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

Lecture 4: Simple measures of health inequality

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How can health inequalities be measured?

- **Simple measures** make pairwise comparisons of health between two subgroups, such as the most and least wealthy
  - main type of measurement used in inequality monitoring
  - intuitive and easily understood

Difference and ratio measures

- **Difference** shows the *absolute* inequality between two subgroups
  - the mean value of a health indicator in one subgroup subtracted from the mean value of that health indicator in another subgroup
- **Ratios** show the *relative* inequality between two subgroups
  - the mean value of a health indicator in one subgroup divided by the mean value of that health indicator in another subgroup

- When there are only two subgroups to compare, difference and ratio are the most straightforward ways to measure absolute and relative inequality

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Absolute and relative inequality

- **Absolute inequality** reflects the magnitude of difference in health between two subgroups
  - Absolute measures retain the same unit of measure as the health indicator
  - For example, if health service coverage were 100% and 90% in two subgroups of one population, and 20% and 10% in subgroups of another population, both cases would report absolute inequality of 10 percentage points
- **Relative inequality** measures show proportional differences in health among subgroups
  - For example, the relative inequality in a population with health service coverage of 100% and 50% in two subgroups would equal 2 (100/50 = 2); the relative inequality in a population with health service coverage of 2% and 1% in two subgroups would also equal 2 (2/1 = 2)

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Applied examples: difference and ratio

Table 1 Area-based inequality in antenatal care (at least four visits) in Colombia, DHS 1995, 2000, 2005 and 2010

Survey year	Coverage in rural area (%)	Coverage in urban area (%)	Difference (urban – rural) (percentage points)	Ratio (urban / rural)
1995	53.8	82.4	28.6	1.5
2000	64.7	84.9	20.2	1.3
2005	73.1	87.1	14.0	1.2
2010	80.5	90.3	9.8	1.1

Table 2 Sex-based inequality in under-five mortality rates in Egypt, DHS 1995, 2000, 2005 and 2008

Survey year	Female (deaths per 1000 live births)	Male (deaths per 1000 live births)	Difference (male – female) (deaths per 1000 live births)	Ratio (male / female)
1995	98.9	92.1	−6.8	0.9
2000	69.3	68.6	−0.7	1.0
2005	46.3	52.1	5.8	1.1
2008	27.7	38.4	10.7	1.4

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Applied example: difference and ratio

Table 3 Wealth-based inequality in births attended by skilled health personnel in the Philippines, DHS 1998, 2003 and 2008

Survey year	Quintile 1 (poorest) (%)	Quintile 2 (%)	Quintile 3 (%)	Quintile 4 (%)	Quintile 5 (richest) (%)	Difference (quintile 5 – quintile 1) (percentage points)	Ratio (quintile 5 / quintile 1)
1998	21.2	45.9	72.8	83.9	91.9	70.7	4.3
2003	25.1	51.4	72.4	84.4	92.3	67.2	3.7
2008	25.7	55.6	75.8	86.0	94.4	68.7	3.7

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Ordered and non-ordered groups

- Ordered groups have an inherent positioning and can be ranked

  – For example, wealth, education level

- Non-ordered groups, by contrast, are not based on criteria that can be logically ranked

  – For example, region, ethnicity, religion, place of residence

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Two subgroups and more than two subgroups

- Some equity stratifiers naturally generate two subgroups
  - For example, sex, urban-rural place of residence
- Other equity stratifiers may comprise multiple subgroups
  - For example, wealth quintiles, region
- Many equity stratifiers could be classified either way
  - For example, urban-rural place of residence could be expanded to include large cities, small cities, towns, villages, countryside, etc.
- Simple measures are appropriate to make pairwise comparisons of two subgroups; complex measures may be useful when there are more than two subgroups

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Simple measures of inequality: multiple subgroups

- When there are multiple subgroups pairwise comparisons may be made between:

  – Subgroups with highest and lowest values of a health indicator

  – Specific pairs of subgroups, based on a selected reference subgroup or subgroups

    - For example, comparing each region with the capital region

    - For example, comparing each wealth quintile to the richest quintile

Limitations of simple measures of inequality

- #1. Pairwise comparisons ignore all other subgroups that are not being compared

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Limitations of simple measures of inequality

Table 4 Wealth-based inequality in births attended by skilled health personnel in Ghana, DHS 2003 and 2008

Survey year	Quintile 1 (poorest) (%)	Quintile 2 (%)	Quintile 3 (%)	Quintile 4 (%)	Quintile 5 (richest) (%)	Difference (quintile 5 – quintile 1) (percentage points)
2003	20.6	31.9	43.3	73.0	90.4	69.8
2008	24.2	50.0	64.8	81.7	94.6	70.4

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Limitations of simple measures of inequality

Figure 1 Births attended by skilled health personnel in Ghana, by wealth quintile, DHS 2003 and 2008
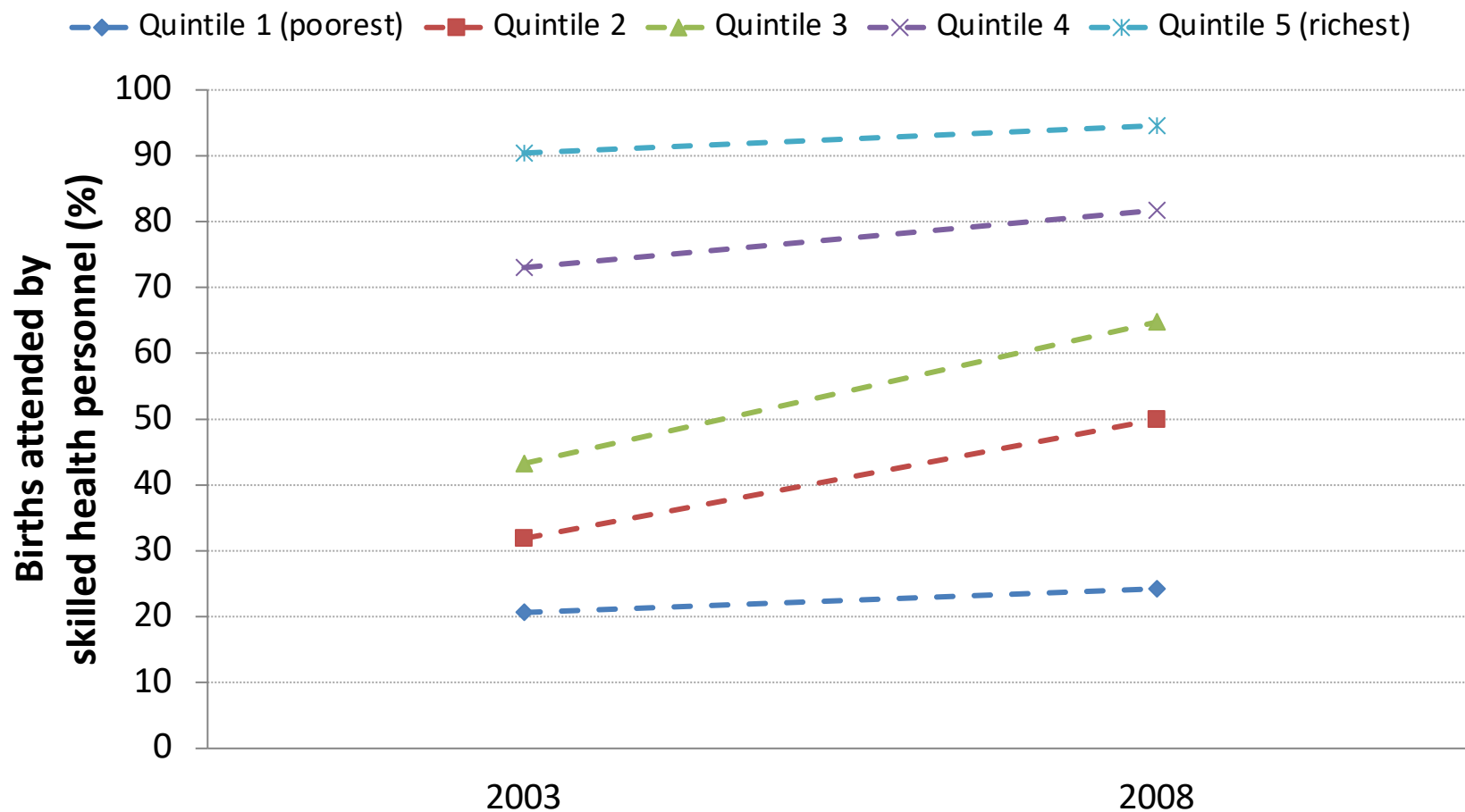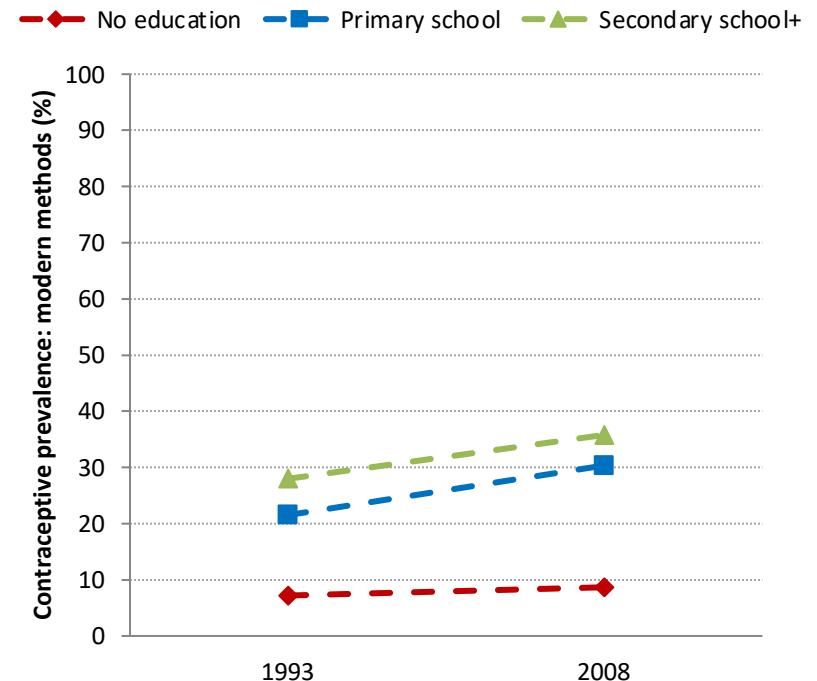
Limitations of simple measures of inequality

- #2. Pairwise comparisons do not take into consideration subgroup size

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Limitations of simple measures of inequality

Table 5 Education-based inequality in contraceptive prevalence (modern methods) in the Philippines, DHS 1993 and 2008

Survey year	None (%)	Primary (%)	Secondary or higher (%)	Difference (secondary or higher – none) (percentage points)
1993	7.2	21.5	28.0	20.8
2008	8.7	30.3	35.8	27.1

Figure 2 Contraceptive prevalence (modern methods) in the Philippines, by education level, DHS 1993 and 2008

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Limitations of simple measures of inequality

Figure 3 Proportion of women of reproductive age in the Philippines, by education level, DHS 1993 and 2008

	1993	2008
■ Secondary+	57,4	75,7
■ Primary	39,9	22,6
■ None	2,7	1,7
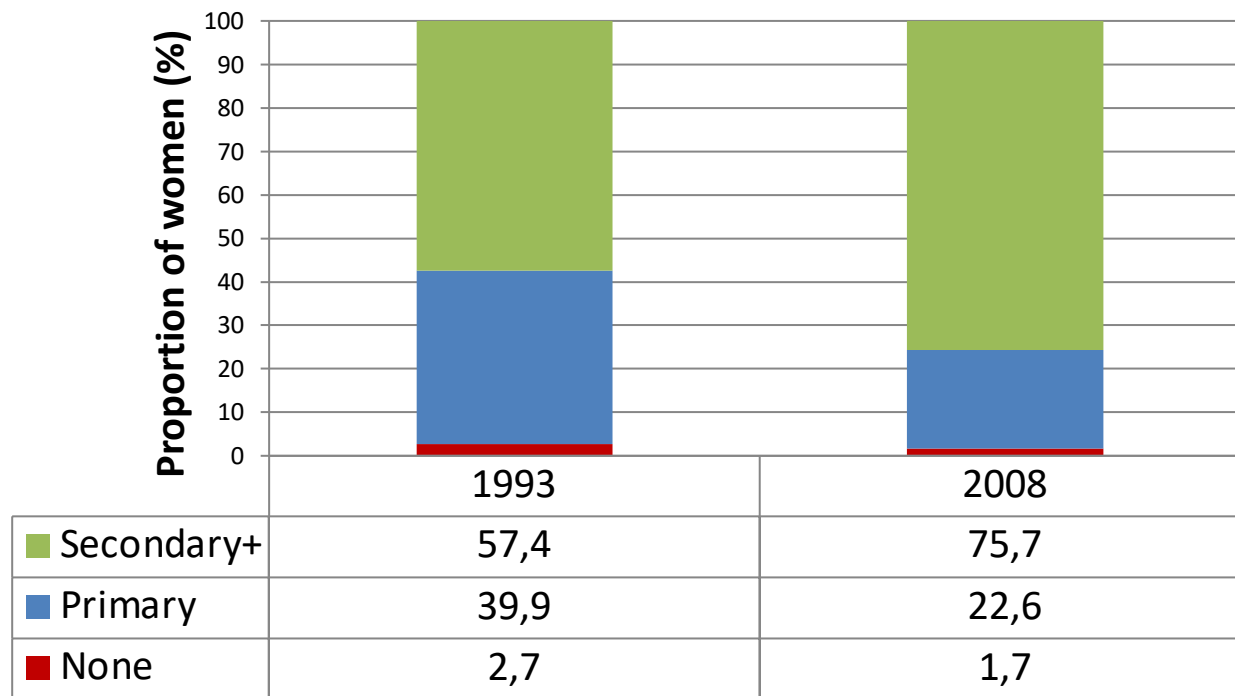
Source: Data provided by: International Center for Health Equity, Federal University of Pelotas, Brazil.

Limitations of simple measures of inequality

- Interpretation challenges due to population shifts:
  - Example: more-educated subgroups may appear to be losing coverage of a health service over time, when in reality this could be the result of a population shift of uncovered persons from less-educated subgroups into more-educated subgroups
  - Should report the relative size of the population subgroups alongside disaggregated mean values of the health indicator

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http://apps.who.int/iris/bitstream/10665/85345/1/9789241548632_eng.pdf

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