Rethinking the 'Urban Advantage:'
Differences in Child Diarrhea Across Rural, Urban Non-Slum and Urban Slum Locations in India

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Abstract:

Urbanization is increasingly characterized by social inequality, poverty and the expansion of slums, which negatively impacts the health of those living in cities. We examine whether the livelihood and health improvements commonly associated with the urban location demonstrate an improvement over rural areas and whether these improvements benefit all urban residents equally. Using data from the 2005 India Human Development Survey, we examine differences in child diarrhea across rural, urban non-slum and urban slum locations. Descriptive statistics show notable differences in the characteristics of each location, but our analysis shows that health outcomes are not significantly location-based. Mother's characteristics, income and household quality all play a strong role in determining child health. However, these factors do not influence child health equally. We plan to further investigate the role of mother's social support and knowledge of diseases as well as household water and sanitation practices.

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Introduction:

Urbanization in the Global South is often associated with a range of improvements over rural living such as: increased economic opportunities, stronger, more diverse social networks, improved gender parity and greater access to critical services like health care (Montgomery 2009; Montgomery and Hewett 2005; Vlahov et al. 2005). Despite the purported benefits associated with urban life, some argue that rapid urbanization, particularly in developing countries, is increasingly characterized by growing social inequality, urban poverty and the expansion of slum settlements (Harpham 2009; Davis 2006). Deepening social inequality and the proliferation of slums can have extremely negative impacts on the livelihood and health of those living in cities.

India is an important case study to investigate these attitudinal differences regarding the benefits of the urban location due to its increasing urbanization and growing slum population. The 2001 Indian Census reports that 42.6 million people – representing approximately 23.1% of the total urban population – were living in urban slums (2001). With the expansion of slum settlements and increasing inequality within Indian cities, there is a need to examine assumptions that the livelihood and health improvements associated with urbanization – commonly referred to as the "urban advantage" – benefit all urban residents equally and what factors may influence differences in health outcomes between urban slum, urban non-slum, and rural residents.

It is well known that inequalities in children's health are indicative of larger social, economic, and political inequalities within a society (Luke and Xu 2011; Marmot 2005; Mosley and Chen 1984). For this reason, we draw on Mosley and Chen's (1984) framework for understanding child health to examine variations in health outcomes by rural, urban non-slum and urban slum areas throughout India. Specifically, we will examine whether differences in the incidence of child diarrhea by location indicate an "urban advantage" for non-slum children or an "urban disadvantage" for slum children when compared to rural children. We examine what factors determine these differences and why certain factors may be more influential in determining child health outcomes.

By examining disaggregated urban populations in comparison to rural populations, we provide evidence that location is an important predictor for health only for rural populations. After controlling for a range of maternal characteristics, socioeconomic indicators and environmental conditions, the argument for an "urban advantage" is less convincing and other, less location-specific variables play a stronger role in predicting child health.

Data and Variables:

This study uses data from the 2005 India Human Development Survey (IHDS) to understand differences in diarrhea for children under five between rural, urban non-slum and urban slum populations. One major benefit of using IHDS data is the disaggregation of the urban population data by slum and non-slum areas as well as a range of health-related variables for individuals and households. The IHDS is a nationally representative survey of 41,554 households collected from 1504 rural villages and 970 urban neighborhoods throughout India (India Human Development Survey 2005). Of the total sample, 27,010 households are located in rural areas, while 13,714

households are located in urban neighborhoods, and 830 households are located in slum neighborhoods within cities.

The IHDS collects information on the incidence of diarrhea in the previous month for all members of the household. We restrict our analysis to children under five, and the dependent variable is the experience of diarrhea in the past month coded 1 for "yes" and 0 for "no."

Independent variables include the three categories of location all coded as dichotomous variables, rural, urban non-slum and urban slum. Using Mosley and Chen's (1984) analytical model for examining child health, we chose a variety of maternal, socioeconomic, and environmental indicators as key determinants of child diarrhea. Mother's education and age are common indicators that influence child health outcomes (1984). To examine female autonomy, we chose two variables: whether the mother typically has money to spend on household expenditures and whether the mother has the most influence in decision-making regarding care for a sick child. We also included a variable indicating whether the household social network included a doctor as a measure of social capital.

In addition to mother's characteristics, we also include a range of socioeconomic and environmental independent variables, including: household income, caste, presence of a household toilet, electricity, total number of rooms in the household, total number of household members, presence of a household water tap, the type of water storage, and whether there is human or animal excrement and/or stagnant water observed by the interviewer at the house. Household infrastructure variables are also included in the model; poor roof and floor quality are used as measures of household infrastructure.

The analysis consists of three logistic regression models predicting the log-odds of diarrhea for children under five. The first model (Model 1 – Table 2) examines the log-odds of diarrhea based solely on location in an attempt to identify whether there is a significant advantage to living in an urban non-slum area compared to rural and whether slum residence is a disadvantage relative to urban non-slum. The second model (Model 2 – Table 2) includes a range of maternal and socioeconomic characteristics to determine how the influence of location on diarrhea changes when controlling for other factors like maternal and household characteristics. The third model (Model 3 – Table 2) examines differences in the likelihood of diarrhea by including a variety of independent variables for environmental conditions like housing density, household infrastructure and access to water.

Preliminary Results:

The descriptive statistics in Table 1 show that the incidence of diarrhea appears much higher in rural areas compared to both non-slum and slum urban areas. Some of the indicators of socioeconomic status confirm assumptions from the literature; namely, income levels in urban slums are much lower than urban non-slum areas and much closer to the income levels of rural residents. Mean household size for urban slums, while lower than rural areas, is higher than urban non-slums confirming evidence that population density may be an influential factor in slums. There are other notable intra-urban differences as well. The presence of a household water tap is lower in slums than non-slum urban areas; the observation of stagnant water and poor roof

and floor quality is higher for slum residents than non-slum residents. Despite higher rates of improved infrastructure for slum areas compared to rural areas, the descriptive statistics point to significant intra-urban differences that could lead to differential health outcomes for urban populations.

The preliminary regression analysis in Table 2 shows that the influence of location on incidence of diarrhea changes with the inclusion of socioeconomic and environmental variables. Preliminary results from Model 1 indicate that location has a highly significant impact on the likelihood of diarrhea for those living in rural areas as compared to residents of urban non-slum areas.

With the inclusion of maternal and socioeconomic characteristics (Model 2 – Table 2), the effect of residence is weakened, specifically, the difference between rural and urban non-slum is smaller and no longer significant. Mother's age and measures of mother's autonomy are highly significant, supporting theories that characteristics of the mother impact children's health. Income proves to be a significant indicator of child diarrhea; those in the poorest two income quintiles are significantly more likely to report incidence of diarrhea than those in the next two income quintiles. The presence of household electricity is significant and negatively associated with the likelihood of diarrhea.

We see that in Model 3, environmental characteristics play a significant role in predicting the likelihood of child diarrhea. The variables for no water storage, observed stagnant water, observed excrement and poor roof quality are all significant and increase the likelihood of child diarrhea, as expected. Surprisingly, having a water connection and storing water with a lid compared to storing water without a lid increases the likelihood of child diarrhea, while having poor floor quality decreases this likelihood. These results are in an unexpected direction, and will be further investigated to determine which household conditions (in particular water and sanitation conditions) are the most relevant for incidence of child diarrhea.

The preliminary results show a need to further analyze other factors that may influence differences in child health by rural, urban non-slum and urban slum areas. Specifically, we plan to examine other influential household conditions related to water and sanitation, as well as how mother's knowledge about other illnesses, exposure to mass media, and involvement in self-help groups may influence children's health.

References:

Census of India. 2001. India at a Glance: Rural-Urban Distribution. Office of the Registrar General and Census Commissioner, India. Retrieved on May 1, 2011 (http://www.censusindia.gov.in/Census_Data_2001/India_at_glance/rural.aspx).

Davis, Mike. 2006. *Planet of Slums.* Verso: New York City: New York.

Harpham, Trudy. 2009. Urban Health: What do we know and where do we go? *Health and Place* 15: 107-116.

India Human Development Survey. 2005. University of Maryland and the National Council of Applied Economic Research, New Delhi. Retrieved on November 20, 2010 (http://ihds.umd.edu/).

Luke, Nancy and Hongwei Xi. 2011. Exploring the Meaning of Context for Health: Community Influences on Child Health in South India. *Demographic Research* 25(article 15): 345-374.

Mosley, Henry and Lincoln Chen. 1984. Child Survival: Strategies for Research. *Population and Development Review* 10:25-25.

Vlahov, David, Nicholas Freudenberg, Fernando Proietti, Danielle Ompad, Andrew Quinn, Vijay Nandi, and Sandro Galea. 2007. Urban as a Determinant of Health. *Journal of Urban Health* 84(1): i16-i26.

Tables:

Table 1 - Descriptive Statistics for Rural, Urban Non-slum, and Urban Slum Residents			
Variables	**Rural**	**Urban Non-slum**	**Urban Slum**
Short-term Morbidity for Children Under 5			
Incidence of diarrhea (dummy variable) (%)	9.12	7.07	6.77
Maternal Characteristics			
Mean years of education	3.48	6.75	4.67
	(4.28)	(5.17)	(4.29)
Mean age	28.49	28.44	27.00
	(6.64)	(6.07)	(5.53)
Doctor within social network (dummy variable) (%)	31.47	32.74	37.99
Cash for household expenditures (dummy variable) (%)	77.07	86.12	78.60
Decisions regarding sick children (dummy variable) (%)	83.17	87.09	80.57
Household Characteristics			
Income category (%)			
Poorest	22.43	5.72	11.35
Second	21.58	10.76	17.69
Middle	19.72	19.65	24.03
Fourth	18.82	26.53	31.00
Affluent	17.44	37.34	15.94
Caste (%)			
Brahmin	3.93	6.88	1.09
Other backward caste	40.91	40.82	42.79
Scheduled caste	23.81	17.24	31.44
Scheduled tribe	10.54	2.93	7.42
Other	20.82	32.13	17.25
Household toilet (dummy variable) (%)	24.27	73.09	51.31
Household electricity (dummy variable) (%)	63.97	92.85	89.08
Mean household rooms	2.71	2.61	1.95
	(1.84)	(1.72)	(1.07)
Environmental Characteristics			
Household water connection (dummy variable) (%)	42.12	70.61	48.25
Water storage (%)			
No storage	14.31	9.31	2.18
Storage with lid	79.59	85.38	91.92
Storage without lid	6.11	5.31	5.90
Mean household size	7.52	6.39	6.64
	(3.56)	(2.92)	(2.97)
Stagnant water observed at home (dummy variable) (%)	20.54	18.46	19.00
Excrement observed at home (dummy variable) (%)	30.37	16.41	11.79
Poor floor quality (dummy variable) (%)	63.40	14.77	29.91
Poor roof quality (dummy variable) (%)	28.32	9.83	14.63

Notes: *N*=20,657. Sample is restricted to individuals under the age of 5. Figures in parentheses represent the standard deviation from the variable.

Table 2 - Logistic Regression on Incidence of Diarrhea within Month Prior to Survey												
	Model 1				Model 2				Model 3			
	β	S.E.	O.R.	Sig.	β	S.E.	O.R.	Sig.	β	S.E.	O.R.	Sig.
Residence												
Rural	0.324	0.059	1.319	***	0.079	0.069	1.082		0.066	0.072	1.068	
Urban slum	0.046	0.193	0.955		-0.165	0.195	0.847		-0.065	0.196	0.937	
(Reference - urban non-slum)												
Maternal Characteristics												
Education					-0.003	0.007	0.998		0.005	0.007	1.004	
Age					-0.022	0.004	0.978	***	-0.020	0.004	0.980	***
Doctor within social network (dummy variable)					0.335	0.054	1.397	***	0.222	0.056	1.249	***
Cash for household expenditures (dummy variable)					0.154	0.066	1.165	**	0.097	0.066	1.101	
Decisions regarding sick children (dummy variable)					0.006	0.072	1.068		0.026	0.073	1.026	
Household Characteristics												
Income category												
Poorest					0.360	0.096	1.433	***	0.258	0.101	1.295	**
Second					0.407	0.094	1.502	***	0.317	0.099	1.373	**
Middle					0.300	0.098	1.349	**	0.224	0.094	1.251	**
Fourth					0.257	0.086	1.292	**	0.196	0.087	1.216	**
(Reference - affluent)												
Caste category												
Other					-0.006	0.134	0.994		0.037	0.134	1.037	
Scheduled tribe					-0.539	0.164	0.583	**	-0.356	0.166	0.701	**
Scheduled caste					0.087	0.135	1.090		0.154	0.136	1.166	
Other backward caste					0.061	0.130	1.063		0.111	0.131	1.117	
(Reference - Brahmin)												
Household toilet (dummy variable)					0.075	0.066	1.078		0.035	0.068	1.035	
Household electricity (dummy variable)					-0.594	0.060	0.552	***	-0.497	0.064	0.608	***
Household rooms					0.002	0.016	1.002		0.003	0.017	1.003	
Environmental Characteristics												
Household water connection (dummy variable)									0.128	0.062	1.136	**
Water storage												
No storage									0.801	0.141	2.227	***
Storage with lid									0.354	0.127	1.425	**
(Reference - storage without lid)												
Total household members									-0.023	0.009	0.977	**
Stagnant water observed at home (dummy variable)									0.197	0.067	1.217	**
Excrement observed at home (dummy variable)									0.257	0.063	1.292	***
Poor floor quality (dummy variable)									-0.278	0.065	0.757	***
Poor roof quality (dummy variable)									0.182	0.069	1.199	**
Intercept	-2.576	0.051		***	-2.011	0.222		***	-2.468	0.264		***
Notes: N=20,657. Sample is restricted to individuals under the age of 5. p<.05* p<.01** p<.001***												