

## Limitations related to globally reported immunization subnational data

In 2017 and for the first time worldwide, WHO has collected and is publishing subnational immunization coverage data reported by its member states. Member states were asked to report their numerator (number of doses administered), denominator (number of eligible individuals) and coverage data (% of eligible individuals receiving the relevant dose of vaccine) for the first and third dose of DTP-containing vaccines (DTP1, DTP3) and measles containing vaccine (MCV1) from their 2<sup>nd</sup> subnational administrative level ("*admin2*" often called *districts*). The data collection is done for the period of January to December 2016 through the [WHO/UNICEF joint annual collection process](#).

There are several limitations to the subnational data that were reported through the WHO-UNICEF JRF.

- **Data completeness**

Due to countries not reporting any data or incomplete data, the subnational coverage data does not include data from all member states.

61 countries, or about 30% of all 194 WHO member states, are not included in the database as they did not report subnational data or shared incomplete data. This also includes 8 very small countries with no subnational administrative levels. The more than 20,000 reported *admin2* represent about half of all *admin2* worldwide.

Of note is that the *admin2* coverage data mainly originates from 3 regions: Africa, the Americas and South-East Asia. Less than 4% of the expected *admin2* data were received from remaining regions.

- **Interpretation bias**

Even if the initial request was to report data at the second subnational administrative level, some of the data received as *admin2* is actually for the first, third and sometimes even a lower administrative level. In the same manner some of the *admin1* reported may actually be referring to the second subnational administrative level. This may explain some of the disparities in terms of district sizes. Some reported districts are not linked to a specific geographical place (eg. migrant population, army camps, etc). These non-geographically based population often don't have a denominator. The diversity in reporting limits comparability across countries.

- **Data quality**

The subnational coverage estimates are collected using the *administrative method*, in which immunization coverage is calculated by expressing the number of doses of DTP1, DTP3, and MCV1 that were administered in each district during the year 2016 (*numerator*), as a proportion of the number of surviving infants in the same district (which is the target group for those doses, or the *denominator*). "Administrative coverage" is prone to errors, including:

- ✦ Numerator errors: these are introduced either inadvertently or deliberately when tallying, summarizing, and reporting the administered doses by health facilities and district administrations.
- ✦ Inaccurate denominators: in most countries, population estimates are based on census data which are updated each year, using estimated growth rates. Even if the census was initially of a high quality, distortions grow over time as certain districts and regions experience much faster growth than others.
- ✦ Numerator / denominator mismatches: In reality, not everybody who lives in a certain district will be vaccinated in that district, and not everybody who is vaccinated in that district also lives there. Mobility thus naturally creates mismatches between the numerator and the denominator. This is aggravated in countries with important migratory movements, for example after conflicts, or in countries with very mobile or nomadic populations.

Numerator errors can be addressed through optimal design of the paper or electronic records; regular supervision; and regular data review at all levels, including through immunization data self-assessments. Denominators pose a much more intractable problem, as population estimates are often outside of the control of the immunization programmes, and because of the issues with mobility and changing demographics mentioned above. For example, urban centres, with their higher growth rates and better health care infrastructure, often over-estimate coverage when using the administrative method, sometimes far in excess of 100%. In fact, as much of 35% of all administrative entities reported coverage over 100%. At the higher administrative levels, denominator mismatches tend to balance each other out, and national level denominators are more reliable than district level denominators.

Another limitation with district level coverage estimates is that they normally cannot be triangulated with coverage survey results, as district level coverage estimates are either not available at the district level or have very wide uncertainty ranges. WHO has therefore no means to challenge or validate district level administrative estimates, as is done in the WHO/UNICEF Estimates of National Immunization Coverage (WUENIC) process for national estimates.

To know more about globally reported subnational data, visit:

[http://www.who.int/entity/immunization/monitoring\\_surveillance/data/subnational/en/index.html](http://www.who.int/entity/immunization/monitoring_surveillance/data/subnational/en/index.html).

For more information, contact: [vpdata@who.int](mailto:vpdata@who.int) (please use “subnational data” in the subject line).

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