

## Variation in quality of primary-care services in Kenya, Malawi, Namibia, Rwanda, Senegal, Uganda and the United Republic of Tanzania

Margaret E Kruk,<sup>a</sup> Adanna Chukwuma,<sup>a</sup> Godfrey Mbaruku<sup>b</sup> & Hannah H Leslie<sup>a</sup>

**Objective** To analyse factors affecting variations in the observed quality of antenatal and sick-child care in primary-care facilities in seven African countries.

**Methods** We pooled nationally representative data from service provision assessment surveys of health facilities in Kenya, Malawi, Namibia, Rwanda, Senegal, Uganda and the United Republic of Tanzania (survey year range: 2006–2014). Based on World Health Organization protocols, we created indices of process quality for antenatal care (first visits) and for sick-child visits. We assessed national, facility, provider and patient factors that might explain variations in quality of care, using separate multilevel regression models of quality for each service.

**Findings** Data were available for 2594 and 11 402 observations of clinical consultations for antenatal care and sick children, respectively. Overall, health-care providers performed a mean of 62.2% (interquartile range, IQR: 50.0 to 75.0) of eight recommended antenatal care actions and 54.5% (IQR: 33.3 to 66.7) of nine sick-child care actions at observed visits. Quality of antenatal care was higher in better-staffed and -equipped facilities and lower for physicians and clinical officers than nurses. Experienced providers and those in better-managed facilities provided higher quality sick-child care, with no differences between physicians and nurses or between better- and less-equipped clinics. Private facilities outperformed public facilities. Country differences were more influential in explaining variance in quality than all other factors combined.

**Conclusion** The quality of two essential primary-care services for women and children was weak and varied across and within the countries. Analysis of reasons for variations in quality could identify strategies for improving care.

Margaret E. Kruk, MD, MPH  
Associate Professor of Global Health  
Harvard T.H. Chan School of Public Health

# Study aims

- To describe variation in observed clinical quality of two primary care – antenatal care and care for sick children – in 7 countries
- To analyze the factors that explain variation

Understanding unnecessary variation in quality of care can yield insights into appropriate targets of intervention

# Study sample

- Nationally representative health system surveys were conducted using comparable tools in Kenya, Malawi, Namibia, Rwanda, Senegal, Uganda, and the United Republic of Tanzania between 2006 and 2015
- Facility audit, provider interviews, and direct observation of clinical care
- First antenatal care visits and all sick child visits at non-hospital health facilities

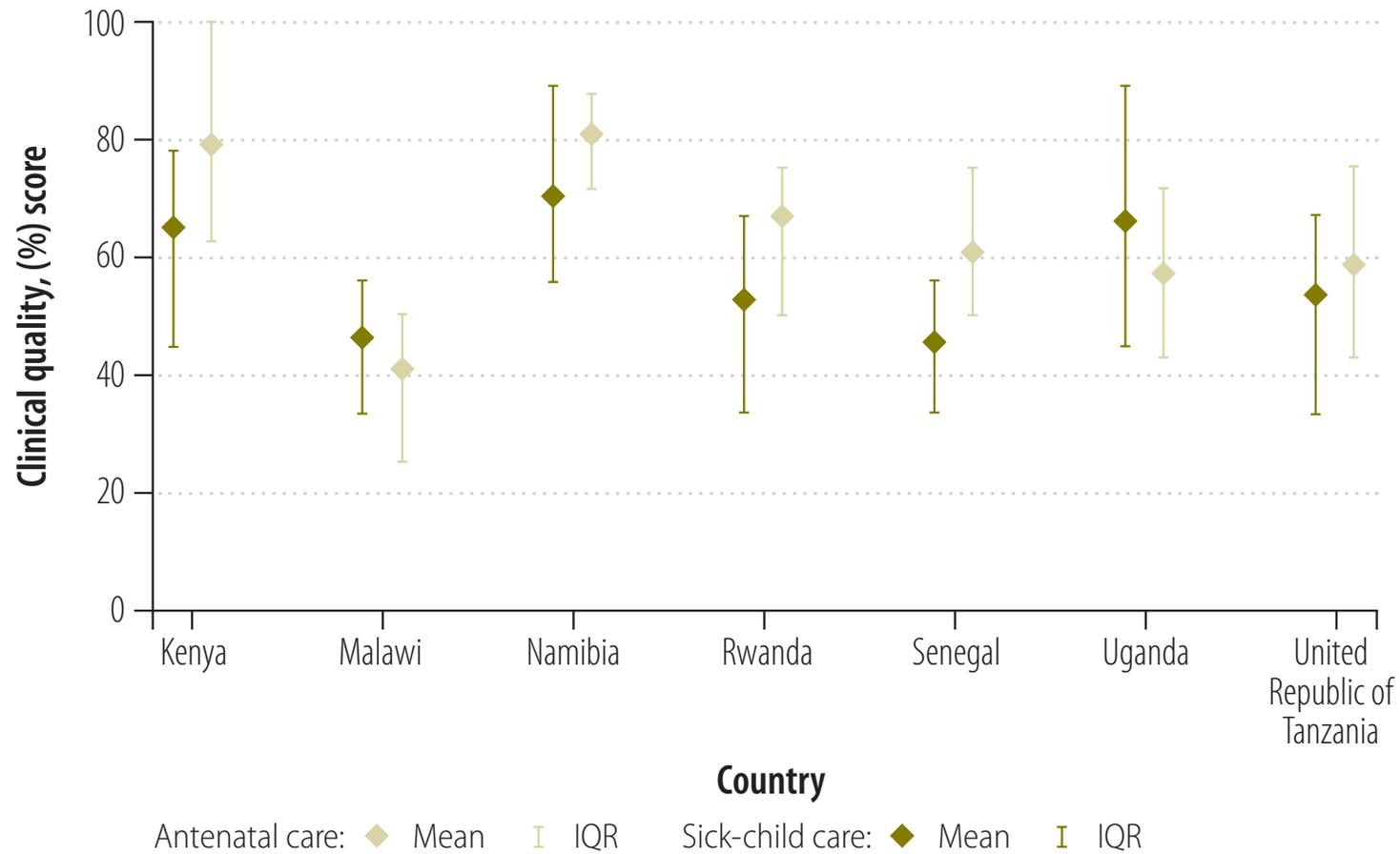
# Methods

- Clinical quality: proportion of essential clinical actions completed out of 8 items for ANC and 9 items for sick-child care in the domains of history, examination, diagnostic tests, and counseling and management
- Multilevel random intercept model (visits within facilities) of quality with country fixed effects as well as facility, provider, and visit-level factors

# Results

- 2,638 ANC visits, 11,814 sick child visits
- 80% public facilities
- 75% of ANC visits and 49% sick-child visits to nurses
- Facilities scoring between 50% and 75% on inputs to quality care (infrastructure, equipment, management)
- Average quality: 62.2% in ANC, 54.5% in sick-child care

# Highly variable care



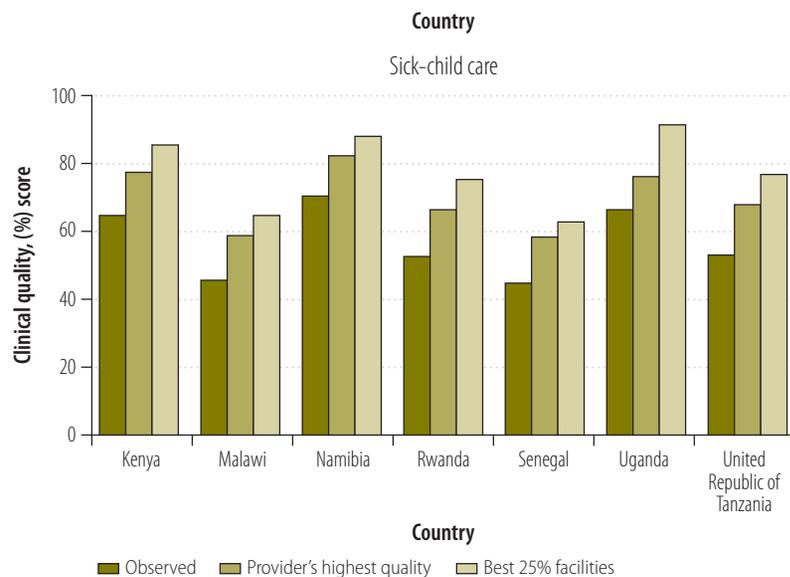
# Full models

Characteristic	Quality coefficient <sup>a</sup> (95% CI)				
	Antenatal care ( <i>n</i> = 2173) <sup>b</sup>	Sick-child care ( <i>n</i> = 10 646) <sup>b</sup>			
<b>Visit variables</b>					
Afternoon visit	-0.2 (-1.8 to 1.3)	-0.5 (-1.5 to 0.4)			
Educational attainment above secondary school	0.6 (-0.9 to 2.1)	-0.9 (-1.7 to -0.03)			
First antenatal visit ≥ 24 weeks	-1.6 (-2.7 to -0.5)	N/A			
Teenage antenatal patient	-1.9 (-3.5 to -0.4)	N/A			
Age of sick child					
< 12 months	N/A	2.0 (1.4 to 2.7)			
12–60 months	N/A	Ref.			
Complaints per sick child	N/A	2.6 (2.3 to 2.8)			
<b>Provider variables</b>					
Cadre					
Physician/clinical officer	-8.3 (-13.4 to -3.1)	0.7 (-1.3 to 2.6)			
Nurse/midwife	Ref.	Ref.			
Nursing assistant/aide/other	-3.2 (-6.8 to 0.5)	-3.1 (-5.0 to -1.2)			
Graduated > 5 years before	-1.2 (-3.6 to 1.3)	1.8 (0.6 to 3.1)			
Supportive environment	-2.8 (-7.3 to 1.7)	0.3 (-2.1 to 2.7)			
<b>Facility variables</b>					
Managing authority					
Government			Ref.		Ref.
Private			4.5 (1.2 to 7.8)		3.0 (1.4 to 4.7)
Services in facility (natural log of service count)			2.0 (-4.4 to 8.4)		-0.2 (-2.8 to 2.5)
Staff per bed (natural log of staff per bed)			2.9 (1.0 to 4.7)		0.2 (-0.8 to 1.1)
Infrastructure index			9.8 (0.7 to 18.8)		2.9 (-2.0 to 7.8)
Equipment index			16.5 (8.5 to 24.4)		2.6 (-0.1 to 5.3)
Management index			-1.9 (-9.3 to 5.6)		4.9 (1.2 to 8.7)
<b>Country</b>					
Kenya			33.4 (28.4 to 38.4)		15.7 (12.6 to 18.8)
Malawi			Ref.		Ref.
Namibia			32.5 (27.8 to 37.1)		26.0 (23.4 to 28.7)
Rwanda			23.2 (18.6 to 27.9)		6.5 (3.9 to 9.1)
Senegal			18.8 (13.5 to 24.0)		1.2 (-1.2 to 3.6)
Uganda			14.4 (9.2 to 19.6)		22.1 (18.8 to 25.3)
United Republic of Tanzania			18.5 (13.4 to 23.7)		8.9 (6.4 to 11.4)
<b>Intercept</b>					
			22.4 (3.1 to 41.7)		30.0 (22.5 to 37.5)

# Facility, provider, visit factors explained limited amount of variation

- 19% of variation in ANC and 41% in sick-child care due to within-provider differences in care
- Full models explained only 37% of variance in ANC and 20% in sick-child care; over 80% of explained variance due to country fixed effect.
- ANC quality was lower among physicians and clinical officers, higher in private clinics and in facilities with better infrastructure and equipment.
- But being in Uganda was linked to 30% better care while better infrastructure was associated with 3% better care

# Discussion



- Understand why countries produce such different levels of quality
- How to standardize sick child care among providers
- Assess best performers

# Quality measures

Type of service	Clinical action by health-care provider
<b>Antenatal care</b>	
History	<ul style="list-style-type: none"> <li>– Asks <math>\geq 1</math> question on pregnancy history<sup>a</sup></li> <li>– Asks <math>\geq 1</math> question about danger signs in pregnancy</li> </ul>
Examination	<ul style="list-style-type: none"> <li>– Measures blood pressure</li> <li>– Measures weight</li> </ul>
Diagnostic tests	<ul style="list-style-type: none"> <li>– Performs or refers for anaemia test</li> <li>– Performs or refers for urine test</li> </ul>
Counselling and management	<ul style="list-style-type: none"> <li>– Prescribes or gives tetanus toxoid injection</li> <li>– Counsels about danger signs in pregnancy</li> </ul>
<b>Sick-child care</b>	
History	<ul style="list-style-type: none"> <li>– Asks <math>\geq 1</math> question on infant feeding or drinking</li> <li>– Asks about diarrhoea or vomitin</li> <li>– Asks about fever or seizures</li> <li>– Asks about cough</li> </ul>
Examination	<ul style="list-style-type: none"> <li>– Measures weight</li> <li>– Measures temperature</li> </ul>
Counselling and management	<ul style="list-style-type: none"> <li>– States diagnosis</li> <li>– Counsels about food intake</li> <li>– Counsels about danger signs for return consultation</li> </ul>

<sup>a</sup> Excluding primiparous women.