Examining the variation in health and nutrition outcomes in Bangladesh's cities

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World Bank

IHD-World Bank Global Conference on Prosperity, Equality, and Sustainability

New Delhi, June 2, 2016

Background and aim

- Increasing policy attention on healthcare provision and health outcomes for the poor in urban areas
- Increasing research on urban health, but insight and relevance often limited by data shortcomings
  - National surveys that treat urban areas as an undifferentiated whole
  - Small-scale purposive samples in cities and towns
- Aim: Examine the variation in adult and child health and nutrition outcomes between and within urban slum and nonslum neighborhoods
- Data: Large-scale household sample survey representative for slum and nonslum neighborhoods in city corporations
  - With rich data on health outcomes and socioeconomic covariates

Urban Bangladesh

- Lower-middle income country
- 8th most populous, with an estimated 159 million in 2014
- Official urban population share was 23% in 2011
  - Ranked in the middle among South Asian countries
  - 28% if definition for urban in previous censuses is maintained
- Annualized urban population growth rate over 1981-2011 was 3.8%
- One-half of population to be urban by 2050
- Dhaka
  - With 14 million in 2014, 11th most populous city in the world
  - Projected to become the 6th most populous by 2030

City corporations

- Urban centers (506) organized into three levels
  - (1) city corporations, (2) municipal cities and towns, (3) upazila headquarters
- Six city corporations in 2006, 11 city corporations now
- 38% of urban population live in city corporations
- 65% of slum settlements are in city corporations
  - Chittagong, Dhaka North, Dhaka South, Gazipur city corporations have most slum settlements
  - Slum settlements vary in size
  - Characterized by high population densities, large shares of rural migrants, poor public environmental services, poor housing quality

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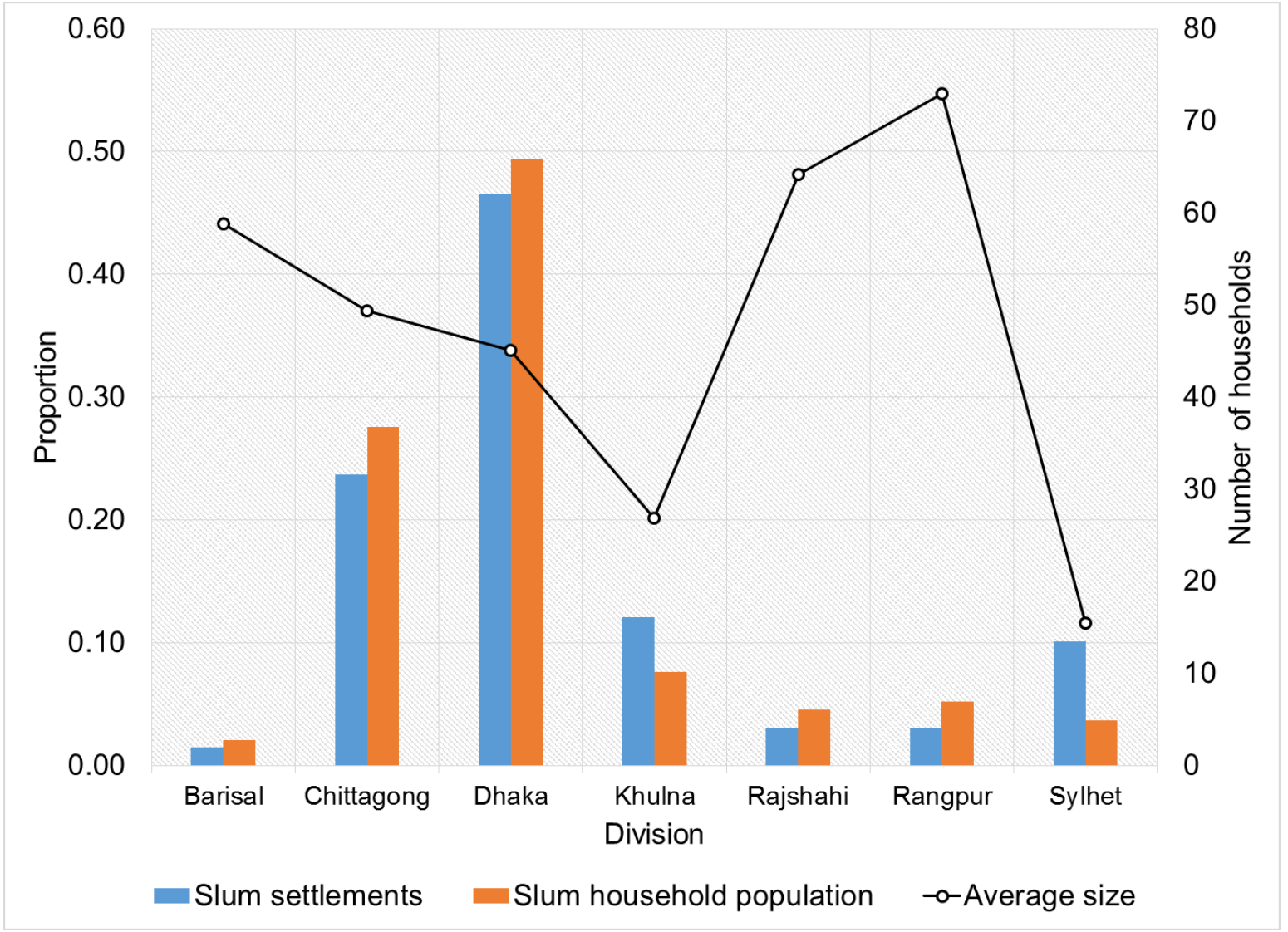
Distribution of slum settlements



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Urban health

- International: Bangladesh ranks worse than comparator countries with respect to the poor than the rich in urban health outcomes
- Urban versus rural: Direction of difference depends on the outcome
- Urban governments responsible for
  - Public health services, preventive and curative care through public facilities, licensing of private providers
  - Institutional reviews suggest poor performance
- Increasing role of NGOs in urban healthcare provision
- Private practices and pharmacies are the main providers

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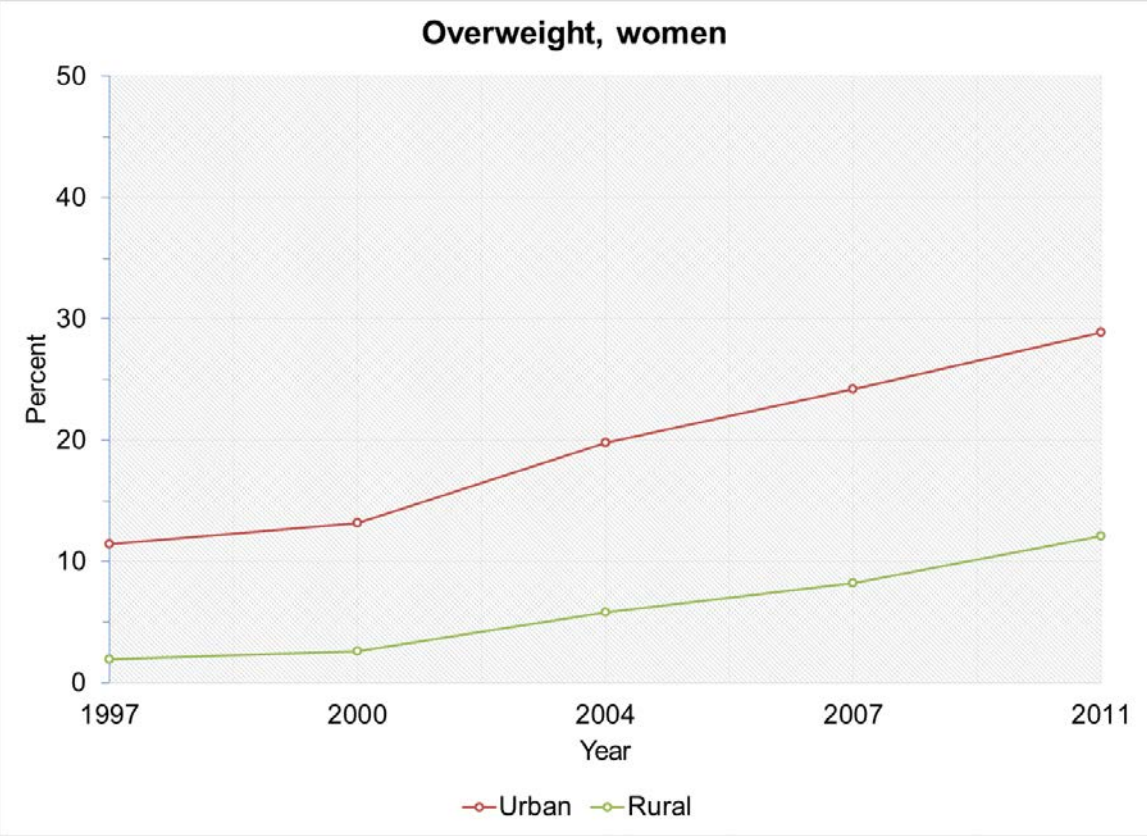
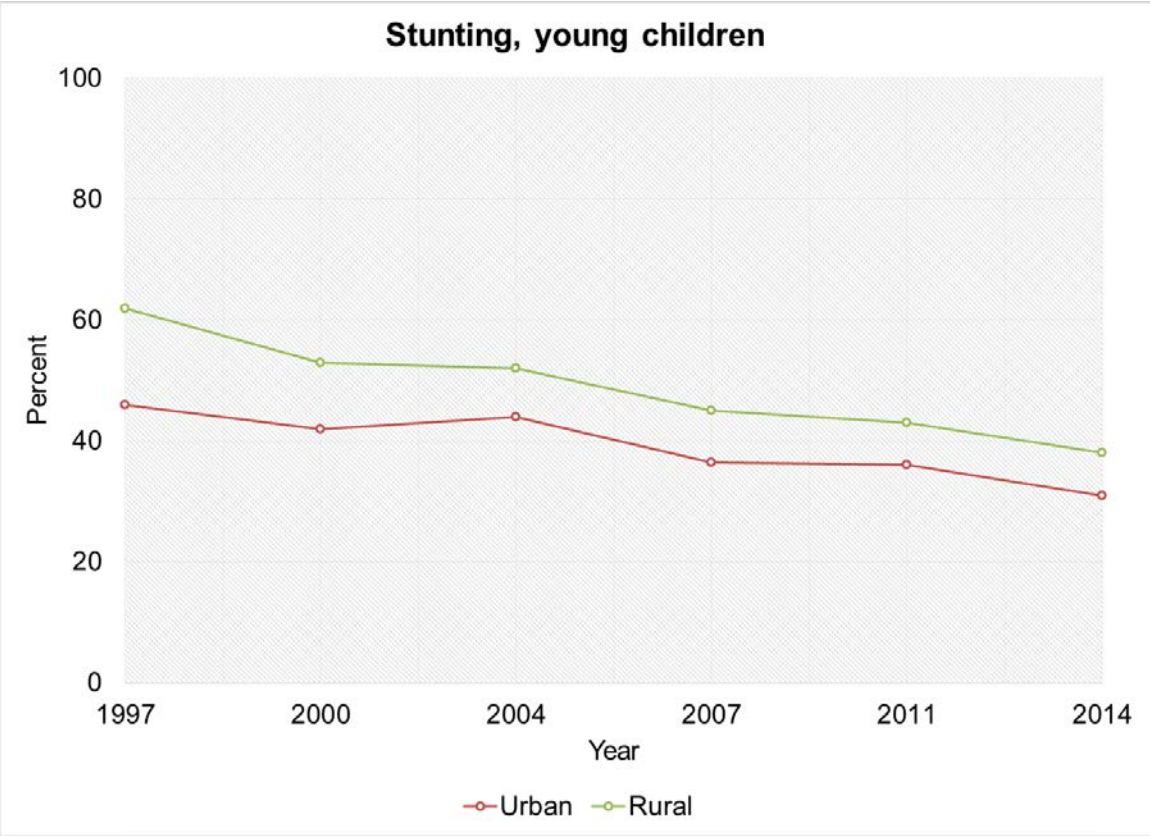
Urban-rural differences in outcomes





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Survey design

- 2006 Bangladesh Urban Health Survey
  - Data publicly released in 2013
- Representative of six city corporations and sample of municipal cities and towns
  - The latter are excluded from the analysis
- Neighborhoods (mahallas) and slum settlements identified using satellite maps and visits
- Primary sampling units (PSUs)
  - Slum settlements (256 PSUs)
  - Nonslum portions of mahallas (192 PSUs)

Survey instruments and response

- Four instruments
  - Neighborhood (respondents: local leaders)
  - Household (Intended: Male head. Typically: Female head)
  - Female (ages 18-59, and ages 10-17 if married)
    - Children ages 0-59 months, information provided by mothers
  - Male (ages 18-59, and ages 10-17 if married)
- Interviews: 12,069 households, 14,191 women (6,207 young children), 13,819 men
- Analysis sample: adults ages 18-49, young children ages 0-59 months

Outcomes and covariates

- Outcomes
  - Several for adults and young children
  - Indicators mostly constructed in standard fashion (e.g., rates in population)
  - Mental ill-health: # of yes's to WHO's 20 questions to screen for depression and anxiety related symptoms
- Covariates
  - Extensive demographic, social, and economic data
  - Four levels: Individual, mother (for young children), household, and neighborhood
  - City corporation identifiers
  - Covariates mostly constructed in standard fashion
  - Some variables combined into index covariates

Conditional analysis: Methods

- Variance decomposition
  - Between and within neighborhood variation
  - Regression with neighborhood fixed effects only
- Multiple regression
  - Covariates at different levels and city corporation identifiers
  - Individual, mother, and household level covariates, and neighborhood fixed effects
- Regression decomposition of slum-nonslum gaps in outcomes
  - Due to (1) mean covariate gaps, (2) estimated parameter gaps, and (3) interactions between covariate and parameter gaps
  - (1) Aggregate level and (2) detailed level

Health status, women

Variable	City corporations			
	Pooled (1)	Slum (2)	Nonslum (3)	Slum–nonslum (4)
Self-reported to be unhealthy	0.16	0.19	0.12	0.06***
Serious illness	0.20	0.22	0.18	0.04***
Serious injury	0.06	0.06	0.06	0.00
Difficulty with mobility	0.20	0.22	0.18	0.04***
Log mental ill-health score	1.31	1.39	1.21	0.18**
Height	150.76	150.13	151.33	–1.20***
Underweight	0.19	0.26	0.12	0.14***
Overweight	0.25	0.15	0.34	–0.19***
Diabetes	0.12	0.05	0.17	–0.12***
Hypertension	0.28	0.23	0.32	–0.09*

Outcomes for the conditional analysis are italicized

Health status, men

Variable	City corporations			
	Pooled	Slum	Nonslum	Slum–nonslum
	(1)	(2)	(3)	(4)
Self-reported to be unhealthy	0.09	0.11	0.07	0.04***
Serious illness	0.16	0.19	0.13	0.06***
Serious injury	0.08	0.09	0.07	0.02**
Difficulty with mobility	0.19	0.23	0.15	0.08***
Log mental ill-health score	0.73	0.85	0.59	0.26**
Height	163.35	162.10	164.33	–2.23***
Underweight	0.26	0.35	0.19	0.16***
Overweight	0.13	0.07	0.18	–0.11***
Diabetes	0.10	0.07	0.12	–0.04
Hypertension	0.17	0.15	0.18	–0.03

Outcomes for the conditional analysis are italicized

Health and nutrition status, young children

Variable	City corporations				
	Pooled	Slum	Nonslum	Slum–nonslum	Rural (DHS 2007)
	(1)	(2)	(3)	(4)	(5)
Unhealthy as reported by mother	0.12	0.15	0.09	0.05***	--
Ill with fever	0.41	0.43	0.39	0.04	0.39
Ill with ARI symptoms	0.15	0.16	0.13	0.03	0.14
Diarrhea	0.07	0.08	0.05	0.03**	0.10
Moderate-to-severe stunting	0.60	0.70	0.48	0.22***	0.45
Moderate-to-severe wasting	0.14	0.18	0.10	0.08***	0.18

Outcomes for the conditional analysis are italicized

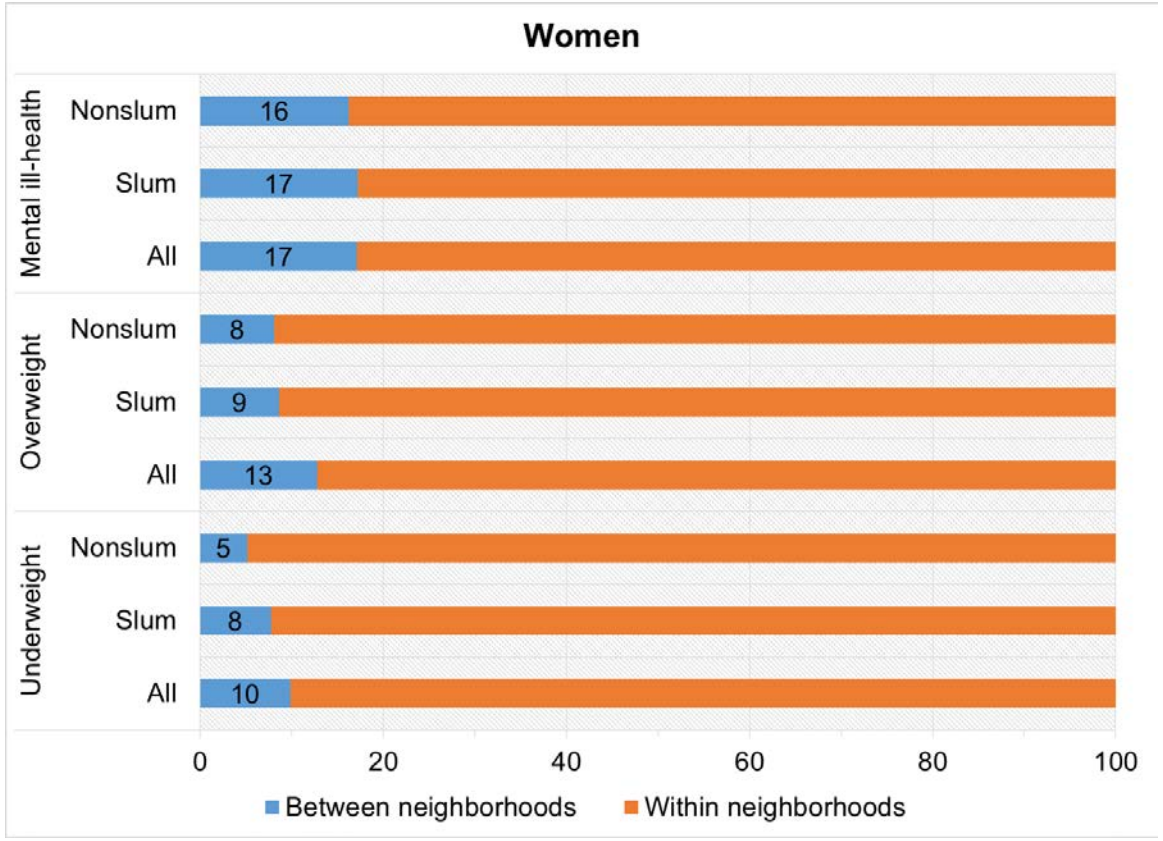
Covariates

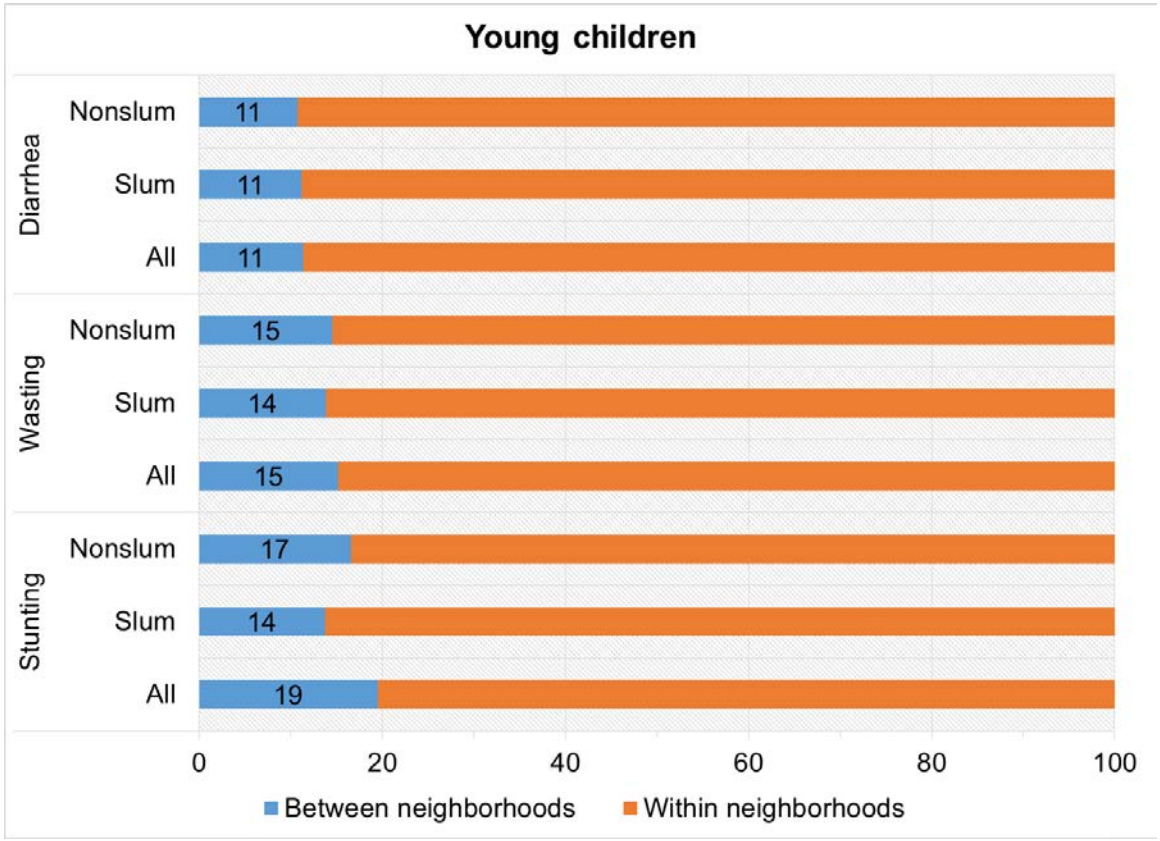
- Means for individual, household, and neighborhood level covariates often substantially poorer for slum than nonslum residents
  - Levels of education
  - Antenatal and perinatal practices by mothers
  - Per-capita household expenditures are on average 0.46 log points lower for slum residents
  - Housing quality and neighborhood quality indexes are on average one standard deviation lower for slum residents

Neighborhood healthcare service availability

Type	City corporations			
	Pooled (1)	Slum (2)	Nonslum (3)	Slum–nonslum (4)
Government healthcare facility	0.05	0.05	0.06	–0.02
Government hospital	0.04	0.03	0.05	–0.02
Government clinic	0.02	0.02	0.02	0.00
Private healthcare facility	0.30	0.28	0.33	–0.06
Private hospital	0.05	0.05	0.06	–0.02
Private clinic	0.27	0.24	0.31	–0.07
NGO healthcare facility	0.26	0.27	0.25	0.02
Pharmacy	0.75	0.64	0.89	–0.25***
Qualified doctor	0.46	0.26	0.71	–0.45***
HFP fieldworker	0.19	0.23	0.14	0.09**
Government HFP fieldworker	0.09	0.12	0.05	0.07***
NGO HFP fieldworker	0.11	0.12	0.09	0.03

Variance decomposition results





Regression results

- Inference results for a given covariate depends on outcome and sample
- Significant covariates
  - Individual: age, high levels of education attainment, mental ill-health
  - Mother: mental ill-health, underweight status
  - Household: household economic status, food shortage
  - Neighborhood: environmental quality, healthcare service provider availability
- Slum versus nonslum distinction significant for fewer outcomes and samples
- Identifiers for city corporations often significant
- Size and significance of covariates robust to accounting for heterogeneity at the neighborhood level and higher

Regression decomposition results

- Aggregate level
  - Covariates gaps tend to contribute most to outcome gaps
  - Parameter gaps significant for female underweight, and child stunting and diarrhea gaps
- Detailed level
  - Individual and household level covariates (mainly education, household economic status) contribute more frequently than neighborhood level covariates

Planned analysis

- Decomposition of evolution in nonslum-slum gap in child nutrition outcomes between 2006 and 2013
- Decomposition of nonslum-slum gap in school participation of children and education attainment of young adults

Thank you