

# INDICATOR ANALYSIS

## HEALTH WORKER DENSITY AND DISTRIBUTION

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<p>How is this indicator calculated?</p>	<p>The effectiveness of health systems is dependent on health workers’ availability, accessibility, and capacity to deliver accepted and quality services.</p> <p>The health worker density and distribution indicator (SDG indicator 3.c.1) was adopted to monitor progress towards Sustainable Development Goal (SDG) target 3.c on the health workforce, especially in least developed countries and small island developing states. It is calculated by assessing the number of health workers per 1000 (or 10 000) population.</p> <p>The WHO determined a threshold of 4.45 doctors, nurses and midwives per 1000 population as a minimum density representing the need for health workers to achieve the SDG target (1).</p>
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<b>GLOBAL TRENDS</b>	
<p>What are the global patterns for this indicator? Trends, geographic patterns etc.</p>	<p>The lowest indicator scores are in Sub-Saharan African countries, with low scores in southeast Asia, south Asia, and some Oceanic countries, while Cuba, Qatar, and many European countries are among the best scoring countries for this indicator (1). 2017 estimates indicate that “47.2% of countries and territories have less than one physician per 1000 populations and 46.2% have less than three nurses or midwives per 1000 population” (1).</p> <p>The global average in 2015 was 5.9 per 1000 population, and the country-level annualised rate of change from 1990 to 2015 based on the mean percentiles for defined targets (90<sup>th</sup> percentile) is +4.2% (1). If the 90<sup>th</sup> percentile was used as the SDG target, the global average in 2030 would need to rise to 10.9 per 1000 population, and the global percentage change from 2015 to 2030 would need to rise to +85.4% (1).</p> <p>In 10,000 population spaces, the threshold for diminishing returns is 30 physicians, 100 nurses or midwives, and 5 pharmacists (1).</p> <p>Health workforce density is associated with decreased maternal and infant mortality rates, as well as decreased total burden of disease as measured in disability-adjusted life years (DALYs) (2).</p>

<b>UTILITY</b>	
<p>What does the indicator measure?</p>	<p>The indicator measures health worker density by type of occupation (per 1000 population), often using International Standard Classification of Occupations (ISCO) 88 to map and compare health workers from different data sets.</p>

What does it NOT measure - what does it miss?	<p>The health worker density indicator measures quantity and not quality of available care.</p> <p>The indicator does not measure the factors that explain variation in health worker density and distribution, such as fixed wage rates, fixed service schedules, regulatory guidelines, and trade unions, which often result in worker shortages or surpluses (2).</p>
If and how does the indicator relate to interface/relationship among health, gender and fragility/stability?	<p>Fragile states are associated with a critically low number of established medical schools, which are presumably a determinant of health worker density and distribution. Additionally, there is very high outmigration of trained medical doctors from many developing countries to more affluent countries (3).</p> <p>Moreover, nurses and midwives are predominantly women, while women are under-represented in health management positions as they are concentrated in lower paying health positions (4).</p>

### AVAILABILITY

Sources for indicator (CRVS, DHS etc. – include links);	<p>Indicator data are available from the following sources:</p> <ol style="list-style-type: none"> <li>1. The Global SDG database (country and region 2000-2019): <a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a></li> </ol>
Dates available;	Depending on country, data as early as 2000 and as late as 2019 is available.
Availability across geographic areas;	Data are available for 195 countries and territories
Availability in conflict affected settings;	Data availability in conflict affected settings varies by country, year and occupation of health worker: Data are available for some years for Yemen, South Sudan, Libya, Somalia, DRC, Afghanistan and Syria.

### GRANULARITY

<i>Disaggregation at national level</i>	
Data disaggregated by sex;	No.

Data disaggregated by identity group (race, ethnicity);	No.
Data disaggregated by income	No.
Data disaggregated by citizenship;	No.
Data disaggregated by migration background;	No.
<i>Disaggregation at sub-national level</i>	
Data disaggregated by geographic region;	No.
Data disaggregated by identity group (race, ethnicity);	No.
Data disaggregated by income.	No.

<b>SOURCES OF BIAS</b>	
What bias can exist with these data?	<p><i>Omission bias:</i> Certain groups of people can be omitted from the assessed population, either unintentionally (in cases where civil registration data are inaccessible or incomplete) or intentionally. Moreover, a government can alter or censor datum to achieve an ulterior goal, such as covering up flaws in their country's health infrastructure. This may also be linked to publication bias, as governments of countries with low health worker density and distribution may give preference to certain datasets over others.</p> <p><i>Reporting bias:</i> Errors can be made and recorded in datum used in the health worker density and distribution calculations. Different definitions of what constitutes a health worker may be used to estimate the health worker density and distribution.</p>

<b>VALIDITY</b>	
Clear and accepted international standards for indicator;	There are clear and accepted international standards to measure health worker density, both ISCO 88 and ISCO 08 classification systems can be used. While ISCO 08 is more recent and offers greater detail and standardisation, few data sources use ISCO 08 codes, resulting in greater data loss (1). Moreover, some studies include dentist personnel in health worker density while others do not (1).

Validity of measurement of indicator generally accepted;	The validity of the indicator is generally accepted.
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### RELIABILITY

Reliability of indicator generally accepted;	The reliability of the health worker density and distribution indicator is generally accepted. However, special attention should be given to how health workers are defined.
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### COMPLEXITY

Enables analysis across time and location.	The health worker density and distribution indicator enables analysis across time and location. However, special attention should be given to ensure that data collection parameters do not differ between contexts.
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### OTHER REFLECTIONS

Is the Indicator modelled? Other reflections on debate, accuracy, etc.	<p>The most recent version of the metadata documentation from March 2021 does not specify how missing values are treated (5).</p> <p>The indicator data are often disaggregated by different occupation unit groups for various countries such as the UK.</p>
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## References

1. Lozano R, Fullman N, Abate D, Abay SM, Abbafati C, Abbasi N, et al. Measuring progress from 1990 to 2017 and projecting attainment to 2030 of the health-related Sustainable Development Goals for 195 countries and territories: a systematic analysis for the Global Burden of Disease Study 2017. *The Lancet*. 2018 Nov 10;392(10159):2091–138.
2. Liu JX, Goryakin Y, Maeda A, Bruckner T, Scheffler R. Global Health Workforce Labor Market Projections for 2030. *Human Resources for Health*. 2017 Feb 3;15(1):11.
3. Snowden JM, Muoto I. Strengthening the Health Care Workforce in Fragile States: Considerations in the Health Care Sector and Beyond. *Health Serv Res*. 2018 Jun;53(3):1308–15.
4. Witter S, Namakula J, Wurie H, Chirwa Y, So S, Vong S, et al. The gendered health workforce: mixed methods analysis from four fragile and post-conflict contexts. *Health Policy and Planning*. 2017 Dec 9;32(suppl\_5):v52–62.
5. United Nations Statistics Division. Indicator 3.1.c: Health worker density and distribution [Internet]. United Nations Statistics Division; 2021. Available from: <https://unstats.un.org/sdgs/metadata/files/Metadata-03-0C-01.pdf>