

# A global systematic assessment of the availability and quality of birth registration data

This *CRVS summary* is edited from 'How useful are registered birth statistics for health and social policy? A global systematic assessment of the availability and quality of birth registration data, a *Population Health Metrics* publication available at <https://doi.org/10.1186/s12963-018-0180-6>

## Why does birth registration matter?

Reliable birth registration data are a fundamental component of national civil registration and vital statistics (CRVS) systems. They are necessary for tracking changes in fertility patterns, for monitoring family planning and maternity and child mortality programs and for future planning and policy affecting wide-ranging areas such as health, education and infrastructure. Birth registration can also lead to a range of benefits for both individuals and society. These include:

- Access to legal entitlements
- Citizenship and voting rights
- Access to health and education
- Proof of age
- Social benefits
- Security benefits in times of crisis

The importance of birth registration is reflected in the Sustainable Development Goal 16.9 that aims, by 2030, to provide legal identity for all, including birth registration.

While birth registration is a near-universal practice in many parts of the world, registration rates remain poor in low and middle-income countries. Furthermore, the status of birth registration globally is not well understood as there is no comprehensive global database to track birth registration systems and data that does not rely on potentially biased, self-reported information.

As part of the Bloomberg Philanthropies Data for Health (D4H) Initiative, researchers at the University of Melbourne have systematically assembled birth registration data for as many countries as possible into a global birth registration database. The quality of the available birth registration data was then assessed, by adapting an existing framework used for death registration data, the Vital Statistics Performance Index.<sup>1</sup>

The database and index together can help enable the tracking of the performance of registration systems over time and between countries and can be of great use for monitoring progress for global and national development goals.

## How is birth registration data quality defined?

In addition to **birth registration completeness**, ie the percentage of births that are registered in a given year, some other specific characteristics of registration data are important for an objective assessment of the quality and importantly, the utility of data collected in a birth registration system. These characteristics are also likely to be of central importance for public health and demographic purposes and are recommended by the UN to be collected by national CRVS systems.<sup>2</sup> These are:

1. **Age of the mother** - to understand the age patterns of fertility and to calculate the total fertility rate
2. **Sex of the newborn** - to monitor the sex ratio at birth and as an indicator of sex preferences in fertility
3. **Birth order of the child** - to understand fertility behaviour
4. **Birthweight** – as it plays a critical role in the survival of the newborn.

## How was the birth registration database compiled?

The database has been constructed from 4,918 country-years of publicly available data from 145 countries covering the period 1948-2015 and includes the number of registered **live births** specified by age of mother, sex of newborn, birth order and birthweight. The data were mainly sourced from the UN Statistical Division database and supplemented with data from Eurostat and directly from national statistical offices and ministry of health databases. The database is the largest collection of birth statistics currently available, containing records of over 1 billion births since 1980.

<sup>1</sup> Phillips DE, Lozano R, Naghavi M, Atkinson C, Gonzalez-Medina D, Mikkelsen L, et al. A composite metric for assessing data on mortality and causes of death: the vital statistics performance index. *Population Health Metrics* 2014;12(1):14.

<sup>2</sup> UN Statistics Division. Principles and Recommendations for a Vital Statistics System, Revision 3. New York: Department of Economic and Social Affairs, UN Statistics Division; 2014. Available at: <http://unstats.un.org/unsd/demographic/standmeth/principles/M19Rev3en.pdf>

**It is important to note that the database only includes data that have been made publicly available.** Many countries may have some form of a birth registration system, but often the data are not published and therefore could not be included in the database.

### Global status of birth registration

The availability of data remains low in many parts of the world. Looking at 109 countries from 1980 to 2015, data availability ranged from  $\leq 5$  years (11 countries) to  $\geq 30$  years (51 countries). While the available data came from all regions of the world including 29 Eastern European or Central Asian countries, 20 Latin American and the Caribbean countries, 11 countries from East Asia and the Pacific, there were only 4 countries from Sub-Saharan Africa.

The data include around 27.9 million births per year on average, and a total of 1.01 billion births registered since 1980. The available data ranged from 13.2% of all births estimated to have occurred in 1990, increasing to 40.0% in 2011. **Only around 33% of births worldwide in 2015 were registered with publicly available records, reflecting the long delays often encountered in countries between collection and publication of data on births (and deaths).** Interestingly, despite the added incentives for birth registration (see above), the estimated completeness of birth registration based on publicly available data is considerably less than for deaths, with 55-60% of global deaths now registered in publicly available data systems.

### Birth registration completeness

To assess completeness of birth registration data existing annual estimates of total births, which are produced by the United Nations Population Division,<sup>3</sup> was used as the denominator. At the time of writing, these data were the only comprehensive estimates available of births occurring in countries; in many cases they are accompanied by considerable uncertainty.<sup>4</sup>

The findings from this study suggest that rapid progress in improving CRVS systems is possible using a few strategic approaches. These include targeted efforts to improve completeness of registration and cause-of-death certification practices, and awareness campaigns to ensure that those who operate CRVS systems in countries such as doctors, statisticians and analysts, understand the importance of accurate and complete vital statistics.

#### Box 1: Birth registration completeness

Birth registration completeness was calculated by dividing the number of births reported for each country, by estimates of the total number of live-born in each country-year.

$$\text{Completeness of birth registration (\%)} = \frac{\text{(Number of registered births)}}{\text{Estimate of actual births}} * 100$$

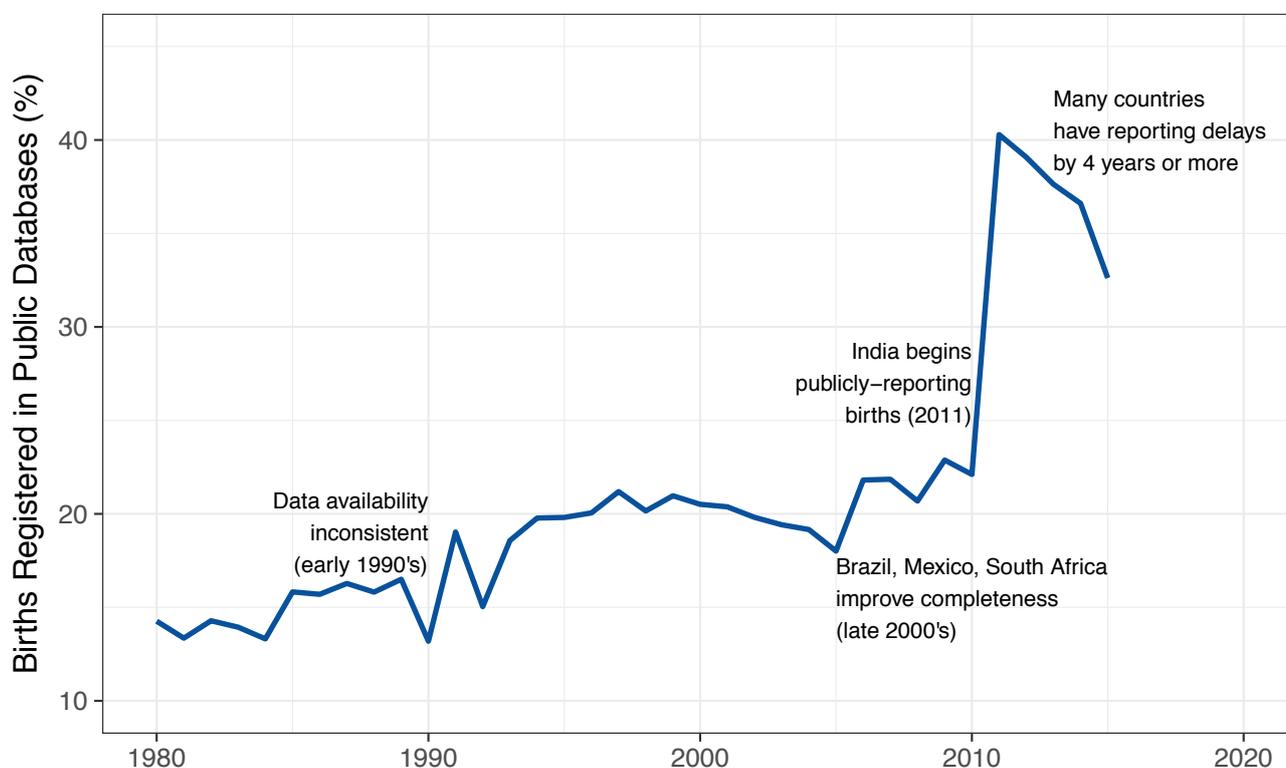
This method found that 102 countries had completeness greater than 80%, five countries were between 50% and 80% and two countries had estimated completeness below 50%. Results for all countries with available data can be found in the original report by Phillips *et al*<sup>5</sup> and summarised in **Figure 1**.

<sup>3</sup> United Nations, Department of Economic and Social Affairs, Population Division. World Population Prospects: The 2017 Revision, Volume I: Comprehensive Tables. UN; 2017. Available from: <https://esa.un.org/unpd/wpp>

<sup>4</sup> More recent estimates of births have been developed by the Global Burden of Disease collaboration. See: GBD 2017 Population and Fertility Collaborators. 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; 392(10159):1995-2051

<sup>5</sup> Phillips DE, Adair T and Lopez AD. How useful are registered birth statistics for health and social policy? A global systematic assessment of the availability and quality of birth registration data. *Population Health Metrics* 2018; 16(1):21.

**Figure 1 Percentage of global births registered in publicly-available data<sup>5</sup>**



## Measuring the performance of a birth registration system – the VSPI-B

Registration completeness is just one aspect of how informative a birth registration database is. To more comprehensively assess how practically useful for policy discussions a birth registration system is, a method was developed that considers accuracy, completeness and data availability together.

The method was adapted from one that was originally used to assess the utility of death registration, and for which a summary index of data quality was developed, known as the Vital Statistics Performance Index (VSPI).<sup>1</sup> To assess birth registration systems, the same quality assessment framework was used, but adapted to include the four **indicators of birth registration data quality** and two **indicators of system performance**. The resulting metric of birth registration data quality was labelled Vital Statistics Performance Index (Births), or VSPI-B.

The six components that comprise the VSPI-B are:

1. Proportion of registered births with unspecified maternal age
2. Proportion of registered births with unspecified newborn sex
3. Proportion of registered births with unspecified birthweight
4. Proportion of registered births with unspecified live birth order
5. Data completeness
6. Timeliness of publication

Simulation techniques were used to measure the accuracy of each of the components and the results were combined into a composite index. **This index quantifies the extent to which the birth data are sufficiently detailed, complete and accurate in reflecting the underlying demographic profile of births in the country.**

## Data quality world-wide

Most country-years reported births by maternal age and the newborn's sex (95.3% and 73.4% respectively), with fewer countries reporting births by live birth order and birthweight (55.6% and 51.1%, respectively). Among countries that reported all four indicators, the highest proportion of missing values was for birth weight (2.6% of births with unknown birth weight) followed by maternal age and live birth order (1.0% each). Births without a recorded sex were very rare, occurring in only 0.05% of cases.

## Overall performance of birth registration systems globally

To assess overall performance, VSPI-B scores were calculated for each country with their most recent year of available data (**Figure 2**).

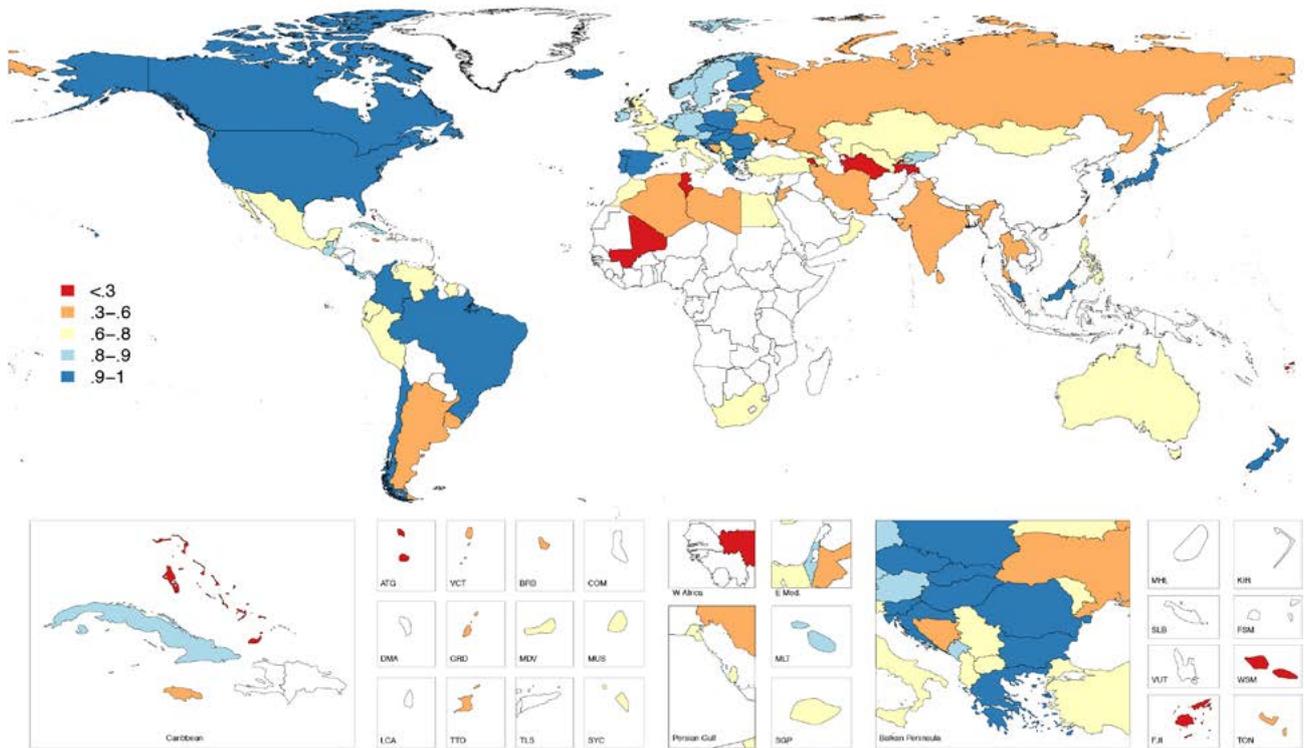
- The 26 countries that had VSPI-B scores in the highest category (between 0.9 and 1) included many high and middle-income countries.
- 17 countries had VSPI-B scores in the range 0.8-0.9 and were characterized by high completeness but sporadic reporting of quality indicators.
- 38 countries were in the range 0.6-0.8 and included high, middle and lower-middle income countries. These countries tended to have lower completeness and lack of reporting of data quality indicators.
- 19 countries had VSPI-B scores in the 0.3-0.6 range, characterized by either low completeness, poor data availability and/or lack of reporting data quality indicators.
- Nine countries had VSPI-B scores that were lower than 0.3. These countries typically had only few years with available data, low completeness and/or lack of reporting of multiple data quality indicators.

## What are the limitations of these approaches

The findings of this study are different to some others, eg UNICEF.<sup>6</sup> The reasons for this could be because other studies rely on self-reported data, not actual records of birth certificates, potentially leading to bias, and because of the uncertainty in the estimate of total births produced by the UN Population Division. Other than this, the biggest limitation is that the database and the VSPI-B assessments are based on publicly available data. **Notably, data from several populous countries were not available for analysis** (eg China, Bangladesh and Pakistan), although these countries routinely collect statistics on births. Inclusion of data for China alone would likely have increased global completeness of birth registration from 40% to 50%. Many countries may have low VSPI-B scores not because their registration systems are poor, but because the data are not publicly available.

6 UNICEF. The State of the World's Children 2017: Children in a Digital World. New York: United Nations Children's Fund (UNICEF); 2017 Dec.

Figure 2 Vital statistics performance index (births) (most recent year with available data)<sup>5</sup>



## Summary

Birth registration forms an important part of national CRVS systems and provides many benefits for both individuals and society. Registration rates vary throughout the world, but tend to be poor in low- to middle- income countries. This report describes the creation of a global birth registration database and the development of a summary index to assess the quality and utility of the data. This was done through the creation of a performance metric called the Vital Statistics Performance Index – Births (VSPI-B). Birth registration completeness worldwide is lower than death-registration, with only around 4 in 10 of births registered in publicly available databases. The VSPI-B scores showed that only a few countries had birth registration data of high coverage and high quality. It is likely that actual birth registration worldwide is substantially higher than the level of 40% reported from the database, since several countries, including populous ones, do not yet make the data publicly available.

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