

# Health inequality monitoring: with a special focus on low- and middle-income countries

## **Lecture 7: Reporting inequalities II**



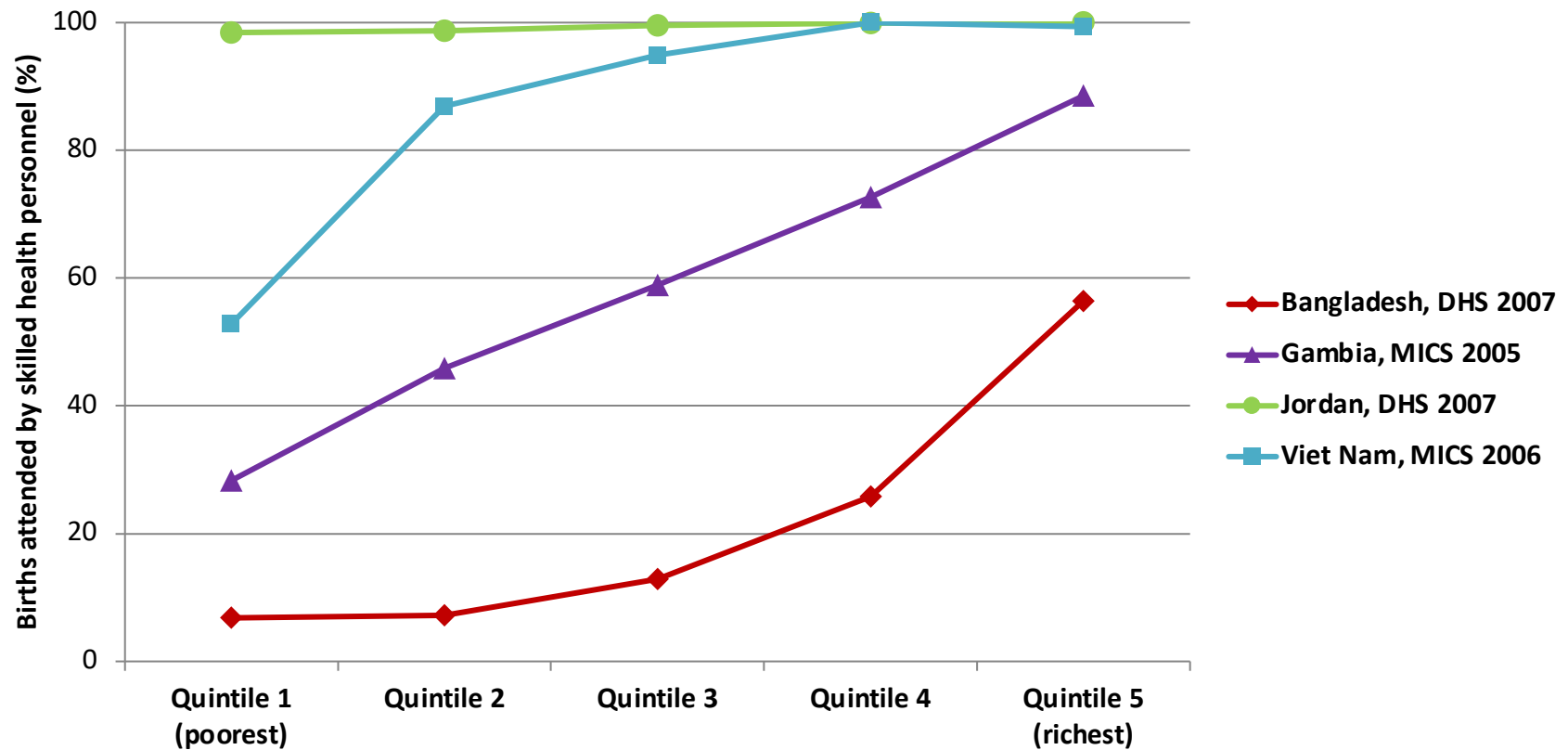
**World Health  
Organization**

# Selecting measures of health inequality to report

- Do an initial survey of the disaggregated data to answer the following questions:
  - What are the most salient conclusions to be communicated?
  - Are there any apparent trends?
  - What does the audience need to know to put the information into context?

# Describing patterns of health inequality using disaggregated data

Figure 1 Patterns of inequality, shown using coverage of births attended by skilled health personnel in Bangladesh, Gambia, Jordan and Viet Nam, by wealth quintile, DHS and MICS 2005–2007



# Types of interventions to address different shapes of inequality

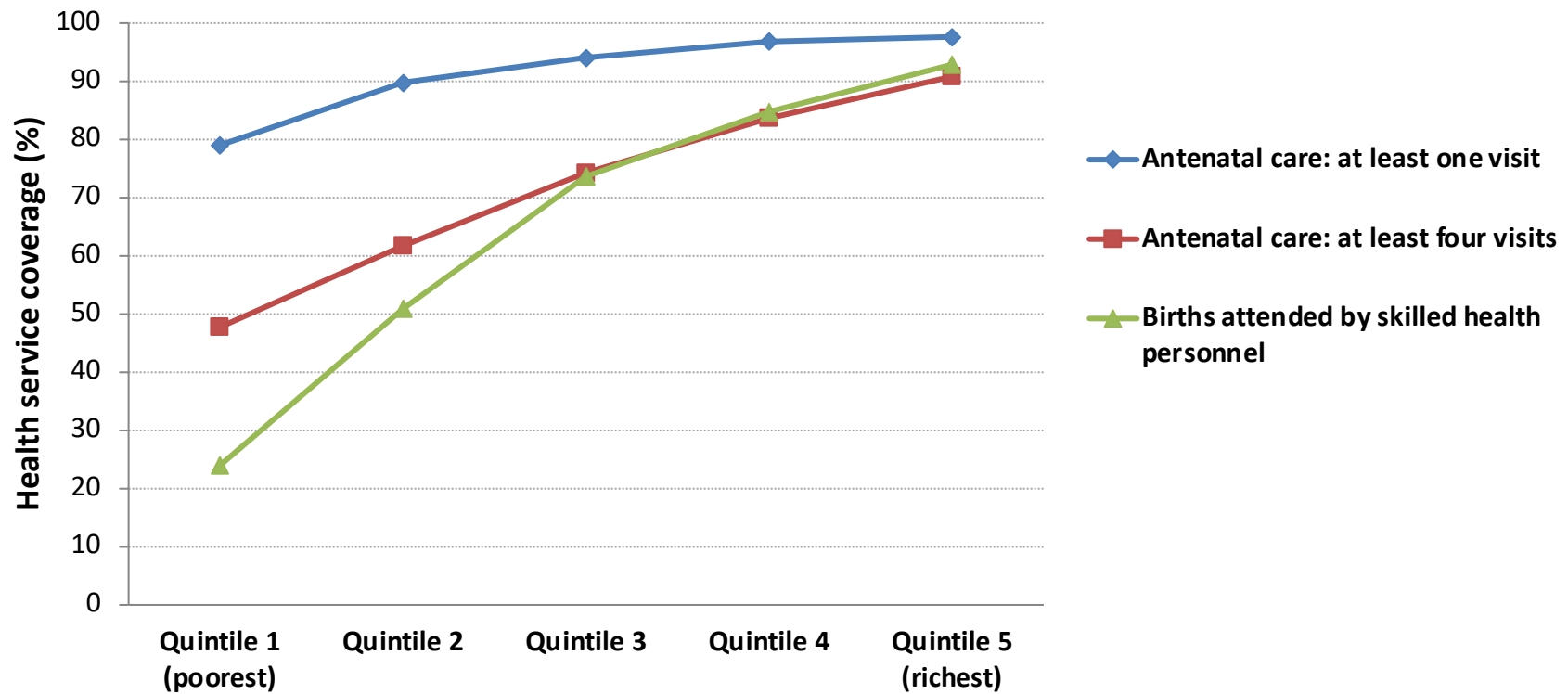
- Mass deprivation
  - Whole-population approach: resources are invested in all (or most) subgroups
- Marginal exclusion
  - Targeted approach: resources are targeted to the most disadvantaged subgroup(s)
- Queuing pattern
  - Combination of whole-population and targeted approaches
- Complete coverage
  - No further interventions needed; ongoing monitoring may be warranted

# Reporting simple or complex measures

- Inequality can usually be effectively shown using only difference and ratio measures
  - Represent absolute and relative inequality
  - Straightforward and easy to understand
- However, it is important to consider which measures will best represent the conclusions that are evident from the data
  - Do difference and ratio tell the whole story?

# Applied example: reporting simple or complex measures

Figure 2 Coverage of selected maternal health service indicators in the Philippines, by wealth quintile, DHS 2008



# Reporting simple or complex measures: an example

**Table 1 Wealth-based inequality in selected maternal health service indicators in the Philippines, DHS 2008**

Indicator	Simple measures of inequality		Complex measures of inequality	
	Difference (percentage points)	Ratio	Slope index of inequality (percentage points) (standard error)	Concentration index (standard error)
Antenatal care: at least one visit	6.9	1.1	13.1 (2.0)	0.0187 (0.0024)
Antenatal care: at least four visits	32.0	1.5	41.5 (2.7)	0.0906 (0.0064)
Births attended by skilled health personnel	68.7	3.7	79.2 (1.8)	0.2283 (0.0084)

# Reporting absolute and relative inequality

- Absolute and relative inequality should be reported together as complementary measures of inequality
- Relative measures are unit-less
  - Useful when making comparisons between indicators with different units
- Absolute measures retain the same unit as the health indicator
  - For example, under-five mortality rates in Colombia:
    - Absolute difference between males and females is **4.6 deaths per 1000 live births**
    - Rates in males is **19.3 deaths per 1000 live births**
    - Rates in females in **23.8 deaths per 1000 live births**
    - The rate is about 25% higher for males than females!



# Reporting absolute and relative inequality: an example

**Table 2 Wealth-based inequality in selected reproductive, maternal and child health indicators in Ghana, DHS 1998 and 2008**

Indicator	Survey year	Quintile 1 (poorest)	Quintile 2	Quintile 3	Quintile 4	Quintile 5 (richest)	Difference	Ratio
Antenatal care: at least one visit (%)	1998	77.0	87.4	92.4	95.0	98.0	21.0	1.3
	2008	92.5	93.2	96.1	97.7	99.1	6.6	1.1
Family planning needs satisfied (%)	1998	25.2	30.6	35.6	47.2	57.3	32.1	2.3
	2008	28.2	32.2	35.6	45.4	56.5	28.4	2.0
Infant mortality rate (deaths per 1000 live births)	1998	71.3	63.1	80.7	54.4	21.3	50.0	3.3
	2008	59.7	45.0	70.5	44.3	46.3	13.5	1.3
Stunting among children under five (%)	1998	39.7	34.7	33.1	20.5	16.3	23.4	2.4
	2008	33.4	34.2	28.0	20.9	14.3	19.2	2.3

# Selecting reference groups according to health indicator types

**Table 3 Wealth-based inequality in selected health indicators in India, DHS 2005**

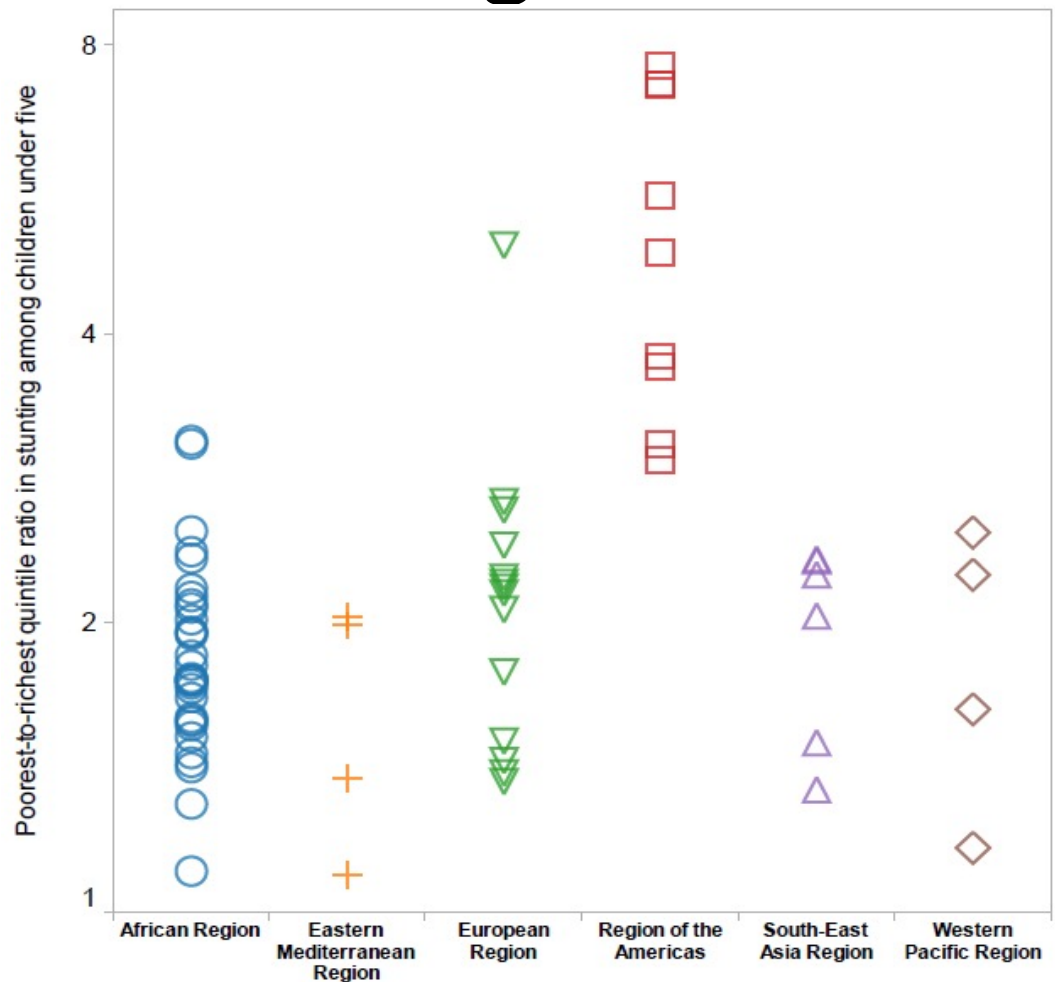
Indicator	Quintile 1 (poorest) (%)	Quintile 2 (%)	Quintile 3 (%)	Quintile 4 (%)	Quintile 5 (richest) (%)	Difference (percentage points)	Ratio
Stunting among children under five	59.9	54.4	48.8	40.8	25.6		
Scenario 1: reference group is quintile 1 (poorest)						–34.3	0.4
Scenario 2: reference group is quintile 5 (richest)						34.3	2.3
Full immunization coverage among 1-year-olds	24.4	33.3	47.1	55.5	71.0		
Scenario 1: reference group is quintile 1 (poorest)						46.6	2.9
Scenario 2: reference group is quintile 5 (richest)						–46.6	0.3

# Reporting inequality and national average

- In general, national average should be reported along with disaggregated data and measures of inequality to present a comprehensive view of the status of the health indicator
- When presenting inequality measures for multiple countries, national levels of health indicators should also be presented
  - For example, there may be low inequality explained by all population subgroups having equally high mortality
    - Cross-country comparisons of within-country inequality in the absence of the national average would give an incomplete representation of the country situation

# Applied example: reporting inequality and national average

**Figure 3** Wealth-based inequality in stunting among children under five in 70 countries, DHS and MICS 2005–2011

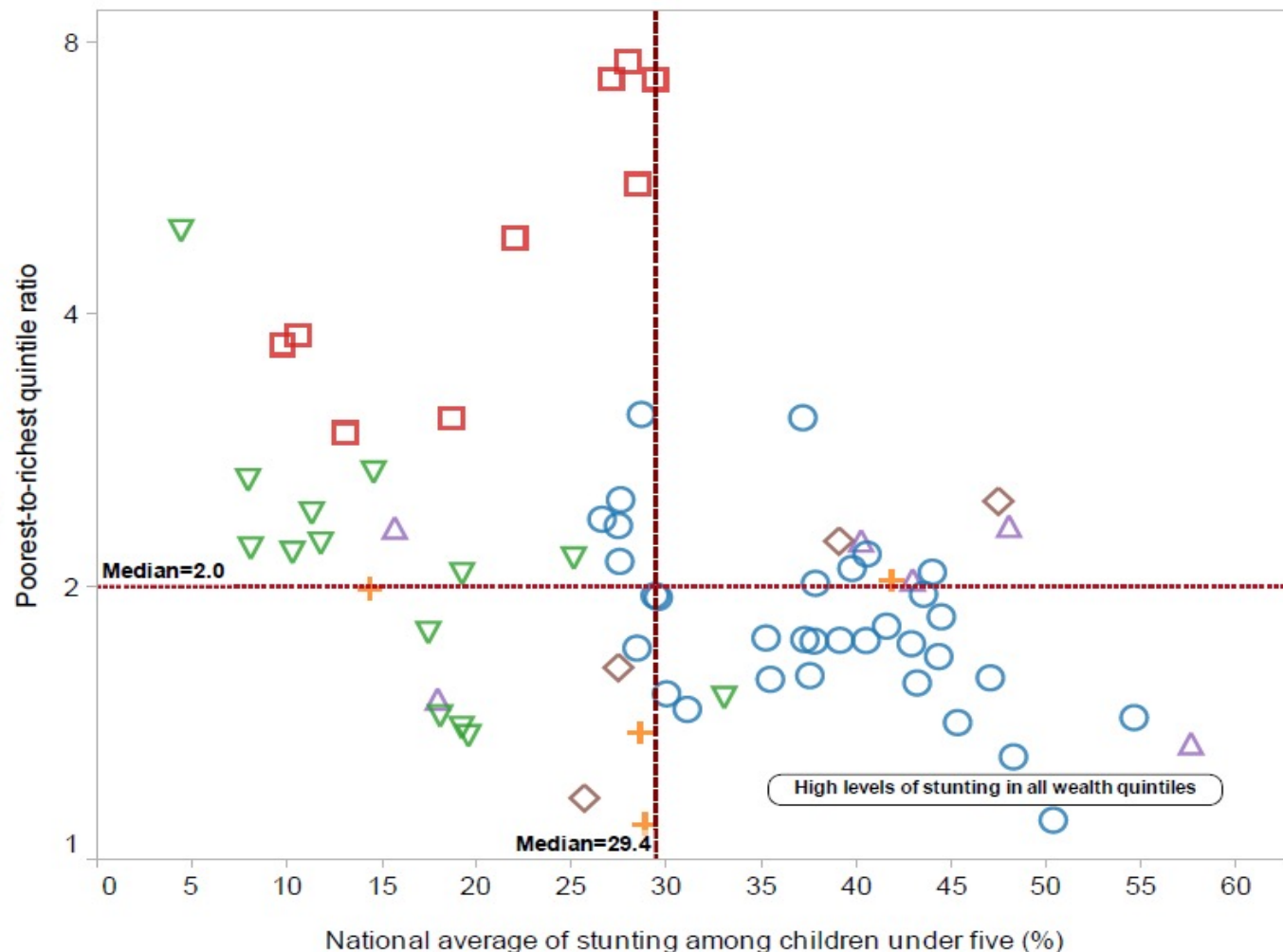


**Shapes** indicate countries within the specified World Health Organization region. Each country is represented by one shape.

# Applied example: reporting inequality and national average

Figure 4 Wealth-based inequality and national average in stunting among children under five in 70 countries, DHS and MICS 2005–2011

- African Region
- Eastern Mediterranean Region
- European Region
- Region of the Americas
- South-East Asia Region
- Western Pacific Region



**Shapes** indicate countries within the specified World Health Organization region. Each country is represented by one shape.

# Special considerations: low sample size

- Household surveys may not be designed to have sufficient subgroup sample sizes
  - As the sample size decreases the estimate becomes more uncertain and the ability to compare becomes more restricted
- High levels of uncertainty in point estimates (broad confidence intervals) pose a challenge
  - Difference and ratio measures for subgroups become less reliable
- When sample size is too low to generate meaningful estimates, the audience should be notified in a systematic way

# Reporting statistical significance

- Reporting the confidence interval or standard error values of point estimates can help the audience to better understand whether health indicators are statistically different between subgroups
- Some caution required:
  - Estimates that are derived from large samples may show statistically significant differences, but in the realm of public health this difference may not be meaningful
- Ensure that point estimates do not lead to false conclusions and misinformed policy:
  - Consider whether confidence intervals of the point estimates are narrow enough for meaningful conclusions; if not, point estimates should not be reported

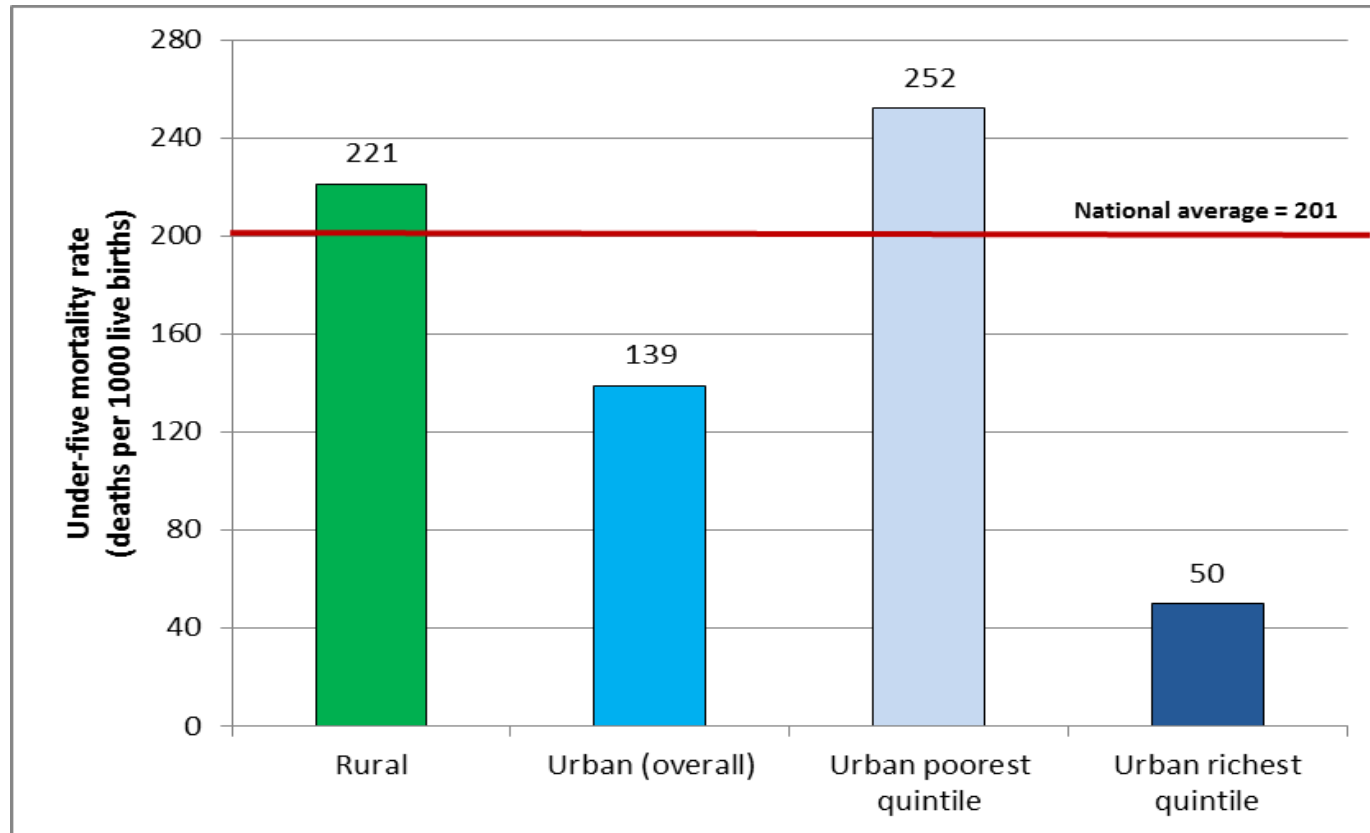
# Special considerations: reporting multiple dimensions of inequality simultaneously

- Although health data disaggregation is presented by a single dimension of inequality at a time, it will occasionally make sense to report multiple dimensions simultaneously
  - For example, reporting socioeconomic (education-based) differences in men and women:
    - First, divide the population based on sex
    - Then, within each subgroup, divide by level of education
    - Calculate and report education-based inequalities in men and women separately



# Applied example: reporting multiple dimensions of inequality simultaneously

Figure 6 Under-five mortality rate in Nigeria, by place of residence and wealth, DHS 2008



Source: Adapted from World Health Organization Centre for Health Development: country profiles on urban health, Nigeria.  
[http://www.who.int/kobe\\_centre/measuring/urban\\_health\\_observatory/uhealthprofiles/en/index1.html](http://www.who.int/kobe_centre/measuring/urban_health_observatory/uhealthprofiles/en/index1.html).

# Reporting time trend: the four quadrant view

- Four quadrant view presents time trends in overall averages along with time trends in inequality
  - Can be applied to multiple health indicators or multiple countries
  - Can present absolute or relative inequality, or in some cases, both

# Reporting time trend: the four quadrant view

- Time trends in overall averages are divided into those with improving versus worsening overall averages
- Time trends in inequality are divided into those with increasing versus decreasing inequality
- Health indicators/countries can be divided into four groups:
  1. improving overall average and decreasing inequality (best outcome scenario)
  2. improving overall average and increasing inequality
  3. worsening overall average and decreasing inequality
  4. worsening overall average and increasing inequality (worst outcome scenario)

# The four quadrant view: multiple health indicators within a single country

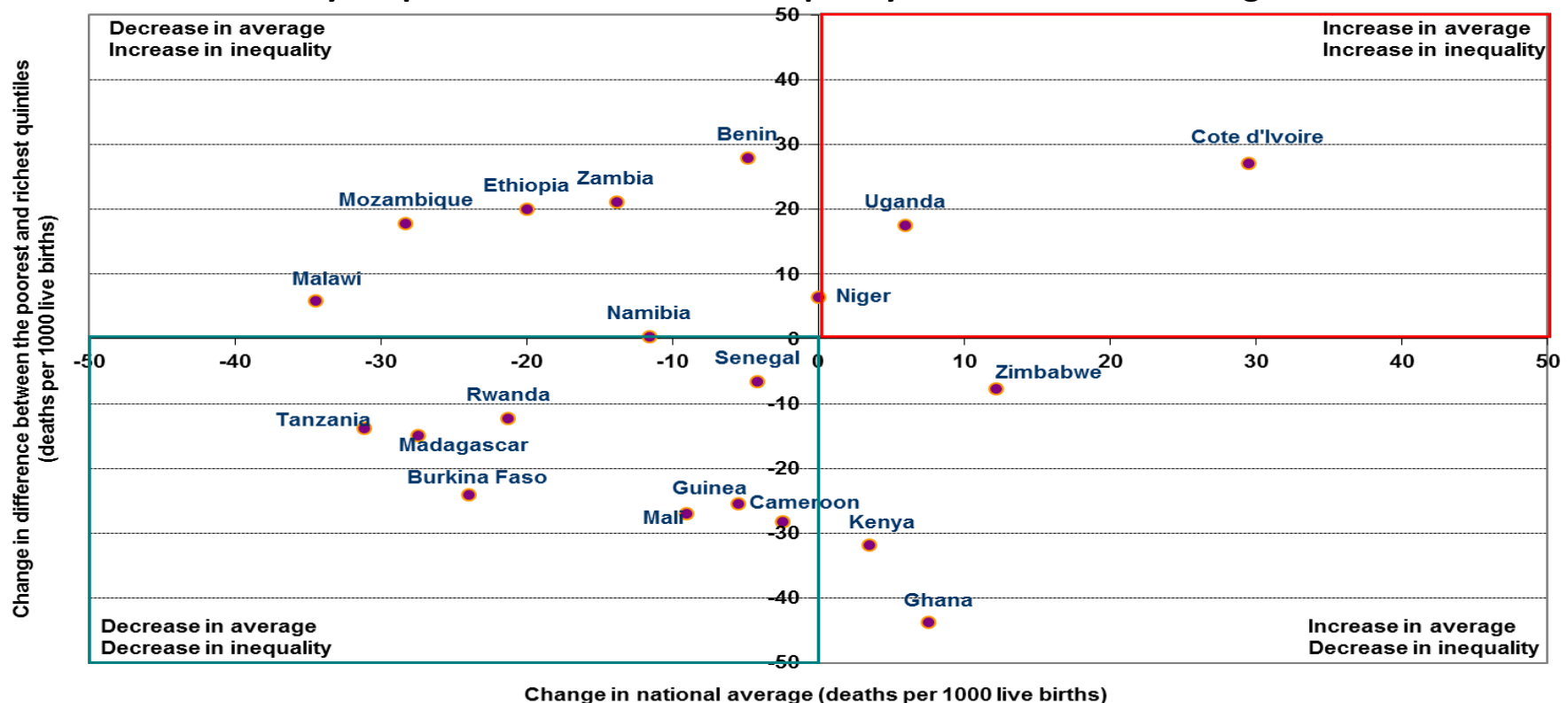
**Table 4 Four-quadrant view of the time trend in various health indicators in Cameroon, wealth-based inequality versus national average, DHS 1998–2004**

	Decreasing relative wealth-based inequality	Increasing relative wealth-based inequality or status quo
<b>Improving national average</b>	<b><i>Best situation</i></b> <ul style="list-style-type: none"> <li>• DTP3 immunization</li> <li>• Births attended by skilled health personnel</li> <li>• Contraception prevalence: modern methods</li> <li>• Infant mortality rate</li> <li>• Under-five mortality rate</li> <li>• Prevalence of underweight among women</li> </ul>	
<b>Worsening national average or status quo</b>	Prevalence of overweight among women	<b><i>Worst situation</i></b> <ul style="list-style-type: none"> <li>• Stunting among children under five</li> </ul>

Source: Adapted from Asbu E et al. *Health inequities in the African Region of the World Health Organization*. Brazzaville, Regional Office for Africa, World Health Organization, 2010.

# The four quadrant view: a single indicator reported by multiple countries

Figure 7 Four-quadrant view of benchmarking time trends in infant mortality rate in 20 African countries over a five-year period, wealth-based inequality versus national average

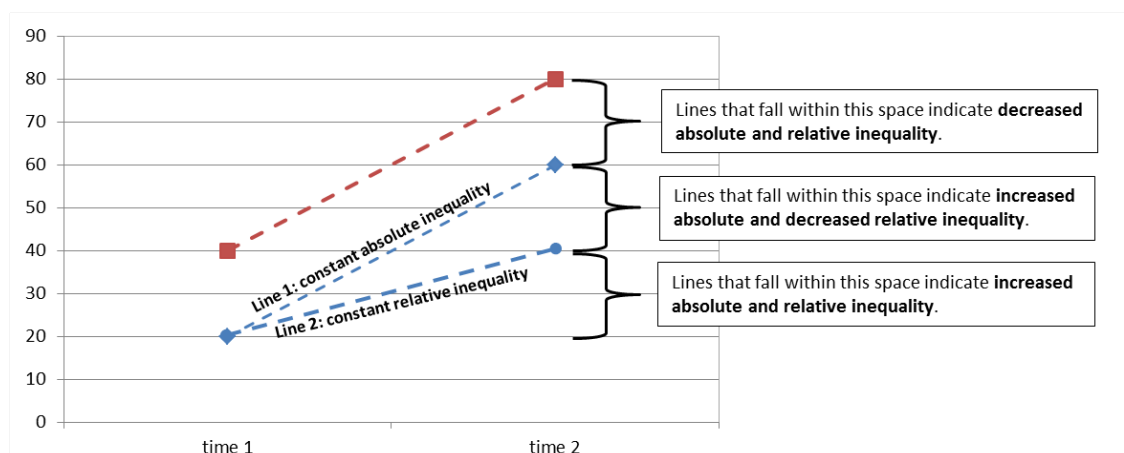


Source: Adapted from Asbu E et al. *Health inequities in the African Region of the World Health Organization*. Brazzaville, Regional Office for Africa, World Health Organization, 2010.

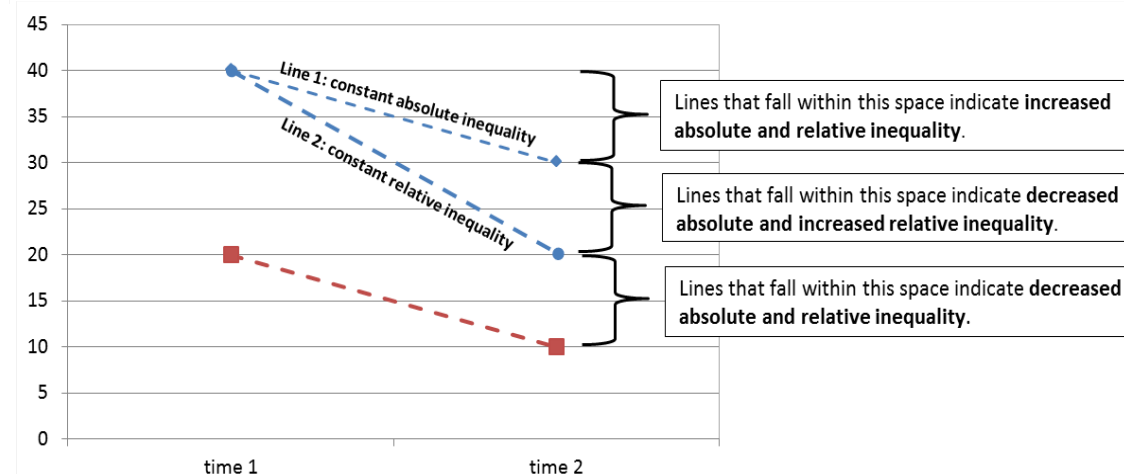
# Reporting time trend: showing time trends across subgroups

Figure 8 Time trends in inequality in subgroups in the case of (a) increasing prevalence and (b) decreasing prevalence of a health indicator, highlighting different scenarios for absolute and relative inequality

## (a) Increasing prevalence of a health indicator



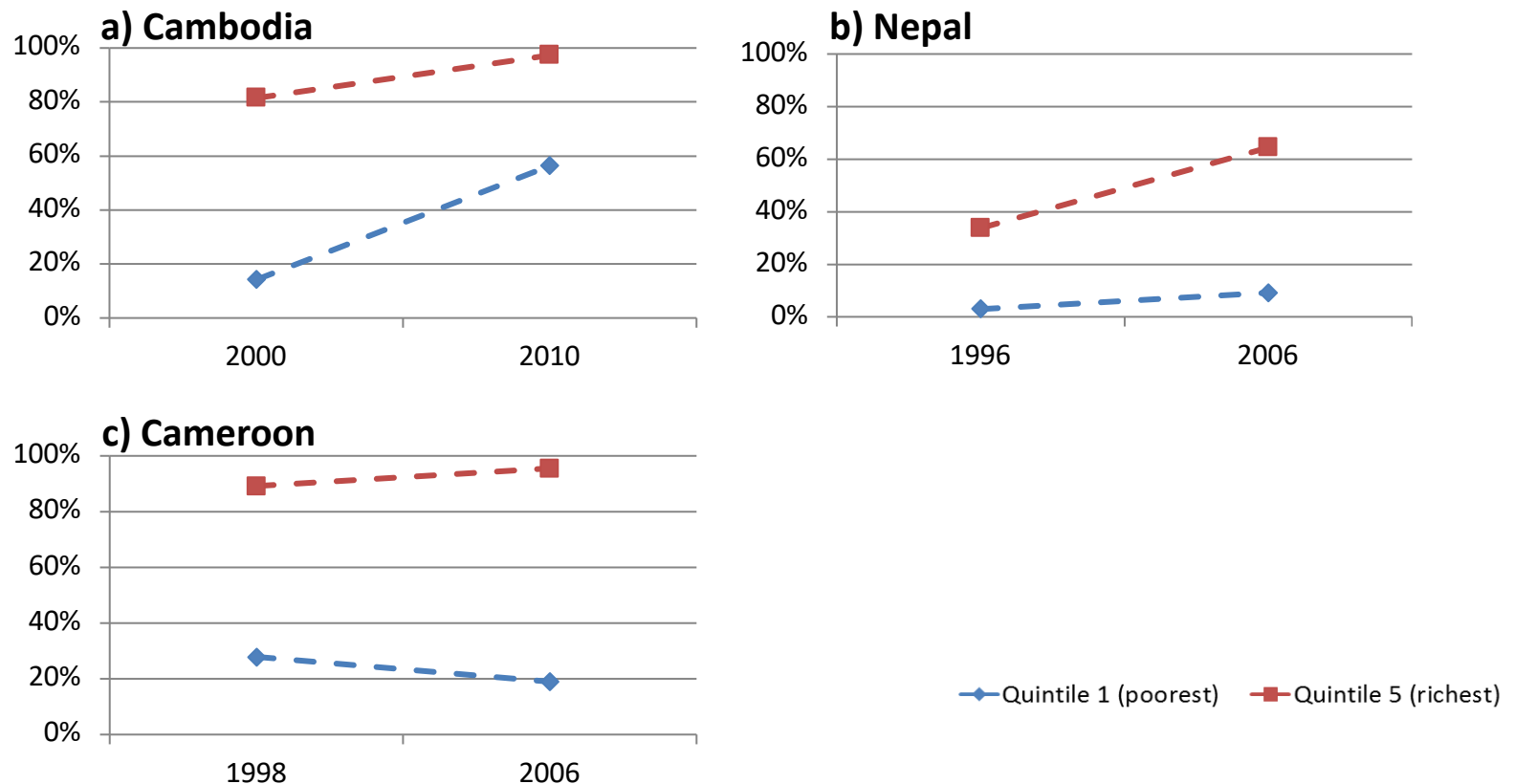
## (b) Decreasing prevalence of a health indicator



Source: Adapted from Barros AJD, Victora CG. Measuring coverage in MNCH: determining and interpreting inequalities in coverage of maternal, newborn, and child health interventions. *PLoS Medicine*, 2013, 10(5):e1001390. doi:10.1371/journal.pmed.1001390.

# Showing time trends across subgroups: applied examples

**Figure 9 Time trends in births attended by skilled health personnel in (a) Cambodia, (b) Nepal and (c) Cameroon, by wealth quintile, DHS and MICS 1996–2010**



# Defining priority areas

- The purpose of priority setting is to help policy-makers interpret the results of inequality monitoring
- A simple and intuitive interpretation of the complicated inequality monitoring process can help policy-makers and the public
- A panel of stakeholders with data or statistics background and an ability to interpret health statistics should review health inequality reports and decide which areas are priorities for action, taking into account:
  - Inequality analyses (latest status, time trend, and benchmarking)
  - National averages
  - Planned national targets and health care agendas
- The process of defining priority areas seeks consensus among stakeholders



# Defining priority areas

- First, assign a score on a scale of 1 to 3 in each of the three reported aspects of inequality (latest status, time trend and benchmarking):
  - 1 indicates that no action is needed
  - 2 indicates that action is needed
  - 3 indicates that urgent action is needed
- This should be done for each health indicator by each equity stratifier.
- National averages for each health indicator may also be scored alongside.

# Defining priority areas

- Next, find the mean of scores across all equity stratifiers and for each indicator.
- This mean score is considered alongside the national average to show where priorities lie:
  - Can identify high-priority health indicators by latest status, time trend and benchmarking
  - Can identify high-priority equity stratifiers

# Health inequality monitoring: with a special focus on low- and middle- income countries

Full text available online:

[http://apps.who.int/iris/bitstream/10665/85345/1/9789241548632\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/85345/1/9789241548632_eng.pdf)

HANDBOOK ON

## Health Inequality Monitoring

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