also are founded on analyses of DALYs, which are the sum of years of life lost (YLLs), plus years lived with disability (YLDs).

Like risk factors, there were significant differences in the rankings and percent changes of causes of all-ages DALYs in 1990 as compared to 2017:

- Drug use disorders increased 71%
- Diabetes increased 117%
- Alzheimer's disease and other dementias increased 115%
- Neck pain increased 75%
- Age-related hearing loss increased 80%
- Depressive disorders increased 53%
- Tetanus dropped 90%
- Measles dropped 86%

In 2017, there were several differences in the rankings of all-ages DALYs between males and females, including:

- Road injuries was the fifth leading cause of DALYs for males,

compared to 16th for females.
- Headache disorders ranked 18th for males and eighth for females.
- Lung cancer ranked 12th for males and 27th for females.
- Self-harm was 16th for males and 31st for females.

The GBD study also identifies nations with high and low healthy life expectancy, as measured by years a person can expect to live in good health, taking into account both death and disability. In 2017, the top three countries were Singapore (74.2 years), Japan (73.1 years), and Spain (72.1 years); lowest were Central African Republic (44.8 years), Lesotho (47.0 years), and South Sudan (50.6 years).

"With increasing life expectancy in many countries, the question for all of us in the health policy arena is whether the additional years are spent in good health or poor health," Murray said. "The burden of disabling conditions has serious implications for health systems and health-related expenditures. Global trends among non-communicable diseases indicate that more effort is needed to increase healthy life expectancy."

Nations with highest fertility rates (average number of children a woman delivers over her lifetime):

Niger—7.1; Chad—6.7; Somalia—6.1; Mali—6.0; Afghanistan—6.0; South Sudan—5.9; Burkina Faso—5.4; Burundi—5.3; Uganda—5.2; Democratic Republic of the Congo, Angola, Nigeria (all 5.1)

Top 10 nations with the largest populations:

China—1,412,480,000; India—1,380,560,000; United States—324, 839,000; Indonesia 258,134,000; Pakistan—214,287,000; Brazil—211,812,000; Nigeria—206,087,000; Bangladesh—156,981,000; Russia—146,189,000; and Japan—128,

363,000

Top 10 global health risks linked to all-ages DALYs (both sexes):

High blood pressure, smoking, high blood sugar, high body mass index, short gestation for birthweight, low birth weight for gestation, alcohol use, high cholesterol, child wasting, and air pollution

Top 10 causes of all-ages DALYs for males for 2017:

Ischemic heart disease, neonatal disorders, stroke, lower respiratory infections, road injuries, COPD, diarrhea-related diseases, diabetes, congenital birth defects, and low back pain

Top 10 causes of all-ages DALYs for females for 2017:

Neonatal disorders, ischemic heart disease, stroke, lower respiratory infections, diarrhea-related diseases, COPD, low back pain, headache disorders, diabetes, and congenital birth defects.

Top 10 and bottom nations for healthy life expectancy (HALE):

Singapore—74.2 years; Japan—73.1 years; Spain—72.1 years; Switzerland—72.0 years; Italy—71.9 years; France—71.7 years; South Korea—71.7 years; Israel—71.4 years; Bermuda—71.4 years; Iceland—71.3 years

Central African Republic—44.8 years; Lesotho—47.0 years; South Sudan—50.6 years; Mozambique—50.6 years; Papua New Guinea—50.8 years; Somalia—51.2 years; Swaziland—51.3 years; Chad—51.5 years; Guinea-Bissau—52.0 years; and Sierra Leone—52.1 years

More information: Christopher J L Murray et al, Population and fertility by age and sex for 195 countries and territories, 1950–2017: a systematic analysis for the Global Burden of Disease Study 2017, *The Lancet* (2018). DOI: 10.1016/S0140-6736(18)32278-5