Global, Regional, and National Prevalence of Anemia and Its Causes in 204 Countries and Territories, 1990–2019

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Objectives: To estimate the total prevalence of anemia by severity and quantify the contribution attributable to 35 underlying causes for 204 countries and territories by age and sex from 1990 to 2019.

Methods: We conducted a systematic review for data on mean and standard deviation of hemoglobin (Hb) by age and sex. Using a 3-step spatio-temporal Gaussian process regression, we estimated mean and standard deviation Hb by location, age, and sex from 1990 to 2019. We then calculated the total distribution of hemoglobin for each location, year, age, and sex and quantified the prevalence of anemia by severity (mild, moderate, and severe). Finally, using a counterfactual analysis, we calculated the portion of total anemia prevalence attributable to 35 causes using cause-specific Hb shifts, cause prevalence, and the overall Hb distribution for each location, year, age, and sex.

Results: All ages anemia prevalence was 22.8% (95% CI: 22.6–23.1) globally in 2019, a decrease from 27.0% (26.7–27.2) in 1990. While prevalence decreased over this time, total cases of anemia increased from 1.42 (1.41–1.43) billion in 1990 to 1.74 (1.72–1.76) billion in 2019. Prevalence was highest among children under five years, with a combined prevalence of 39.7% (39.0–40.4) in 2019. Globally, 54.1% (53.8–54.4) of anemia cases were mild, 42.5% (42.2–42.7) were moderate, and 3.4% (3.3–3.5) were severe.

Anemia was responsible for 58.6 (40.14–81.1) million years lived with disability in 2019. The regions with the highest burden were Western Sub-Saharan Africa, South Asia, and Central Sub-Saharan Africa. The top three contributing causes globally were Dietary iron deficiency, Vitamin A deficiency, and Beta-thalassemia trait, respectively.

Conclusions: Despite reductions in anemia prevalence globally, the burden of anemia remains persistently high in many regions. An increased focus on interventions is needed to accelerate progress toward meeting Global Nutrition Target 2, a 50% reduction of anemia in women of reproductive age by 2025, and to alleviate the substantial health loss in children under five years of age. These estimates of total burden of anemia by severity and its underlying causes allow for more precise targeting of interventions to the highest-burden regions and the causes contributing the most to total prevalence.