Series of SDG Webinars for the Arab Region SDG 2.2.1, 2.2.2, 2.2.3, 3.4.2 and 3.5.2

## Anaemia prevalence estimates and determinants SDG 2.2.3

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## Introduction

- Accurate and timely data needed for countries to achieve health goals and targets
- Core function of WHO is to monitor the health situation and assess health trends
- The Micronutrients Database in the WHO Vitamin and Mineral Information System (VMNIS):
  - Compiles national, sub-national and first administrative level data on the vitamin and mineral status of populations
  - Used to monitor micronutrient status, provide global estimates of the burden of micronutrient malnutrition, and calculate trends in status over time









## Data sources VMNIS Micronutrients database



- Ministries of health through WHO regional and country offices
- National research and academic institutions
- Non-governmental organizations
- Organizations of the UN system
- Reports and peer-review publications generated by partners or implementing partners
- Peer-review publications found literature search



- Sampling frame of defined population
- Sample representative at national, regional and 1st admin level
- Population-based, household-based or facility based sample (complying with representativeness)
- Cross-sectional sample or baseline assessment of interventions
- Standard, validated data collection techniques and laboratory methodology

## **Global estimates of anaemia prevalence**



- Produced by WHO since at least the early 1980s
- Bayesian hierarchical mixture model as of 2011
  - Estimates informed by data from each country-year itself, if available, and by data from other years in the same country and in other countries
  - Estimates also informed by **covariates**
  - Includes variance term to account for **unobserved design** factors (e.g. sample design, season, method of haemoglobin measurement, type of blood sample)
  - Accounts for additional factors (e.g. subnational data, imprecise age ranges)

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### • Survey data

- Restricted to data on children 6-59 months and women of reproductive age
- National and subnational (if representative of at least 3 1<sup>st</sup> admin levels) data
- Haemoglobin adjusted for elevation using US CDC formula
- Haemoglobin adjusted for smoking status if available
- Data availability for latest round of estimates (2000-2019)
  - 489 population-representative data sources from 133 countries worldwide with 4.5 million hemoglobin measurements
    - 458 (94%) nationally representative sources
    - o 408 (83%) sources had data for women (providing an average of 2.1 data sources per country)
    - o 393 (80%) sources had data for children (providing an average of 2.0 data sources per country)
  - Countries with at least one data source represent 92% of women and children in the world
  - Countries with at least 2 data sources represent 85% of women and children in the world

## **Determinants of anaemia**

Consideration for covariates in statistical model

#### World Health Organization

### • Determinants

- Development & socio-demographics
  - o Maternal education
  - o Urban/rural residence
  - o Fertility rate
- Health & nutrition
  - Dietary intake of iron and other micronutrients
  - Body mass index / weight-for-age Z scores
  - o Malabsorption disorders
  - Intestinal helminths and parasites
  - Malaria and other disease incidence
- Genetics
  - Hemoglobinopathies, thalassemias, haemoglobin variants, G6PD deficiency

Population group	Covariates in 1990-2016 model	Covariates in 2000-2019 model
Children	Maternal education Proportion of population in urban areas Prevalence of sickle-cell disorders and thalassaemias Mean weight-for-age Z score	Socio-demographic index Meat supply (kcal/capita) Shock-free under-five mortality
Women	Maternal education Proportion of population in urban areas Prevalence of sickle-cell disorders and thalassaemias Mean body mass index	Socio-demographic index Meat supply (kcal/capita) Mean body mass index

### **Anaemia prevalence estimates** 2000-2019



- Estimated distributions of haemoglobin concentration in each country-year for each population group
- Calculated population mean and prevalence of anaemia<sup>1</sup> for each country-year



1 Total anaemia defined as <110 g/L in pregnant women and children 6-59 months of age and <120 g/L in non-pregnant women Moderate+severe anemia defined as <100 g/L in pregnant women and children 6-59 months of age and <110 g/L in non-pregnant women Severe anaemia defined as <70 g/L in pregnant women and children 6-59 months age and <80 g/L in non-pregnant women</p>

# **Global trends in the prevalence of anaemia** 2000-2019



50.0% 45.0% 40.0% 35.0% 30.0% 25.0% 20.0% 15.0% 10.0% 5.0% 0.0% 2013 2012 2011 2009 2008 2008 2007 2006 2005 2005 2004 2003 2002 2019 2018 2017 2016 2015 2014

Children 6-59 months of age

#### Pregnant women

Non-pregnant women





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FILTERS

 Africa Americas

Europe

Eastern Mediterranean

South-East Asia

Western Pacific

Prevalence of anaemia in women of reproductive age (aged 15-49) (%)

Year Sex Latest Female .

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## Prevalence of anaemia in women of reproductive age (aged 15-49) (%)

Latest

Year

Sex Female



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Africa

#### Prevalence of anaemia in non-pregnant women (aged 15-49) (%)

Year

Sex

15-49) (%) Latest Female





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#### Prevalence of anaemia in non-pregnant women (aged 15-49) (%)

Year

Sex

Latest

Female



FILTERS	Prevalence of anaemia in pregnant women (aged 15-49) (%)	Year Latest	Sex Female	
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Children 6-59 months					
of age	WHO region	Anaemia percentage (95% CI)	Anaemia number (millions) (95% Cl)	Severe anaemia percentage (95% CI)	Severe anaemia number (millions) (95% Cl)
	African	60 (57-64)	102.5 (96.3-108.5)	2.7 (2.1-3.4)	4.6 (3.6-5.8)
	Americas	17 (13-20)	12.1 (9.8-14.7)	0.2 (0.07-0.4)	0.1 (0.06-0.3)
Global anaemia	Eastern Mediterranean	43 (36-50)	36.4 (30.2-42.4)	2.0 (0.9-3.3)	1.7 (0.8-2.8)
prevalence	European	20 (15-27)	11.5 (8.2-15.5)	0.1 (0.06-0.4)	0.1 (0.03-0.2)
2019	South-East Asia	49 (39-58)	83.2 (66.4-98.2)	1.1 (0.5-2.1)	1.8 (0.8-3.5)
	Western Pacific	19 (11-32)	23.3 (13.0-38.1)	0.3 (0.1-0.7)	0.3 (0.1-0.8)
	Global	40 (36-44)	269 (244-297)	1.3 (1.0-1.7)	8.7 (6.7-11.2)

### Anaemia prevalence estimates Global trends for women: 2000-2019



#### Pregnant women



1 Total anaemia defined as <110 g/L in pregnant women and children 6-59 months of age and <120 g/L in non-pregnant women Moderate +severe anemia defined as <100 g/L in pregnant women and children 6-59 months of age and <110 g/L in non-pregnant women Severe anaemia defined as <70 g/L in pregnant women and children 6-59 months age and <80 g/L in non-pregnant women</p>

#### Non-pregnant women 15-49 years of age

### **Anaemia prevalence estimates** Trends for women in the ESCWA region: 2000-2019



Pregnant women



1 Total anaemia defined as <110 g/L in pregnant women and children 6-59 months of age and <120 g/L in non-pregnant women Moderate +severe anemia defined as <100 g/L in pregnant women and children 6-59 months of age and <110 g/L in non-pregnant women Severe anaemia defined as <70 g/L in pregnant women and children 6-59 months age and <80 g/L in non-pregnant women</p>

#### Non-pregnant women 15-49 years of age

#### Non pregnant women

## Global anaemia prevalence estimates by EC regions 2019

UN region	Anaemia	Anaemia	Severe anaemia	Severe anaemia
	percentage	number (millions)	percentage	number (millions)
	(95% CI)	(95% Cl)	(95% CI)	(95% Cl)
ESCWA	33.1	33.1	1.4	1.4
	(26.8,19.7)	(26.8,39.7)	(0.7,2.2)	(0.7,2.2)
ECA (E,W,S,C,N	38.4	110.7	1.3	3.7
Africa)	(34.7,42.1)	(100.2,121.3)	(1,1.6)	(2.8,4.7)
ECE (Europe)	16.6	47.7	0.4	1.3
	(13.2,20.8)	(37.8,59.7)	(0.2,0.8)	(0.7,2.4)
ECLAC (LAC and	17.1	28.2	0.5	0.9
Caribbean)	(12.4,23)	(20.5,38.1)	(0.3,1)	(0.4,1.6)
ESCAP (East and North Asia)	15.8	60.6	0.3	1
	(10,24.1)	(38.2,92.2)	(0.1,0.6)	(0.5,2.3)
ESCAP (South East	26.8	44.8	0.6	1
Asia)	(20.9,33.4)	(35.1,56)	(0.4,1.1)	(0.6,1.8)
ESCAP(South and South-West Asia)	47.5	236.5	2	10.1
	(40.3,54.3)	(200.7,270.2)	(1.2,3.2)	(0.7,2.2)
Global	29.6	538.8	1	18.7
	(26.6-32.5)	(484.5,592.4)	(0.8-1.4)	(13.7-25.1)

## Global anaemia prevalence estimates by EC regions 2019

**Pregnant women** 

UN region	Anaemia	Anaemia	Severe anaemia	Severe anaemia
	percentage	number (millions)	percentage	number (millions)
	(95% CI)	(95% CI)	(95% CI)	(95% CI)
ESCWA	34.2	2.3	1.1	0.1
	(27.3-40.9)	(1.8,2.7)	(0.5-1.7)	(0,0.1)
ECA (E,W,S,C,N	44.1	12	1.9	0.51
Africa)	(41.4-46.7)	(11.3,12.7)	(1.5-2.3)	(0.41,0.62)
ECE (Europe)	20.2	1.9	0.3	0.03
	(15.5-25.9)	(1.5,2.5)	(0.1-0.6)	(0.01,0.06)
ECLAC (LAC and Caribbean)	21.9	1.4	0.4	0.0
	(15.5-29.4)	(1,1.9)	(0.2-0.7)	(0.0,0.0)
ESCAP (East and North Asia)	19.1	2.2	0.3	0.0
	(11,31.1)	(1.2,3.5)	(0.1,0.8)	(0,0.1)
ESCAP (South East	37.5	2.6	0.8	0.1
Asia)	(32.1,42.2)	(2.3,3)	(0.4,1.5)	(0.0,0.1)
ESCAP(South and South-West Asia)	46.1	11	1.7	0.40
	(41.1,49.8)	(9.8,11.9)	(1,2.4)	(0.25,0.58)
Global	37	32	1.3	1.1
	(34-39)	(29.8-34.2)	(1.0-1.5)	(0.9-1.4)

## Anaemia prevalence estimates: 2019



#### Women of reproductive age

Prevalence of anaemia in women of reproductive age (%)



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### Anaemia in women of reproductive age Global indicator and targets

- Global nutrition target 2: reduce the prevalence of anaemia in women of reproductive age by 50% by 2025, using baseline of 2012
  - Current round of estimates indicate 2012 baseline prevalence of 28.5% and 2019 estimate of 29.9%
    - Most countries appear off-track for a 50% reduction Ο
    - Guatemala and Philippines had the most progress Ο







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A talented team

- Dr Lisa Rogers
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- Dr Christopher Paciorek
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- Dr Gretchen Stevens, consultant







## Tools to monitor SDG 2.2.3



#### Micronutrient survey manual





#### **Tracking Tool**





- WHO-UNICEF Technical Expert Advisory group on nutrition Monitoring (TEAM) to develop technical notes regarding data quality in anaemia assessment
- WHO to develop a Micronutrient survey analyser
- Enhance the Micronutrients database towards further equity disaggregations



#### World Health Organization

## Thank you



## World Health Organization

Organisation mondiale de la Santé

Photo credit: WHO/Jim Holmes