

# **Inequalities in Coverage of Essential RMNCAH Interventions: the Kenyan Context**

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# Background

Throughout the MDG era, maternal, newborn, and child survival in Kenya improved considerably.

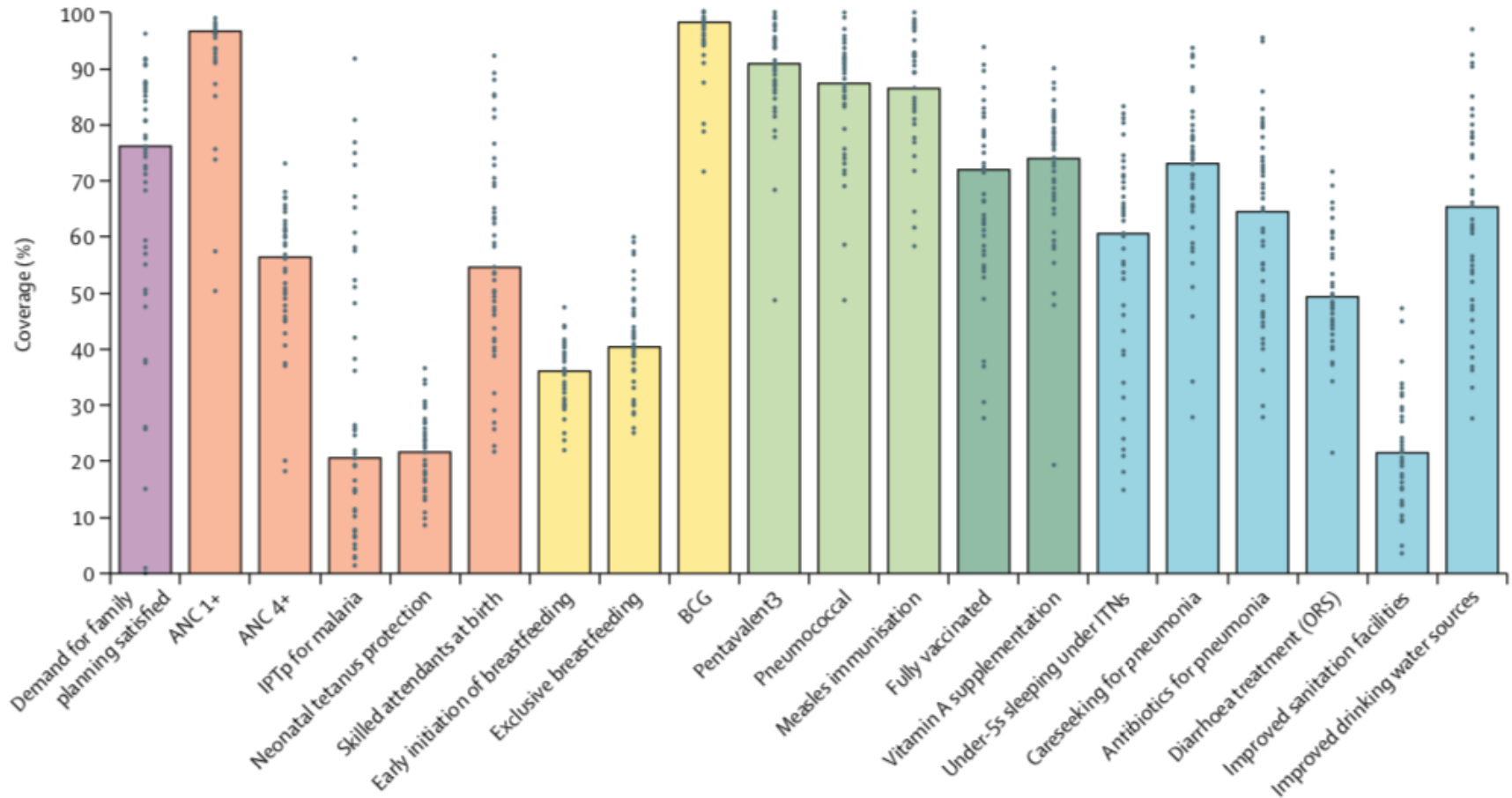
From 1998 to 2014:

- **MMR: -39%** (from 590 to 362 deaths/100,000 live births)
- **NMR: -21%** (from 28 to 22 deaths/1000 live births)
- **U5MR: -54%** (from 112 to 52 deaths/1000 live births)

Keats et al, LGH 2016

# Background

## Coverage of RMNCAH interventions also improved, but...



Keats et al, LGH 2016

# Background

- **Socioeconomic and regional inequalities will be a threat to any further gains in RMNCAH**
- **Kenya will need to better understand these inequalities (burden, distribution, and trends) in order to prioritize effective strategies for achieving universal coverage and improving health at a population-level**

Keats et al, LGH 2016

# Objectives

**Assess levels of coverage and absolute/relative socioeconomic and regional inequalities in:**

- **11 essential RMNCAH interventions from 2003 to 2014**
- **Measures of composite coverage (CCI and co-coverage)**
- **At the national level and subnational level**

# Methods

- **Datasets: K-DHS surveys 2003, 2008, 2014 (allowed for time trend analysis)**
  - ~30,000 WRA and children <5 years
- **National, regional, county, and subcounty level representation**
  - **Regions: 8 (Central, Coast, Eastern, Nairobi, North Eastern, Nyanza, Rift Valley, Western)**
  - **Counties: 47**
  - **Subcounties (constituencies): 290**

# Methods

## RMNCAH Interventions:

- family planning needs satisfied (**FPS**)
- antenatal care with a skilled provider (**ANCS**)
- 4 or more antenatal care visits (**ANC4**)
- skilled attendant at birth (**SBA**)
- early initiation of breastfeeding [within one hour] (**EIBF**)
- 3 doses of DPT vaccine (**DPT3**)
- measles vaccination (**MSL**)
- full immunization of children (**FULL**)
- vitamin A supplementation [within 6 months] (**VITA**)
- oral rehydration therapy and continued feeding for children with diarrhoea (**ORT**)
- care seeking for children with suspected pneumonia (**CPNM**)

# Methods

## Summary measures of coverage:

### 1) Co-coverage

- Includes 9 essential mother/child interventions:
  - ANCS, tetanus toxoid 2+ doses, SBA, VITA, BCG immunization, DPT3, MSL, access to improved water, insecticide treated bed net for children
- Score ranges from 0 to 9
- Also reported co-coverage with 6 or more interventions (CC6+)

### 2) Composite coverage index (CCI)

$$CCI = 1/4 \left( FPS + \frac{SBA+ANCS}{2} + \frac{2DPT3+MSL+BCG}{4} + \frac{ORT+CPNM}{2} \right)$$



# Methods

## Equity Analyses:

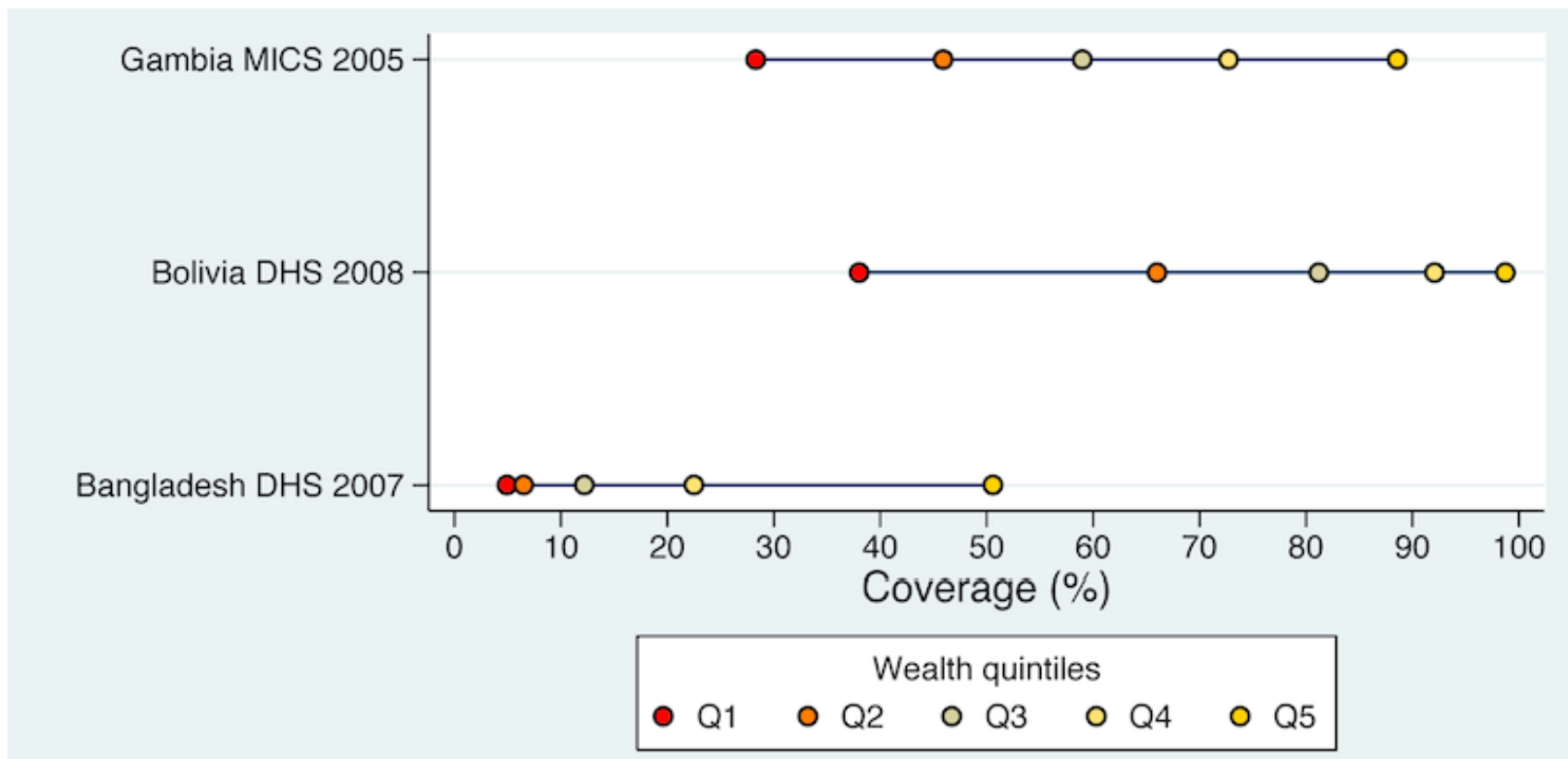
- Household asset data assembled into wealth quintiles (Q1 to Q5)
  - Q1 = poorest 20% of population
  - Q5 = richest 20% of population
- Absolute Inequality = actual coverage gap that exists between wealth groups
  - Q5-Q1 gap
  - Slope index of inequality (SII)
- Relative Inequality = degree of unfairness between richest and poorest
  - Q5/Q1 ratio
  - Concentration index (CIX)

# Methods

- **SII (%)**:
  - + values → higher coverage in the wealthier subgroup (pro-rich)
  - - values → higher coverage in the poorest subgroup (pro-poor)
  - 0 = absence of absolute inequality
- **CIX (values\*100)**:
  - Values fall between -1 and 1
  - Same interpretation as above
- **Grouped CIX and SII into categories of socioeconomic inequality**:
  - Low (<|15|), moderate (|15-40|), high (|40-60|), very high (>|60|)

# Methods

## Additional Equity Concepts: Linear, Bottom, and Top Inequality



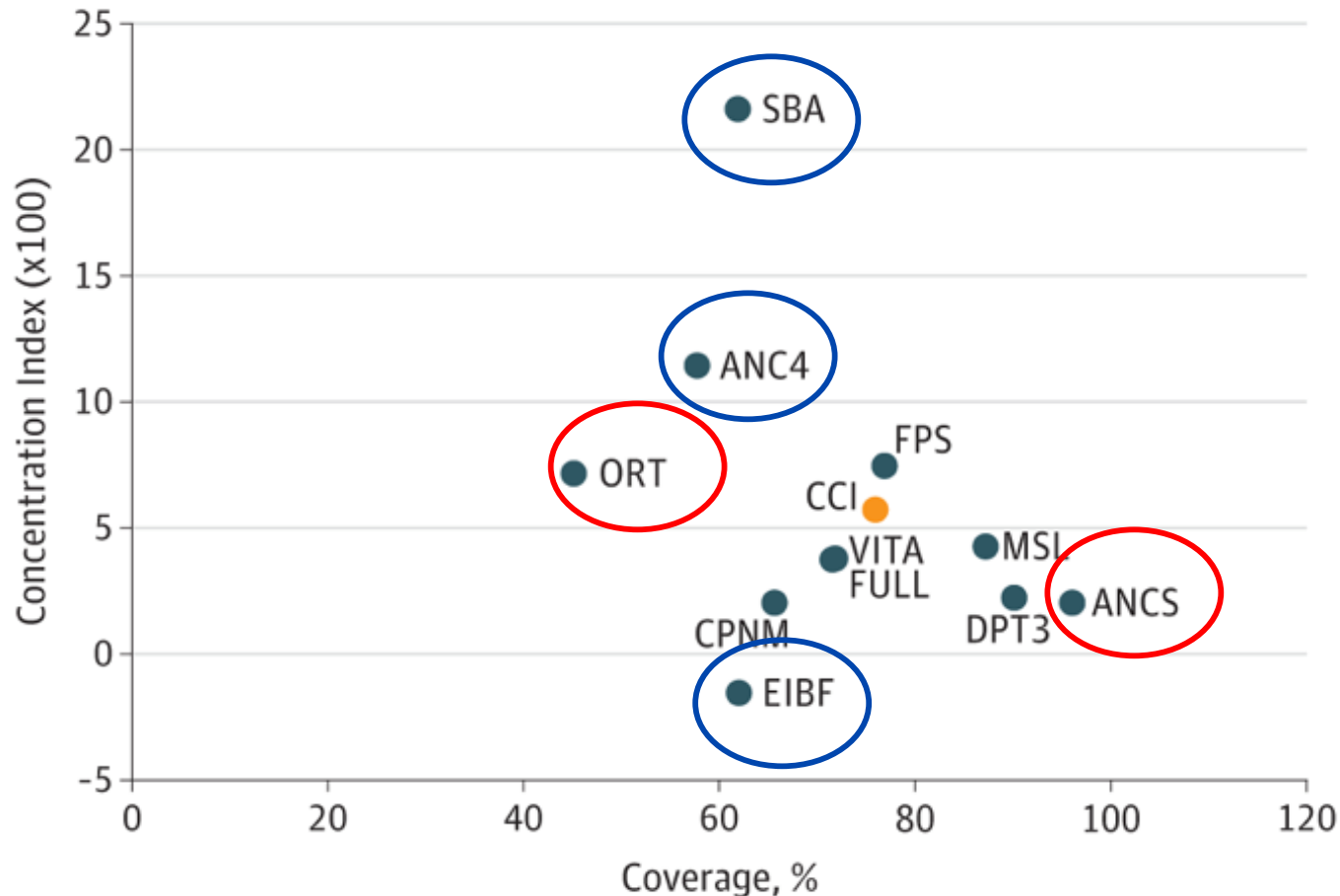
Barros and Victora, PLoS Med 2013

# Select Results

Healthier Children. A Better World.

# Results

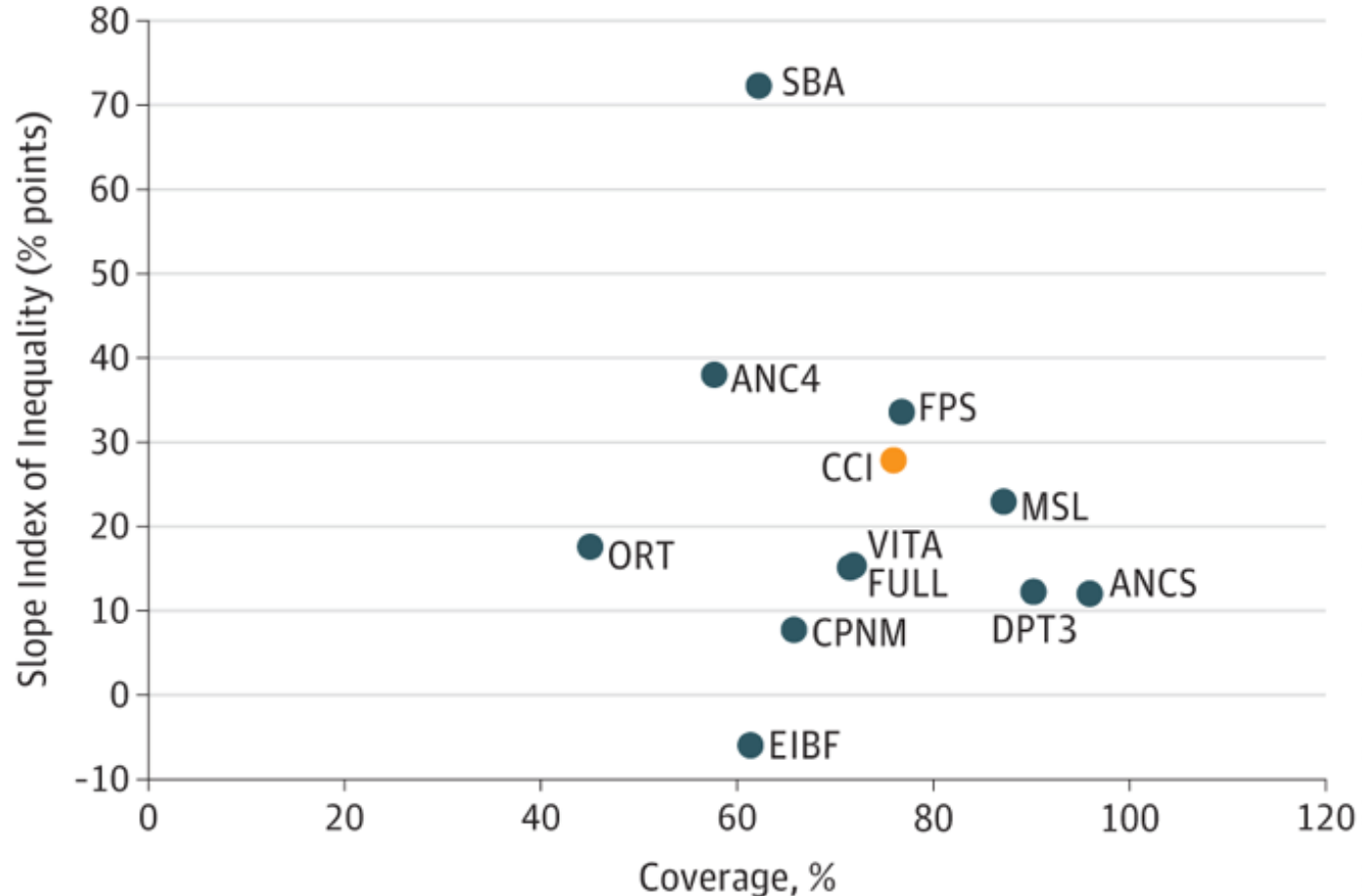
## Coverage vs Relative Inequality (CIX), National



- Coverage is relatively high overall; highest for ANCS (96%) and lowest for ORT (45%)
- Most relative inequality: SBA, ANC4
- Least relative inequality: EIBF (pro-poor intervention; Q1=67% and Q5=59%)
- CCI: 76%; low relative inequality

# Results

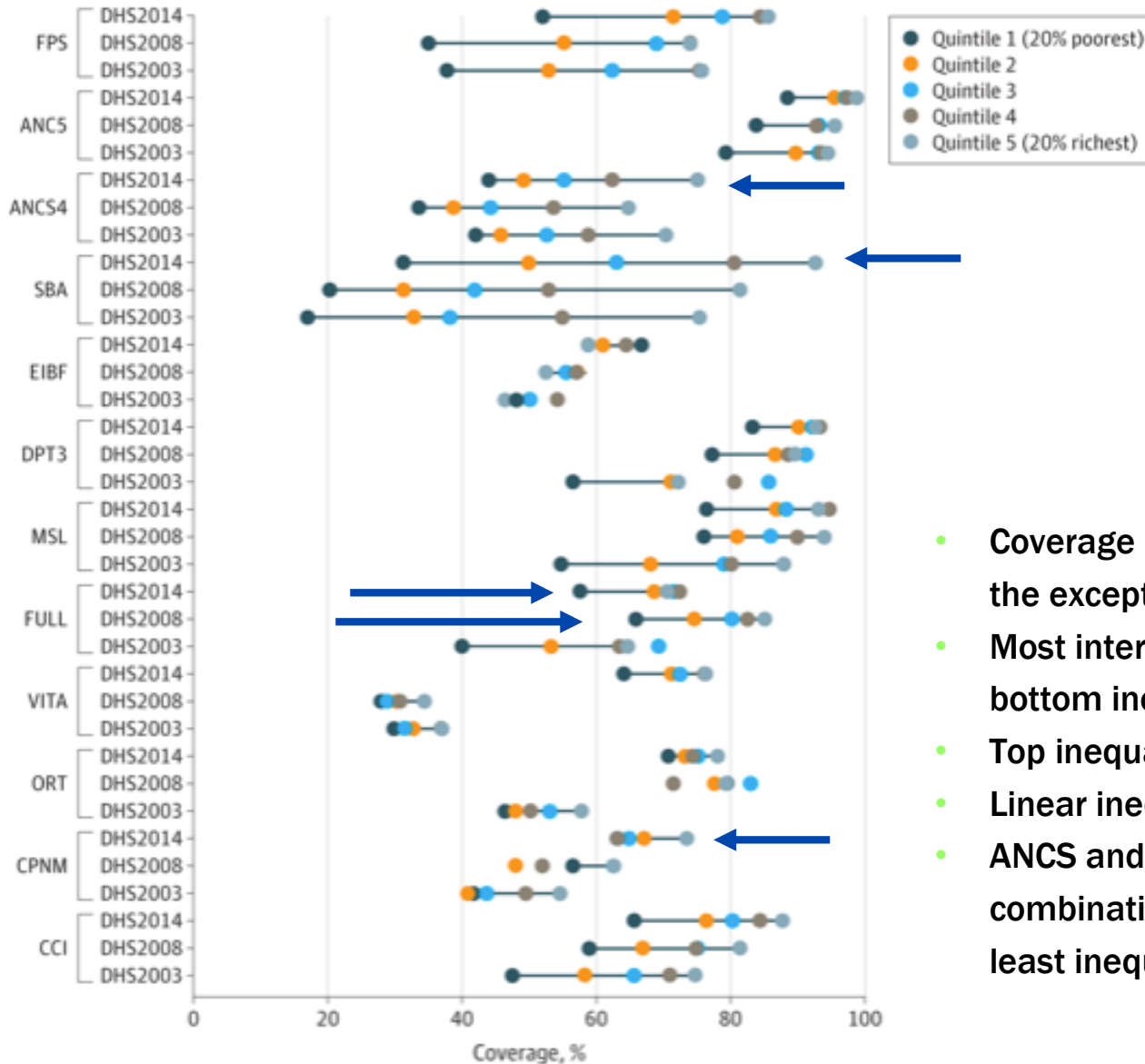
## Coverage vs Absolute Inequality (SII), National



- Most absolute inequality: SBA, ANC4, FPS
- Least absolute inequality: EIBF (pro-poor) and CPNM (pro-rich)
- CCI: moderate absolute inequality

# Results

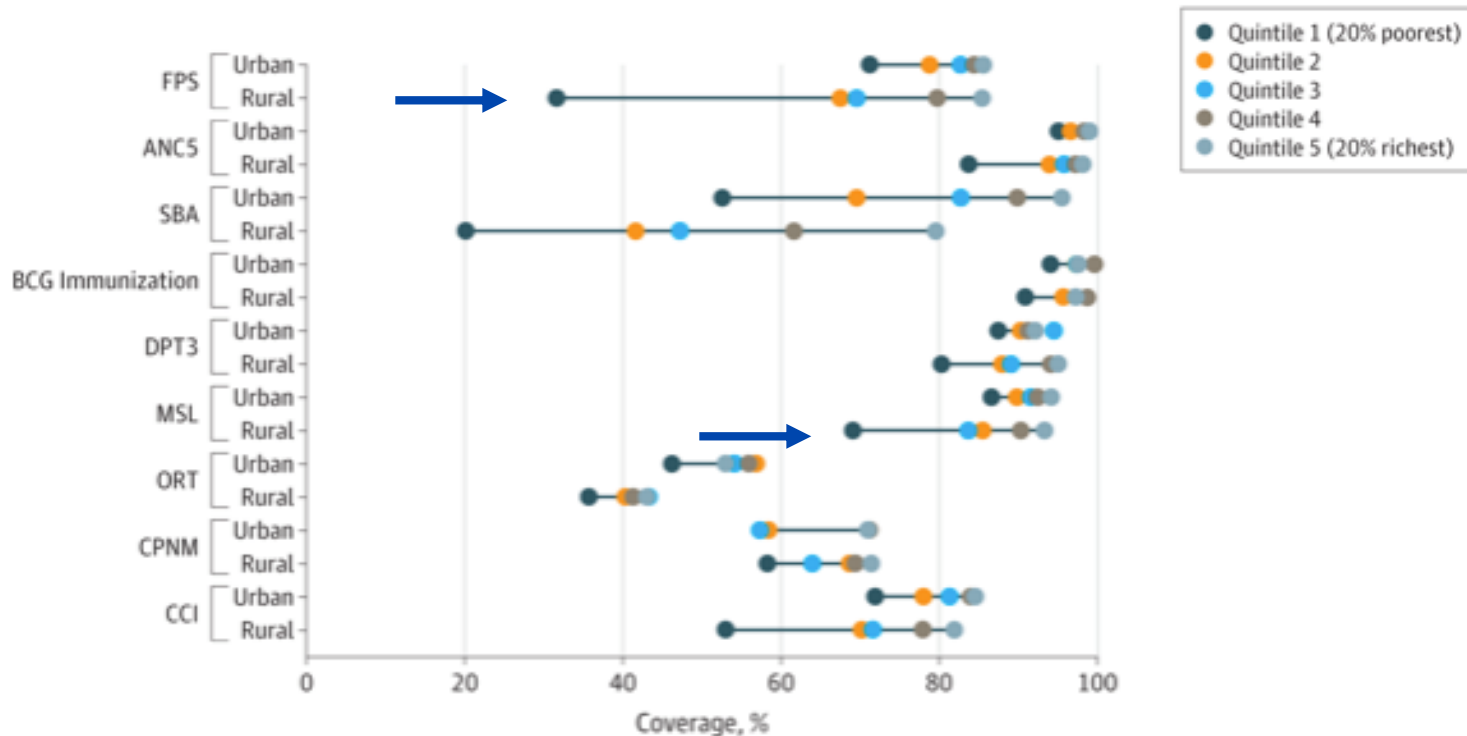
## Patterns of Inequality by Wealth Quintile



- Coverage improving over time, with the exception of FULL
- Most interventions demonstrate a bottom inequality pattern
- Top inequality: CPNM and ANCS4
- Linear inequality: SBA
- ANCS and DPT3 show best combination of high coverage and least inequalities (2014)

# Results

## Patterns of Inequality by Urban/Rural Residence (2014)

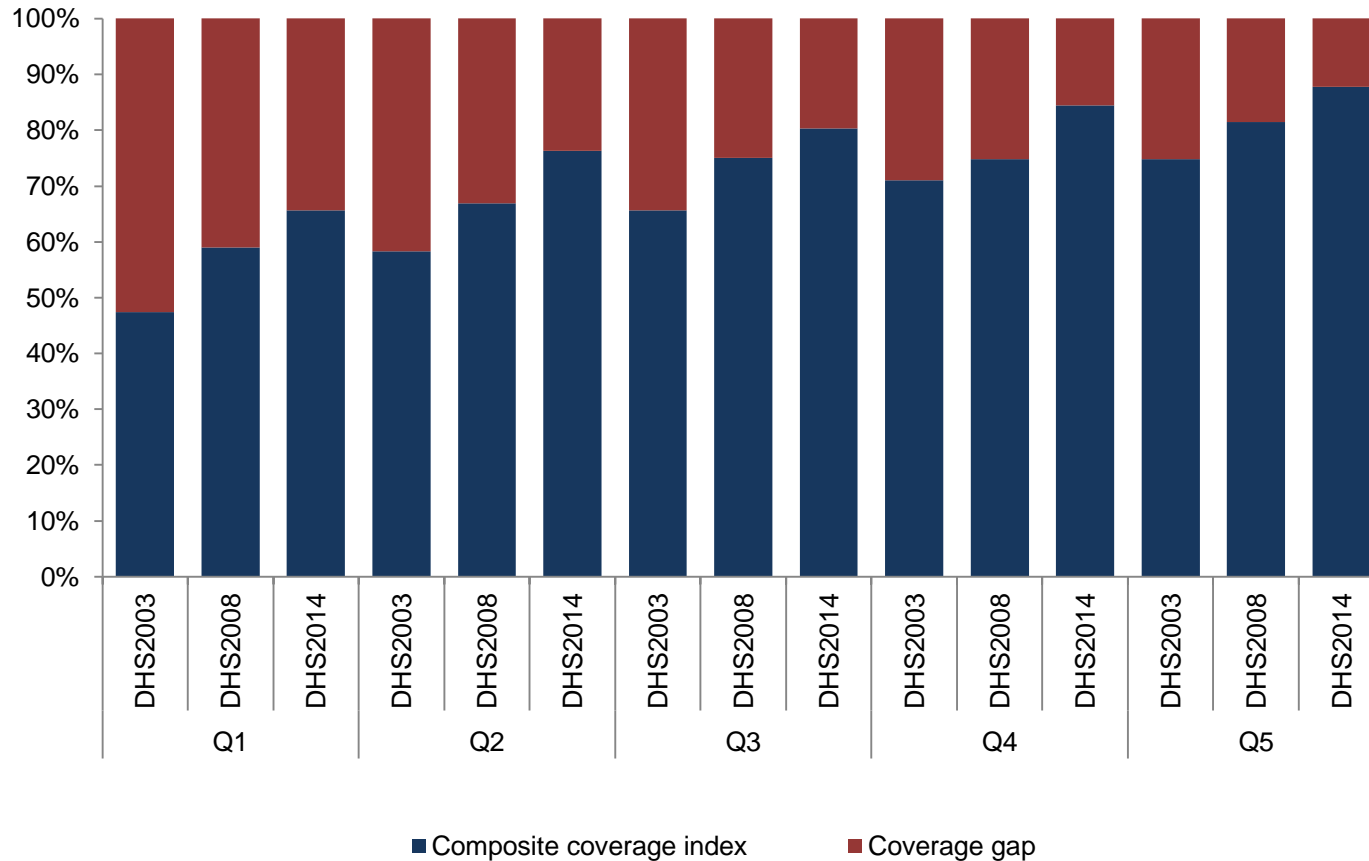


- Bottom inequality that is pronounced for FPS and MSL in rural populations
- Coverage from Q2 to Q5 similar in urban and rural settings (with the exception of SBA and ORT) → “urban advantage” gone
- Targeting of poorest populations everywhere



# Results

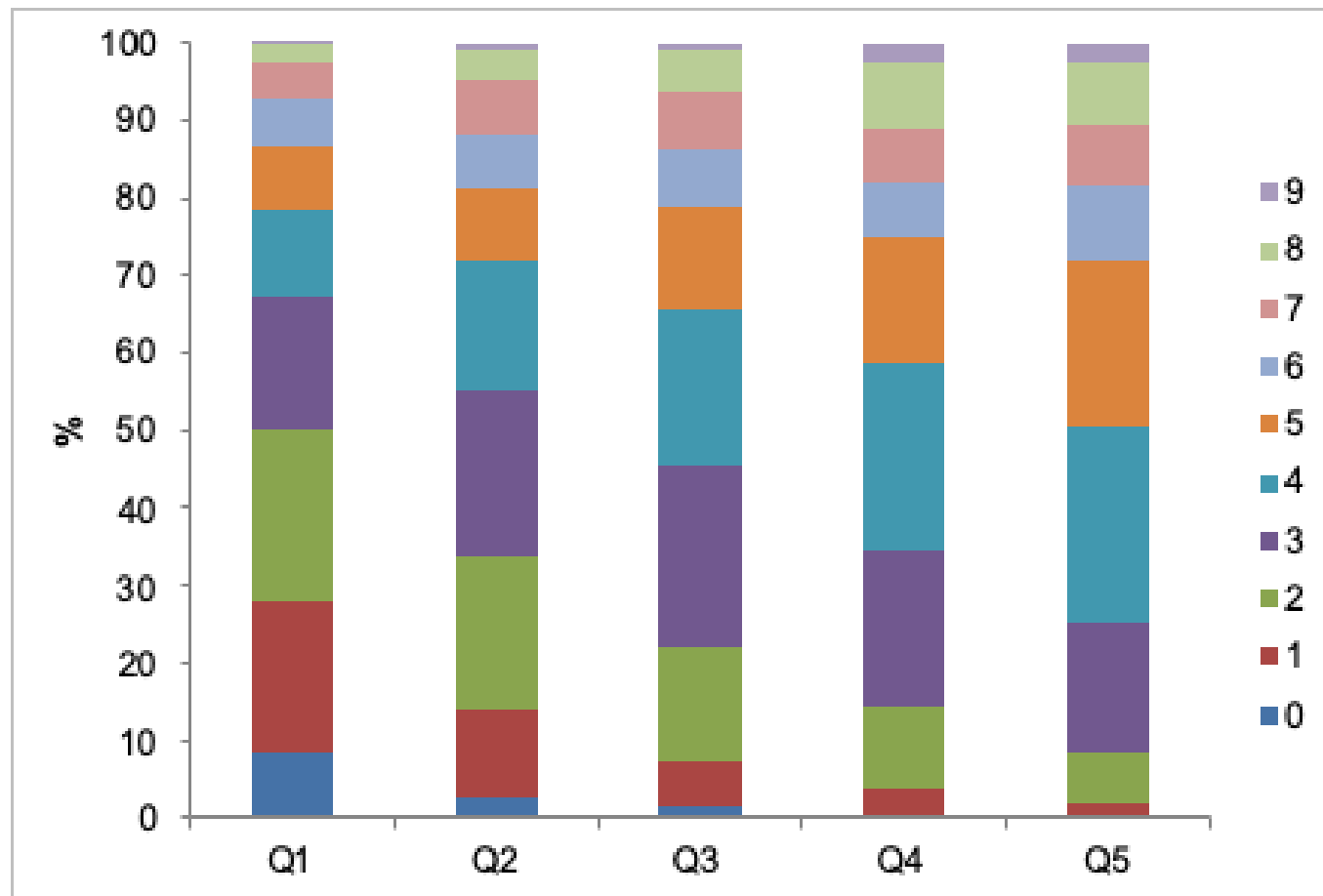
## Composite Coverage Index and Coverage Gap



- CCI coverage gaps declined over time in each wealth quintile
- In 2014, gaps across Q1 to Q5: 34%, 24%, 20%, 16%, 12%
- To reach universal coverage, will need to target the poorest

## Results

**Co-Coverage: % of mother/child pairs receiving 0-9 interventions**



- **Q1: 50% received  $\leq 2$  interventions and 10% received none**
- **Q5: 7% received  $\leq 2$  interventions and everyone received at least 1 intervention**
- **Receipt of all 9 interventions was low overall (2.5% among the richest)**

# Results

## Regional Inequalities: Coverage by Region

Region	% (95% CI)		
	Skilled Birth Attendance	Measles	Co-coverage ( $\geq 6$ Preventive Interventions) <sup>a,b</sup>
Coast	58.24 (52.68-63.80)	86.61 (82.56-90.67)	23.09 (20.37-25.82)
North eastern	32.36 (23.57-41.14)	69.85 (61.65-78.04)	10.06 (7.69-12.43)
Eastern	63.30 (58.76-67.83)	92.09 (88.79-95.39)	22.21 (19.71-24.72)
Central	89.73 (87.62-91.83)	97.16 (95.34-98.98)	27.27 (23.53-31.01)
Rift Valley	51.27 (47.83-54.70)	83.14 (80.57-85.72)	16.51 (15.11-17.91)
Western	47.79 (43.83-51.75)	85.74 (80.93-90.55)	20.97 (18.87-23.07)
Nyanza	65.04 (61.20-68.88)	85.26 (81.66-88.86)	21.77 (19.42-24.12)
Nairobi	89.10 (84.71-93.49)	92.52 (87.85-97.19)	26.13 (22.23-30.04)

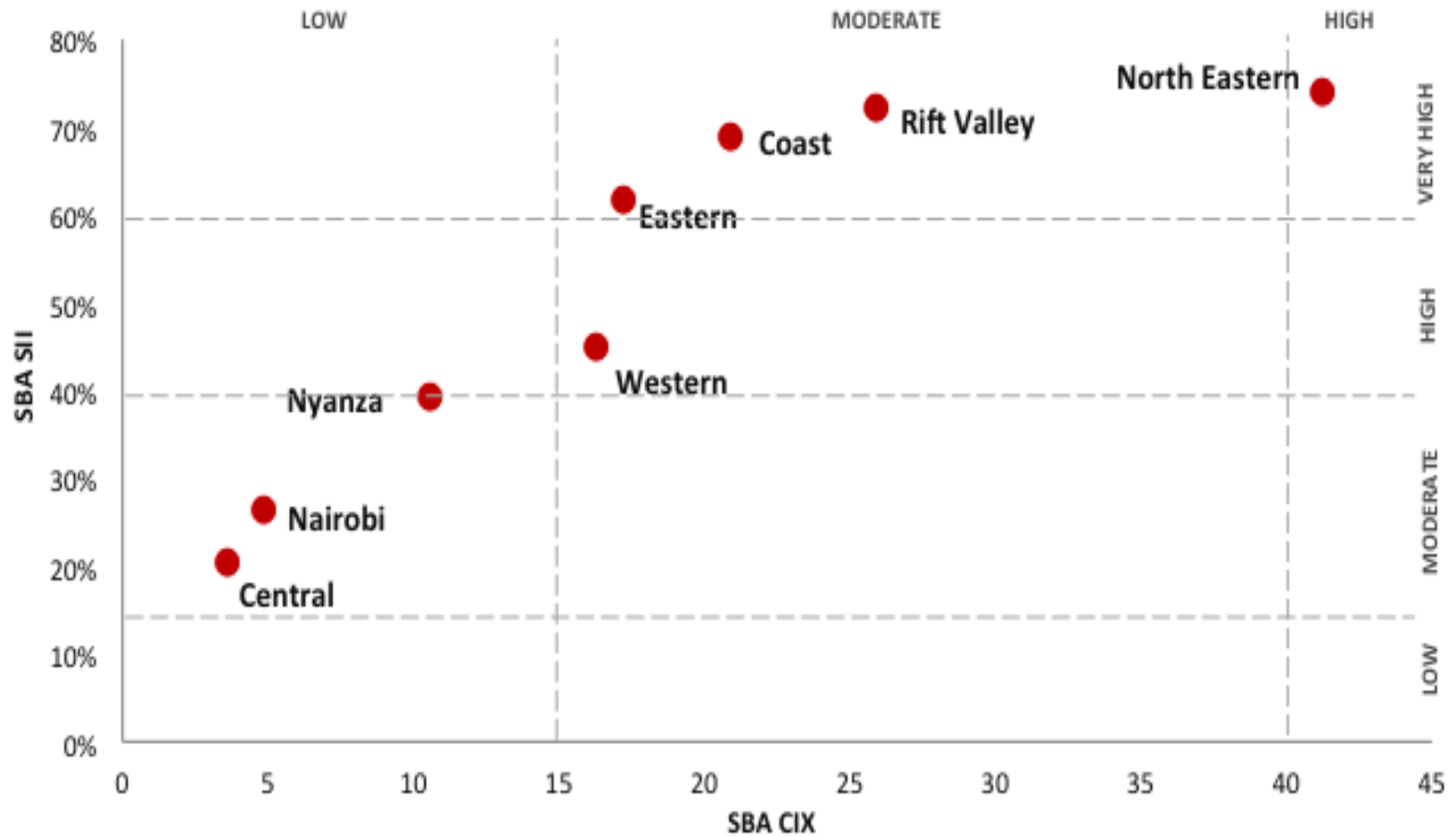
Estimates presented as means with 95% confidence intervals.

- **CC6+ low across all regions (10%-27%)**
- **MSL coverage high ( $\geq 83\%$ ), but lagged in North Eastern region (70%)**
- **SBA variable, ranging from 32% in North Eastern region to 90% in Central and Nairobi regions**



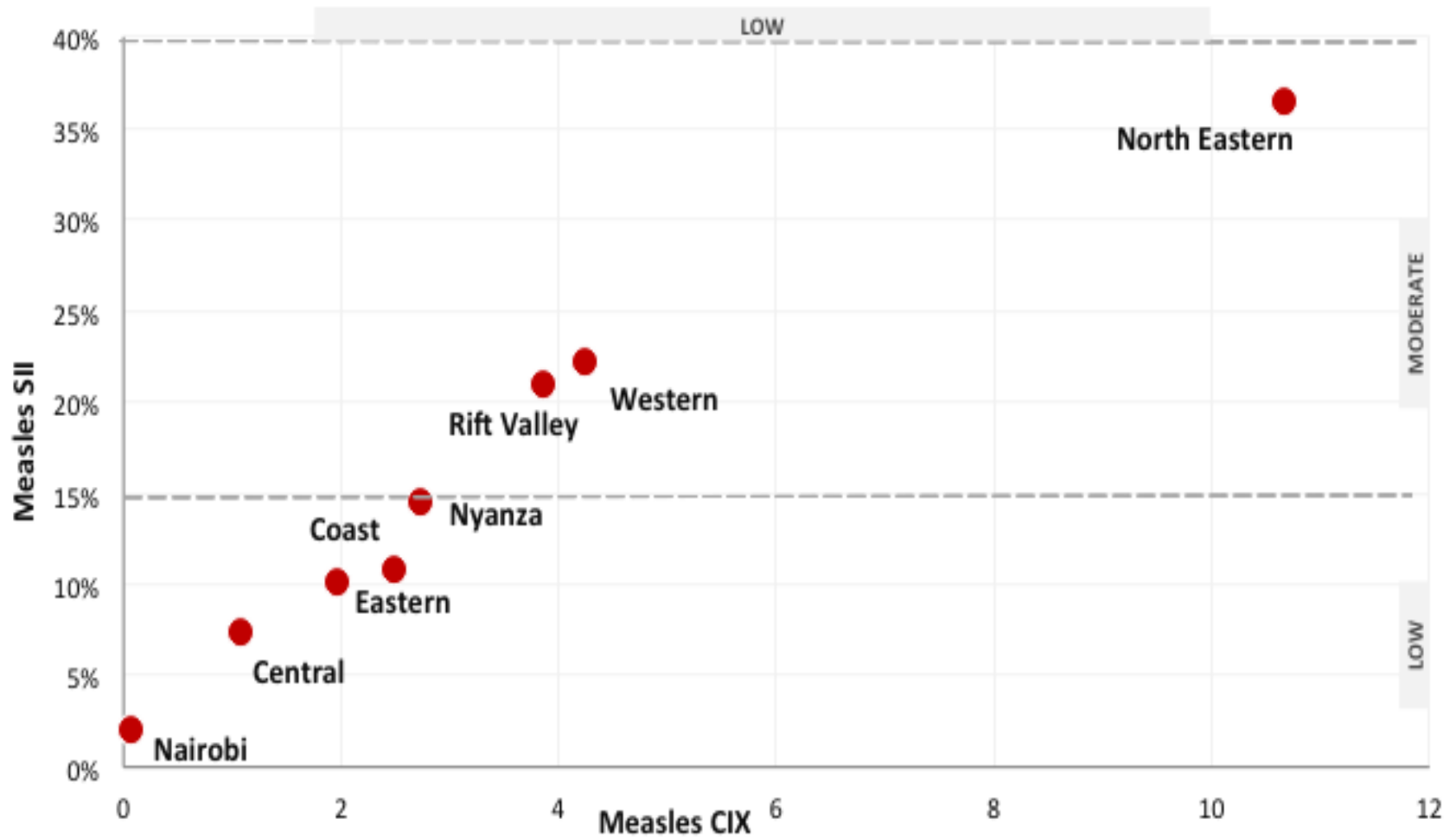
# Results

## SBA: SII vs CIX by Region



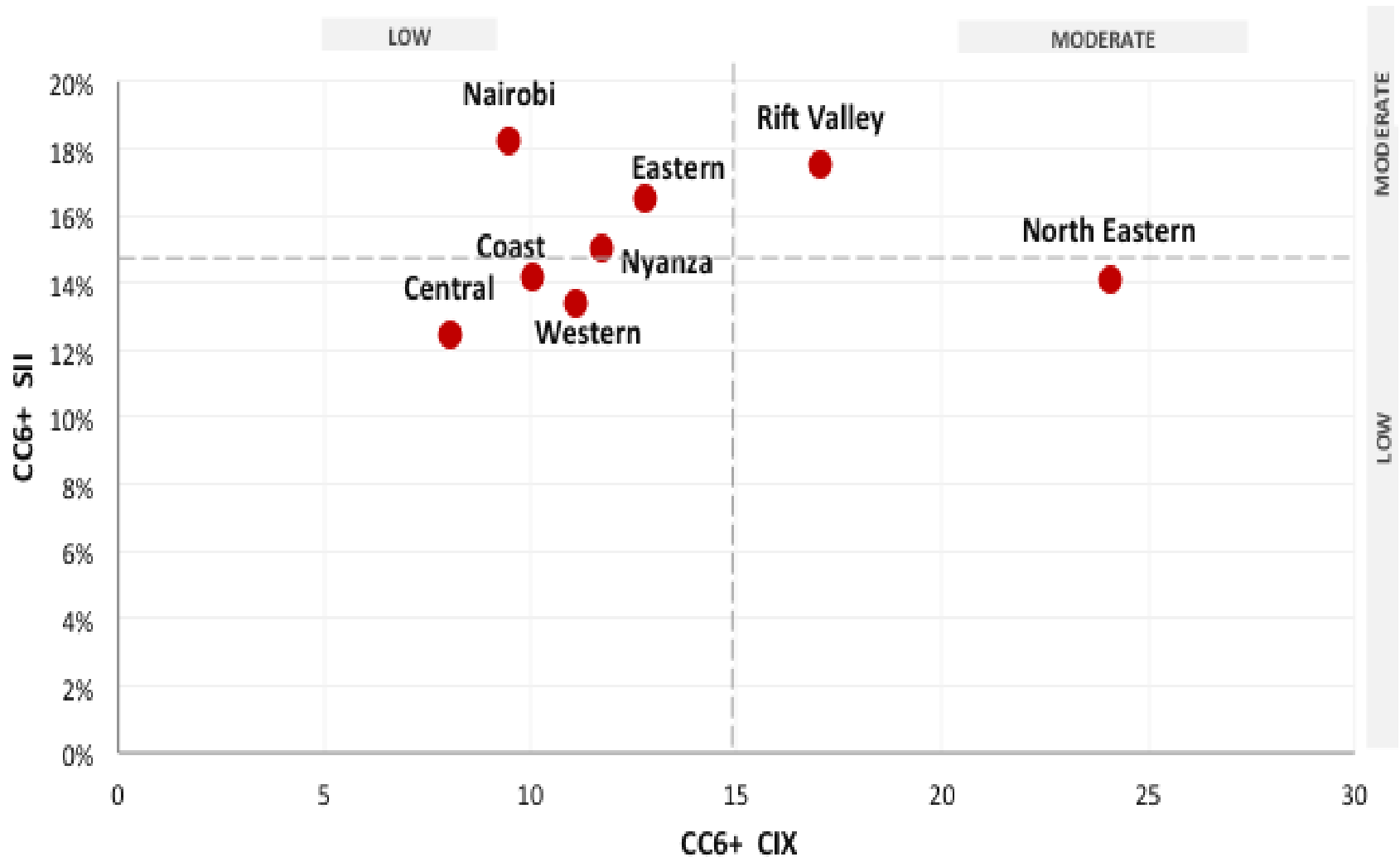
# Results

## Measles: SII vs CIX by Region



# Results

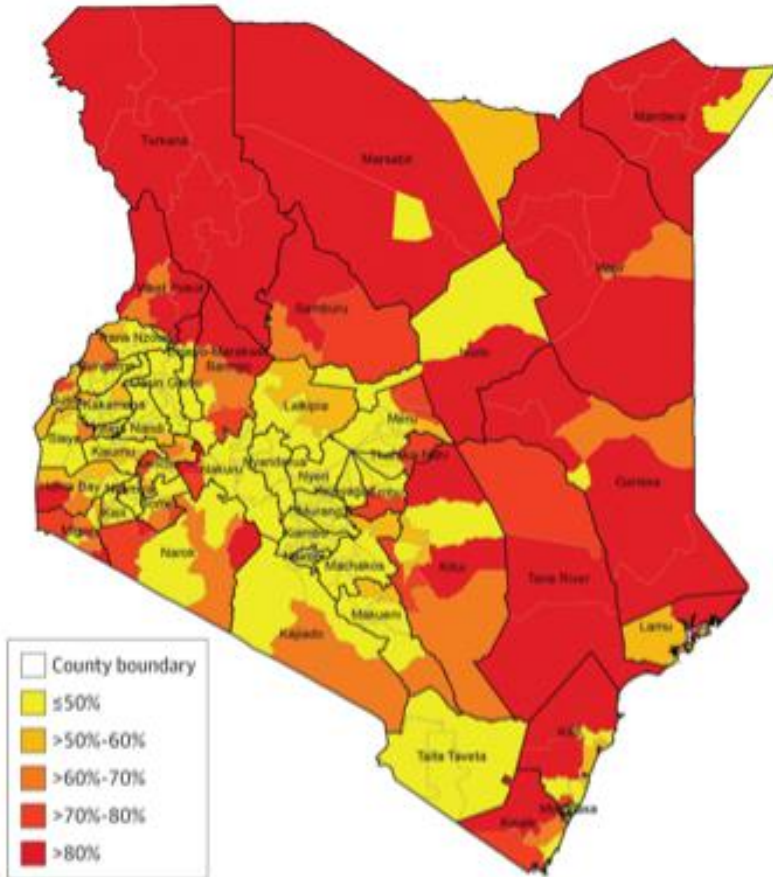
## Co-Coverage (6+): SII vs CIX by Region



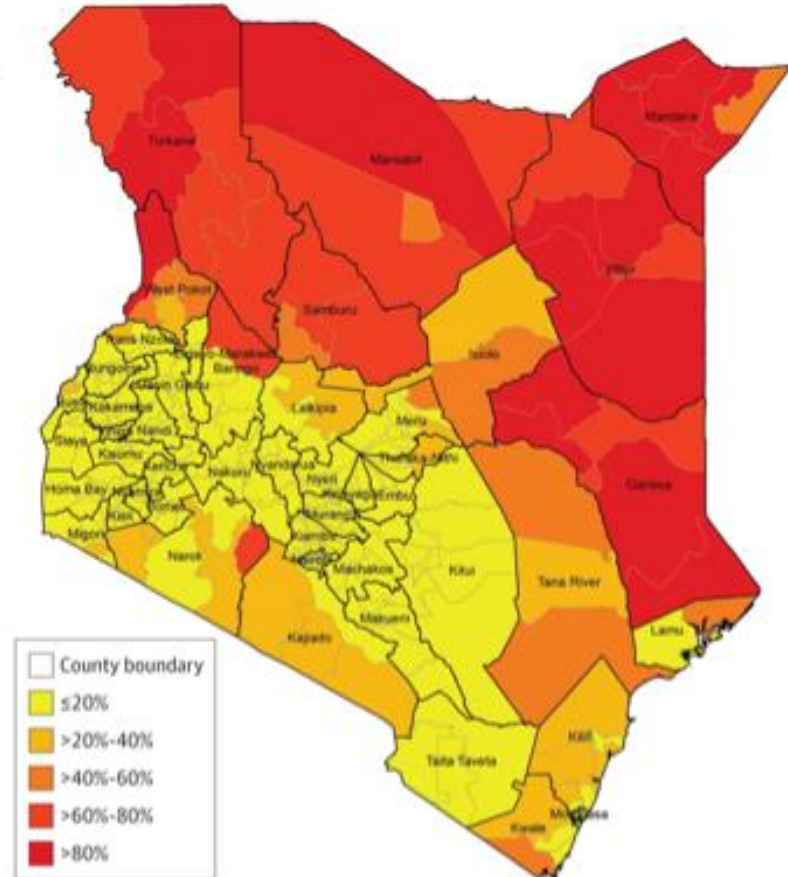
# Results

## Coverage at Sub-County Level

**A** Proportion of households in the 2 poorest wealth quintiles



**B** Proportion of illiterate women

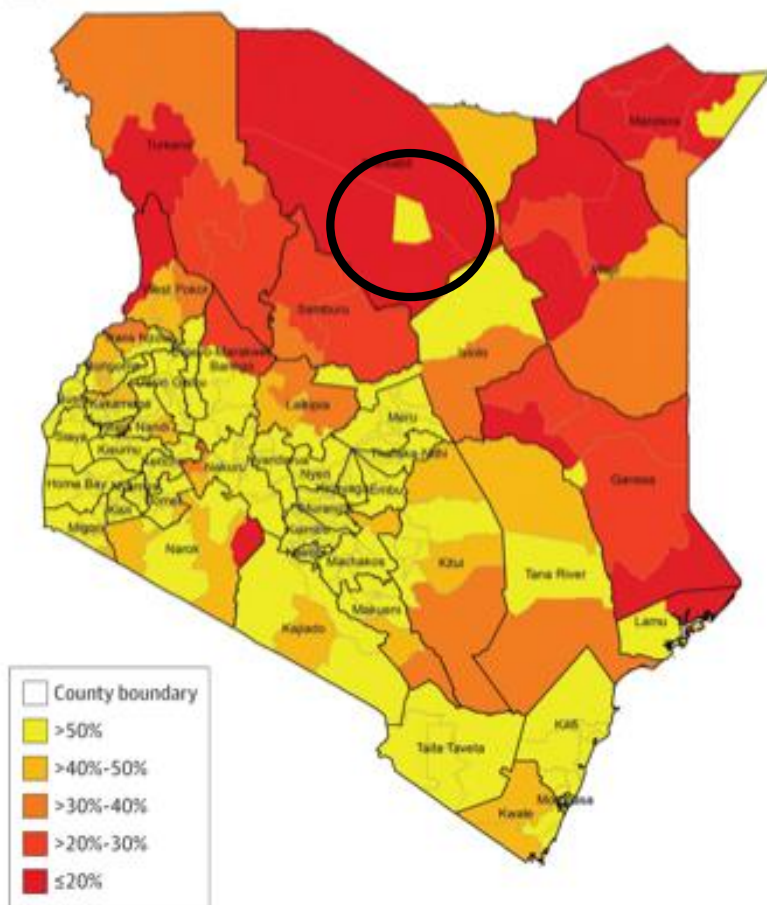


- Clear geospatial inequalities in wealth and literacy exist, and populations in the northern and eastern regions of Kenya are worse off

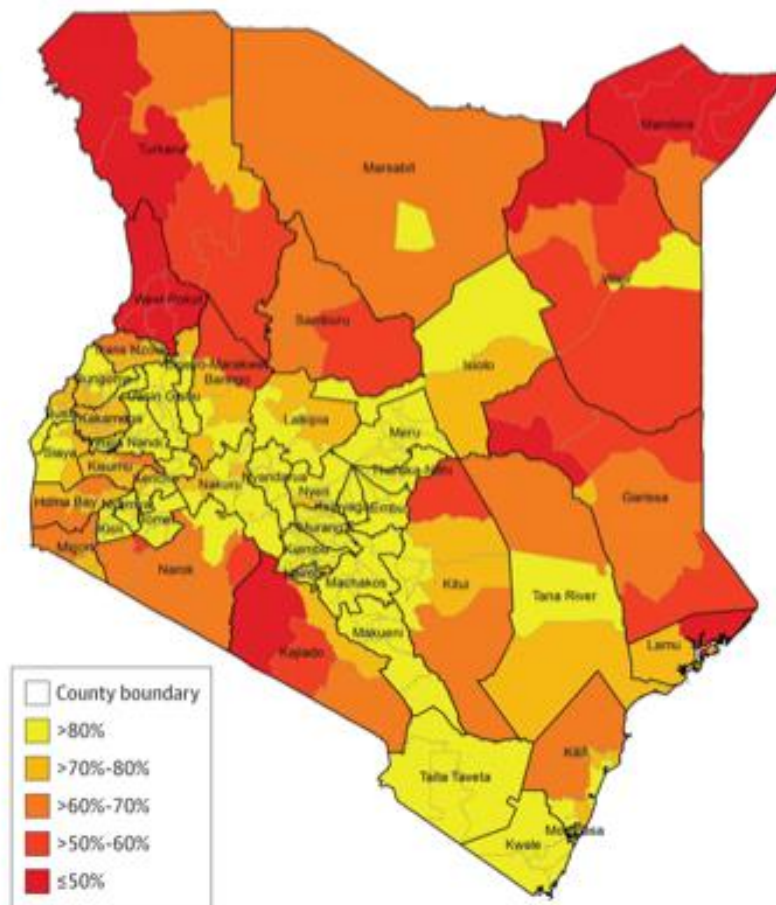
# Results

## Coverage at Sub-County Level

C Coverage of skilled attendant at birth



D Coverage of full immunization



- Same pattern overall, with more variation in intervention coverage by constituency



# Results

## Lives Saved Analysis

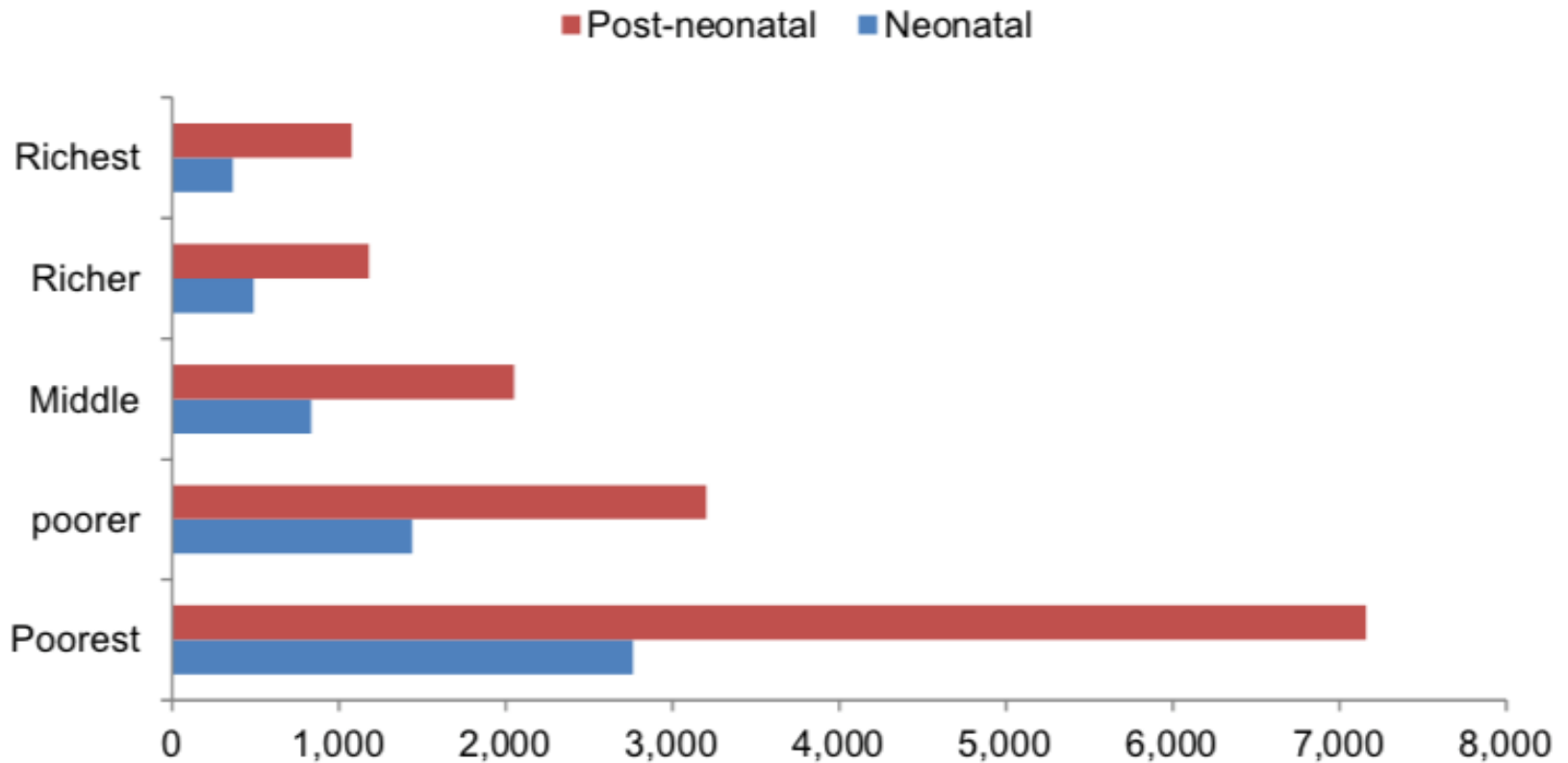
Child deaths prevented through scaling up community interventions, by wealth quintile. Scale up from baseline levels in 2014 to 90% by 2030.

	Intervention Type
1	ANC
2	Breastfeeding promotion
3	Complementary feeding promotion
4	Vitamin A supplementation
5	Promotion of hand washing practices
6	Chlorhexidine cord care
7	Thermal care
8	ITN and IRS for children under 5 years
9	ORS
10	Zinc for diarrhea treatment
11	Oral antibiotics for treatment of NN infections
12	Oral antibiotics for treatment of pneumonia
13	SAM management

# Results

## Lives Saved Analysis

Child deaths prevented through scaling up community interventions, by wealth quintile.



- **5884 neonatal deaths averted**
- **14,666 post-neonatal deaths averted**

# Summary

- Coverage improved from 2003 to 2014, but most RMNCAH interventions in Kenya demonstrated pro-rich and bottom inequality patterns
- Most inequitable:
  - Facility-based interventions such as skilled birth attendance, family planning services, and antenatal care (4+ visits)
- Least inequitable:
  - Breastfeeding and child vaccinations (though ANCS demonstrated the best combination of high coverage and low inequalities)

# Summary

- **Inequalities are highest in the northern and eastern regions and lowest in central and Nairobi**
- **Significant disparities noted for urban poor and especially poor, rural populations**
- **Variation in coverage occurs even at the sub-county level**
- **Community outreach interventions can reduce neonatal and child deaths, especially in the poorest populations**

# Conclusions

- **Though coverage has improved, wealth and geospatial inequalities are persistent**
- **For Kenya to achieve UHC, targeting should be strategic in order to reach the most vulnerable (i.e. urban slums, rural poor, and counties/constituencies in the northern and eastern regions)**
- **Integrated approaches to maternal health service delivery at the community level (where facility access is low) would be beneficial**
- **Next steps should look beyond wealth and geospatial inequalities to better understand additional population subsets: age, gender, ethnic groups/tribes, etc.**

# Acknowledgements

## Co-authors:

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**AKU: Zaid Bhatti, Arjumand Rizvi**

**Kenya: Dr. William Macharia, Dr. Anthony Ngugi**

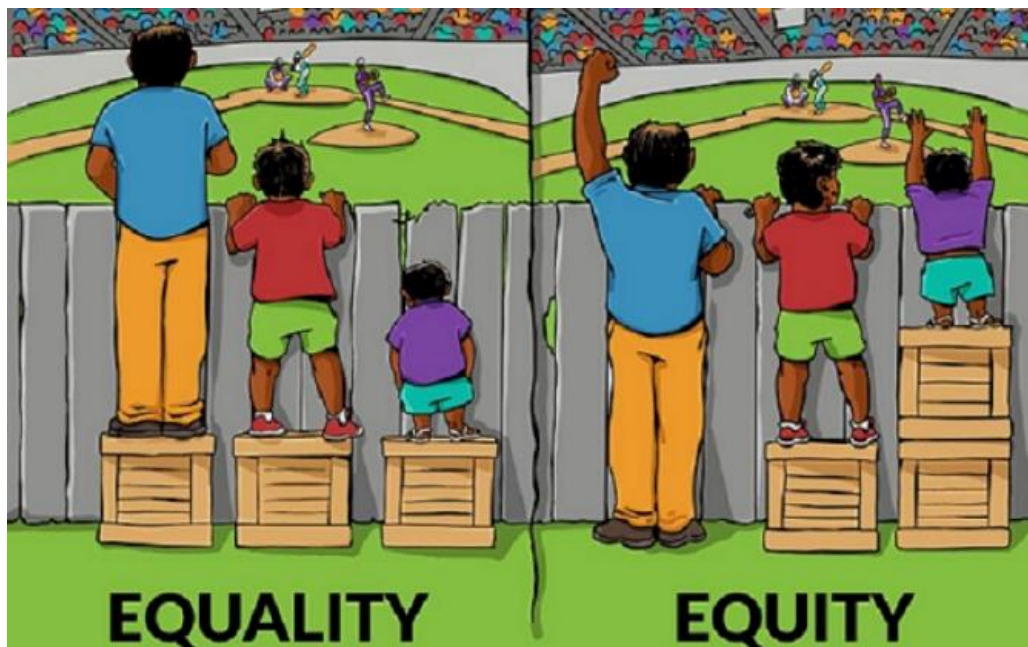
## Equity Analysis Support:

**Dr. Cesar Victora & Team**

**Countdown to 2015 and the Bill & Melinda Gates Foundation**



## Supplementary Slides



- Equality = equal sharing or division (in coverage or service access); can be measured
- Equity = degree of fairness or justice in a society
- Inequalities will increase pervasive societal inequities

# Supplementary Slides

## Indicator definitions:

Indicator		Definition
<b>FPS</b>	Family planning needs satisfied	Percentage of currently married fecund women who say that they do not want any more children or that they want to wait 2 or more years before having another child, and are using contraception (met need for contraception divided by the demand).
<b>ANCS</b>	Antenatal care visit by skilled provider	Proportion of mothers who were seen by a skilled health provider for at least one antenatal care visit during last pregnancy.
<b>ANC4</b>	4+ antenatal care visits	Proportion of mothers who had at least 4 antenatal care visits during last pregnancy.
<b>SBA</b>	Skilled birth attendant	Proportion of mothers who had their delivery assisted by a skilled health professional.
<b>EIBF</b>	Early initiation of breastfeeding	Proportion of newborns put to the breast in their first hour of life.
<b>ITNC</b>	Insecticide treated bed net for children	Proportion of children aged 0–59 months who slept under an ITN the night before the interview.
<b>DPT3</b>	DPT immunization	Proportion of children aged 12-23 months who received three doses of DPT vaccine.
<b>MSL</b>	Measles immunization	Proportion of children aged 12-23 months who received a dose of measles vaccine.



# Supplementary Slides

## Indicator definitions:

<b>FULL</b>	Fully immunized children	Proportion of children aged 12-23 months who received three doses of DPT and polio vaccines and one dose of BCG and measles vaccines.
<b>VITA</b>	Vitamin A supplementation	Proportion of children aged 6–59 months who received at least one high dose of vitamin A supplement in the previous six months.
<b>CPNM</b>	Care seeking for pneumonia	Proportion of children aged 0–59 months with suspected pneumonia taken to an appropriate health provider.
<b>ORT</b>	Oral rehydration therapy	Percentage of children aged 0–59 months with diarrhea in the previous two weeks who received oral rehydration therapy (packets of oral rehydration salts, recommended home solution, or increased fluids) and continued feeding.
<b>CCI</b>	Composite coverage index	<p>CCI is calculated as the weighted average of coverage of a set of eight preventive and curative interventions; it gives equal weight to four stages in the continuum of care: family planning, maternal and newborn care, immunization, and case management of sick children. The following expression is used to obtain the estimate: where FPS is demand for family planning satisfied, SBA is skilled birth attendant, ANCS is antenatal care with skilled provider, DPT3 is three doses of DPT vaccine, MSL is measles vaccination, BCG is BCG vaccination, ORT is oral rehydration therapy and continued feeding for children with diarrhoea, and CPNM is care seeking for children with suspected pneumonia.</p> $CCI = \frac{1}{4} \left( FPS + \frac{SBA+ANCS}{2} + \frac{2DPT3+MSL+BCG}{4} + \frac{ORT+CPNM}{2} \right)$

# Supplementary Slides

## Table 1: Coverage and Magnitude of Inequalities (2014)

Intervention	% (95% CI)			Difference (Q5 Minus Q1, Percentage Points)	Slope Index of Inequality, Percentage Points	Value Ratio (Q5:Q1)	Concentration Index ( $\times 100$ ), % (95% CI)
	Overall Coverage	Quintile 1 Coverage	Q5 Coverage				
Family planning needs satisfied	76.84 (75.31 to 78.38)	52.11 (47.93 to 56.28)	85.52 (82.86 to 88.18)	33.41 (31.90 to 34.93)	33.61 (28.51 to 38.70)	1.64	7.48 (6.31 to 8.65)
Antenatal care with a skilled provider	95.89 (95.40 to 96.36)	89.67 (88.08 to 91.25)	98.97 (98.40 to 99.54)	9.30 (8.29 to 10.32)	11.90 (9.49 to 14.32)	1.10	1.96 (1.62 to 2.29)
Antenatal care visits ( $\geq 4$ visits)	57.60 (56.20 to 59.00)	43.95 (41.46 to 46.45)	74.98 (73.01 to 76.95)	31.03 (30.5 to 31.55)	38.03 (34.40 to 41.65)	1.71	11.45 (10.31 to 12.59)
Skilled birth attendant	61.85 (59.89 to 63.81)	31.12 (28.29 to 33.95)	92.70 (91.35 to 94.05)	61.58 (60.10 to 63.06)	72.47 (69.65 to 75.29)	2.98	21.68 (20.47 to 22.88)
Early start of breastfeeding	29.74 (28.70 to 30.78)	31.41 (29.36 to 33.47)	28.16 (24.89 to 31.43)	-3.25 (-4.47 to -2.04)	-1.59 (-5.41 to 2.24)	0.90	-1.29 (-3.40 to 0.83)
DPT3 immunization	90.09 (88.72 to 91.47)	83.65 (80.73 to 86.58)	92.84 (89.26 to 96.42)	9.19 (8.53 to 9.84)	12.26 (6.67 to 17.85)	1.11	2.20 (1.23 to 3.18)
Measles immunization	87.08 (85.70 to 88.46)	76.36 (73.45 to 79.26)	93.06 (90.00 to 96.12)	16.7 (16.55 to 16.86)	22.94 (17.70 to 28.18)	1.22	4.23 (3.29 to 5.18)
Full immunization	71.34 (69.22 to 73.46)	61.99 (58.30 to 65.69)	73.15 (66.21 to 80.09)	11.16 (7.91 to 14.4)	15.33 (6.91 to 23.75)	1.18	3.76 (1.81 to 5.72)
Vitamin A in past 6 mo	71.74 (70.45 to 73.04)	64.26 (61.69 to 66.84)	76.44 (73.57 to 79.30)	12.18 (11.88 to 12.46)	15.37 (10.97 to 19.78)	1.19	3.79 (2.77 to 4.82)
Oral rehydration therapy	45.13 (42.36 to 47.90)	39.21 (35.29 to 43.13)	54.52 (47.00 to 62.04)	15.31 (11.71 to 18.91)	17.69 (9.41 to 25.96)	1.39	7.16 (4.20 to 10.12)
Care seeking for pneumonia	65.74 (62.69 to 68.79)	62.56 (57.40 to 67.71)	73.49 (65.35 to 81.62)	10.93 (7.95 to 13.91)	7.78 (-2.59 to 18.14)	1.17	2.03 (-0.56 to 4.61)
Composite coverage index	75.84 (62.26 to 84.98)	62.26 (61.28 to 63.22)	84.98 (84.04 to 85.91)	22.72 (22.76 to 22.68)	5.7 (2.2 to 9.1)	1.36	26.9 (21.7 to 32.1)

Abbreviations: DPT3, diphtheria-pertussis-tetanus; Q1, lowest quintile of household wealth; Q5, highest quintile of household wealth.