

Health policy, health outcomes, and economic growth

Lessons from India



In brief

- The relationship between health and economic growth is dynamic, complex and under-appreciated. Along with education, health may be viewed as an integral input to productivity, similar to other conventional inputs such as labour and physical capital.
- India's economic performance in aggregate has been remarkable in the past two decades. However, transforming economic growth into better health outcomes has lagged behind most countries.
- This brief discusses the link between economic growth and health outcomes in India. Based on IGC studies it summarises evidence on issues related to nutrition, sanitation and pollution and health service delivery.
- It concludes that India's health service can be improved through a focus on improving awareness of healthcare and entitlements to it, better service delivery, better monitoring of patients, and paying attention to socio-cultural factors.
- The authors conclude that further research is needed into several other areas of the relationship between health and growth in India, particularly health awareness, the quality of healthcare, population growth and physical capital.

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Economic growth and health

The relationship between health and economic growth is dynamic, complex and under-appreciated. As one of the components of human capital (along with education), health may be viewed as an integral input to productivity; similar to other conventional inputs such as labour and physical capital (Weil 2007). While there is compelling evidence that health impacts economic growth, the magnitude of the effect is less clear- largely due to multi-dimensionality of health outcomes and two-way causation between health and income. As discussed in table 1- there are multiple mechanisms through which better health can lead to economic growth these include: (a) increased productivity (b) savings effect (c) better education outcomes and (d) demographic effect.

Historically, improvements in health across countries have resulted from three main sources:

- a. Improved standard of living – particularly nutrition
- b. Public health (clean water/sanitation) and health behaviour modification (i.e. people quitting smoking, washing hands, and becoming more aware of germs)
- c. Medical interventions (antibiotics, drugs, surgeries)

This brief discusses the link between economic growth and health outcomes in India. Based on IGC studies it summarises evidence on issues related to nutrition, sanitation and pollution and health service delivery.

Economic growth and health

As the figures show- there is strong correlation between income and health indicators. If we exclude a few African countries that have a high prevalence of HIV- the correlation between GDP/Capita and life expectancy (Figure-1) is extremely strong.

Possible mechanisms leading health improvements to augment economic growth:

- a. Increased productivity: Improvement in health and nutrition leads to healthier workforce- who can work harder, longer and think better.
- b. Demographic effects: Less infant mortality would lower fertility rates and increase investments in each child.
- c. Better education outcomes: Healthy children can learn more in school and lead to a better educated workforce
- d. Savings effects: High life expectancy leads people to save more and participate in the building of more effective institutions.

Figure 1: Life expectancy and income

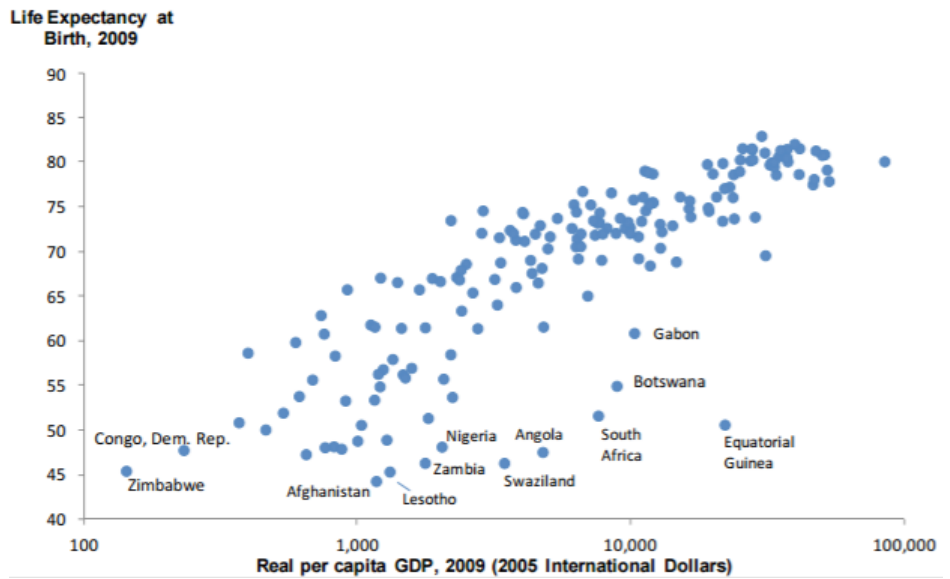
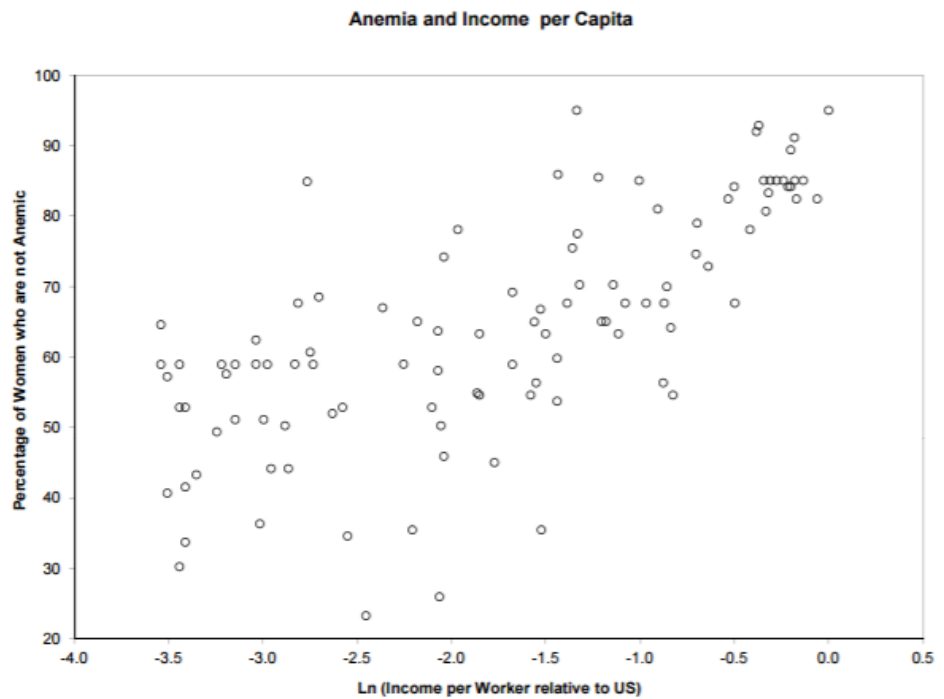


Figure 2: Anemia and income per-capita



Source - Figure 1 and 2 - Weil (2013)

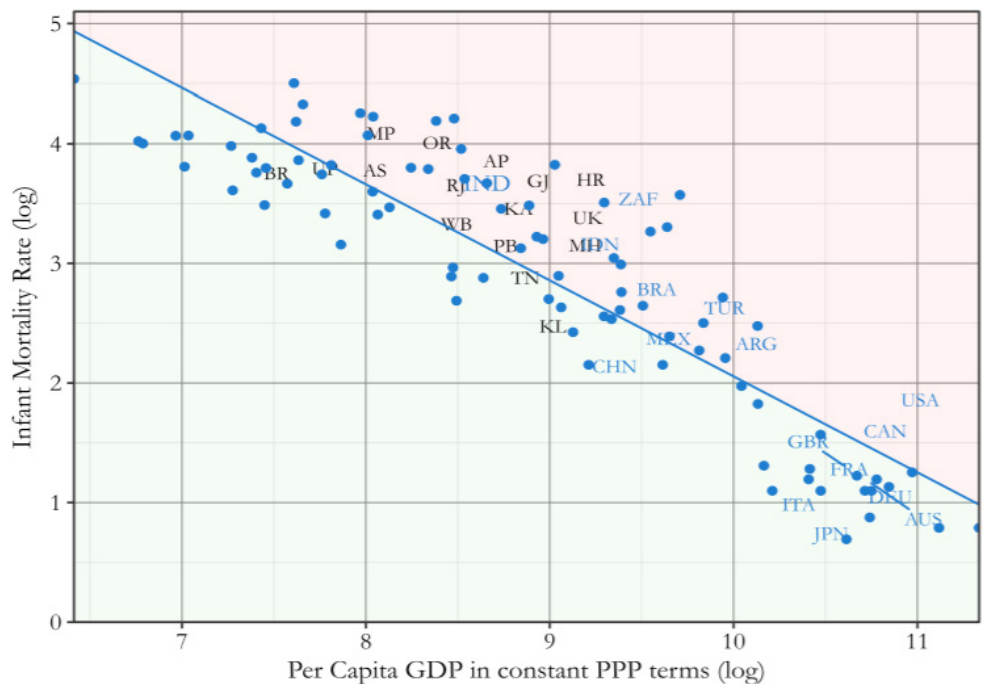
Economic growth and health outcomes in India

India's economic performance in aggregate has been remarkable in the past two decades. However, in transforming economic growth to better health outcome India has lagged behind most countries.

Key messages:

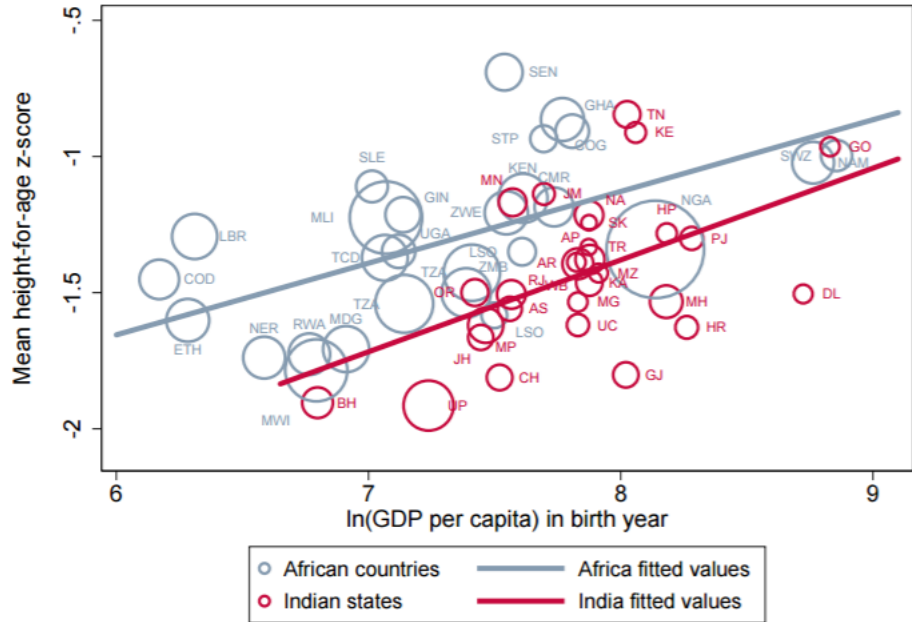
- In international comparisons, infant mortality rate (IMR) in India is higher than its per capita GDP would predict.
- At a disaggregated level, almost all Indian states do worse in international comparison of IMR and real per capita GDP (Figure 3).
- If we compare child height to GDP per capita- the Indian performance is worse than African countries and almost all Indian states do worse than most of the African Countries (Figure 4).
- If we compare GDP per capita and IMR for India and China from 1950 till 2000- China has done a much better job of translating income growth into reductions of IMR (Figure- 5).

Figure 3: IMR vs Per capita GDP (Indian states and world)



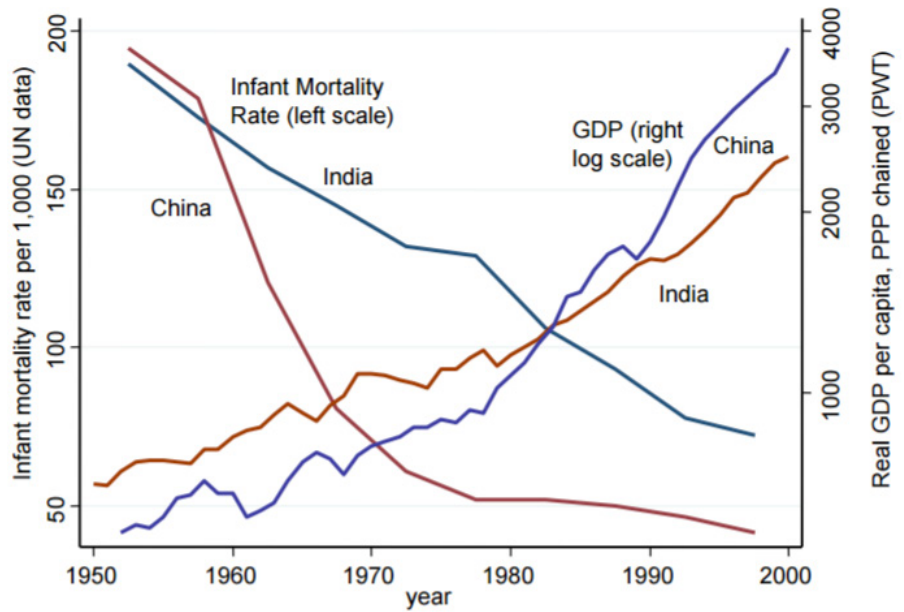
Source: Indian economic survey 2016-2017

Figure 4: Child height vs GDP per capita (India and Africa)



Source: IGC (2014)

Figure 5: IMR vs Per capita GDP (India and China)



Source: Cutler et al (2006)

Nutrition

Major IGC studies:

1. Afridi et al. (2013) evaluates the extension of school meal programs to higher grades in the public schools of Delhi and finds that students who benefitted were likely to exhibit additional classroom effort as measured through improved performance on maze puzzles that required the ability to concentrate for sustained lengths of time. This study thus provides evidence that improved nutrition has a direct impact on cognition and educational outcomes of children. The study suggests that returns to nutrition investments are likely to be even higher in cases where nutrition levels are comparatively lower.
2. Schofield (2014) directly addresses the consequences of low caloric intake among adults in India. This research has two prongs which together show that poor nutrition incurs large penalties in the wage labour market, and even medium amounts of increments in caloric intake can result in substantial improvements in labour supply, productivity, and earnings.
3. Jayachandran and Pande (2015) documents reasons for why stunting – an indicator of when height-for-age is two standard deviations below the mean – is so prevalent among Indian children. The comparison that has gained much mileage is that rates of stunting in India are higher than in some Sub Saharan African countries with lower levels of per capita income and higher levels of child mortality. The study finds that Indian firstborns are actually taller than African firstborns but this is true only for firstborn sons. Thereafter height declines with birth order and depends on sibling's gender, pointing to the importance of intra-family allocations as a key contributing factor for stunting in India.

Key messages:

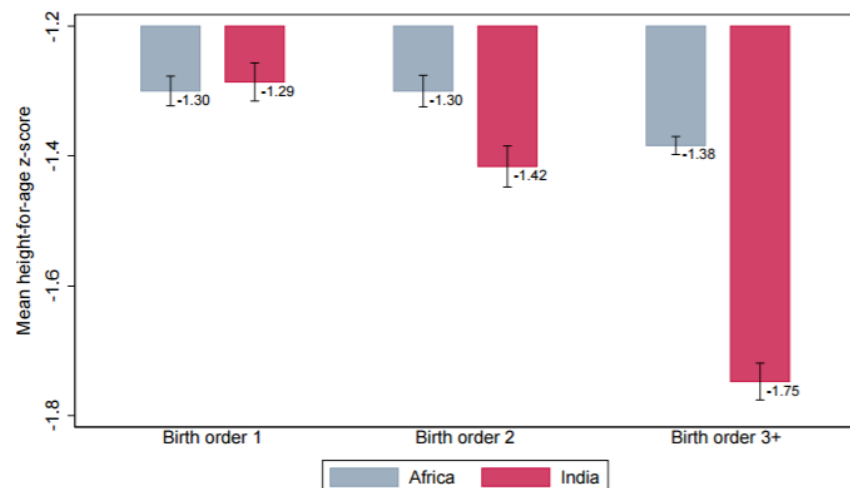
- a. Evidence shows that overall caloric intake has a highly significant impact on worker productivity and Body Mass Index (BMI) and height correlates with high wages.
- b. Improved nutrition has a direct impact on cognition and educational outcomes of children in India.
- c. Poor nutrition incurs large penalties in the wage labour market in India.
- d. Gender bias and son preference in intra – household allocation decisions play a deciding role in explaining the poor health of India's children.

Why are Indian children shorter than African children?

Why are Indian children so short? Over 40% of those five and under are stunted — meaning they are in the bottom 2-3% of the worldwide height distribution for healthy children of their age and sex. This rate has improved only modestly since the 1990s. IGC study by Jayachandran and Pande find that:

- Indian nutrition enigma begins only with the second-born child, and becomes more pronounced for each subsequent baby.
- Among children born third or later, 48% are stunted in India versus 40% in Africa, while the rates for firstborn children are 35% in India versus 37% in Africa.
- India's patrilineal traditions dictate that the eldest son care for his parents in old age and inherit property. Families therefore allocate inordinate resources — nutritious foods, iron supplements, tetanus shots and prenatal check-ups — to a pregnant woman as long as there is a possibility that she is carrying the family's firstborn son. Once a male heir is born, prenatal investments drop off.
- Basically, intra household allocations, gender bias and first son preference are key contributing factors to stunting.

Figure 6: Child height in India and Africa, by child's birth order



Notes: The figure depicts the mean child height-for-age z-scores for Sub-Saharan Africa and India, by the birth order of the child. The mean is calculated over all children less than 60 months old with anthropometric data.

Source: Jayachandran and Pande (2015)

Sanitation and pollution

Coffey et al. (2015) reveals that social, cultural and religious factors have a role to play in explaining India's slow transition to safe sanitation. In particular, open defecation remains high by standards of other countries at similar levels of per capita income for several reasons including the fact that affordable pit latrines are viewed as ritually polluting by caste Hindus, and open defecation is associated with good health and strength. Hence, while the Government may invest in building toilets to promote hygiene, they remain largely unused given prevailing cultural and religious norms. Changing behaviour in these circumstances is difficult to accomplish because

it involves going against centuries of tradition and social programming. More than resources, a strategy that has found success in other countries like Bangladesh is encouraging an active role for local NGOs in spreading health awareness and knowledge on the negative health repercussions of practices such as open defecation which spread bacterial, viral and parasitic infections including diarrhoea and cholera.

Do et al. (2016) is the second IGC study that focuses on water pollution analyses the “Ganga Pollution Cases” of 1987 India’s first environmental litigation ruling by the Supreme Court that required tanning industries along the Ganga river in Kanpur, Uttar Pradesh to clean-up pollution. This project finds that neonatal mortality declined significantly as a result of the policy ruling. Importantly, there is a spatial externality associated with river pollution where pollution travels impacting communities downstream and reducing the probability of infant survival.

Adhvaryu et al. (2016) studies the impact of fine particulate matter (PM) on worker productivity in a garment factory and finds that exposure to this type of pollution negatively impact individual worker and aggregate production. The study also finds large, negative, and statistically significant impacts of fine PM exposure on quality of products produced.

Brainerd and Menon (2014) considers the impact of the adoption of high yielding varieties of seeds as part of the Green Revolution in India and the concomitant exponential rise in the use of fertilisers that were required for these seeds. The subsequent seepage of agrichemicals - nitrogen, phosphorus and potassium – into water is found to have several negative health consequences. In particular, exposure in early stages of foetal development increases the likelihood of infant mortality, especially neonatal mortality which is intimately tied to things that happen in utero. Such early exposure manifests itself even in older children where both height-for-age and to a lesser extent, weight-for-age, are negatively impacted from the presence of these pollutants in water.

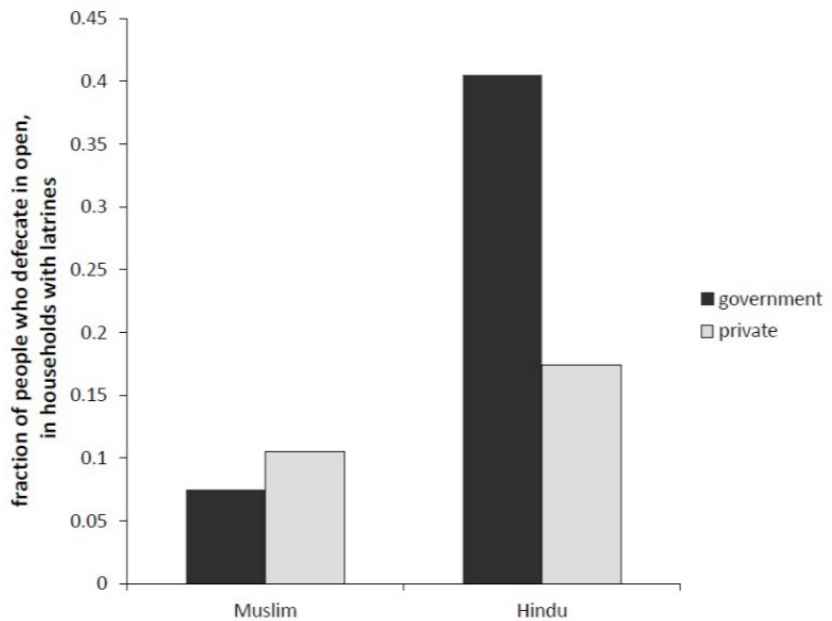
Key messages:

- a. Reducing open defecation in India is going to need more than building new toilets- it will need changing behaviour through active spreading of health awareness and knowledge.
- b. Reducing river water pollution reduces neonatal mortality significantly.
- c. Fine particulate matter (PM) levels reduce worker productivity, aggregate production and quality of products.
- d. Higher use of agrichemicals- and higher exposure of pregnant women to these agrichemicals increases infant mortality- particularly neonatal mortality.

Religion and latrine use

Apart from above figure from IGC study- India's 2005 National Family Health Survey finds that rural Muslim households are 19 percentage points less likely to defecate in the open than rural Hindu households, despite the fact that they are poorer on average (Geruso and Spears 2015).

Figure 7: Latrine use among people in household with latrines, by religion and latrine type



Latrine use computed using data from the SQUAT survey. For more information on these data, see Coffey et al. (2014).

Health service delivery

Lemos and Scur (2012). Using a sample of approximately 7000 established hospitals (with either an Orthopaedics or Cardiology department, those that provided acute care, and those that offered overnight beds) across urban and rural areas, the study finds that healthcare management practices in India falls far short of those in developed countries even after controlling for hospital size. Benchmarks include operations, monitoring, targets and people management. In the full sample of all countries, Indian hospitals on average are 1.8 standard deviations behind the best-managed ones which are in the US. Private hospitals (both for profit and not for profit) are better managed than public hospitals.

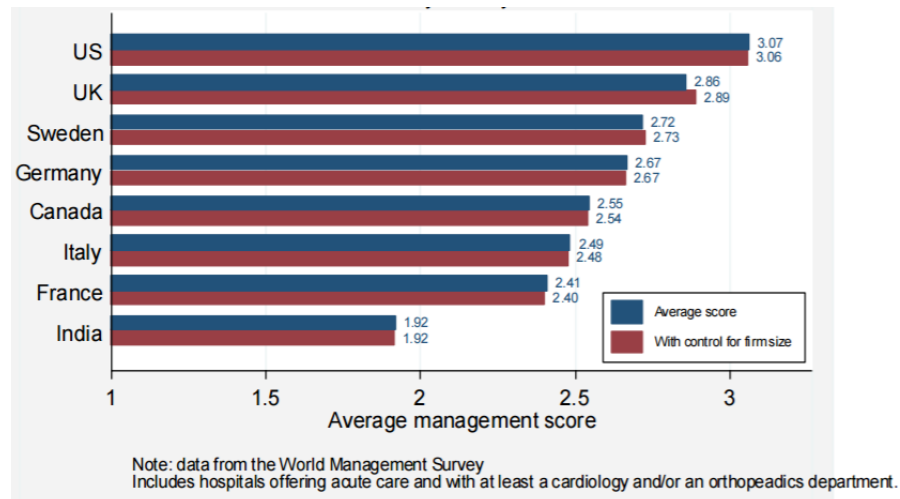
Only 4% of Indian hospitals are better managed than the average US hospital, and only 15% better than the average hospital in France, the second-lowest scoring country in the sample. Still, they do observe this *very* small yet existent tail of very well managed hospitals.

Influential non-IGC studies

Chaudhury et al (2006) made unannounced visits to primary schools and health clinics in Bangladesh, Ecuador, India, Indonesia, Peru and Uganda and recorded whether they found teachers and health workers present at the facilities. Averaging across countries, 19 percent of teachers and 35 percent of health workers were absent. Numbers for India were worse- 25 percent absenteeism among teachers and 40 percent absenteeism among primary healthcare workers (including doctors).

Regarding healthcare quality, Das et al (2008) noted that in India, even basic essential procedures for common diseases were not being used by healthcare providers - even in the richest Indian state, Delhi.

Figure 8: Hospital management score, by country



Source: Scur (2012)

Figure 9: Provider absence rate by country and sector

	Absence rates (%) in	
	Primary schools	Primary health centers
Bangladesh	16	35
Ecuador	14	—
India	25	40
Indonesia	19	40
Peru	11	25
Uganda	27	37
Unweighted average	19	35

Source: Chaudhury et al (2006)

Key messages:

- a. Healthcare provision in India is in a grim situation with respect to both the availability and quality of services.
- b. Both quality of government-provided and private healthcare services face multiple quality concerns in India.
- c. While India must improve the availability of healthcare services and healthcare infrastructure, this should not detract from efforts to improve quality of healthcare.

Policy lessons

1. **Improving Awareness:** Information and awareness levels of healthcare entitlements are low on average, and improvements in this sphere are likely to reap substantial benefits (Banerjee *et al.* 2010, Lemos and Scur 2012, Schofield 2014, Brainerd and Menon 2014, Coffey *et al.* 2015).
2. **Better Service Delivery:** Delivery of products from public welfare services is weak or often absent, and take-up of schemes is low (Banerjee *et al.* 2010, Coffey *et al.* 2015, Wadhwa 2016). Some part of this is tied to lack of knowledge, but importantly, leakage is a factor that has sizable repercussions. In light of this, there are IGC studies that analyse improving methods of delivery through the utilisation of ICT technologies for example, or by designing schemes that may be more insulated against capture (Sekhri 2016, Berry *et al.* 2016).
3. **Better Monitoring:** Implementing effective health schemes requires accurate information on what works and importantly, on what does not work. Hence designing evaluations that can deliver this information in accurate ways is crucial. Where measurement error and costs are a factor, focusing on sub-samples and using intelligent strategies to gather required information is not only desired but prudent (Kinnan *et al.* 2016).
4. **Paying attention to socio-cultural factors:** Finally, many of the health and sanitation related problems in India has socio-cultural angle to it. Improving health scenario in India would therefore require more than supply of quality health and sanitation facilities- it need careful consideration of cultural, social and religious factors that affect use of these services.

What don't we know?

Evidence from IGC India research teaches us that improving awareness is critical to increasing take-up of sanitation infrastructure, new health technologies, and health insurance. But beyond a few identified means (relying on social networks/ community groups and some evidence for incentive pay), we are still unclear on how to tackle this issue. Importantly, NGOs that have been an effective platform for raising health awareness in other countries appear to function relatively less well in this regard in India. A reason may be the more diversified nature of Indian society along

caste and other lines which makes changing ingrained behaviour a difficult objective to achieve.

A second area where further research seems warranted is how to improve the quality of care administered by medical providers in India, both individuals and hospitals. We understand from IGC India research and from evaluations of medical care that the quality of primary care is low not because tools or medicines are lacking, but because of insufficient effort on the part of providers themselves. Hence further study on designing effective mechanisms to regulate providers – both public and private – towards rendering more competent service and care would serve to fill a currently existing vacuum in this area.

Moving beyond health awareness and the quality of healthcare, other topics on which we have weak evidence that may be strengthened through further research include the importance of understanding demographic transitions and fertility dynamics. Population pressures have direct impacts on per capita income and on fixed natural resources such as land for example. In particular, fertility transitions are a means by which health may increase economic growth since declining fertility directly increases well-being per person. Alternatively, rapidly growing populations can have detrimental effects on important inputs such as land with immediate implications for agricultural output and food security. A more comprehensive understanding of these factors arising from further research on these themes would be helpful to guide policies.

Finally, macroeconomic research from cross-country studies suggests that health can impact growth by increasing physical capital (Weil 2007). The intuition is that an increase in labour provided by a healthy productive workforce augments the marginal product of capital, thus spurring further investments in capital inputs. Hence labour and capital may be complementary in the growth process, and initiatives that increase the health of the labour force would reap additional returns through their supplementary effects on physical capital. Although this link has been broadly noted, there is as yet little evidence for it on a more microeconomic within-country scale. Further work on this topic is thus called for.

References

- Adhvaryu, Achyuta, Kala, Namrata and Anant Nyshadham. 2016a. “The Light and the Heat: Productivity Co-benefits of Energy-saving Technology.” IGC Working Paper.
- Adhvaryu, Achyuta, Kala, Namrata and Anant Nyshadham. 2016b. “Management and Shocks to Worker Productivity.” IGC Working Paper.
- Afridi, Farzana, Barooah, Bidisha and Rohini Somanathan. 2013. “School Meals and Classroom Effort: Evidence from India.” IGC Working Paper F-35021-INC-1.
- Ashraf, Quamrul, Lester, Ashley and David Weil. 2008. “When Does Improving Health Raise GDP?” NBER Macroeconomics Annual 2008, University of Chicago Press.
- Ashraf, Quamrul, Weil, David and Joshua Wilde. 2013. “The Effect of Fertility Reduction on Economic Growth,” *Population and Development Review* 39(1): 97-130.
- Banerjee, Abhijit, Bharadwaj, Anjali, Pande, Rohini and Michael Walton. 2010. “Investigating the Relationship between Poor Sanitation Infrastructure and Water Quality in Delhi’s Slums.” IGC working paper.
- Barnwal, Prabhat, van Geen, Alexander, and Chander Kumar Singh. 2014. “Household Responses in 26 Bihar Villages One Year after Tube wells Were Tested for Arsenic for a Fee.” IGC Project.
- Berg, Erlend, Ghatak, Maitreesh, Manjula, R., Rajasekhar D. and Sanchari Roy. 2012. “Motivating Knowledge Agents: Can Incentive Pay Overcome Social Distance?” IGC Working Paper F-35010-INC-1.
- Berry, James, Mehta, Saurabh, Mukherjee, Priya and Gauri Kartini Shastri. 2016. “Elucidating Avenues for Corruption: Micronutrient Fortification Strategies in India’s Midday Meals Program.” IGC Project.
- Brainerd, Elizabeth and Nidhiya Menon. 2014. “Seasonal Effects of Water Quality: The Hidden Costs of the Green Revolution to Infant and Child Health in India,” *Journal of Development Economics* 07:49-64.
- Coffey, Diane, Gupta, Aashish, Hathi, Payal, Spears, Dean, Srivastav, Nikhil and Sangita Vyas. 2015. “Culture and the Health Transition: Understanding Sanitation Behavior in Rural North India.” IGC Working Paper F-35114-INC-1.
- Cutler, David, Deaton, Angus and Adriana Lleras-Muney. 2006. “The Determinants of Mortality,” *Journal of Economic Perspectives* 20(3): 97-120.
- Chaudhury Nazmul, Hammer Jeffrey, Kremer Michael, Muralidharan

Karthik and F. Halsey Rogers. “Missing in Action: Teacher and Health Worker Absence in Developing Countries”, *Journal of Economic Perspectives* 20(1):91-116.

Das, Jishnu, Hammer, Jeffrey and Kenneth Leonard. 2008. “The Quality of Medical Advice in Low-Income Countries,” *Journal of Economic Perspectives* 22(2): 93-114.

Debnath, Sisir and Tarun Jain. 2015. “Social Networks and Health Insurance Utilization.” IGC Working Paper F-35304-INC-1.

Do, Quy-Toan, Joshi, Shareen and Samuel Stolper. 2016. “Can Environmental Policy Reduce Infant Mortality? Evidence from the Ganga Pollution Cases.” IGC Working Paper E-35116-INC- 2.

Van Geen, Alexander and Chander Kumar Singh. 2013. “Piloting a Novel Delivery Mechanism of a Critical Public Health Service in India: Arsenic Testing of Tube well Water in the Field for a Fee.” IGC Policy brief 35049.

Jayachandran, Seema and Rohini Pande. 2015. “Why Are Indian Children So Short? The Role of Birth Order and Son Preference.” IGC Working Paper F-35034-INC-1.

Kinnan, Cynthia, Malani, Anup and Alessandra Voena. 2016. “Impact Evaluation of a Public Health Insurance Plan in India: Post Health Event Survey Pilot.”

Kjelsrud, Anders. 2016. “Food Security, Malnutrition and the Incidence of Poverty in India.” IGC Project.

Lemos, Renata and Daniela Scur. 2012. “Could Poor Management be Holding Back Development.?” IGC Working Paper F-6006-INC-1. 35

Menon, Nidhiya. 2016. “Christianity and Infant Health in India.” Working Paper. Schofield, Heather. 2014. “The Economic Costs of Low Caloric Intake: Evidence from India.” Working Paper.

Weil, David and Gauri Kartini Shastri. 2003. “How Much of Cross-Country Income Variation is Explained by Health?” *Journal of the European Economic Association* 1(2/3): 387-396. 36

Weil, David. 2007. “Accounting for the Effect of Health on Economic Growth,” *Quarterly Journal of Economics* 122(3): 1265-1306.