**Frequently Asked Questions for Paper**

“Mapping 123 million neonatal, infant, and child deaths between 2000 and 2017”

**Q: What is the definition of under-5 mortality?**

* Under-5 mortality includes deaths of neonates (birth to 28 days of age), infants (up to 1 year of age), and deaths of children under age 5. The mortality rate is reported as the probability of death before age 5 for every 1,000 live births.

**Q: What countries were included in the study?**

* The study looks at 99 countries where the majority of under-5 deaths occurred in 2017. The countries studied are in the middle, low-middle, or low quintiles of the Socio-demographic Index (SDI) described in the Global Burden of Disease study. The SDI is a measure of development based on income per capita, educational attainment, and fertility rates among women under age 25.
  + Brazil and Mexico were excluded because of the lack of availability of vital registration data that have been the basis for existing subnational estimates in those countries.
  + Albania, Moldova, and North Korea were excluded due to geographic discontinuity with other surveyed countries and lack of data.
  + China and Malaysia were excluded because they transitioned to high-middle SDI status during the study period.
  + Libya was included, despite high-middle SDI status, to create better geographic continuity. (Without Libya, Egypt is modeled as part of North Africa with no neighbors, making geospatial analysis difficult).
  + Island nations with populations under 1 million were excluded.

**Q: What are the major causes and risks for under-5 mortality?**

* Globally, premature birth was the biggest cause of deaths before the age of 1 year in 2017. Malaria, diarrheal diseases, and lower respiratory infections were the largest killers of children between the ages of 1 and 5. Many risk factors contribute to under-5 deaths, with some of the biggest being low birth weight and short gestation, undernutrition, and lack of access to clean water. More information on causes of death and risk factors is available [in the Global Burden of Disease study.](http://www.healthdata.org/gbd/gbd-2017-resources)

**Q: What are the key takeaways from this study?**

* A child’s risk of dying before age 5 varies tremendously depending on where they are born. There is up to a 40-fold difference in the probability of death before age 5 across all districts included in this analysis. The highest mortality rates at the local level were observed in Nigeria, and the lowest in Cuba.
* Despite progress in all countries studied, the geographic areas with the highest concentration of child deaths in 2000 are largely the same as those suffering the largest burden in 2017. This reflects inequality that is resistant to improvement and may indicate a need for new strategies to further reduce child deaths.
* Based on the analysis, nearly half of the 5.4 million under-5 deaths in 2017 can be attributed to inequalities in child death rates within and across countries.

**Q: How did population changes factor into the results?**

* Child death rates declined despite population growth, indicating that progress in lowering death rates is outpacing a growing under-5 population.

**Q: What other variables were included in the analysis?**

* The researchers included the following sociodemographic and environmental covariates:
  + travel time to nearest inhabited area of 50,000 or more, which serves as a proxy for remoteness from services;
  + intensity of lights at night, which serves as a measure of electricity consumption and economic development;
  + mean years of educational attainment by women of reproductive age;
  + the mass per cubic meter of air of particles with a diameter less than 2.5 micrometers (PM2.5);
  + the ratio of children under 5 to number of women of reproductive age (fertility proxy);
  + the total population; and
  + indicator for urban land cover, as defined by the [Global Human Settlement project](https://ghsl.jrc.ec.europa.eu/datasets.php).
* The analysis also included the following health-related covariates:
  + proportion of children aged 12-23 months who have received the third dose of diphtheria-pertussis-tetanus vaccine, which also serves as a proxy for routine health service utilization in children;
  + incidence rate of *Plasmodium falciparum* malaria in children under 5;
  + prevalence of stunting in children under 5.

**Q: Why were the different administrative subdivisions chosen for analysis?**

* The estimates from this analysis are available at the level of countries, first administrative divisions (regions, states), second administrative divisions (districts, municipalities), and a 5x5 kilometer grid. Because policy decisions often happen at the first or second administrative level, estimates at that scale are useful for health officials and decision-makers working to tailor health interventions to local medical, infrastructural, and cultural conditions. In press materials, IHME may use the term “district” to refer to second administrative subdivisions within a country. This does not align perfectly with naming conventions in every country mapped. A list of all naming conventions in the mapped countries is available from the IHME media team.

**Q: How does this analysis compare to results from the Global Burden of Disease study?**

* The Global Burden of Disease study produces estimates only at a national level, or at the first administrative level for select countries. This study uses a geospatial analysis to provide estimates at a more granular resolution, then aggregates those estimates to policy-relevant units within each country. National-level results can mask major differences in the distribution of child deaths within countries. This research estimated that as much as a 10-fold difference in mortality rate exists at the district level within a single country.
* These granular estimates allow decision-makers to tailor health responses precisely, making health policy decisions for local areas rather than entire countries. They also help to identify geographic inequities.