

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



Pediatric Mortality

and importance of

PNEUMONIAS





Table 1: New and total input data by estimation method

	New input data			Total input data		
	Data points	Deaths	Countries	Data points	Deaths	Countries
Neonates						
High-quality vital registration	404 (28%)	658 836 (21%)	73	1460	3 126 336	73
Low mortality model	413 (17%)	328 023 (14%)	70	2417	2366 534	72
Moderate or high mortality model	119 (49%)	90 126 (47%)	17	243	190 245	43
Children aged 1–59 months						
High-quality vital registration	416 (27%)	449 854 (18%)	76	1520	2 493 617	76
Low mortality model	299 (18%)	308 753 (19%)	73	1663	1646 909	76
Moderate or high mortality model	302 (58%)	104 170 (22%)	19	520	476 494	46

Data are n (% of total input data).

Table 1: New and total input data by estimation method

- **Low Mortality** (<10 deaths per 1000 livebirths for neonates; <25 deaths per 1000 livebirths for children aged 1–59 months) (mostly with high-quality vital registration)
- **Moderate Mortality** (10–20 deaths per 1000 livebirths for neonates; 25–35 deaths per 1000 livebirths for children aged 1–59 months)
- **High Mortality** (≥20 deaths per 1000 livebirths for neonates; ≥35 deaths per 1000 livebirths for children aged 1–59 months) (mostly without high-q registration)

Perin J, Mulick A, Yeung D, et al. Global, regional, and national causes of under-5 mortality in 2000–2019: an updated systematic analysis with implications for the Sustainable Development Goals. *The Lancet Child & Adolescent Health* 2022;6:106-15.

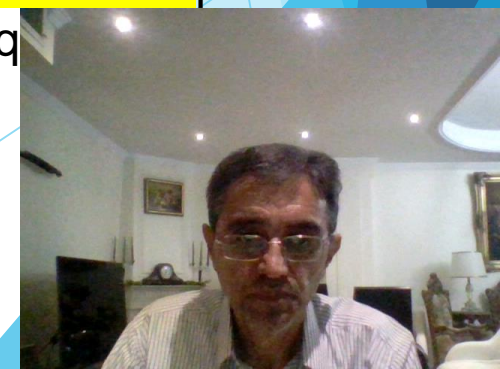


Table 1: New and total input data by estimation method

	New input data			Total input data		
	Data points	Deaths	Countries	Data points	Deaths	Countries
Neonates						
High-quality vital registration	404 (28%)	658 836 (21%)	73	1460	3 126 336	73
Low mortality model	413 (17%)	328 023 (14%)	70	2417	2366 534	72
Moderate or high mortality model	119 (49%)	90 126 (47%)	17	243	190 245	43
Children aged 1–59 months						
High-quality vital registration	416 (27%)	449 854 (18%)	76	1520	2 493 617	76
Low mortality model	299 (18%)	308 753 (19%)	73	1663	1646 909	76
Moderate or high mortality model	302 (58%)	104 170 (22%)	19	520	476 494	46

Data are n (% of total input data).

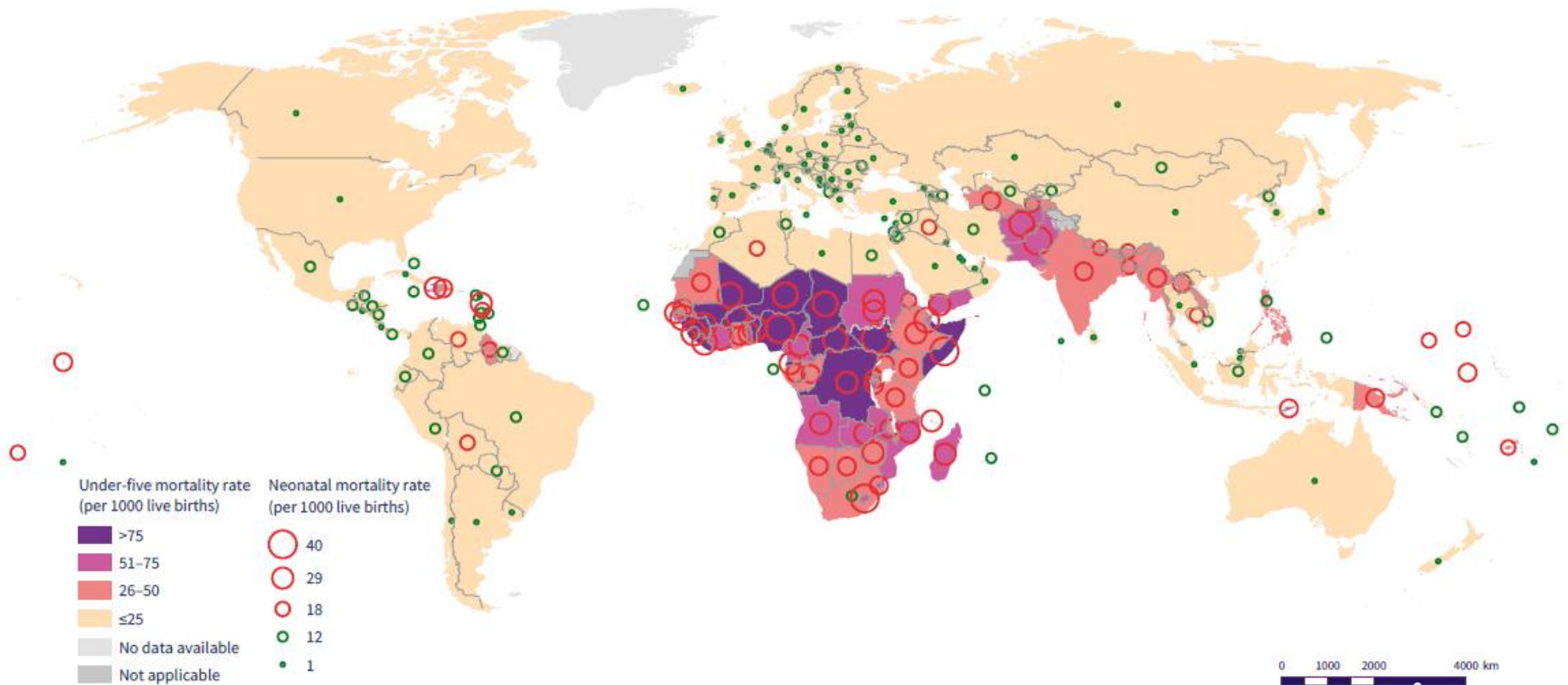
Table 1: New and total input data by estimation method

- **Low Mortality** (<10 deaths per 1000 livebirths for neonates; <25 deaths per 1000 livebirths for children aged 1–59 months) (mostly with high-quality vital registration)
- **Moderate Mortality** (10–20 deaths per 1000 livebirths for neonates; 25–35 deaths per 1000 livebirths for children aged 1–59 months)
- **High Mortality** (≥20 deaths per 1000 livebirths for neonates; ≥35 deaths per 1000 livebirths for children aged 1–59 months) (mostly without high-quality vital registration)

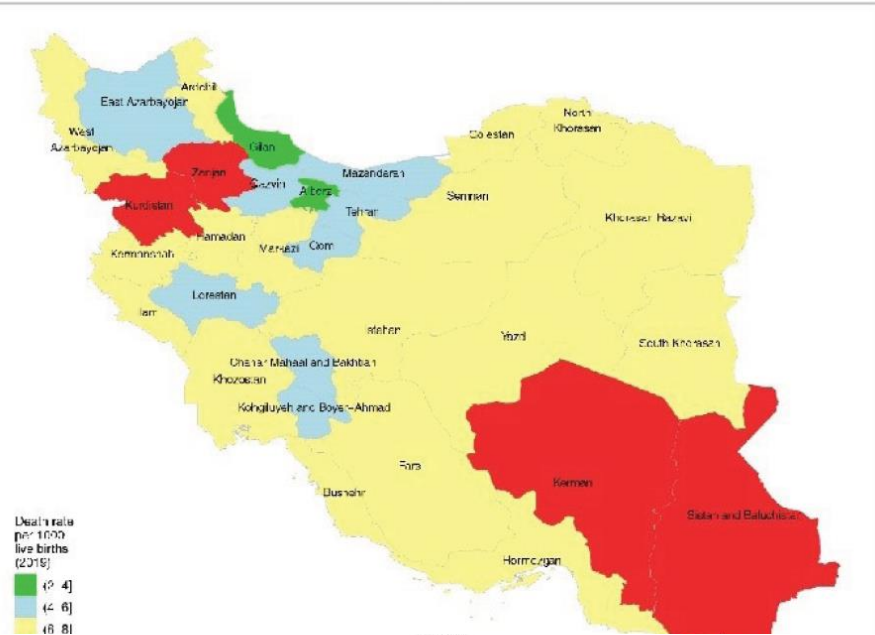
Perin J, Mulick A, Yeung D, et al. Global, regional, and national causes of under-5 mortality in 2000–2019: an updated systematic analysis with implications for the Sustainable Development Goals. *The Lancet Child & Adolescent Health* 2022;6:106–15.



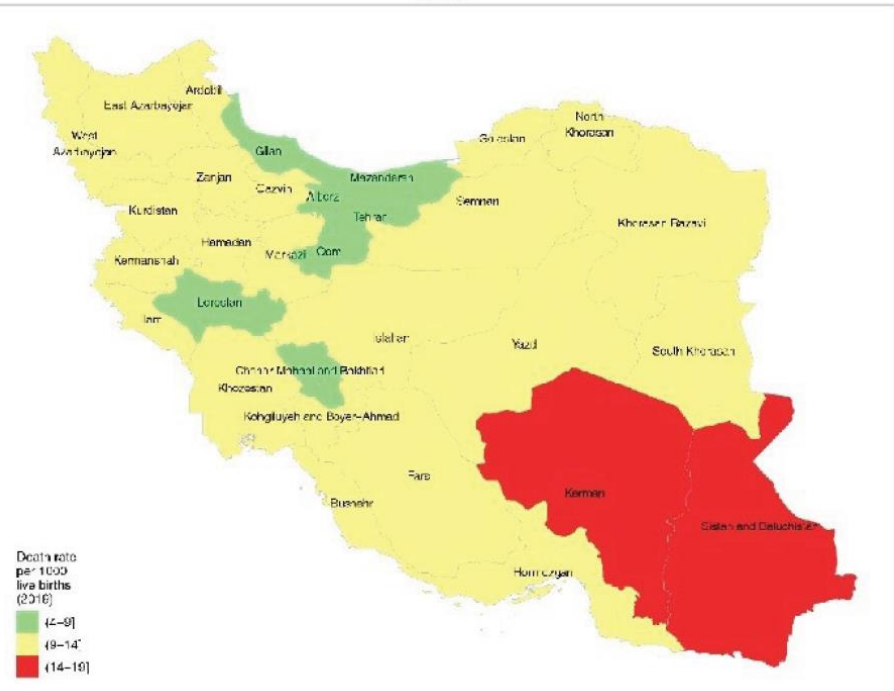
Figure 1.6 Under-five mortality rate and neonatal mortality rate, by country/area, 2021



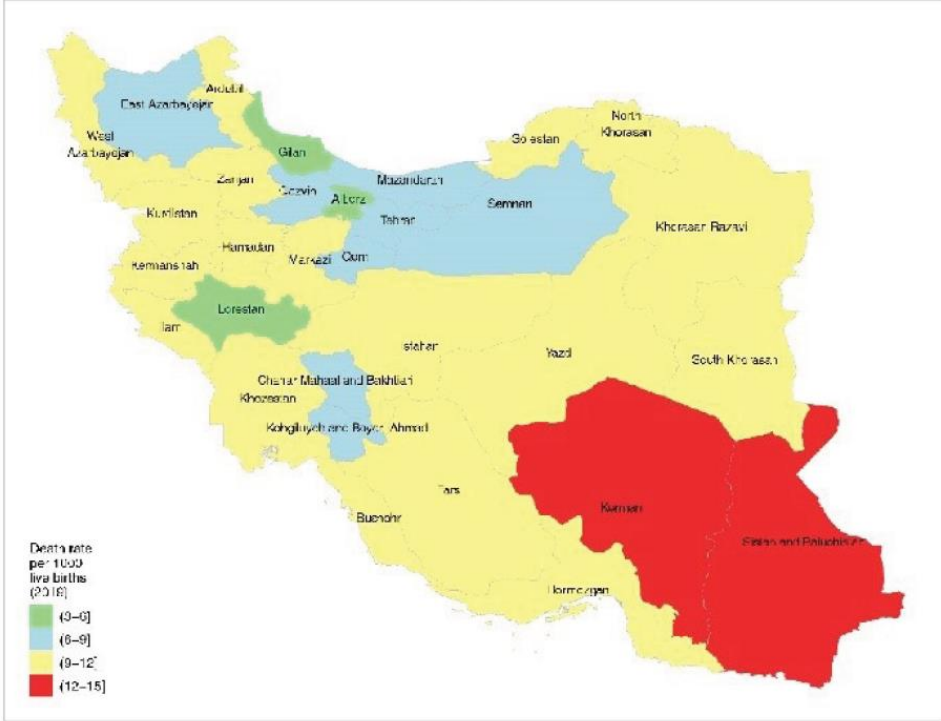
Neonate
2019



Child
2019



Infant
2019



Neonatal, Infant, and Child Mortality Rates Across Provinces of Iran in 2019. (A) Neonates; (B) Infants; (C) Children

Sepanlou SG, Rezaei Aliabadi H, Naghavi M, Malekzadeh R. Neonate, Infant, and Child Mortality by Cause in Provinces of Iran: An Analysis for the Global Burden of Disease Study 2019. Arch Iran Med 2022;25:484-95.

Causes of mortality

Causes of mortality are a crucial input for health systems for identifying appropriate interventions for child survival.

In 2019,

- ▶ There were 5.30 million deaths among children younger than 5 years, primarily due to
 - ▶ Preterm Birth Complications (17.7%),
 - ▶ Lower Respiratory Infections (13.9%),
 - ▶ Intrapartum-related Events (11.6%), and
 - ▶ Diarrhoea (9.1%),
- ▶ with 49.2% due to Infectious Causes.



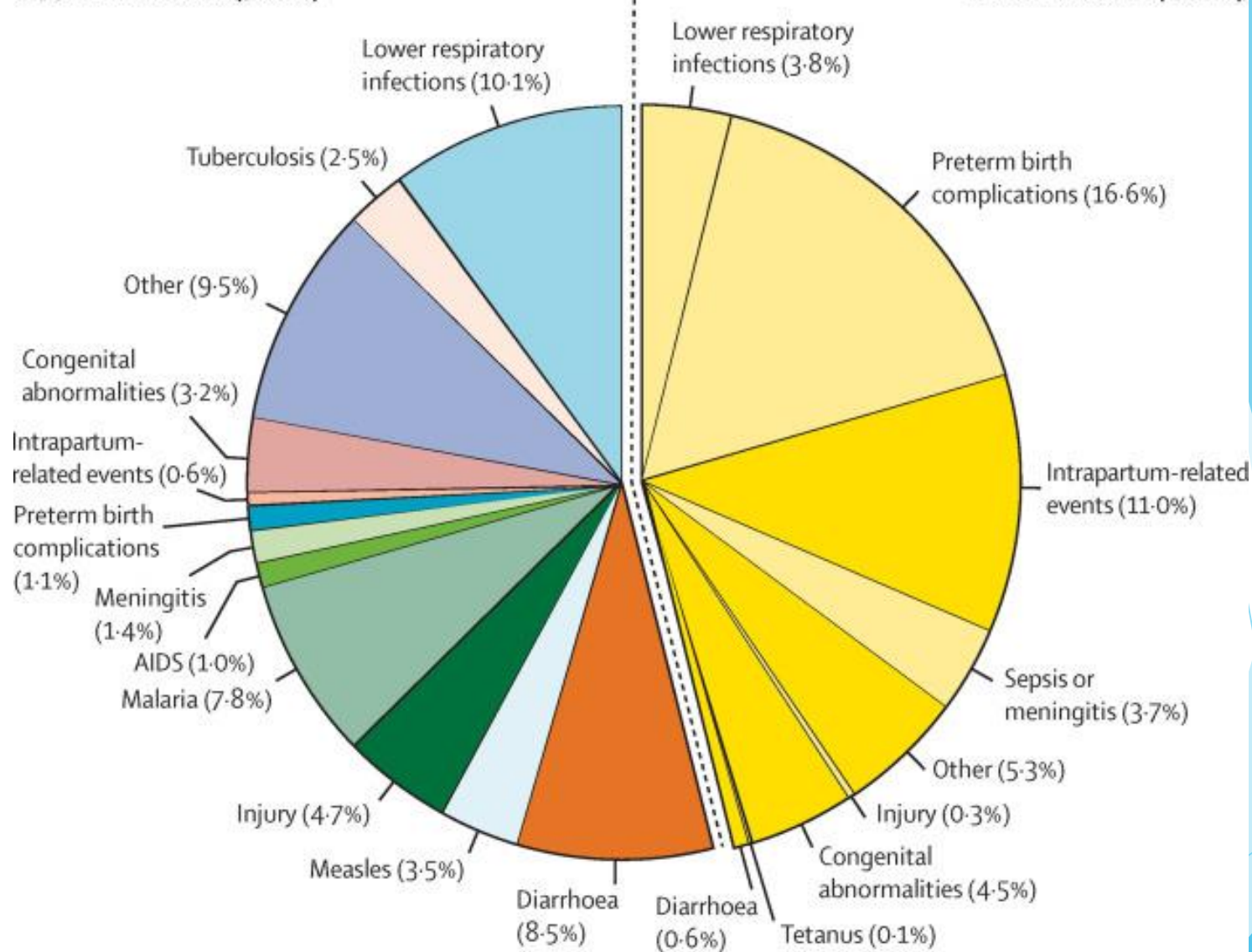
Causes of mortality

In 2019,

- ▶ Vaccine-preventable deaths, such as for lower respiratory infections, meningitis, and measles, constituted 21.7% (20.4-25.6) of under-5 deaths, and many other causes, such as diarrhoea, were preventable with low-cost interventions.
- ▶ Under-5 mortality has declined substantially since 2000, primarily because of a decrease in mortality due to lower respiratory infections, diarrhoea, preterm birth complications, intrapartum-related events, malaria, and measles.
- ▶ There is considerable variation in the extent and trends in cause-specific mortality across regions and for different strata of all-cause under-5 mortality.

1-59 month deaths (54.0%)

Neonatal deaths (46.0%)



Perin J, Mulick A, Yeung D, et al. Global, regional, and national causes of under-5 mortality in 2000-2019: an updated systematic analysis with implications for the Sustainable Development Goals. *The Lancet Child & Adolescent Health* 2022;6:106-15.

Pneumonia

Death Triangle

malnutrition



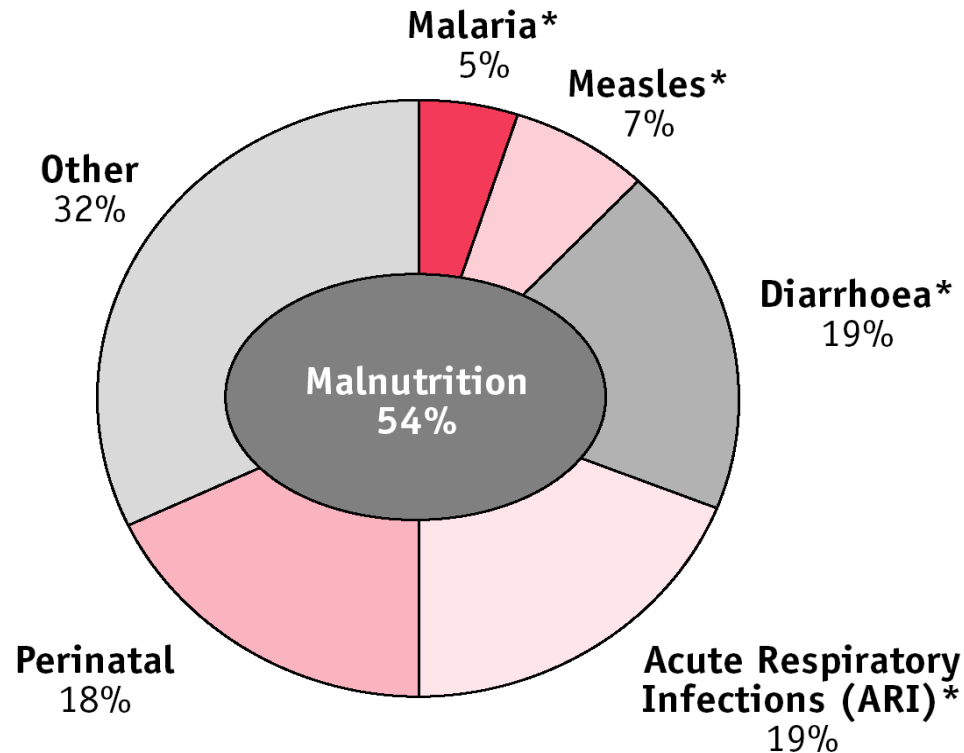
Diarrhea

Measles &
malaria

▶ 3/4 episodes of childhood illness are caused by one of these five conditions.



Distribution of 11.6 million deaths among children less than 5 years old in all developing countries, 1995

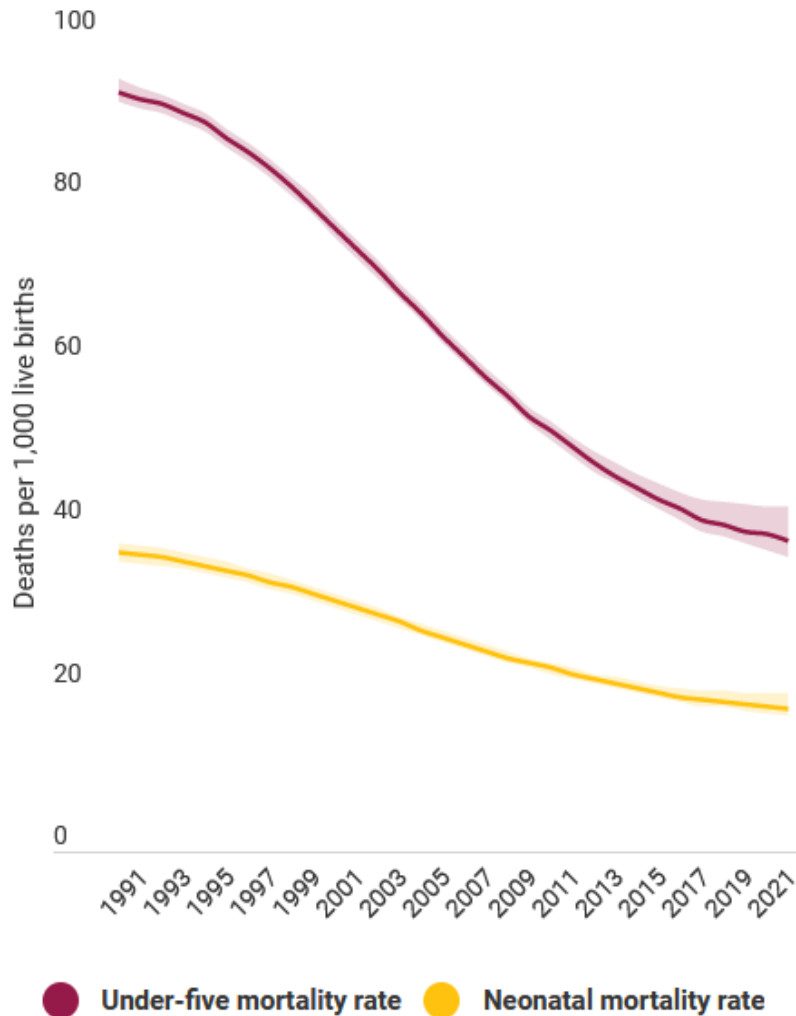


* Approximately 70% of all childhood deaths are associated with one or more of these 5 conditions.

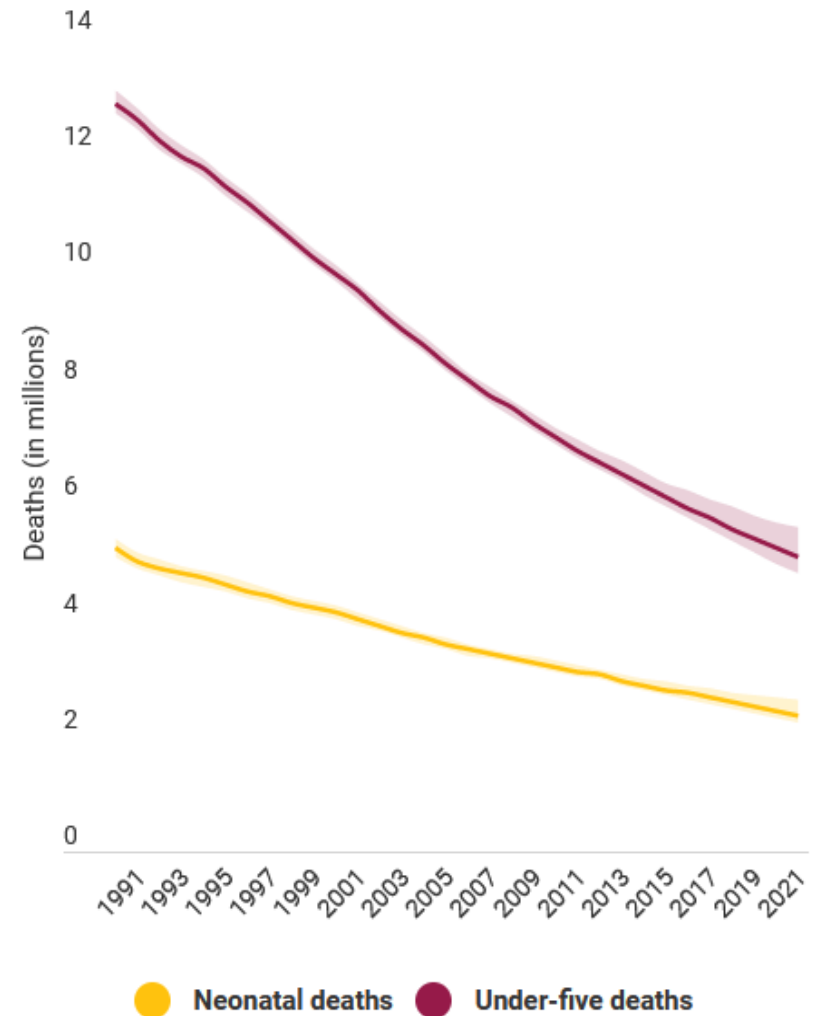
Based on data taken from *The Global Burden of Disease 1996*, edited by Murray CJL and Lopez AD, and *Epidemiologic evidence for a potentiating effect of malnutrition on child mortality*, Pelletier DL, Frongillo EA and Habicht JP, *AMJ Public Health* 1993;83:1130–1133.



Mortality rates



Number of deaths



▶ Both the under-five mortality rate and the number of under-five deaths have fallen by more than half since 1990

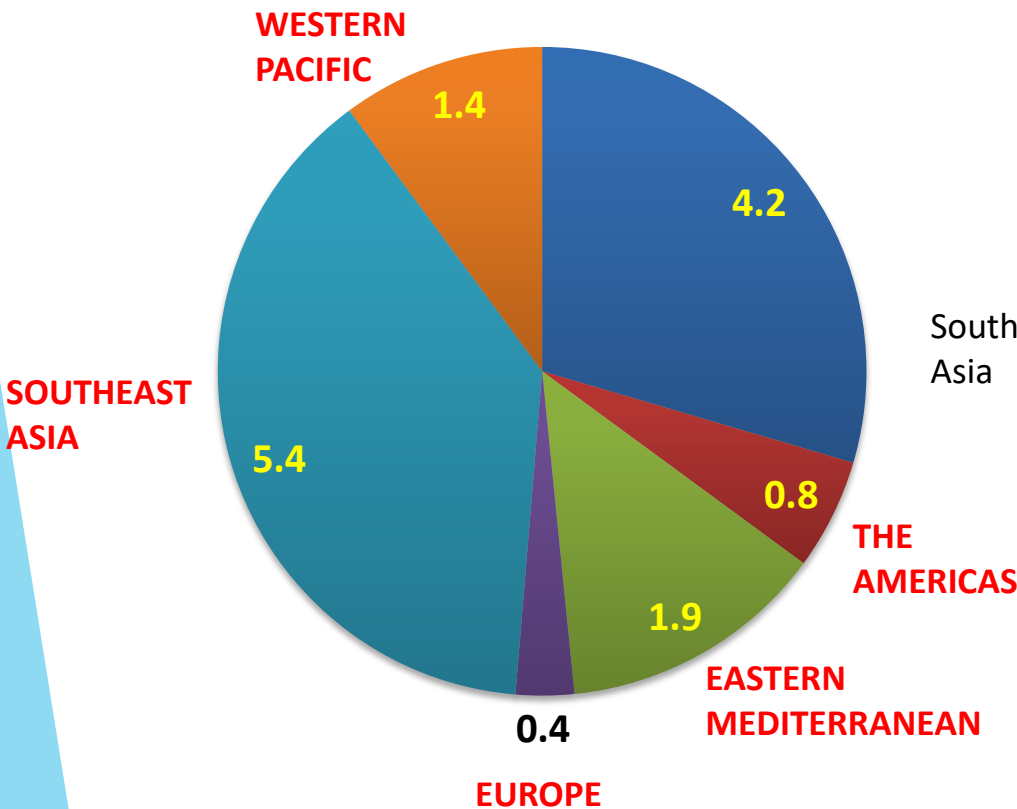
▶ Global mortality rates and number of deaths by age, 1990-2021

Source: [United Nations Inter-agency Group for Child Mortality Estimation \(UN IGME\), 2023](#).

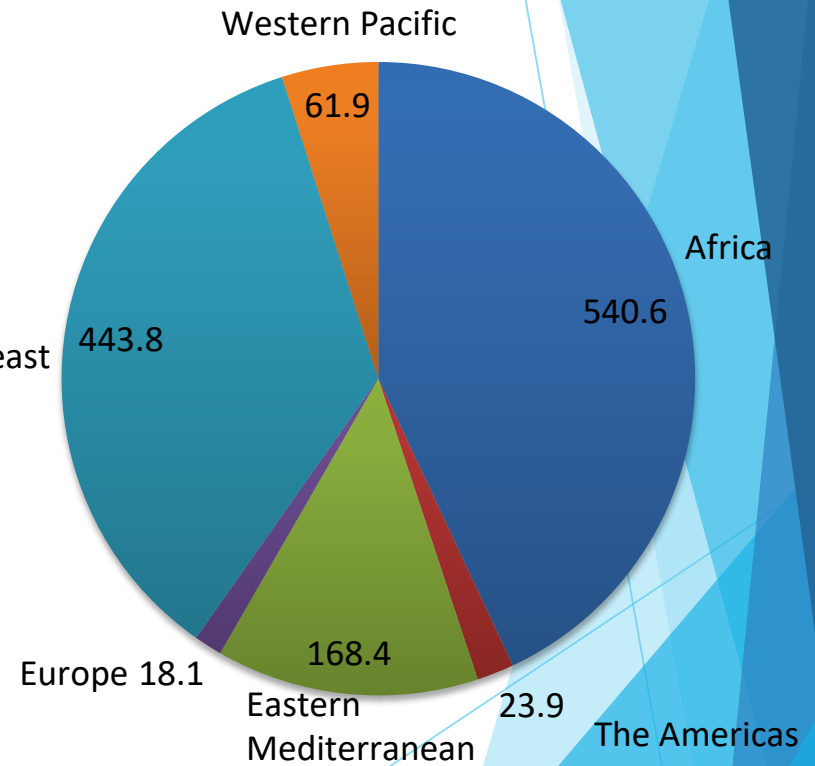


Regional burden of severe pneumonia episodes & mortality among children aged 0-4 years in 2010

Pneumonia
14.1 million episodes



Pneumonia
1,256,800 deaths

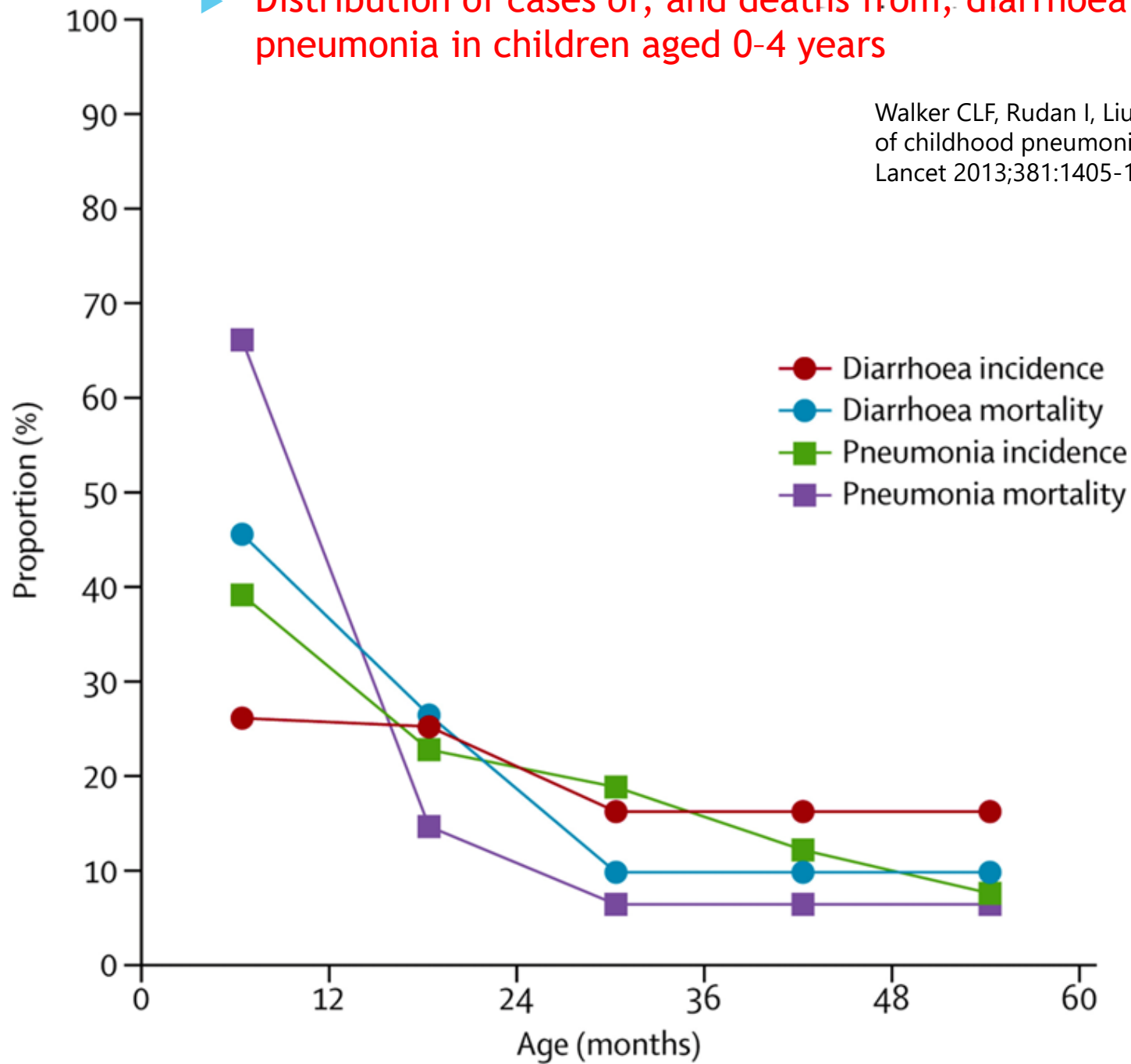


Walker CLF, Rudan I, Liu L, et al. Global burden of childhood pneumonia and diarrhoea. The Lancet 2013;381:1405-16.



► Distribution of cases of, and deaths from, diarrhoea and pneumonia in children aged 0-4 years

Walker CLF, Rudan I, Liu L, et al. Global burden of childhood pneumonia and diarrhoea. The Lancet 2013;381:1405-16.



Pneumonia and the risk of long-term sequelae

- ▶ The risk of at least **one long-term major sequela** from pneumonia is **5.5%** (95% CI: 2.8-8.3) in non-severe pneumonia and **13.6%** (95% CI: 6.2-21.1) in **hospitalized severe pneumonia**
- ▶ Sequelae include: reduction in lung volume and bronchiectasis (0.9% of severe cases)
- ▶ The risk of sequelae is higher among children < 2 years of age (**13.4%**, 95% CI: 4.5-22.3)



Vaccine-preventable causes of pneumonia severe morbidity and mortality

- ▶ *Streptococcus pneumoniae* is the most common vaccine-preventable pathogen and accounts for **18.3%** of severe episodes (2.6 million) and **32.7%** of deaths (411,000)
- ▶ *Haemophilus influenzae* type B accounts for **4.1%** of severe episodes (574,000) and **15.7%** of deaths (197,000)
- ▶ Influenza virus led to 982,000 episodes (**7%**) and 137,000 deaths (**10.9%**)



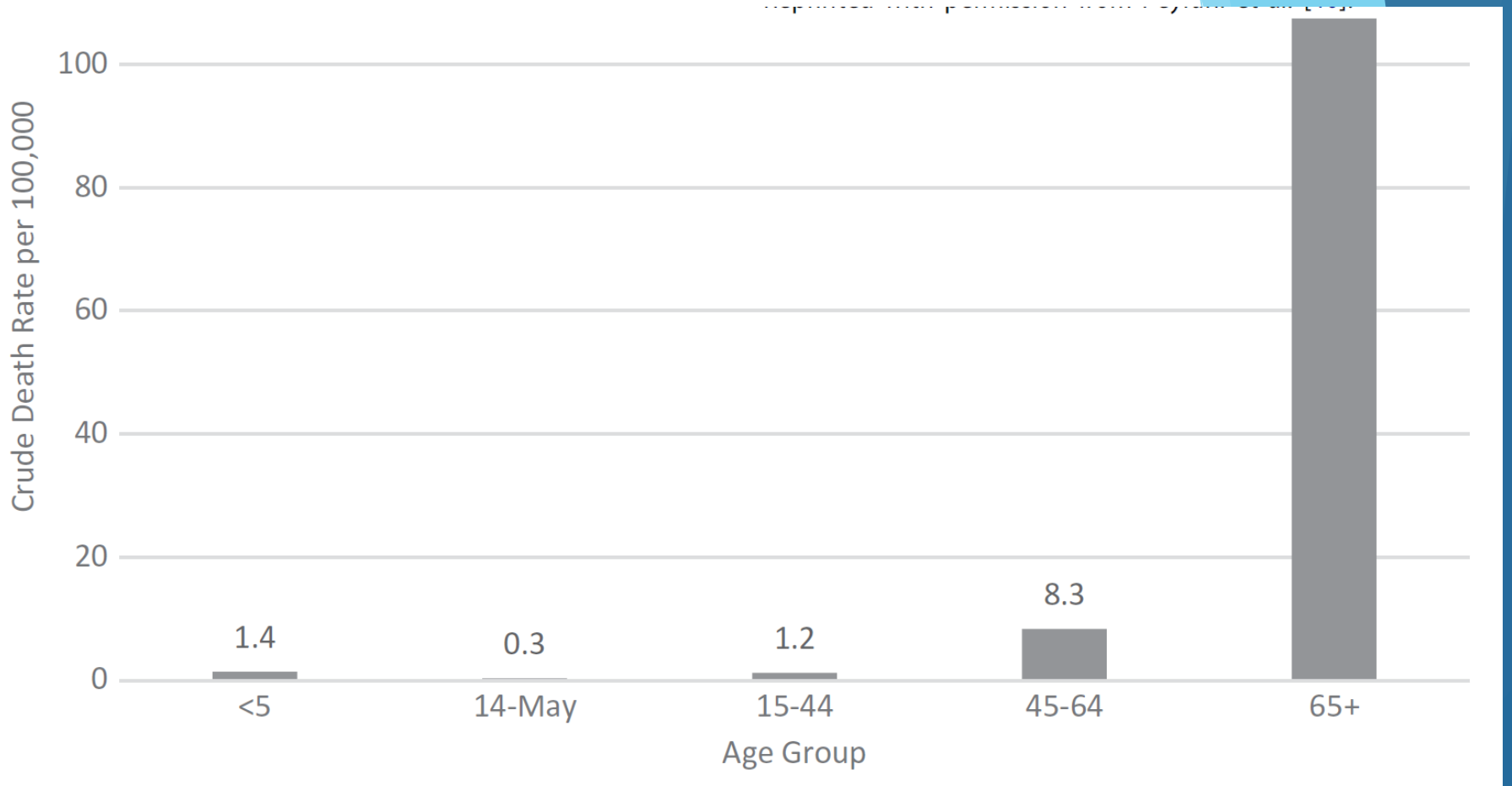


Figure 1. Pneumonia and influenza death rates by age group: 2013.

Centers for Disease Control and Prevention. National Center for Health Statistics. CDC WONDER On-Line Database, Compiled from Compressed Mortality File 1999-2013 Series 20 No. 2S, 2015

Peyrani P, Mandell L, Torres A, Tillotson GS. The burden of community-acquired bacterial pneumonia in the era of antibiotic resistance. Expert review of respiratory medicine. 2019 Feb 1;13(2):139-52.