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# WHO/ISI Special Topic Meeting “Measuring health workforce inequalities: methods and applications”

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Till Bärnighausen  
Harvard School of Public Health, Boston  
Africa Centre for Health and Population Studies, Mtubatuba  
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# Outline

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- **Motivation**
  - Papers
  - Discussion points
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# Average health worker densities and population health outcomes

- **Mortality:** controlling for national per capita income, income poverty, female adult literacy and nurse density – a 10% increase in physician density leads to a
  - 3.25% decrease in maternality ( $p < 0.0001$ )
  - 2.25% decrease in under-5 mortality ( $p < 0.0001$ )
  - 1.83% decrease in infant mortality ( $p < 0.0001$ )
- **Underweight prevalence:** controlling for female adult literacy, nurse density, and access to an improved watersource – a 10% increase in doctor density leads to a
  - 1.93% decrease in underweight prevalence, net of PPP\$1-a-day poverty ( $p = 0.0406$ )
  - 2.28% decrease in underweight prevalence, net of PPP\$2-a-day poverty ( $p = 0.0104$ )
- **Vaccination coverage:** controlling for national per capita income, female adult literacy, land area and physician density – a 10% increase in nurse density leads to a
  - 3.20% increase in MCV coverage ( $p = 0.0097$ )
  - 3.70% increase in DTP3 coverage ( $p = 0.0083$ )
  - 3.80% increase in Polio3 ( $p = 0.0089$ )

Sources: Anand and Bärnighausen 2004, 2007, 2009; MCV = measles-containing vaccine, DTP = diphtheria-tetanus-pertussis

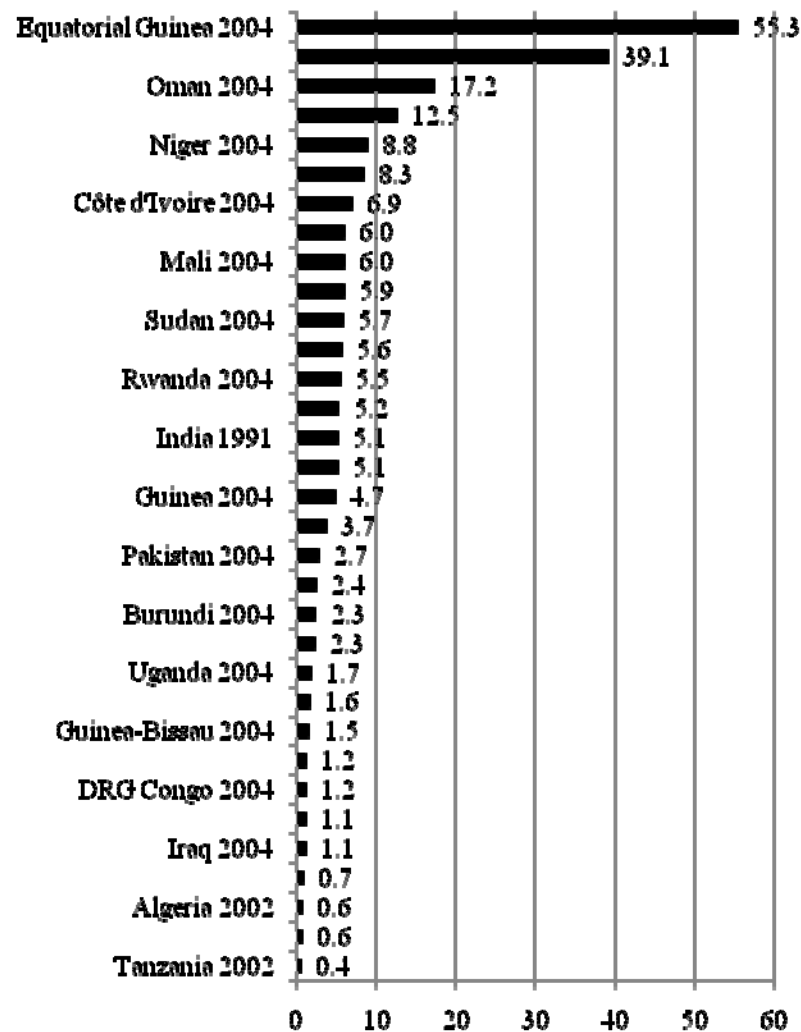
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# Unequal distributions

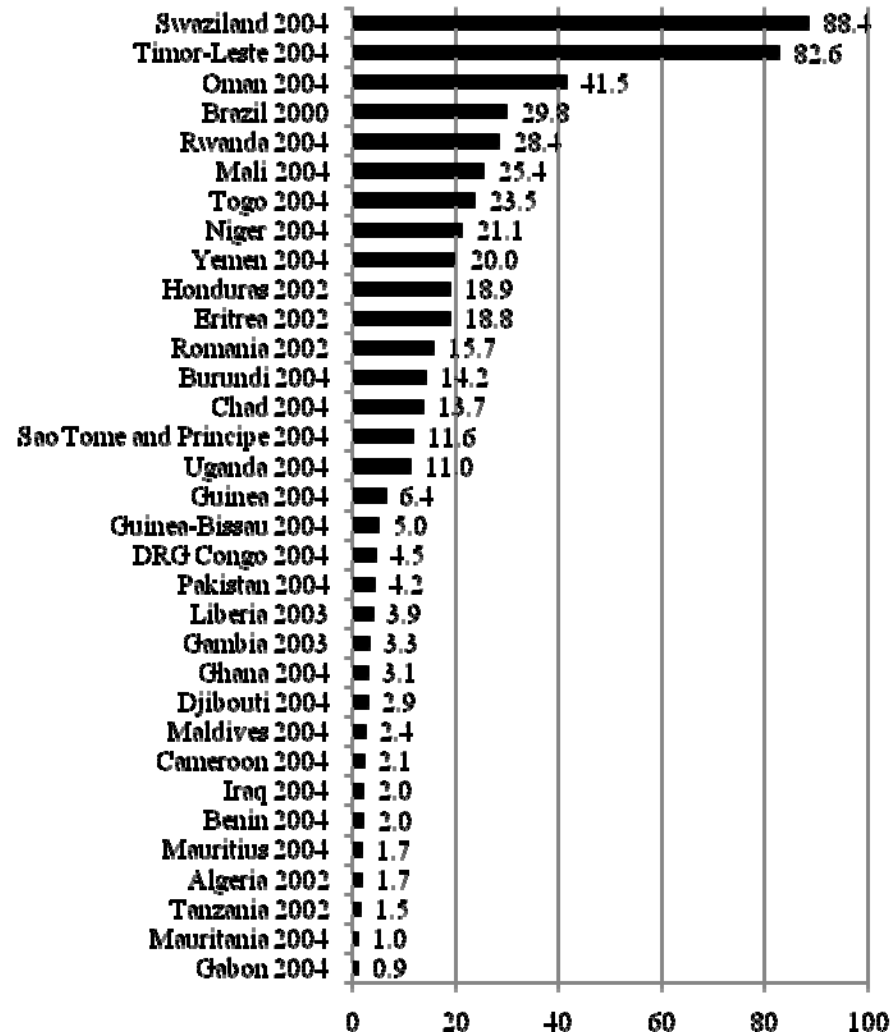
- Regional
- Demographics
- Skill level and experience

# Urban-to-rural HRH-to-population ratios

## Nurses



## Doctors



Sources: WHO *Global Atlas of the Health Workforce* 2009; Bärnighausen & Bloom, *NBER WP # 15168*, 2009 <http://www.nber.org/papers/w15168.pdf>

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# Data sources

- Population census
- Routine national reporting systems
- National sample surveys
  - Labour force surveys
  - Household surveys
- Facility-based assessment

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# Goal of the Special Topic Meeting

- “To promote statistical discourse on measuring health workforce inequalities and the implications for policy and planning”

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# Descriptives

- Almeida, Vieira, Moreno and Candeias
  - Brazil
  - Household sample survey (PNAD)
  - Relationship between individual characteristics and worker position (technician vs. professional)
- Nigenda, Idrovo and Méndez
  - Mexico
  - Labour force survey (ENOE)
  - HRH wastage
- Kitaw and Hailemariam
  - Ethiopia
  - Routine national reporting system
  - Unweighted vs. education-weighted HRH population densities

# Findings: Almeida et al.

## Logistic regression: Technician vs. professional

<b>Coefficients</b>	<b>Estimate</b>	<b>Std. Error</b>	<b>z value</b>	<b>Pr(&gt; z )</b>
Intercept	2.0349	0.5409	3.7620	0.0002
Schooling: Elementary School	-	-	-	-
Schooling: High School	1.8733	0.5894	3.1780	0.0015
Schooling: Graduate	-2.5597	0.5550	-4.6120	0.0000
Schooling: Master or Doctor	-4.3159	1.1795	-3.6590	0.0003
Income	-0.0004	0.0001	-3.2010	0.0014
Job Sector: Private	-	-	-	-
Job Sector: Public	0.6502	0.2054	3.1660	0.0015

# Findings: Nigenda et al.

## Predictors of labor wastage among physicians, nurses, dentists and pharmacists

Variable	OR	95% CI	
Sex			
Male	1		
Female	1.58	1.20	2.07
Age (years)	0.77	0.72	0.82
Age <sup>2</sup> (years)	1.00	1.00	1.01
Household role			
Head of household	1		
Spouse	2.26	1.66	3.07
Other	1.67	1.24	2.26
Marital status			
Married	1		
Divorced	1.29	0.88	1.89
Single	1.25	0.88	1.79
Number of children			
None	1 <sup>†</sup>		
One	1.26	0.91	1.74
Two	1.87	1.34	2.61
Three or more	2.09	1.48	2.94
Migrant			
No	1		
Yes	1.04	0.86	1.25
Size of city or town of residence			
More than 100,000 inhabitants	1		
Between 15,000 and 99,999 inhabitants	0.67	0.51	0.90
Between 2,500 and 14,999 inhabitants	0.92	0.64	1.32
Less than 2,500 inhabitants	1.48	0.94	2.34
Education			
Undergraduate degree only	1		
Postgraduate degree	0.45	0.33	0.61
Profession			
Physician	1		
Dentist	1.95	1.55	2.46
Nurse	0.85	0.67	1.07
Pharmacobiological chemist (pharmacist)	3.55	2.70	4.65
OR: Odds ratios obtained from multiple logistic regression model.			
<sup>†</sup> p for trend <0.05			

# Findings: Kitaw and Hailemariam

## HRH per 1,000 population

	A	B	C	D
Addis Ababa	0.70	0.74	0.65	0.40
Tigray	0.53	0.81	0.62	0.29
Ethiopia	0.27	0.56	0.42	0.19
Amhara	0.11	0.51	0.35	0.12

### Numerators

A : doctors + nurses + midwives

B: A + health assistants + health extension workers + frontline workers

C: B weighted by total years of education (basic education + professional training)

D: B weighted by years in professional training

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# Technical questions

- Data quality
- Sampling frame
- HRH definitions
- Causal inferences

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# Goal of the Special Topic Meeting and mission of WHO HRH Department

- “To promote statistical discourse on measuring health workforce inequalities and the implications for policy and planning”
- “To provide equitable access for all people to an adequately trained, skilled and supported health workforce to contribute towards the attainment of the highest possible level of health”

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# Inequality vs. inequity

- Implicit norms
  - Almeida et al.: adequacy of worker position?
  - Nigenda et al.: elimination of wastage?
  - Kitaw and Hailemariam: equality of population density?
- Rationale for implicit norms
  - Evidence/theory
  - Outcomes
  - Dimensions

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# Interventions

- Almeida et al.
  - Improved opportunities for workers employed below education status
  - Improved education opportunities for women
- Nigenda et al.
  - Re-employment programs for unemployed health workers
  - Improved child support
- Kitaw and Hailemariam:
  - Financial or non-financial incentives for service in underserved areas