

Objectives

1. Provide an overview of diarrhea, symptoms, diagnosis and the costs of morbidity
2. Characterize the burden of diarrhea morbidity and mortality globally and in South Asia
3. Characterize the burden of diarrhea morbidity and mortality in India
4. Describe findings from key global and locally relevant sources of data

What is diarrhea?

Diarrhea

Condition of having 3 or more loose stools or liquid bowel movements per day

Main forms of childhood diarrhea

Acute watery diarrhea:

Significant fluid loss and rapid dehydration

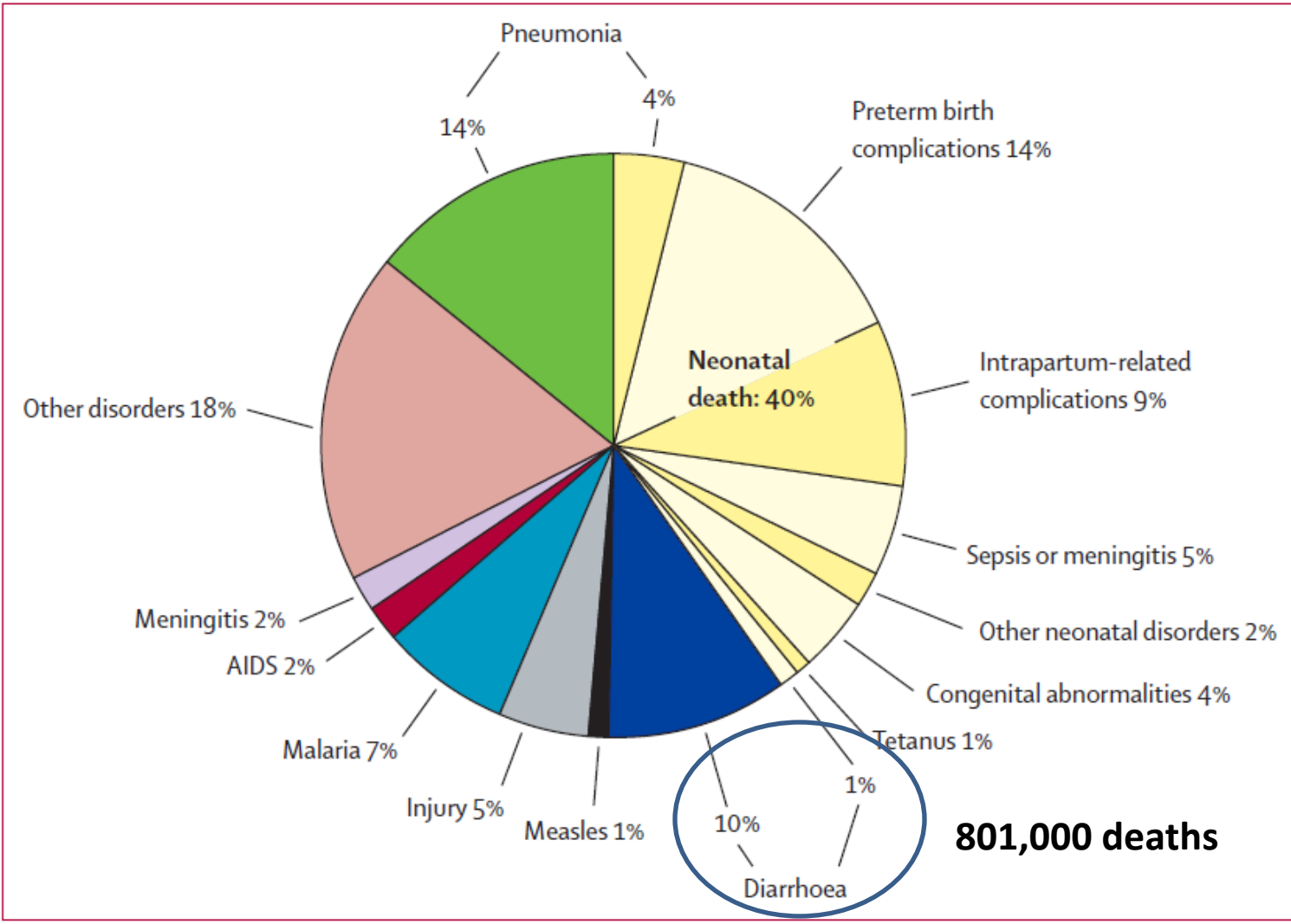
Bloody diarrhea (dysentery):

Visible blood in stools, associated with intestinal damage and nutrient loss

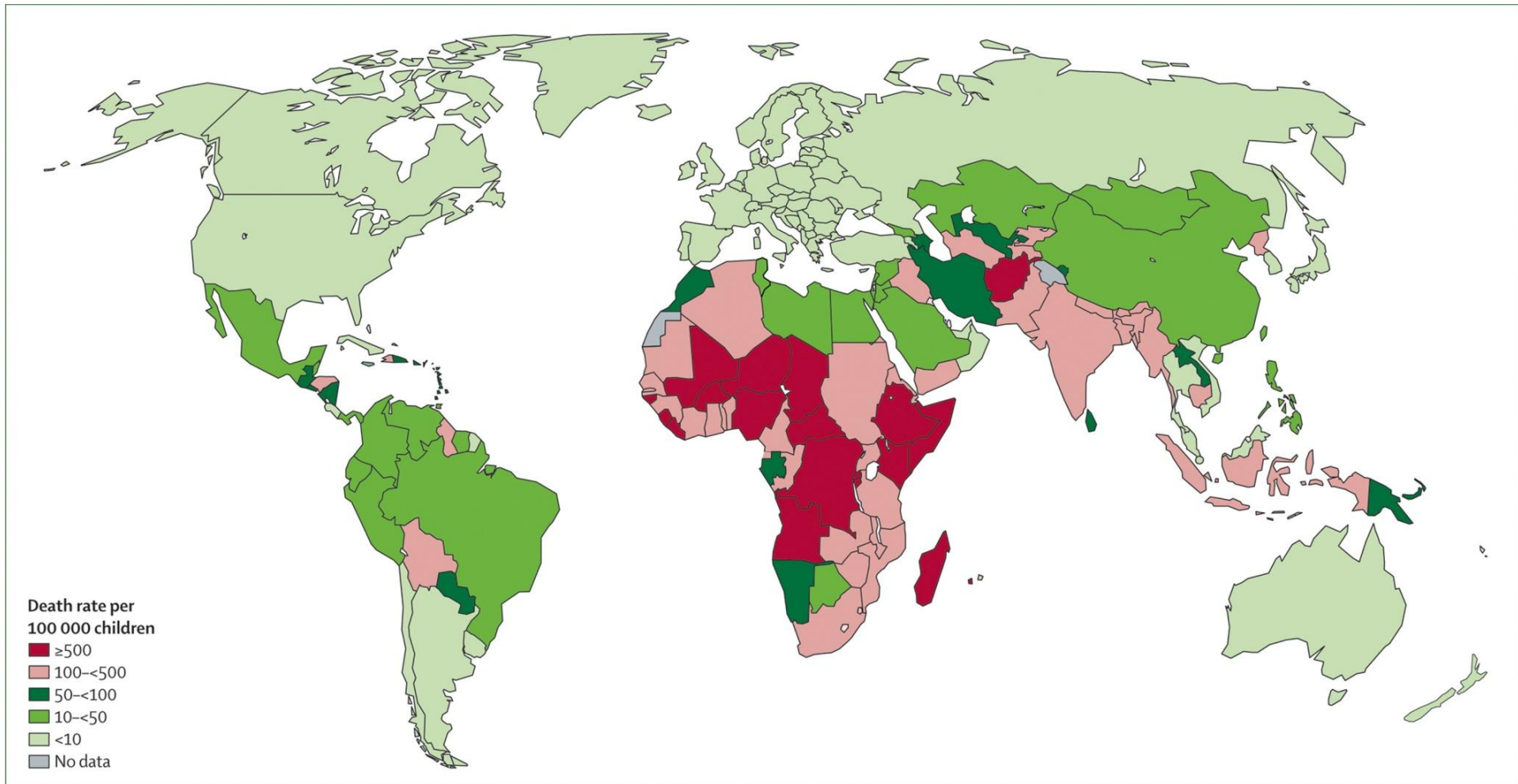
Persistent diarrhea:

Diarrhea lasting 14 days or more

Global Causes of Death in Children Under 5 in 2010



Global Mortality from Diarrhea in Children



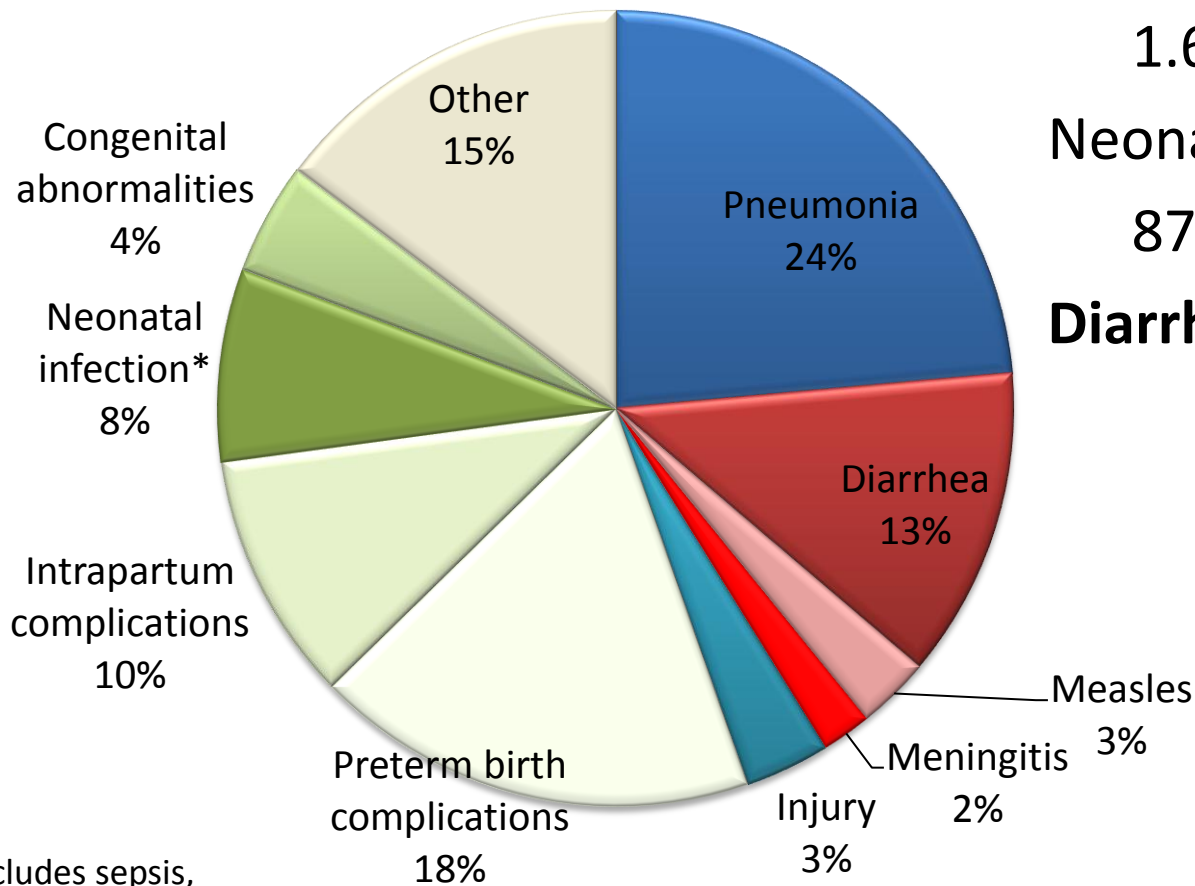
Deaths due to diarrhea per 100,000 children younger than 5 years

Sources of mortality estimates for India

Child Health Epidemiology Research Group (CHERG)

Million Death Study (MDS)

CHERG: Causes of death in India in 2010



Total under 5 mortality:

1.68 million

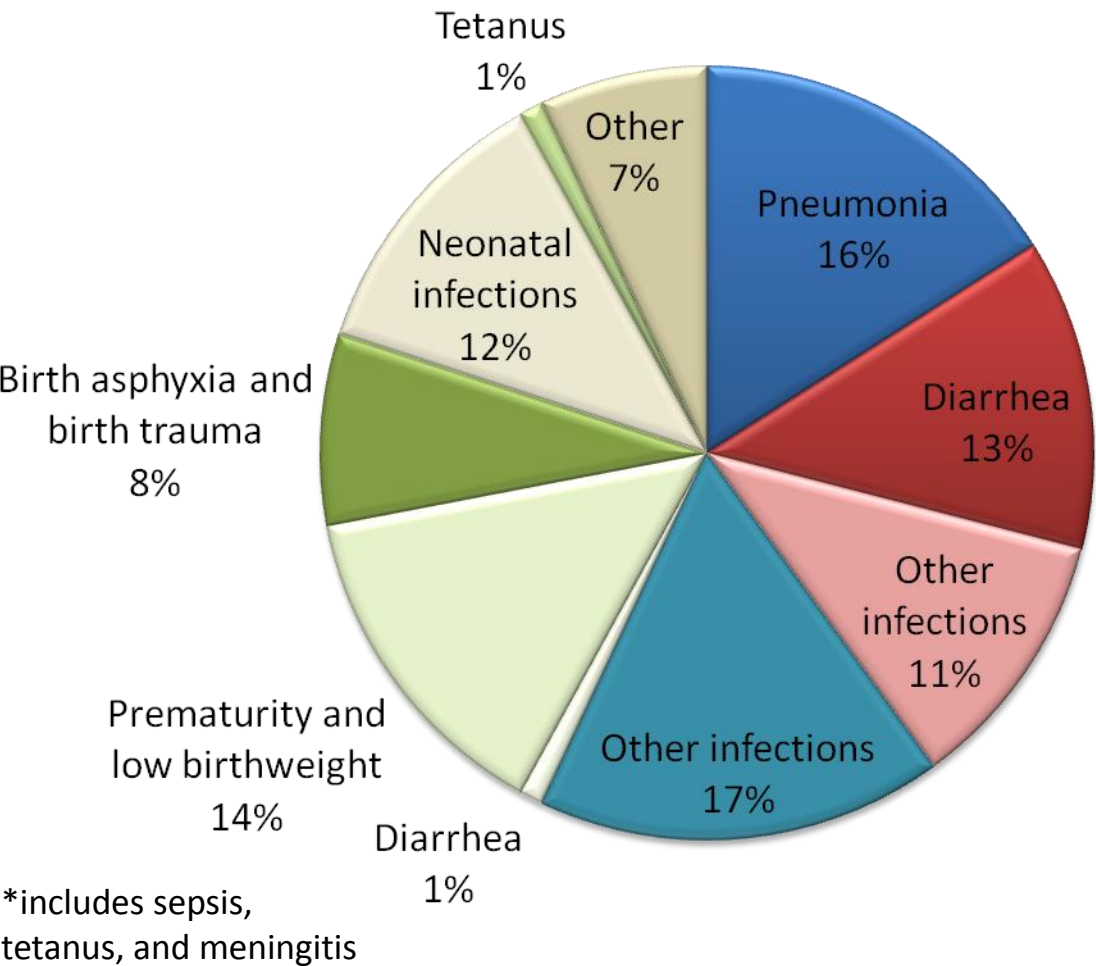
Neonatal deaths (52%):

875,000

Diarrhea: 212,000

*includes sepsis, tetanus, and meningitis

Million Death Study: Causes of death in India in 2005



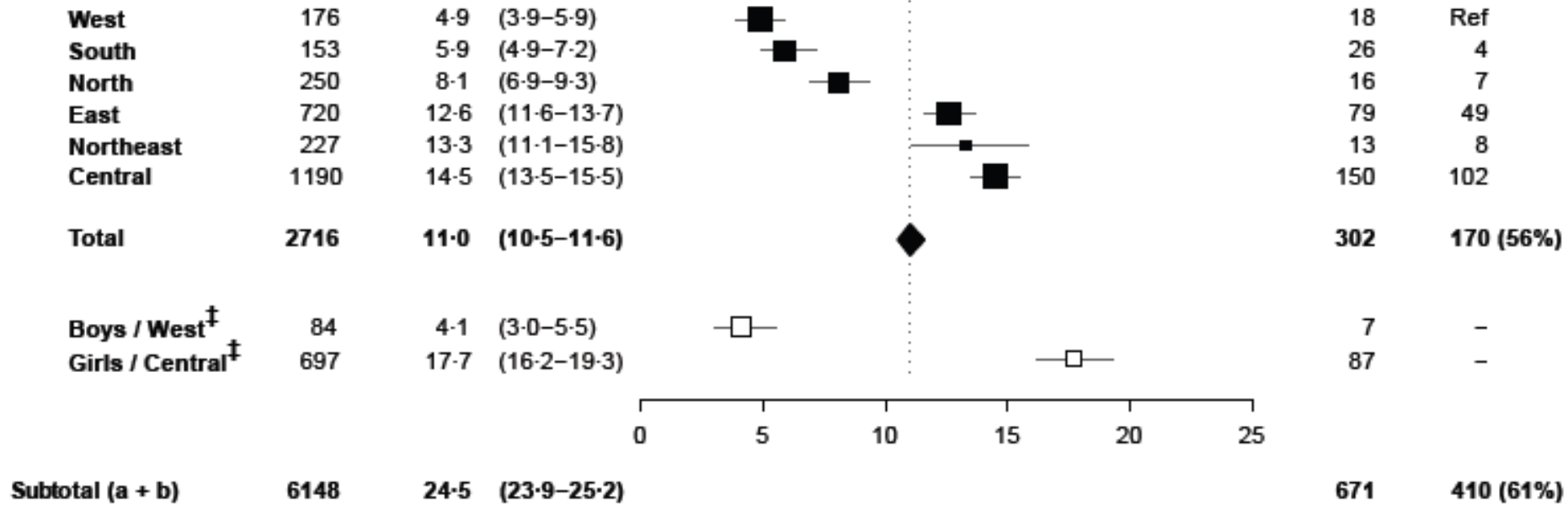
Total under-5 mortality:
2.35 million

Neonatal deaths (43%):
1.01 million

Diarrhea: 334,000

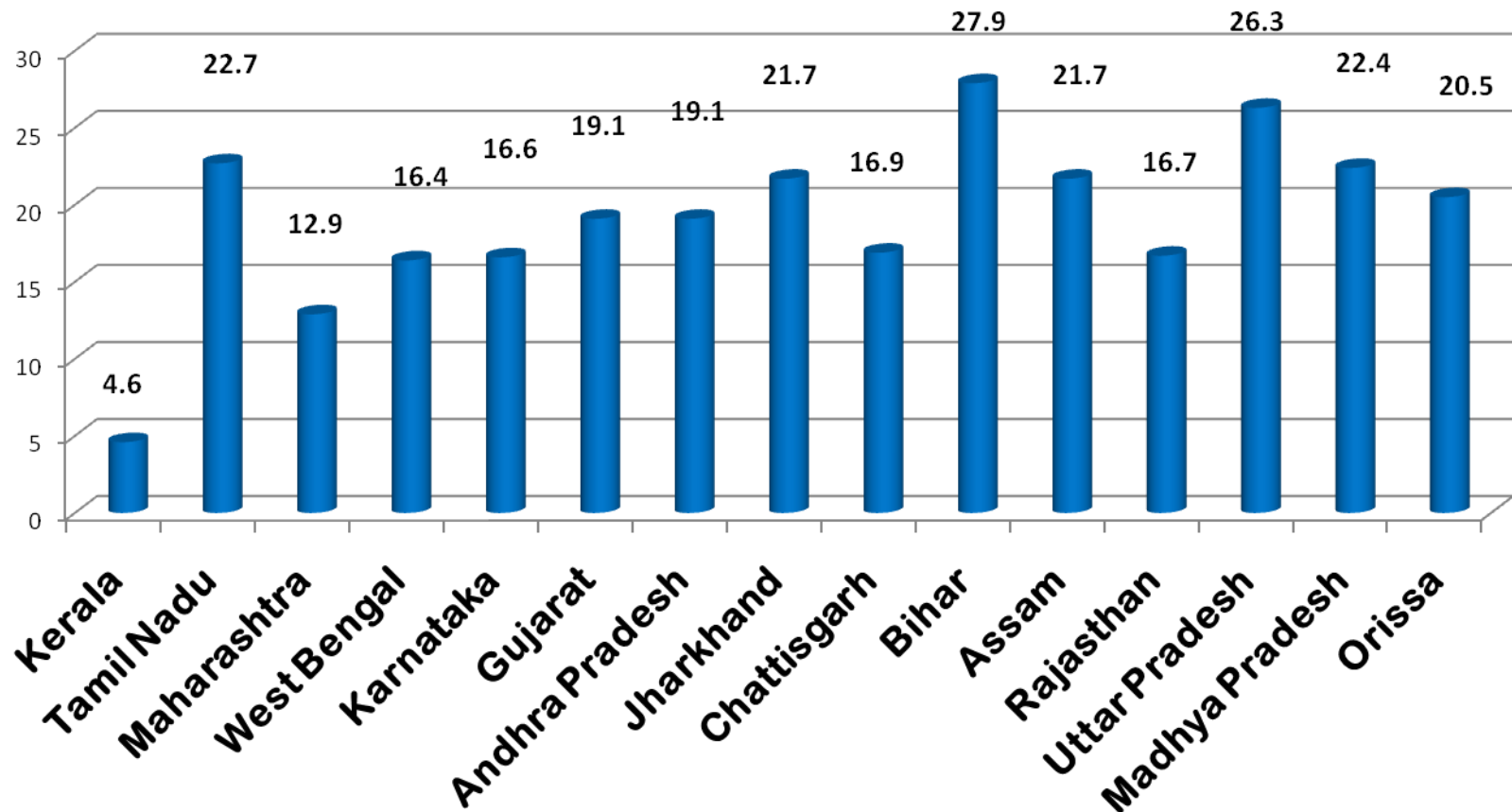
Mortality rates by region

(b) Diarrhoeal diseases



Addressing regional inequity will also be crucial to bringing down childhood pneumonia mortality

Diarrheal diseases as cause of death at age 1-59 months by state (%)- 2001-03



The Million Death Study Collaborators. Causes of neonatal and child mortality in India: a nationally representative mortality survey. *Lancet* 2010

Studies of Diarrhea Mortality in India

% infant and child mortality due to diarrhea

| Study Location | Study Design | Study Years | Age Range (Months) | % mortality due to diarrhea |
|----------------|--------------------------------|-------------|--------------------|-----------------------------|
| Harayana | Community – based Surveillance | 1992-1994 | 0-1 | 1.7 |
| | | | 1-11 | 22.2 |
| Uttar Pradesh | Cohort | 1993-1994 | 0-59 | 18.3 |
| West Bengal | Cohort | 1998-1999 | 0-59 | 17.0 |

Studies of Diarrhea Mortality in India

Mortality rate for diarrhea

Million Deaths Study (2005 Survey):

<1 month: 1.2 / 1000 live births (0.9, 1.5)

1-59 months: 11.1/1000 live births (10.4, 11.9)

Studies of Diarrhea Mortality in India

Proportion of cases resulting in death (CFR)

Harayana (cohort, 1982-1983)

0.6 % of acute cases

11.9 % of persistent cases

Diarrhea Morbidity in India

Not just concerned with **deaths**

Causes a significant number of **episodes of diarrhea**

Causes a significant number of **hospitalizations**

Contributes to **undernutrition (burden is not quantified yet)**

Studies of Diarrhea Incidence and Prevalence

Incidence: 4 India, 1 neighboring countries

Study design

| | | |
|-----------------|---|---|
| Community-based | 2 | 1 |
| Hospital-based | 2 | 0 |

Time period

| | | |
|-----------|---|---|
| 1970-1979 | 0 | 1 |
| 1980-1989 | 1 | 0 |
| 1990-1999 | 1 | 0 |
| 2000-2007 | 2 | 0 |

Studies of Diarrhea Incidence and Prevalence

Incidence:

Median Incidence 3.2 episodes per child per year

Prevalence: range of reported prevalence values
per 2 week period (India) or 100 days
(Bangladesh)

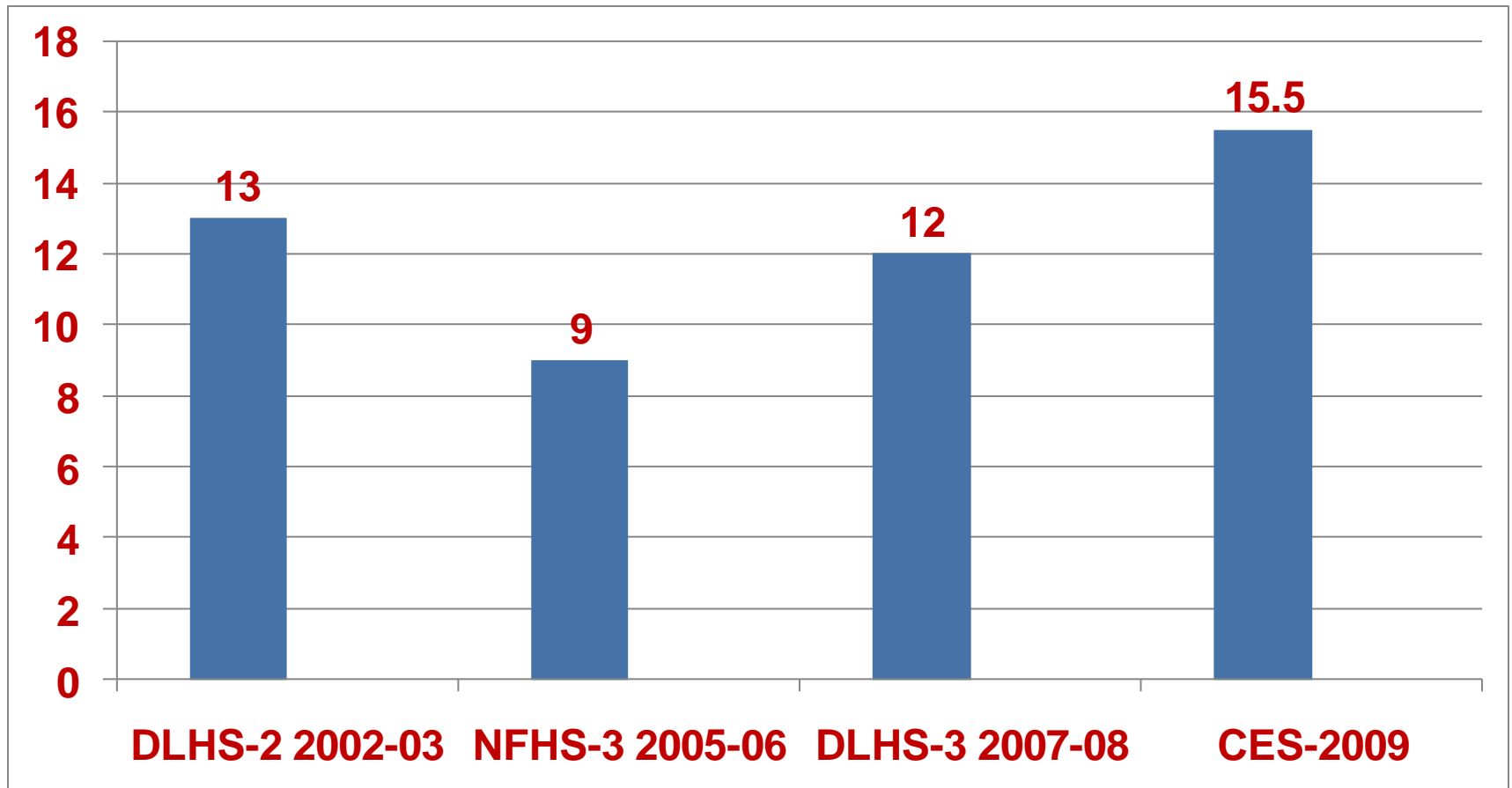
India (N=3): 5.7-26.4%

Bangladesh (N=1): 12.8%

GI infection rate per child/year in first 3 years

- | | rate /child/yr (95% CI) |
|------------------------|--------------------------|
| • First year of life | 3.6 (3.3-3.9) |
| • 2 nd year | 1.64 (1.47-1.83) |
| • 3 rd year | 1.16 (1.02-1.33) |

Prevalence of Diarrhea(%)



Key Messages

Diarrhea accounts for 13% of all deaths in Indian children younger than 5 years

There is significant morbidity associated with diarrhea in children under 5 years of age.

Reducing mortality from diarrhea is critical to achieving MDG 4 goals