# TABLE OF CONTENTS

1. **Overview** .......................................................................................................................... 1  
   1.1. Urban health advantages ................................................................................................. 1  
   1.2. Urban health penalties .................................................................................................... 5  
   1.3. Policy responses .............................................................................................................. 10  
   1.4. Conclusions .................................................................................................................... 14  

2. **Introduction** ....................................................................................................................... 17  
   2.1. Urban health advantage and penalty .............................................................................. 17  
   2.2. Methodology .................................................................................................................. 18  

3. **Urban health system governance and organization** ....................................................... 20  
   3.1. Division of responsibilities ............................................................................................ 20  
   3.2. Policy directions ............................................................................................................ 22  
   3.3. Case studies ................................................................................................................... 27  

4. **Urban demographics and epidemiology** ...................................................................... 41  
   4.1. The demographic context .............................................................................................. 41  
   4.2. Epidemiology ................................................................................................................ 45  
   4.3. Summary ...................................................................................................................... 58  

5. **Service Utilization** .......................................................................................................... 60  
   5.1. Service utilization ........................................................................................................... 60  
   5.2. Use of government and private-sector health care services .......................................... 62  
   5.3. Evidence from the cities and their states ....................................................................... 63  
   5.4. Summary ...................................................................................................................... 66  

6. **Disparities** ......................................................................................................................... 68  
   6.1. Disparities in outcomes ................................................................................................. 70  
   6.2. Disparities in service utilization ..................................................................................... 75  
   6.3. Differences in private sector health service utilization .................................................. 78  
   6.4. Differences in household health expenditures .............................................................. 80  
   6.5. Urban slums ................................................................................................................... 83  

7. **Urban water and sanitation** ........................................................................................... 88  
   7.1. The state of urban water and toilets: coverage .............................................................. 88  
   7.2. The importance of public sanitation ............................................................................. 94  
   7.3. Increasing coverage and improving quality of services: the challenges ....................... 94  

8. **References** ....................................................................................................................... 98
1. OVERVIEW

India’s urban population is large and growing. In 2014, India’s total population was about 1.3 billion. (World Bank, 2015) Between 1991 and 2011, the proportion of the population of India living in urban areas rose from 26 to 32 percent (377 million). However, these figures are based on an administrative definition for urban areas that likely results in an underestimation of the size of the urban population in India. An alternative measure, the agglomeration index, indicates that already in 2008, more than half of the country’s population lived in urban areas, (World Bank, 2013; Uchida and Nelson, 2008) a figure more consistent with historical experience and with India’s economic growth, which averaged 7.2 percent annually during 2000-2010.

Urbanization is increasingly recognized as both accompanying and fostering economic growth through agglomeration economies. Economic benefits of agglomeration come about through improved access to labor, suppliers, markets and services, easier knowledge exchange, and increased specialization and economies of scale. At the same time, congestion costs can counteract the benefits of agglomeration, as increasing size and density of cities raises costs and affects living standards, including through increased risks of disease, accidents and crime. (Quigley, 2009; Ellis and Roberts, 2016)

Mirroring the agglomeration/congestion dichotomy are the notions of urban health advantage and urban health penalty. Perceptions of urban health in developing countries are shaped by the historical record of the Industrial Revolution in the 19th century, as the populations of rapidly growing cities suffered worse health conditions than rural populations. (Woods, 2003) However, by the early 20th century, improved sanitation, hygiene and medical technology, as well as reduced poverty and better access to nutritious foods, led to a reversal of urban-rural differences in health conditions. (World Bank, 2009) In currently developing countries, household surveys generally show that health and nutrition indicators are on average better in urban areas than in rural areas, although with significant inequalities within urban populations. (Van de Poel, O’Donnell and Van Doorslaer, 2007) This urban health advantage can be attributed to higher average incomes in urban areas compared to rural areas, improved hygiene and sanitation conditions as governments establish services in growing cities, and better access to health care services. (Leon, 2008)

This paper is an exploratory analysis of this dichotomy in the context of urban India, drawing on available literature, administrative information and government reports, census and household survey data, and qualitative information from visits to four case study cities – Chennai, Bhubaneswar, Meerut and Shillong.

1.1. Urban health advantages

Overall, the urban health advantage in India is considerable, although with significant exceptions. For example, in 2012, average under-five mortality in urban areas was 32.0 per 1,000, 45 percent lower than the rate of 58.0 per 1,000 in rural areas. (Figure 1.1) This urban-rural difference is of similar magnitude, although somewhat larger, than the 40 percent gap in 1992-93. A significant urban advantage is also evident with regard to service utilization indicators, although urban-rural differences have narrowed in recent years as coverage has improved faster in rural areas. The
urban-rural difference in delivery care coverage dropped from 251 percent (of the rural level) in 1992-93 to just 12 percent in 2014, when 89.2 percent of births among the urban population took place in health facilities, compared to 79.6 percent of births among the rural population.

**Figure 1.1. Trends in under-five mortality and institutional delivery, urban and rural, India, 1992-2014**

Sources: 1992-93, 1998-99 and 2005-06 National Family Health Surveys (1, 2 and 3); 2002-04 and 2007-08 District Level Household and Facility Survey (2 and 3); 2009 Coverage Evaluation Survey; 2013-14 Rapid Survey on Children; and 2014 National Sample Survey (71st Round).

**Figure 1.2. Trends in outpatient and inpatient medical care utilization, urban and rural, India, 1992-2014**


On average, urban populations also use more inpatient medical care than rural populations, although the urban advantage has disappeared with regard to outpatient care. (Figure 1.2) In 2014, in urban areas the annual hospitalization rate was 44 per 1,000 population, more than double the rate of 20 per 1,000 in 1995-96. The hospitalization rate in rural areas similarly more than doubled during the period, but the difference between the urban and rural rates remained similar.
The urban health advantage is evident at all household economic levels. In 2005-06, among the poorest 20 percent of households under-five mortality was 45.0 per 1,000 in the urban population compared to 63.2 per 1,000 in the rural population. There was similarly a large urban-rural difference in fertility at the poorest quintile, while the difference in child malnutrition was not as large. A similar pattern is seen with service utilization indicators. For example, in 2014, among the poorest quintile of urban households, 85.2 percent of births were in health facilities, compared to 74.9 percent among the poorest quintile of rural households. (Figure 1.3) This pattern is evident for such indicators as vaccination coverage, antenatal care utilization and contraceptive use, where the poorest urban quintile in the four states where our case studies are located consistently showed better results than the poorest rural quintile.

**Figure 1.3. Under-five mortality (2005-06) and institutional delivery (2014) by household economic status, urban and rural, India**

![Graph showing under-five mortality and institutional delivery by household economic status and urban-rural location.](image)

Sources: 2014 National Sample Survey (71st Round) and World Bank staff estimates from 2005-06 National Family Health Survey 3.

Better access to private sector health services accounts for a significant portion of urban-rural differences in service utilization. For example, in 2014, among the urban population, 47.5 percent of births were delivered in private sector health facilities, compared to 24.1 percent among the rural population. (2014 National Sample Survey, 71st Round) However, urban-rural differences in use of private sector services are not as large with regard to general outpatient and inpatient care. For example, in 2014, among the urban population, 69.4 percent of persons ill in the previous 15 days went to private providers for outpatient care, compared to 62.5 percent among the rural population. At the same time, there are considerable differences between cities in the use of private sector services. In Meerut, where use of the private sector for outpatient care was on average 89.6 percent, the poorest quartile tended to use the private sector slightly more, at 93 percent. In contrast, the poorest quartile in Chennai reported using the private sector considerably less (36.6 percent) than the average for the city (65.2 percent). (2005-06 National Family Health Survey 3)

While, as described in the next section, urban households, particularly the better-off, pay more out-of-pocket for health care than do rural households, they are somewhat more likely to have access
to insurance to cover health costs. On average, in 2014, 18.1 percent of urban residents received health insurance benefits, compared to 14.1 percent of rural residents. This difference is largely driven by higher coverage of better-off households by private health insurance, although benefits received from government health insurance are comparable in urban and rural areas. Urban residents are also less likely to need to resort to informal insurance mechanisms such as borrowing, selling assets and receiving contributions from others, in order to meet health care costs. Again, the urban-rural difference is higher at higher household economic levels. (Figure 1.4) On average, in 2014, 25.1 percent of urban households needed to draw on such coping mechanisms to pay hospital bills, compared to 32.2 percent of rural households.

Figure 1.4. Health insurance benefits and sources of financing to meet health care costs, by household economic status, urban and rural India, 2014


An urban advantage is also manifested in access to water and adequate sanitation, services with significant effects on health and nutrition. In 2011, although most urban and rural households (98 and 96 percent respectively) used what is considered a safe source for drinking water, the water source for 71 percent of urban households was within their premises, compared to just 35 percent of rural households. While in urban India 20 percent of households did not have toilets, and 68 percent of these households defecated in the open, 70 percent of rural households did not have a toilet facility, of which 97 percent resorted to open defecation. (2011 Census) These urban-rural differences were evident at all levels of household economic status.

Better health, nutrition and population outcomes and service utilization indicators in urban areas are firstly reflective of better economic conditions in cities. For example, in 2011-12, average monthly per capita expenditure among the urban population was Rs 2,630 (US$ 52), compared to Rs 1,430 (US$ 28) among the rural population. (2011-12 National Sample Survey, 68th Round)

Urban health advantages are also partly due to some specific agglomeration economies, especially the concentration of health services in urban areas. This is the case with regard to private health services, but it is also true for government hospital services (although not government primary
health care services). The case studies point to the concentration of health services as an important agglomeration economy. Chennai, Bhubaneswar and Shillong all benefit from being state capitals, leading to concentration of hospital services in particular. Meerut’s proximity to Delhi provides access to tertiary hospital services.

A further potential agglomeration economy, closely tied to the urban economy overall, relates to the value of land in urban areas. It is estimated that governments in India could monetize their land holdings to generate as much as US$ 27 billion annually for urban development investments. (McKinsey & Company, 2010) A number of state and local urban governments, in Delhi for example, have traded access to land for private hospital development for commitments to reserve hospital beds for the urban poor, initiatives that have shown mixed success.¹ A more sophisticated effort is a planned public-private partnership in Bhubaneswar that involves development by a private partner of the Municipal Corporation’s network of hospital and outpatient services. The private entity is largely motivated by access to the location of the Municipal Corporation’s hospital on land that it would not otherwise be able to acquire or develop. This partnership provides an example of another potential agglomeration economy - innovation linked to the dynamism of the private sector in cities. Another example of innovation is high-volume and low cost surgical care provided by private hospitals, often purchased by government-financed insurance schemes, such as cardiac procedures provided by a Bangalore hospital to thousands of patients. (Mukherji and Swaminathan, 2013)

The population density of urban areas provides an inherent agglomeration economy in that it is easier and more cost effective to reach people with services, such as immunization. Investments in infrastructure and services, such water supply and sanitation, are necessarily more cost-effective with higher population densities.

Finally, the age distribution of the urban population in India may also point to an urban economic advantage, since in comparison with the age distribution of the rural population, the urban population has a greater proportion in the most economically productive ages between 20 and 59 years. In urban areas, this age group accounts for about 56 percent of the population, compared to about 48 percent in rural areas, suggesting that the so-called demographic dividend is currently centered on urban economies in India.

1.2. Urban health penalties

The major exception to the urban advantage in health, nutrition and population outcomes is the ratio of females to males, which is worse among urban populations compared to rural populations, worse among the better-off compared to the poor (in both urban and rural areas), and has been getting worse over time. The 2011 census found that among the urban population in India there were 902 girls for every 1,000 boys aged 0 to 6 years, while the ratio among the rural population was 919. There has been a deterioration among both urban and rural populations, as the ratios in 1991 were 935 and 948 respectively. Survey data in 2005-06 indicated that this urban penalty held

---

at every household economic level and that the sex ratio worsened at higher economic levels. (Figure 1.5) In the poorest quintile in urban areas, the number of girls for every 1,000 boys was 910, lower than in the poorest quintile in rural areas, where it was 923, but significantly better than in the highest quintile in urban areas, where it was 820. The lower sex ratio in urban areas is consistent with persistent cultural preference for sons combined with lower fertility, growing household economic resources providing greater access to ultrasound and abortion services, and greater availability of such services in urban areas. (Jha et al., 2011)

Figure 1.5. Child sex ratio by household economic status, urban and rural India, 2005-06

![Child sex ratio by household economic status, urban and rural India, 2005-06](image)


The urban-rural difference in sex ratios is apparent in 2011 census data for the districts where our city case studies are located. Consistent with national patterns, the lowest ratios are in Meerut District and the highest in Chennai and East Khasi Hills. Worse ratios in urban areas compared to rural areas of these districts are observed in Khorda District (which includes Bhubaneswar), Meerut District, and East Khasi Hills District (which includes Shillong). Nonetheless, Chennai provided an exception to the general pattern, as the ratio of 950 in urban Chennai was better than the rural average of 936 for the state.

There is also some indication that nutrition outcomes may be worse in some instances among the urban poor compared to the rural poor. In 2005-06, the national average rates of child stunting among the poorest quintiles in urban (53.6 percent) and rural areas (58.8 percent) were similarly very high, while in Tamil Nadu, the rate of 42.3 percent among the poorest urban quintile was higher than the rate of 35.6 percent among the poorest rural quintile. Although national surveys find that rates of reported diarrhea suffered by children are similar in urban and rural areas, in some cases, reported prevalence can be higher among urban populations. In Meghalaya, 4.8 percent of under-five children in urban areas had diarrhea in the two weeks prior to the survey, compared to 2.8 percent in rural areas. This is likely related to poor sanitation in urban areas.

Some infectious diseases are associated with urban areas, although definitive conclusions cannot be drawn due to uncertainties about incidence in both urban and rural areas. Tuberculosis has long
been associated with urban congestion and poor living conditions in slums. While studies in India have found higher prevalence among rural populations, a 2005 prevalence survey indicated higher risk infection among urban populations. (Chadha, 2005) Recent emergence of drug-resistant tuberculosis may be concentrated in particular urban areas, such as Mumbai. (Dalal et al., 2015) Incidence of the viral disease dengue is increasing worldwide, including in India, associated with urbanization. (Guha-Sapir and Schimmer, 2005) However, again, at least one study in India found similar prevalence in both urban and rural areas. (Tripathi et al., 2008) Dengue is transmitted by the aedes aegypti mosquito, which also carries the chikungunya and zika viruses; the mosquito’s habitat is adapted to urban conditions. India is estimated to contribute one-third (33 million infections in 2010) of the global burden of apparent dengue infections. (Bhatt et al., 2013). In 2015, the number of reported dengue cases in Delhi was the highest in 20 years.2

With regard to chronic, or non-communicable, diseases, the picture is mixed. Urban-rural differences in reported prevalence as well as risk factors such as tobacco differ in different circumstances. For example, self-reported prevalence of diabetes and hypertension were significantly higher in urban Khorda District (containing Bhubaneswar) than in the rural part of the district. This was the case in Meerut District with regard to diabetes, but not hypertension. (2012-13 Annual Health Survey) The presence of biometric signals of diabetes and hypertension was similar among urban and rural populations of East Khasi Hills District (containing Shillong). (2012-13 District Level Household and Facility Survey 4) Nationally, in 2005-06, tobacco use by men was lower in urban areas (28.7 percent) than in rural areas, and alcohol use was similar. (2015-06 National Family Health Survey 3)

Nonetheless, over-nutrition is clearly more prevalent among urban populations, posing increased risks for non-communicable diseases. In 2005-06, 15.9 percent of men were overweight or obese in urban India, compared to 5.6 percent in rural areas; the proportions for women were 23.5 percent and 7.4 percent in urban and rural areas respectively. (2005-06 National Family Health Survey)

Air pollution represents a significant urban health penalty. Ambient air pollution is estimated to contribute to 3 percent of the total burden of disease in India, and pollution levels – from vehicles, industry, electricity generation and heating and cooking – are likely higher in urban areas. Air pollution in the form of fine particulate matter (PM) (particularly particles that are less than 10 or 2.5 microns in diameter, PM_{10} and PM_{2.5} respectively), penetrates deep into the lungs and is associated with cardiovascular and respiratory diseases, lung cancer and mortality. One study estimates that 650,000 premature deaths in India each year are associated with air pollution. (Lelieveld, Evans, Fnais, Giannadaki, & Pozzer, 2015) Concentrations of PM_{2.5} tend to be higher in larger and more densely populated cities. Air pollution in Delhi in particular has been characterized as among the worst in the world. For the more dangerous PM_{2.5}, in 2013, Delhi had mean annual levels that were almost 15 times higher than guidelines, along with Patna and Gwalior. Among our case study cities, Meerut had five times the recommended level of PM_{2.5} and six times the recommended PM_{10} levels, while the other cities were closer to guidelines. (World Health Organization, 2014). Nonetheless, household or indoor air pollution is estimated to

---

contribute a larger proportion of the national disease burden (6 percent), and may be a greater problem in rural areas where indoor cooking and heating fires are more prevalent. (Balakrishnan, Coen and Smith, 2014) Among our case studies, self-reported asthma is higher in rural Khorda and Meerut Districts than in urban areas of those districts. (2012-13 Annual Health Survey)

Injuries and deaths due to road traffic accidents, as well as crime, are thought to contribute to an urban health penalty, but again urban-rural contrasts are not clear. A nationally-representative mortality survey found that, in 2005, 2 percent of all deaths in India were due to road accidents, with a slightly higher rate among urban populations. (Hsiao, 2013) At the same time, surveys find that the rate of reported injuries of all kinds is higher in rural areas than in urban areas. For example, in Tamil Nadu, 4 percent of the urban population reported suffering any type of injury, compared to 5.4 percent of the rural population. (2012-13 District Level Household and Facility Survey 4)

Overall, even though child mortality and the burden of infectious diseases generally are lower among urban populations, maternal and child health conditions still represent a significant challenge. At the same time, it is evident that injuries and non-communicable diseases, along with associated risk factors like over-nutrition and air pollution, present important and likely growing burdens on urban populations. This dual burden of disease may represent somewhat of an urban health penalty, although the pattern also characterizes rural populations.

**Figure 1.6. Household health expenditures by household economic status, urban and rural India, 2011-12**

With regard to service utilization, the main exception to the urban advantage is government-provided nutrition services, which are used more by rural populations and by the poor. Overall, in 2005-06, 10.0 percent of under-six children in urban areas received supplementary nutrition from government services, compared to 22.7 percent of rural children. Among the poorest quintile, these proportions were 16.9 percent of urban children and 25.9 percent of rural children. (2005-06 National Family Health Survey 3)

Utilization of government nutrition services is a reflection of a general pattern of urban populations using less government services, particularly at the primary level, compared to rural populations,
although differences are lower among the poor. For example, in 2014, among the urban population, 41.7 percent of births were delivered in government health facilities, compared to 55.5 percent among the rural population. In the poorest urban quintile, the proportion was 53.5 percent, compared 58.0 percent in the poorest rural quintile. (Figure 1.3) Other indicators of reproductive and child health service utilization show that urban populations are less likely to use government services than rural populations. Similarly, in 2014, use of general outpatient care from government health services was lower in urban areas (18.7 percent) compared to rural areas (24.7 percent). However, as an indication that government hospital services are more available in urban areas, urban populations used more government inpatient services (18 percent) compared to rural populations (11 percent).

Reflecting greater use of health services, especially private sector health services, higher out-of-pocket spending on health care by urban households can be considered an urban penalty. In 2011-12, average monthly health expenditures by urban households totaled Rs 146 (US$ 2.90), compared to Rs 95 (US$ 1.89) by rural households. (2011-12 National Sample Survey, 68th Round). However, health spending by the poorest in both urban and rural areas was quite similar in both absolute terms and as a proportion of total household consumption expenditures. As household economic status increased, household spending on health care increased, both in rupee terms and as a proportion of total expenditures, and the urban-rural gap increased. (Figure 1.6) Thus, this urban penalty is mostly felt by the better-off, reflecting their better access to private health care services, but, as noted above, better-off households in urban areas have better access to formal insurance and are less likely to use informal insurance mechanisms to cover health care costs. On the other hand, urban populations benefit slightly less from government-supported health insurance (12.0 percent), compared to rural populations (13.1 percent). (2014 National Sample Survey, 71st Round)

Disparities in health, nutrition and population outcomes and service utilization can also be considered an urban health penalty, although they are just as relevant for rural populations. Mirroring disparities between states across India, linked to differing economic conditions, there are considerable differences between the four city case studies, with indicators generally better in Chennai, followed by Bhubaneswar and Shillong, and lastly Meerut. In 2005-06, under-five mortality among the poorest quartile in Chennai was 44.8 per 1,000, considerably lower than the overall average in Meerut (62.8) and half the rate among the poorest quartile in Meerut (83.9). (2005-06 National Family Health Survey 3)

Within urban populations, indicators generally (except sex ratio and out-of-pocket expenditures) show improvements with increased household economic status. In 2005-06, under-five mortality among the highest household economic quintile among the urban population was 19.9 per 1,000, less than half the rate of 45.0 among the lowest urban quintile. Similarly, in 2014, while 95.9 percent of births among the highest urban quintile were delivered in health facilities, 85.2 percent of births among the lowest urban quintile were delivered in an institutional setting. (Figure 1.3) In 2014, while 38.4 percent of urban households in the highest economic quintile received benefits from health insurance, the proportion among urban households in the poorest quintile was 9.5 percent. (Figure 1.6)
Urban slums are the most visible concentration of the variety of congestion costs associated with urbanization, including urban health penalties. Because slum populations are socio-economically heterogeneous, health outcome and service utilization indicators in slums are generally better than those of the poorest households in the urban population, but also generally worse than overall urban averages. The 2011 census enumerated 65.5 million people living in slums, or around 17 percent of the total urban population of 377 million. Meerut and Chennai are among the cities with the highest proportion of their populations living in slums, at around 40 percent. In 2005-06, under-five mortality among the slum population in Meerut was 86.1 per 1,000, compared to 69.4 among the population living outside of slums; in Chennai, these estimates were 46.3 and 31.5 respectively. Utilization of various types of health care and nutrition services by slum inhabitants is lower than by non-slum populations, while slum populations are more likely to make use of government health services, even though government health facilities are generally not located in slums. At the same time, a 2012 survey found that between 15 and 29 percent of surveyed slums experienced improvements in medical facilities over the previous 5 years. (2012 National Sample Survey, 69th Round)

Slum residents also suffer from penalties (in relation to the urban population as a whole) with regard to water and sanitation. Although 65 percent of slum households have access to water from an improved source, the water source is located within their premises for only 42 percent, as compared to the urban average of 71 percent. More strikingly, 34 percent of slum households do not have a toilet facility in their premises, compared to the urban average of less than 20 percent, and almost one in five slum residents defecate in the open. (2011 Census)

1.3. Policy responses

Implicit in the notion of congestion costs, which restrain the acceleration of economic growth fostered by urbanization, is the proposition that governments can and should reduce these costs in order to maximize the benefits of urbanization. (Ellis and Roberts, 2016) From this perspective, despite the fact that, with regard to health, nutrition, and population, urban populations in India are generally doing better than rural populations, it is likely that they could be doing even better, and that this would enhance the social and economic benefits of urbanization. This view is consistent with the broader notion that better health, nutrition and population conditions contribute to improved human capital, increasing the population’s capacity to pursue economic development. (Sachs, 2001) Even more broadly, improved health and nutrition are considered development objectives in themselves, (Sen, 1999) which should motivate government action to improve conditions for the urban poor in particular.

India’s constitution assigns to state governments responsibility for local administration, health services, and water supply and sanitation. The 73rd and 74th amendments to the constitution, adopted in 1992, set out standards for how rural and urban local governments respectively should be organized, providing lists of options for local government responsibilities to be devolved by state governments. This was to a great extent motivated by the notion that empowered local governments would be more responsive to local demands for better social services. (Mullen, 2011) However, in contrast with rural local governments, possible responsibilities for urban local
governments listed under the 74th amendment do not include services such as education and health care, focusing on urban infrastructure such as water supply and sanitation and. “Public health” is mentioned, but the term refers to environmental hygiene and sanitation rather than medical services.

Given the dramatic growth of cities in India, administrative fragmentation is common as a given urban area may be governed by a combination of a long-standing municipal corporation in the historical center of the city, other urban local governments in parts of the city that have grown over time, and state and local government structures (i.e. Districts, Blocks, Panchayats) in place for newly-urban areas that are still considered administratively as rural. For example, the Municipal Corporation of Chennai recently expanded, gaining a population of about 2.5 million, in order to encompass urban areas on its periphery, but another 1.5 million people in the larger urban agglomeration of Chennai still remain outside its boundaries. In addition, within cities there can be differences in the administrative status of neighborhoods, particularly differences between slums and established neighborhoods and between different categories of slums, which may be officially-recognized or not, affecting extension of government services. Among the over 3,000 slums in Chennai, only 751 are “notified,” or officially recognized under relevant legislation. In Bhubaneswar, 436 slums were enumerated by the 2011 census, of which 99 were authorized. Administrative fragmentation contributes to considerable differences in access to services. In Chennai, access to treated drinking water ranges from 46 percent of households in ward 110 to 94 percent in ward 15. (2011 Census)

There are large differences in the structures and capacities of urban governments in India. The municipal corporations of several large cities, notably Mumbai, Chennai and Kolkata, benefit from significant resources and capacity due to their historical legacies. Along with managing transport, water, sanitation and other infrastructure and systems associated with urban government, these and some other large cities provide health services through their own networks of facilities and staff. The Chennai Municipal Corporation runs almost 150 primary health care facilities of different types, while the Bhubaneswar Municipal Corporation manages a hospital and a half dozen primary facilities. However, in most urban areas in India, government health services are part of state government systems. This is the case in Meerut and Shillong.

Observers have suggested that until about a decade ago, the central government’s response to urbanization was characterized by neglect, if not active discouragement. The political economy of urban areas has been described as a situation where the middle class is able to exert its political influence in order to receive basic services, notably water and sanitation, while poor and slum populations struggle to influence governments to make the necessary investments in public infrastructure for their benefit. (Chaplin, 2011) However, recent central government initiatives mark recognition of the need to effectively manage urbanization as a force for economic growth. (Mukhopadhyay, 2006) These focus on urban transport, water and sanitation infrastructure, housing, and slum resettlement and development.

In the health sector, larger government hospitals are located in urban areas, but the main focus of government support to primary health care has been on rural areas. There are less than 2,000
government primary health care facilities designated as urban facilities, (Government of India, 2013c) compared to more than 25,000 Primary Health Centres in rural areas. (Government of India, 2015a) The central government’s flagship investment program, started in 2005, was called the National Rural Health Mission and did not include investment plans for health services managed by urban local governments.

A National Urban Health Mission was approved by the central government in 2013, when both the rural and urban programs were subsumed under the National Health Mission. The urban program adopted a similar approach as the National Rural Health Mission, with objectives for availability of different levels of government services, including community health workers, auxiliary nurse midwives, Urban Primary Health Centres and Urban Community Health Centres. (Government of India, 2013a) With an urban population of 377 million, this would imply investment in about 5,000 new Urban Primary Health Centres and 1,000 Urban Community Health Centres. Support for community-based organizations is also planned. Administration of the Urban Health Mission is integrated with the existing implementation of the National Rural Health Mission, led by the state governments, although the program encourages “active participation” of urban local governments. Possible exceptions are Delhi, Mumbai, Kolkata, Chennai, Bengaluru, Hyderabad and Ahmedabad, where municipal corporations may take the lead in implementation. (Government of India, 2013a) In our city case studies, the urban health investment program is largely at the planning stage, with initial work focused on upgrading existing facilities. Chennai has the most ambitious plans, aiming to create 20 new Urban Primary Health Centres and proposing support to 15,000 community-based organizations (Mahila Arogya Samitis). In contrast with the efforts mentioned above to leverage the value of government land to improve access to hospital services by the poor, land values and availability have presented a barrier to government investment in new urban primary health care infrastructure. (Government of India, 2014b)

In fiscal year 2014-15, the budget for the National Health Mission was Rs 220 billion (US$ 3.6 billion), of which Rs 20 billion (US$ 315 million) was allocated for investments under the urban health program. The annual budget was similar (US$ 320 million) for the central government’s investment program for new tertiary-level institutions in urban centers across the country.

Another major policy direction in the health sector in recent years, taken by the central and some state governments, involves government-financed health insurance for the poor. These programs provide coverage for inpatient services for eligible households, purchasing services from both government and private hospitals. A total of 36.3 million households are currently enrolled in the central government health insurance program targeting poor households, and it has been estimated that by 2015, about 500 million people will have become eligible for benefits under various central and state government insurance programs. (La Forgia and Nagpal, 2012) For example, both government and non-government hospital services in Shillong provide services

---


purchased by the state government’s Megha Health Insurance Scheme based on the central government program to which the state government has added resources in order for the entire state population to be eligible.

The 2010 Clinical Establishments Act provides a legislative basis for state governments to regulate private sector health care providers.\(^5\) The Act requires health facilities to be registered and to meet minimum requirements to be defined for different types of services. The Act currently applies to nine states. However, detailed regulations and guidelines for implementation of the Act, including minimum standards, have not yet been adopted, hampering effective implementation. Although Uttar Pradesh has adopted the national legislation, implementation is still limited to the requirement for facilities to register with the state government. Over 2,300 private health care providers are registered in Meerut, but no estimates are available of the substantial number of unqualified providers. Experience with government-financed health insurance schemes indicates that regulation and quality control of private sector providers is likely to be most effective when linked to government purchasing of services.

Governments in India spend about 1 percent of GDP on health, two-thirds of which comes from state governments. (Government of India, 2014c) However, the programs described above illustrate how the central government’s fiscal power has been used to set national strategies and standards. The financing of these programs, as well as, in nutrition, of the Integrated Child Development Services, has until recently been split 75:25 between the central and state governments. Between 2005-06 and 2014-15, central government funding for the National (Rural) Health Mission rose from Rs 44.3 billion (US$ 1.0 billion) to Rs 171.2 billion (US$ 2.8 billion). (Government of India, 2015a) Central financing of the Integrated Child Development Services was Rs 54.0 billion (US$ 1.3 billion) in 2007-08, rising to Rs 162.7 billion (US$ 2.7 billion) in 2014-15. (Government of India. 2015b) However, with the theme of “cooperative federalism,” the central and state governments are moving towards greater unconditional fiscal transfers to the states and less funding tied to centrally-directed programs. In particular, the proportion of tax revenue transferred to the states by the central government has risen from 32 percent to 42 percent, while the number of central government schemes will be cut, and the center-state financing ratio will be changed to 60:40 for the National Health Mission, Integrated Child Development Services, and other central schemes. (Government of India, 2015f)

This direction in fiscal policy means that state governments will have increasing importance for urban health and nutrition services. This is all the more the case since, in contrast to the thrust of development of rural local governments, health and nutrition services are not envisioned as part of urban government responsibilities, with the possible exception of large municipalities that manage existing health services. Nonetheless, a large proportion of funding for the National Health Mission will still be provided by the central government (60 percent), so that the program will remain an important tool for setting the agenda as well as for leveraging state government funding. Over the past several years, there has been debate at the national level over the direction of health policy (High Level Expert Group for Universal Health Coverage, 2011), and a draft strategy has been

---

formulated (Government of India, 2014c), but this has not been finalized due to disagreement over the respective roles of government-managed and private sector health services,⁶ as well as the strategy’s fiscal implications.⁷

1.4. Conclusions

This exploratory analysis provides an overview of the status of health, nutrition and population in urban India, putting basic data on the table as well as examining the specifics of four cities. Overall, we find that there is a considerable urban health advantage, drawing on agglomeration economies related to the concentration of health services in cities, as well as contributing to urbanization as an engine for economic growth. However, there are important exceptions, particularly relating to the urban sex ratio, child malnutrition in some cases, especially among the poor, some infectious diseases such as dengue, and the growing burden of injuries and non-communicable diseases. Urban populations, while benefiting earlier than rural populations from the demographic dividend, are also faced earlier with a dual burden of disease. Large disparities, between the urban poor and better-off, as well as between cities in different parts of the country, are also major challenges.

With regard to the policy response to congestion costs associated with health, nutrition and population, although government hospital services are concentrated in urban areas, until recently, government investment in primary health care and nutrition services has been focused on rural areas. Some of the trend data on basic services such as immunization and delivery care, which show faster improvements in rural areas along with growing use of government services, suggest that investment in government primary health services can have an impact on improving coverage. This is the main thrust of the central government’s urban health investment program. At the same time, there has been positive experience, at a feasible fiscal cost, with government-financed health insurance covering inpatient care and targeting the poor. (Sood et al., 2014) These two strands of government policy are likely to continue and, in our view, make sense given our understanding of the overall picture of urban health, service delivery and financing. That is, continuation of this dual strategy involves improved supply of government-delivered maternal and child health (and nutrition) services in urban areas, combined with government financing of higher-level and more costly hospital care for the poor in order to prevent catastrophic and impoverishing out-of-pocket expenditures. The growing burden of non-communicable diseases indicates that the package of primary-level services delivered by the government in urban areas should also include relevant cost-effective services to address non-communicable diseases, the evidence base for which is becoming established based on experience in India. (Krishnan et al., 2013; Basu, Bendavid and Sood, 2015)

It is likely that households are better able to self-insure to cover more predictable ongoing outpatient care (through coping mechanisms such as borrowing or selling assets), as opposed to large unpredictable expenses for high-level hospital care. (Gertler and Gruber, 2002) This is the justification for targeting limited fiscal resources to cover higher-level inpatient services for the

---

poor. At the same time, the private sector under-supplies basic maternal and child health services (and perhaps also cost-effective non-communicable disease services); thus the justification for allocating resources to government provision.

These two policy directions, however, do not adequately deal with where the bulk of health care services are provided and household out-of-pocket spending are incurred (especially in urban areas): private sector outpatient services. While it has been pointed out that current government insurance schemes, focusing on inpatient care, do not address most out-of-pocket health spending (the majority of which is spent on medicines) (Shahrawat and Rao, 2012), advocates have pushed for greater investment in government delivery of outpatient services (High Level Expert Group for Universal Health Coverage, 2011), achieving temporary success in a short-lived government commitment to provide medicines free-of-charge. (Nagarajan, 2015) Policymakers are balking at the fiscal implications while questioning the feasibility of the government system replacing the preponderant private sector supply of general outpatient care. Over time, as their fiscal resources and capacities grow, governments in India will surely start to undertake a combination of supplying and purchasing general outpatient health services. In the meantime, government action to improve urban health, nutrition and population will likely follow the existing policy directions of strengthening basic preventive, maternal and child health (and perhaps non-communicable disease) services at the primary level, along with supplying (through government hospitals) and financing (through insurance schemes purchasing private services) high-cost hospital services for the poor. This will continue to leave the bulk of general outpatient care to be paid for out-of-pocket and supplied by the private sector.

At the same time, ongoing changes to fiscal federalism that are empowering state governments may in the medium term result in state-level experimentation with different strategies. One could envision, for example, a strategy in Meerut (where 93 percent of the poorest quartile generally use private services when sick) focused on purchasing private services and a strategy in Chennai (where 63 percent of the poorest quartile generally use government services) focused on government service provision targeting the urban poor.

Government action is also needed to address congestion costs in other sectors that have large impacts on health and nutrition, especially water supply and sanitation, as well as air and water pollution control. Other urban development issues, such as urban planning, land and property tenure, and transport, also have effects on health and nutrition, both direct, through improved living conditions, and indirect, through improved economic growth and household economic levels. Similar to the health sector, the national government is supporting a number of programs that, in conjunction with state and local governments, aim to address these issues. However, in contrast with the health sector, there is also a considerable emphasis on strengthening the responsibilities and capacities of urban local governments in these areas. Part of the rationale is the notion that urban communities will be able to more easily hold accountable for service delivery their elected local governments in comparison to state or national governments. Indeed, it is suggested that urban development investments will not be effective as long as it is the case that urban residents cannot vote out the real decision-makers at the state and central levels. (Mukhopadhyay, 2006)
In the health sector, however, this hoped-for dynamic will not be relevant to most urban areas in India. (Even the large municipal corporations that will continue to run health services will rely on central and state government funding, particularly for investment). Other accountability mechanisms will be all the more important for improvement in urban health and nutrition conditions. These could include regular measurement of key indicators (including through the type of household surveys that provide much of the data for this analysis), effective use of information systems and routine service delivery data, data transparency, substantive involvement of community-based organizations, accountability mechanisms built into health and nutrition programs themselves such as patient feedback systems, and clearly defined service packages and benefits. At a minimum, urban health investment and service delivery programs implemented by state governments should include substantive involvement of elected urban local governments.
2. INTRODUCTION

It is increasingly recognized that India is urbanizing rapidly, that urbanization is accompanying and contributing to economic growth, but that living conditions in urban areas are often not adequate, particularly for the poor. Health, nutrition and population conditions are an important part of the urbanization equation. This paper explores the extent to which health, nutrition and population conditions may be contributing to the benefits of urbanization, as well as the extent to which they may reflect its costs. This is an exploratory study that reviews available information on health, nutrition, and population conditions in urban India. Recognizing that national generalizations and statistics may mask considerable diversity in how the opportunities and challenges of urbanization and health are met in different cities across the country, this paper also draws on specifics of four case studies: Chennai in Tamil Nadu, Bhubaneswar in Odisha, Meerut in Uttar Pradesh, and Shillong in Meghalaya.

The preceding summary section provides an overview of this exploratory analysis, discussing the patterns and issues that emerge, along with policy implications. This introductory section briefly discusses how urbanization and health may be conceptualized, and describes the methodology of this paper. Section 3 describes governance and organization of urban health systems. Sections 4 and 5 review data on the demographic and epidemiological situation in urban India, as well as service utilization. Section 6 analyzes disparities in health outcomes and access to services, and section 7 focuses on water supply and sanitation in urban areas.

2.1. Urban health advantage and penalty

Economic development is accompanied by increased urbanization. Currently, in developing countries, the proportion of the population that lives in urban areas is rising in conjunction with economic growth, mirroring the historical pattern of developed countries. The transition from an agrarian economy to one dominated by manufacturing and services is accompanied by the growth of towns and cities where these industries are mostly located. (World Bank, 2009) At the same time, urbanization in itself is thought to foster economic growth through what are called in the economics literature agglomeration economies. These come about through improved access to labor, suppliers and markets, facilitated knowledge exchange, increased specialization, economies of scale, increased productivity, greater opportunities for innovation and entrepreneurship and improved access to services. (Quigley, 2009) At the same time, congestion forces can counteract the economic growth effects of agglomeration, as increasing size and density of cities raises costs and affects living standards. Congestion forces can include high land prices and wages, unpriced negative externalities such as traffic jams and pollution, unmet need for essential services, and effects of population density such as increased risks of disease, accidents and crime. (Quigley, 2009; Ellis and Roberts, 2016)

Mirroring the agglomeration/congestion dichotomy, the public health literature includes the notions of urban health advantage and urban health penalty. Perceptions of the relationship between urbanization and health in developing countries, like that between urbanization and socio-economic development more general, has been shaped by the historical experience of richer countries. During the Industrial Revolution in the 19th century, the populations of rapidly growing
cities in Western Europe suffered worse health conditions than rural populations due to crowding, poor housing and poor sanitation. Mortality exceeded fertility while the urban population nevertheless grew dramatically due to migration. (Woods, 2003) Crowding, poor housing, unsafe water supply, inadequate sanitation, environmental pollution, fires, violence, epidemics, alcohol abuse and lack of access to nutritional foods, were all factors contributing to the urban health penalty during this period, and indeed remain important today. In addition, growth in the burden of non-communicable diseases, as well as injuries and death due to road accidents, can plausibly be associated with increased urbanization. (Campbell and Campbell, 2007) Both historically and now, social alienation and inequalities among urban populations are thought to contribute to poor health outcomes, including mental health. (Galea and Vlahov, 2005) There is considerable focus on the health situation of poor populations in urban areas, including residents of slums. (Rice and Steinkopf Rice, 2009)

The historical experience of cities during the Industrial Revolution is that, by the early 20th century, improved sanitation, hygiene and medical technology, as well as reduced poverty and better access to nutritious foods, eventually led to a reversal of urban-rural differences in health conditions. (World Bank, 2009) In currently developing countries, household surveys have shown for some time that health and nutrition indicators are on average better in urban areas than in rural areas, although with significant inequalities within urban populations. (Van de Poel, O’Donnell and Van Doorslaer, 2007) This urban health advantage can be attributed to higher average incomes in urban areas compared to rural areas, improved hygiene and sanitation conditions as governments establish services in growing cities, and better access to health care services. Indeed, it became apparent in the 1970s and 80s that governments in many developing countries were devoting disproportionate resources to health services in urban areas, particularly hospital services available to the urban elite and middle class. At the same time, private sector health services are concentrated in cities, so that overall, urban populations have significantly greater access to health services than do rural populations. It has also been suggested that the health impacts of highly effective technologies, such as immunization, are multiplied in urban areas where concentrated populations are easier to reach. (Leon, 2008)

The urban health penalty can be considered as among the negative externalities of congestion, requiring government intervention in order to maximize the economic benefits of agglomeration. (World Bank, 2009) At the same time, the urban health advantage may make positive contributions to agglomeration economies. Concentration in cities of higher-level medical services and education may, like in other industries, involve productivity gains. (Baicker and Chandra, 2010) More available and higher quality health services may be a pull factor, contributing to attracting and retaining people in urban areas. More broadly, better health conditions may contribute to improved human capital, increasing the population’s capacity to pursue economic development. (Sachs, 2001) Finally, improved health can be considered as a development objective in itself (Sen, 1999).

2.2. Methodology

This is an exploratory analysis drawing on available literature, administrative information and
government reports, census and household survey data, and qualitative information from visits to
the four case study cities. This exploratory approach was necessary to provide an overview of a
subject – urban health in India – on which little is available in either published or grey literature.

We initially conducted a literature review that identified relevant published papers, reports and
data sources relevant to health in urban India. This reviewed a somewhat limited literature focused
on urban health in particular, some analysis of urban health issues in developing countries and only
a few studies focused on urban health in India. We then chose several cities in India as case studies.
Given the wide variety of urban contexts in India it is impossible to select a “typical” city to
examine. Selection criteria included that the cities together represent a range of contexts, sizes,
and institutional arrangements, and that there also be some pre-existing contact between the World
Bank and government authorities in order to facilitate access to stakeholders. We selected Chennai,
Bhubaneswar, Meerut and Shillong. Chennai presents a combination of being one of the half dozen
developing countries and only

large “metros” of over five million population, capital of a more economically wealthy southern
state with better social indicators, and governed by a well-established municipal government. On
the other hand, Meerut is a large non-capital city in one of the poorer states with poor social
indicators, and with a less well-established local government structure. Bhubaneswar falls
somewhere in between, as a middle-sized state capital, providing some examples of innovation in
the context of urban health. Shillong, although also a state capital, is a small city in a mountainous
area, providing an example from the North-East region of the country. The authors are cognizant
that these four cities are not sufficient to fully represent the range of urban contexts in the country,
but they provide considerable variation in important aspects that can deepen our understanding of
patterns evident in national data.

We collected background information on each city, and then visited the cities to interview a range
of stakeholders. These included government officials (at all levels, including in the fields of health,
medical education, water, and sanitation), local academics, non-governmental organization
representatives, service providers and patients at both public and private clinics. Reports on each
case study were drafted and drawn upon for this synthesis paper.

This synthesis paper uses the case studies as a basis to investigate a broad gamut of urban health
issues relevant for India. Administrative data from government programs in the case cities were
used, as well as district, state and national-level quantitative data from the 2011 census and a
number of household surveys, notably the series of National Family Health Surveys, Annual
Health Surveys, District Level Household and Facility Surveys, and National Sample Surveys.
3. URBAN HEALTH SYSTEM GOVERNANCE AND ORGANIZATION

This section examines how the health sector in urban areas is organized by the central, state and local governments in India. It reviews the division of responsibilities between the different levels of government, recent policy directions, and how health system organization works in practice in the four city case studies.

3.1. Division of responsibilities

India’s constitution, adopted in 1950, includes, as part of its “Directive Principles of State Policy,” Article 47 on the government’s overall responsibilities in health and nutrition: “The State shall regard the raising of the level of nutrition and the standard of living of its people and the improvement of public health as among its primary duties […].” (Government of India, 2007) India’s government can be characterized as federal in structure, and the constitution sets out responsibilities for the central (Union) and state governments. State governments are clearly assigned responsibility for health services and other closely-related sectors such as water supply and sanitation. At the same time, the constitution’s list of responsibilities shared between the central and state governments includes numerous pieces of the health sector, including population control and family planning, mental health services, education, medical education and regulation of medical professions, vital statistics, and epidemics (across state borders). Economic and social planning, social security and social insurance, are also shared responsibilities. The central government has exclusive responsibility for international quarantine measures, tobacco taxation, and the regulation of goods, including pharmaceuticals, traded across state borders or exported.

In practice, the division of constitutional responsibilities has been characterized as imbalanced, as the state governments do not have fiscal powers commensurate with their constitutional responsibilities. The states can tax goods, but the central government possesses the power of income and corporate taxation. The central government’s fiscal power underlies interventions in areas of state government responsibility, including health and nutrition services. In conjunction with central financing and programs, the central government has a strong role in standard-setting, so that health and nutrition services are organized similarly across the country.

States are fully responsible for local government; however, with the 73rd and 74th amendments, adopted in 1992, the constitution sets out standards for how they are to be organized in rural and urban areas respectively. With these amendments, local governments were given status under the constitution, and were required to be elected, with one third of seats reserved for women. The amendments were to a great extent motivated by the notion that empowered local governments would be responsive to local demands, including for better social services. (Mullen, 2011) However, the process was driven by an impetus to reform local governance in rural areas, with the 74th amendment, relating to urban areas, included almost as an afterthought. (Ramanathan, 2007)

The 74th amendment set out three types of urban local governments: Nagar Panchayats for areas transitioning from rural to urban; Municipal Councils for smaller urban areas; and Municipal Corporations for larger urban areas. There are 2,108 Nagar Panchayats, 1,595 Municipal Councils, and 139 Municipal Corporations. (Indiastat)
The 73rd and 74th amendments provide latitude to state governments to decide on the functions that they devolve to local governments, drawing on separate lists of possible functions for rural and urban areas. The list of possible functions for rural local governments has a significant focus on service provision, including health ("hospitals, primary health centers and dispensaries"), family planning, nutrition ("women and child development"), education, subsidized food distribution, water supply and sanitation. In contrast, the list of possible functions for urban local governments focuses on urban infrastructure such as roads, sanitation and water supply, rather than on service delivery. The list does not include education and nutrition services, while it mentions "public health" in conjunction with sanitation and solid waste management, clearly referring to environmental health measures such as pollution and vector control and not to medical services. State-level legislation determines which functions are devolved to urban local governments. (States are free to choose to assign responsibilities to local governments other than those listed).

The 74th amendment envisions establishment of State Finance Commissions every five years to determine the financing of local governments by state governments. In practice, many states have not set up such commissions and, if they have, often do not apply their recommendations. Other potential sources of revenue for urban governments are limited; property taxes are not clearly linked to property values while fees for services such as water supply are similarly not directly linked to costs. This has been characterized as a situation of “rich cities, poor urban governments,” that do not have sufficient fiscal resources to fulfil their responsibilities. (Mehta and Mehta, 2010)

The 73rd and 74th amendments do not apply to tribal areas in Assam, Meghalaya, Tripura, Mizoram, and Nagaland, as well as parts of other states declared as "scheduled areas." Different types of arrangements for local government in these areas are specified in the constitution, including regional, district and local administrations. Health, education and other social services are listed as possible responsibilities of such bodies, which would apply to both rural and urban areas.

There are large differences in the structures and capacities of urban governments in India. The municipal corporations of several large cities, notably Mumbai, Chennai and Kolkata, benefit from significant resources and capacity due to their historical legacies, having been established several hundred years ago. Along with managing transport, water, sanitation and other infrastructure and systems associated with urban government, these and some other large cities provide health services through their own networks of staff and facilities. However, in most urban areas in India, health services are part of the state government system.

Delhi presents a particular case, as powers and responsibilities are shared between the national government, the government of the National Capital Territory (largely functioning like a state government), and three municipal corporations. Given the dramatic growth of cities in India, such administrative fragmentation is, in fact, the norm, as particular urban areas may be governed by a long-standing municipal corporation in the historical center of the city, other urban local governments in parts of the city that have grown over time, and state and local government structures (i.e. Districts, Blocks, Panchayats) in place for newly-urban areas that are still considered by the administration as rural. In addition, within cities there can be differences in the administrative status of neighborhoods, particularly differences between slums and established
neighborhoods and between different categories of slums, which may be officially-recognized or not, affecting extension of government services.

3.2. Policy directions

3.2.1. Urban development

Observers have suggested that until about a decade ago, the central government’s response to urbanization was characterized by neglect, if not active discouragement. The political economy of urban areas has been described as a situation where the middle class is able to exert its political influence in order to receive basic services, notably water and sanitation, while poor and slum populations struggle to influence governments to make the necessary investments in public infrastructure for their benefit. (Chaplin, 2011) However, initiation of the Jawaharlal Nehru Urban Renewal Mission in 2005 marked recognition of the need to effectively manage urbanization as a force for economic growth. (Mukhopadhyay, 2006) The program focused on urban infrastructure development, conditioning financing on implementation by the states of the measures included in the 74th amendment to the constitution, including electoral and administrative reforms. Recent initiatives further reflect the increasing policy priority given to managing and improving urbanization. Improved housing, particularly in slums, is the aim of *Rajiv Awas Yojana* (2013) as well as a proposed *Housing for All* program. The *Atal Mission for Rejuvenation and Urban Transformation* and the *Smart Cities Mission* (2015) focus on improving urban infrastructure, including water supply and sanitation. A recently-launched national program with the aim of ending open defecation in India by 2019, *Swachh Bharat* (2014), includes an urban component focused on building household and community toilets as well as improving solid waste management.

3.2.2. Health and nutrition services

In the health sector, larger and higher-level government hospitals, run by central, state and municipal governments, are located in urban areas, although the numbers of hospitals and beds in rural areas are significant. In 2013, there were over 1.4 million beds in over 13,000 hospitals in urban areas; this compares with about 500,000 beds in over 45,000 government hospitals in rural areas (including Community Health Centres). (Open Government Data Platform India) A major thrust of central government development policy in the sector focuses on tertiary-level medical education institutions. In 2012, the central government established in urban centers across the country six new tertiary-level hospitals on the model of its flagship All India Institute of Medical Sciences in Delhi, and intends to invest in at least a further ten institutions. The 2014-15 budget for this investment program was Rs 19,560 million (US$ 320 million).

With regard to primary health care, there have been long-standing national programs that cover both rural and urban areas, including in the areas of family planning, disease control and nutrition. With central and state government funding, these programs are implemented through the health services managed by state governments, as well as through those health services managed by some municipal governments. Nonetheless, the main focus of government support to primary health care has been on rural areas. There are less than 2,000 government primary health care facilities
designated as urban facilities (Urban Family Welfare Centres and Urban Health Posts), of which about 1,200 include a physician on staff. (Government of India, 2013c) In contrast, there are more than 25,000 Primary Health Centres in rural areas, all of which are supposed to be staffed by at least one physician (2,000 reportedly do not have a doctor on post). (Government of India, 2015a) Similarly, the Integrated Child Development Services (ICDS), the government’s main nutrition-related service delivery program, is largely focused on rural areas. There are over 1.3 million Anganwadi Centres in the country, the great majority of which are in rural areas.\(^8\) In 2013-14, 36.7 percent of children aged 6-36 months received supplementary food from an Anganwadi Centre in urban areas, compared to 53.8 percent in rural areas. (Government of India, 2015d)

The rural focus of government support to primary health care is exemplified by the fact that the central government’s flagship program, started in 2005, was called the National Rural Health Mission (NRHM). The NRHM encompassed various ongoing disease-specific and maternal and child health programs, along with investments and human resources aimed to improve state government primary health services. Support under specific programs was available to health services managed by municipal governments, the scale of which, as mentioned above, is quite limited, while investment plans for health services managed by urban local governments were not included in the program.

### 3.2.3. National Urban Health Mission

Although an urban health program was also discussed at the time the National Rural Health Mission was initiated, the National Urban Health Mission was not approved by the central government until 2013, when both the rural and urban programs were subsumed under the National Health Mission. The urban program adopted a similar approach as the National Rural Health Mission, with objectives for availability of different levels of government services. The program aims to have in place one community health worker (ASHA) for 200-500 urban households, one auxiliary nurse midwife (ANM) per 10,000 population,\(^9\) one Urban Primary Health Centre per 50-60,000 population, and one Urban Community Health Centre for 5-6 Urban Primary Health Centres. With an urban population of 377 million, this would imply investment in about 5,000 new Urban Primary Health Centres and 1,000 Urban Community Health Centres. The urban program guidelines include the possibility that services be delivered by private organizations, particularly non-profit. The NRHM strategy also envisions this, but implementation has been limited. The National Urban Health Mission’s stated objectives emphasize improving services for slum populations and other under-served groups. Support for community-based organizations, called Mahila Arogya Samiti, is envisioned, with a focus on slums. (Government of India, 2013a)

Administration of the Urban Health Mission is integrated with the existing implementation of the National Rural Health Mission, led by the state governments, although the program encourages “active participation” of urban local governments. Existing state and district-level implementation

---

\(^8\) The authors could not find data on the number of Anganwadi Centres in urban areas.

\(^9\) Unlike in rural areas, no health facility (Sub-Centre) is envisioned from which ANMs provide services. ANMs and Female Health Workers would be based at Urban Primary Health Centres and responsible for outreach services. (Government of India, 2013a)
structures have added the National Urban Health Mission to their responsibilities. Exceptions are Delhi, Mumbai, Kolkata, Chennai, Bengaluru, Hyderabad and Ahmedabad, where municipal corporations may take the lead in implementation. State governments have the freedom to decide to hand over implementation to urban governments in other large cities where they have the capacity. State plans and budgets are developed on the basis of city-specific plans for approval by the central government. The National Urban Health Mission targets 779 cities with a population above 50,000 as well as all district headquarters and state capitals. Urban areas with populations less than 50,000 are to be supported through the existing National Rural Health Mission mechanisms. (Government of India, 2013a)

The NUHM is in the initial stage of implementation, focused on institutional arrangements, planning, and investments in existing urban health facilities. The government recognizes that “the progress of implementation of National Urban Health Mission has not been satisfactory in many states. Most of the activities sanctioned under the programme have not been taken up and there is poor utilisation of the funds released under the programme.” In the government’s fiscal year 2014-15, the budget for the National Health Mission was Rs 220 billion (US$ 3.6 billion), of which Rs 20 billion (US$ 315 million) was allocated for investments under the urban health program.

3.2.4. Government-financed insurance schemes

The other major policy direction in the health sector in recent years, taken by the central and some state governments, involves government-financed health insurance for the poor. These programs provide coverage for a defined set of inpatient services for eligible households, purchasing services from both government and private hospitals. Long-standing government-subsidized programs for public sector workers have been joined by government-financed insurance aimed at households who possess a Below Poverty Line (BPL) card (issued by state governments, providing access to social benefits, notably subsidized food). The central government program, Rashtriya Swasthya Bima Yojana (RSBY), launched in 2008, covers secondary-level inpatient care up to an annual limit of Rs 30,000 (US$ 450). To be eligible for benefits, BPL households need to enroll and pay a nominal premium of Rs 30 (US$ 0.45) per family member. Started under the Ministry of Labour, the Ministry of Health and Family Welfare has recently been assigned responsibility for the program. Like other central schemes, RSBY is implemented by state governments, some of whom have added covered services and have expanded eligibility. (La Forgia and Nagpal, 2012)

Currently, 23 states participate in the program. Several large separate insurance programs, covering tertiary care services, have been put in place by the state governments of Andhra Pradesh, Tamil Nadu and Karnataka. (Sood et al., 2014) The Karnataka program does not involve an enrolment process or premium payment; BPL card holders are automatically eligible for benefits. A total of 36.3 million households are currently enrolled in RSBY, holding smart-cards issued by

---


the scheme, and 9.8 million hospitalizations have been covered since its inception.\textsuperscript{12} It has been estimated that by 2015, about 500 million people will have become eligible for benefits under such central and state government insurance programs. (La Forgia and Nagpal, 2012) The central government estimated that 13.7 percent of the urban population, or 52.8 million people, were below the poverty line in 2010-11. (The estimate for the rural population was 25.7 percent, or 216.5 million people). (Government of India, 2013d) However, state governments issue BPL cards to larger numbers of households on the basis of a variety of criteria. The 2014 National Sample Survey found that 12.0 percent of the urban population benefited from government health insurance, compared to 13.1 percent of rural inhabitants.\textsuperscript{13} In the poorest quintile in urban areas, this proportion was 7.7 percent, compared to 15.1 percent among the highest quintile.\textsuperscript{14} A significant proportion of the hospital services purchased by these schemes are provided by facilities in urban areas, particularly higher-level services.

3.2.5. Regulation of private sector health services

The central government has recently taken steps towards strengthening regulation of private sector health care services, which provide the majority of health care services in both urban and rural areas. The preponderance of private health care in urban areas in particular makes regulation a crucial aspect of government action on urban health. The 2010 Clinical Establishments Act provides a legislative basis for state governments to regulate private sector health care providers (although it also applies to government health facilities). The Act requires health facilities to be registered and to meet minimum requirements to be defined for different types of services. The law also requires health services to maintain records and provide information to the government, notably in cases of epidemics and disasters. It prescribes public posting of information on services and prices, as well as requiring that emergency services be provided when they are needed (to the extent of the facility’s capacity).\textsuperscript{15}

Because health care regulation is the responsibility of the states, state government legislatures would need to pass a resolution in order for the law to apply to their states. The Act currently applies to nine states. Detailed regulations and guidelines for implementation of the Act, including minimum standards, have not yet been adopted, hampering effective implementation. For the most part, adequate implementation capacity has not yet been put in place by state governments. Nonetheless, the Act provides a necessary legislative platform to start improving regulation of private health care services that are currently largely unregulated.

\textsuperscript{13} Note that these data refer to payments by health insurance for health care received by households. Other households may be eligible for or covered by insurance programs but have not needed the relevant health care services.
\textsuperscript{14} Government health insurance includes programs that cover public sector employees and their families as well as programs that benefit BPL households.
3.2.6. Fiscal federalism

Governments in India spend about 1 percent of GDP on health, two-thirds of which comes from state governments. (Government of India, 2014c) The central government’s fiscal power has been used to shape state government action in the health sector. Recently, as described above, this has been done through the National Health Mission and government-financed insurance schemes that purchase services from private (and to a lesser extent, public hospitals). The financing of these programs, as well as the Integrated Child Development Services, has been split 75:25 between the central and state governments.\textsuperscript{16} Between 2005-06 and 2014-15, central government funding for the National (Rural) Health Mission rose from Rs 44.3 billion (US$ 1.0 billion) to Rs 220 billion (US$ 3.6 billion). (Government of India, 2015a) Central financing of the Integrated Child Development Services was Rs 54.0 billion (US$ 1.3 billion) in 2007-08, rising to Rs 162.7 billion (US$ 2.7 billion) in 2014-15. (Government of India. 2015b)

However, under the term “cooperative federalism,” the central and state governments are moving towards a system of greater unconditional fiscal transfers to the states and less funding tied to centrally-designed and directed programs. In particular, the proportion of tax revenue transferred to the states by the central government has risen from 32 percent to 42 percent, while the number of central government schemes will be cut, and the center-state financing ratio will be changed to 60:40 for the National Health Mission, Integrated Child Development Services, and other central schemes. In addition, a greater proportion of the budgets of those schemes (25 percent) will be determined by individual state governments. (Government of India, 2015f) Consistent with this policy direction, central government funding allocations for the National Health Mission and Integrated Child Development Services were reduced in the 2015-16 national budget in comparison to the previous year. (Sharma, 2015)

This direction in fiscal policy means that state governments will have increasing importance for urban health and nutrition services. This is all the more the case since, in contrast to rural panchayats, health and nutrition services are generally not envisioned (under the 74\textsuperscript{th} amendment, for example) as part of urban government responsibilities. Possible exceptions are the municipal governments of large cities that manage existing health service systems. At the same time, the government’s main policy document on fiscal federalism recognizes that education, health, child nutrition, water supply and sanitation, are “broad sectors that fall under the category of overlapping responsibilities […] where principles and objectives of externality, redistribution and equalisation are critical.” (Government of India, 2015e) A large proportion of funding for the National Health Mission will still be provided by the central government (60 percent), leaving the program as an important tool for setting the agenda as well as for leveraging state government funding. Over the past several years, there has been debate at the national level over the direction of health policy (High Level Expert Group for Universal Health Coverage, 2011), and a draft strategy has been formulated (Government of India, 2014c), but this has not been finalized due to disagreement over

\textsuperscript{16} The financing split was 90:10 for the eight North East states, as well as Himachal Pradesh, Uttarakhand and Jammu and Kashmir, until recently called “Special Category” states.
the respective roles of government-managed and private sector health services,\textsuperscript{17} as well as the strategy’s fiscal implications.\textsuperscript{18}

### 3.3. Case studies

The four case studies provide illustrations of how the governance arrangements and policies described above have played out in a variety of ways across urban areas in India. Table 3.1 provides census data on the four case study cities that illustrate how administrative boundaries do not often coincide with the geographic locations of urban populations. The 2011 census measured the populations of both rural and urban administrative entities, as well of what are termed “urban agglomerations.”\textsuperscript{19} These encompass contiguous urban areas that are centered on a larger urban core but are not governed by a single administrative structure. In addition, each city is located in a district which is part of the state government administration.

#### Table 3.1. Census data on case study urban areas, India, 2011

<table>
<thead>
<tr>
<th>City</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chennai Municipal Corporation</td>
<td>7 million*</td>
</tr>
<tr>
<td>Chennai urban agglomeration</td>
<td>8,696,010</td>
</tr>
<tr>
<td>Chennai District</td>
<td>4,646,732</td>
</tr>
<tr>
<td>Bhubaneshwar Municipal Corporation</td>
<td>843,402</td>
</tr>
<tr>
<td>Bhubaneswar urban agglomeration</td>
<td>886,397</td>
</tr>
<tr>
<td>Khordha District (urban and rural)</td>
<td>2,251,673</td>
</tr>
<tr>
<td>Meerut Municipal Corporation</td>
<td>1,305,429</td>
</tr>
<tr>
<td>Meerut urban agglomeration</td>
<td>1,424,908</td>
</tr>
<tr>
<td>Meerut District (urban and rural)</td>
<td>3,443,689</td>
</tr>
<tr>
<td>Shillong Municipal Board</td>
<td>143,229</td>
</tr>
<tr>
<td>Shillong urban agglomeration</td>
<td>354,759</td>
</tr>
<tr>
<td>East Khasi Hills District (urban and rural)</td>
<td>825,922</td>
</tr>
</tbody>
</table>

* Reported by Chennai Municipal Corporation.

Source: 2011 Census.

Chennai urban agglomeration has a population of 8.7 million, of which about 7 million live within the boundaries of the Chennai Municipal Corporation, located in Chennai District but also extending beyond it into Thiruvallur and Kancheepuram Districts. (Prior to its expansion in 2011, the Chennai Municipal Corporation was contiguous with Chennai District, with a population of about 4.7 million). With its expansion, the Municipal Corporation absorbed dozens of

\textsuperscript{17} Sethi, Nitin. 2015. “NITI Aayog against free health care, bats for more private sector role.” \textit{Business Standard (India)}. August 25.

\textsuperscript{18} Reuters. 2015. “Modi govt puts brakes on universal health plan.” \textit{Times of India}. March 27.
municipalities, towns, “census towns,” and “out-growths.”

The urban agglomeration of Bhubaneswar, with a population of almost 900,000, includes the Bhubaneswar Municipal Corporation, with a population of about 850,000, and over 20 “out-growths,” entirely located within Khorda District. The Meerut urban agglomeration, with a population over 1.4 million, is similarly almost entirely composed of the Meerut Municipal Corporation, with a population of about 1.3 million, plus a military cantonment and four “census towns,” all located within Meerut District. The population of the Shillong urban agglomeration, at over 350,000 is more than double that of the Shillong Municipal Board, as it includes a military cantonment and ten towns (governed by traditional tribal councils called Durbars).

3.3.1. Health system governance

A range of governance arrangements are in place across the four cities, and the urban agglomeration centered on each city encompasses a mix of administrative structures. All four cities are located in districts that include peri-urban and rural populations. All of the urban local governments examined have responsibilities for water supply, sanitation and solid waste management, although in the cases of Meerut and Shillong these responsibilities are divided between various state and local administrative bodies.

With regard to health services, the Chennai Municipal Corporation has a strong role based on its historical legacy and management of a network of health services. Like Tamil Nadu as a whole, Chennai benefits from a tradition of focus on public health separately from medical services. Bhubaneswar Municipal Corporation also manages health services but the lead on urban health system development, particularly at the primary health care level, is being taken by the state government. The Bhubaneswar Municipal Corporation is working on leveraging its existing health service infrastructure to develop hospital and outpatient curative services through a public-private partnership. The various administrations in the Shillong urban agglomeration have no role in government health services, which are largely run by the state government.

**Chennai**

The Chennai (formerly Madras) Municipal Corporation has a long history with health care and public health. The first hospital in India was the Madras General Hospital, founded in 1679, while four other hospitals were established in Madras between 1800 and 1820. In 1939, the Madras Public Health Act was passed, the first of its kind in India. The city (and indeed Tamil Nadu as a whole) benefits from high political support for health programs. The Chennai Municipal Corporation is responsible for government health services and implements national and state government health programs. The Municipal Corporation is headed by an elected Mayor, who presides over an elected council representing the city’s 200 wards.

The planning and management of public health and health care services in most states is under one

---

19 “Census towns” are urban centers administered as rural areas, while “out-growths” are urbanized areas connected to a larger urban area but with no administrative status separate from the rural administration in which they are located.
government department. This has generally led to the subordination of public health services, such as environmental health measures and preventive health interventions, to medical services – in terms of the proportion of health budgets spent on public health programs, career opportunities for public health staff, the numbers of staff recruited, and the quality of public health training they receive. In Tamil Nadu, however, three separately funded and staffed health directorates exist; these are the Directorate of Medical Services, Medical Education and Public Health. The last is endowed with a budget comparable to the others, and has a large workforce on the ground complemented with well-trained technical staff with a significant amount of responsibility and decent career incentives. Observers suggest that this has strengthened public health and preventive health care in the state. (Das Gupta et al., 2010) Thus, within the Chennai Municipal Corporation, two departments are responsible for health services – Family Welfare and Public Health. The Public Health Department conducts public health activities, including vector control, such as anti-mosquito interventions. Both departments manage facilities that provide health services and function independently. While Urban Primary Health Centres are under the oversight of the Department of Public Health, Emergency Obstetrics Centres are accountable to the Department of Family Welfare. As a result, services are disjointed since the Department of Public Health deals largely with preventive services and vertical disease programs, while the Department of Family Welfare deals mainly with reproductive and child health services. There have also been problems with integrating workers employed under different disease-specific programs, as well as in managing career paths of medical staff recruited by one or the other of the Public Health or Medical Services directorates.

In 2011, the Municipal Corporation boundaries expanded significantly to incorporate neighboring urban areas. It grew from 174 square kilometers to 426 square kilometers, and its population increased from 4.7 million to 7 million, with an additional estimated 1 million migrant population that includes large numbers of construction workers and small traders. Chennai also hosts a floating population of about 150,000 daily. The Municipal Corporation is now divided into 15 zones and 200 wards, as compared to 10 zones and 155 wards before the expansion. The new areas lack infrastructure and are poorer; posing a challenge to the Municipal Corporation to extend services. A number of indicators related to contraceptive use and antenatal care appear to have worsened according to recent survey data, which can likely be explained by the recent expansion of Chennai’s administrative boundaries. Use of any method of family planning was 63 percent in 2012-13, compared to 58 percent in 2007-08. Likewise, the proportion of pregnant women who received any antenatal checkup fell from 100 percent to 81 percent, and the proportion of children who were exclusively breastfed between 0 and 5 months declined from 73 percent to 59 percent. (2007-08 and 2012-13 District Level Household and Facility Surveys) The Corporation plans to use mobile clinics to reach the populations recently included in its boundaries.

Bhubaneswar

The modern city of Bhubaneswar was developed in 1946 as the capital of the state of Odisha (previously called Orissa), to replace Cuttack. It is a planned city, with wide roads and open green spaces. The 2011 census reports a total city population of about 840,000, accounting for 12 percent of the total urban population of the state. Bhubaneswar is located in Khordha district (which has a
population of about 2.3 million). The population has expanded dramatically, growing 29 percent over the decade 2001-11, which has led to squatter settlements and slums. Bhubaneswar has 436 slums, only 99 of which are authorized, housing a population of about 310,000, which accounts for over a third of the total population of the city.

Health services in the city are managed by the state government’s Department of Health and Family Welfare, the Bhubaneswar Municipal Corporation (BMC) and the private sector, including three private medical colleges. The Department of Health and Family Welfare runs 18 dispensaries and the main referral hospital, Capital Hospital, along with 6 homeopathic and ayurvedic dispensaries. The Bhubaneswar Municipal Corporation manages 5 dispensaries and the BMC hospital, along with 11 homeopathic dispensaries. Following national regulations, the three private medical colleges manage urban health training centres that provide out-patient care. Reportedly, there is little interaction between these centres and the government system. Going forward, the state government is taking lead responsibility for primary health care services in Bhubaneswar. Five posts have been created for the position of Additional Medical Officer-Public Health, responsible for urban areas in the state (Bhubaneswar, Cuttack, Bharampur, Sambalpur and Raokila). This official of the state Department of Health and Family Welfare (under the Khorda district administration) leads a Program Management unit that is to coordinate with the Municipal Corporation’s health services as well as the state Departments of Public Health Engineering and Housing and Urban Development. The Additional Medical Officer-Public Health is a member and convener of the City Health Society, chaired by the elected Mayor of Bhubaneswar. The Society is to meet monthly to set direction on health issues and encourage coordination.

With regard to other sectors, the Bhubaneswar Municipal Corporation includes Slum Improvement Officers responsible for monitoring conditions in slums, identifying needs and taking measures to address them. The Corporation implements a number of national programs targeted to the urban poor, such as the National Urban Livelihoods Scheme, and has established two night shelters for homeless people that are managed by non-governmental organizations.

The Chief Medical Officer of the Municipal Corporation, with 250 sanitary officers, is responsible for sanitation and environmental health, including waste collection and disposal, as well as mosquito control. Waste collection and disposal in 57 wards is contracted to three private organizations while in 10 wards it is handled by the Municipal Corporation.

**Meerut**

The population Meerut Municipal Corporation was 1.3 million in 2011. The city is located in the district with the same name and the district’s population is almost evenly distributed between urban and rural inhabitants. Meerut city accounts for 38 percent of the district’s inhabitants. More than 40 percent of households in Meerut city live in slum areas, which is the fifth highest proportion among Indian cities with over a million population. In 2011, there were 185 slums in Meerut city of which 43 percent were unregistered and thus less likely to have access to public services.

Meerut city is administered by a Municipal Corporation (Nagar Nigam), with an elected Mayor and a Municipal Commissioner appointed from the civil service. The Municipal Corporation’s
Public Health Department is responsible for birth and death registration, solid waste management, and hygiene and sanitation regulation. It employs Food and Sanitation Inspectors to oversee garbage collection and disposal and slaughter house maintenance and registration. Currently, there are 11 inspectors for the city although 14 positions are sanctioned. Waste management in the city is observed to be poor, especially within slums. The Municipal Corporation, the state government and the Meerut Development Authority are involved in water supply and sanitation. Water supply is mostly dependent on untreated groundwater from wells.

Most government health services in the city are managed by the Uttar Pradesh state government. The state government operates two District Hospitals in the city (one general and one for women) as well as 19 Urban Health Posts. The Cantonment General Hospital is meant for the military inhabitants of the Cantonment and their families, but also provides care to the general public at highly subsidized rates. Three dispensaries are operated by the Central Government Health Services for government employees and their families. The Nagar Nigam operates 3 homeopathic clinics. The Nagar Nigam’s public health department ran a communicable diseases hospital but this was closed several years ago. The Nagar Nigam’s Chief Health Officer, the Nagar Swastha Adhikari, is on deputation from the state Department of Health and Family Welfare. There is one private medical college in the city with an associated urban health training center that provides primary health care services.

Shillong

Meghalaya is one of the five least urbanized states in India (20 percent of the total population is urban compared to the national of average of 31 percent). Shillong, its capital city, is located in East Khasi Hills District which has a population of 825,922. Of the district population, 44 percent is urban, mostly encompassed by Shillong. The Shillong urban agglomeration (also referred to as Greater Shillong) consists of Shillong Municipality and Cantonment, as well as a number of towns. As per the 2011 census, the population of the Shillong urban agglomeration was about 350,000. About half of Shillong’s households reside in the Municipality and Cantonment, and the other half in the neighboring towns.

There is an overlapping mix of local governance structures in Meghalaya. Areas now encompassed by the state were designated as autonomous tribal areas under the 6th Schedule of the 1950 constitution, so that the 73rd and 74th constitutional amendments do not apply. The Autonomous District Councils of Khasi, Jaintia and Garo, continued in existence after creation of the state in 1972. Under the constitution, the Autonomous District Councils have responsibilities in the areas of land regulation and use, forest and water management, inheritance and marriage and other social customs, as well as governance of villages and towns, although it is specified that state legislation has precedence. Deriving from the authority of the Autonomous District Council of Khasi Hills, the five towns encompassed in Greater Shillong are governed by traditional Durbars (Councils) which handle local administrative and judicial issues. Autonomous District Councils and Durbars are elected. In the Khasi tribal tradition, property is inherited via the youngest daughter or female relative. However, although some women have been elected to Autonomous District Councils, the requirements of the 73rd and 74th amendment for reserved seats do not apply, and there has been
controversy over the roles of women in the local *Durbars* since traditionally women have been excluded from these bodies. Because central government programs are implemented through the state government administrative apparatus, traditional local governance structures may not be involved in implementation.

Shillong Municipality is administered by a Municipal Board, created by state legislation in 1973, and the Cantonment by a Cantonment Board. The Municipal Council is administered by a civil servant, and elections have not been held due to opposition related to the existence of the elected Autonomous District Council. The municipality is also hampered by poor revenue-raising ability. The fact that only 4 percent of the land in the state is owned by the state government is also notable given the importance of land to development projects elsewhere in the country.

The 2011 census provides information on slums only for Shillong Municipality, reporting a slum population of 14,500. However, anecdotal reports indicate that slum areas are widespread in Greater Shillong, made up of migrant populations and marginalized groups. These areas lack water, sanitation, health and other services.

The state government’s Public Health Engineering Department supplies water to 80 percent of the city, with the rest obtaining water from springs and other sources. Within the Shillong Municipality, water is provided to the Municipal Board, and for the rest of Greater Shillong it is generally provided to the local *Durbars*. Water is then piped or provided from public taps to households by the Municipal Board and *Durbars*. The Shillong Municipal Board is responsible for sanitation and solid waste management within the municipality, while in the rest of Greater Shillong liquid and solid waste disposal is organized in a variety of ways by the local *Durbars*.

Although responsibilities for water and sanitation are shared between different types and levels of government, all government health services are managed by the state government.

In the absence of a highway bypass, traffic congestion is high in Shillong as all traffic for southern Assam and Manipur, Tripura or Mizoram, has to enter the city. There are plans to establish New Shillong Township to address some of the problems of congestion and infrastructure; currently, the scheme is in the process of acquiring the planned 2,700 square hectares of land.

### 3.3.2. Health programs and services

The Chennai Municipal Corporation operates a substantial network of primary health care services and robust public health and disease control programs, with responsibilities divided between two departments within Corporation. The Bhubaneswar Municipal Corporation runs a more limited network of health services while leadership on primary health care services in particular is being ceded to the state government. There is recent experience with strengthening health care services in slums in the city. In Meerut and Shillong, government health services are centered on hospital services managed by the state government, and these confront a number of challenges, notably relating to human resources. Plans for urban health service development through the National Urban Health Mission have started with mapping and planning, as well as upgrading of existing government facilities. Plans for each city involve substantial investment in primary health care
facility infrastructure, as well as the creation of community-level organizations. Contracting of non-governmental organizations or private sector health care providers does not figure in plans as yet.

**Chennai**

The Chennai Municipal Corporation operates 121 Urban Primary Health Centres, 12 Emergency Obstetrics Centres, 1 communicable disease hospital, 6 diagnostic centers, 15 dental clinics and another 28 homeless shelters, but also runs several geriatric centres, a de-addiction center, and non-communicable disease clinics. Primary health care facilities are under-utilized while the tertiary system is over-burdened. A weak referral system undermines integration. Public health programs are robust, such as tuberculosis case finding and non-communicable disease screening.

The Corporation implements state government schemes such as the *Muthulakshmi Reddy* Maternity Benefit Scheme, which credits Rs. 12,000 (US$ 182) in three installments to the bank accounts of pregnant women, conditional on: (i) availing complete antenatal care services; (ii) delivery in a government facility; and (iii) completion of the third dose of diphtheria, pertussis and tetanus (DPT) immunization before the infant is 14 weeks old. In addition, the national conditional cash transfer encouraging institutional delivery (*Janani Suraksha Yojna*) is implemented. In Chennai, all babies born in Emergency Obstetric Centers are provided with a package including blankets and an anti-mosquito net. These programs have contributed to growth in the use of government facilities for maternal care. Delivery at government institutions increased from 49 percent in 2007-08 to 57 percent in 2012-13; similarly, utilization of government services for antenatal care rose from 50 percent to 67 percent in the same period. (2007-08 and 2012-13 District Level Household and Facility Surveys) Additional data on about 12,600 institutional deliveries in 2014 provided by the Corporation corroborates that while about 38 percent of women delivered in the private sector, 42 percent were in government hospitals and 20 percent in Corporation hospitals.

The Chennai Municipal Corporation has been in the vanguard of delivery of non-communicable disease interventions through the primary health care system. In 2005, the Corporation began a cervical and breast cancer screening program; by May 2014, over 500,000 women were screened. At “Well Women Clinics,” the Corporation health services also screen women for anemia, diabetes and sexually-transmitted infections.

Other state government programs implemented in Chennai are the Chief Minister’s Health Insurance Scheme, which finances surgical procedures for the poor, and the *Moovaloor Ramamritham Ammaiyaar* Marriage Assistance Scheme, aimed at delaying girls’ marriage. The city runs 203 canteens (*Amma Unavagam*), staffed by women’s self-help groups, that deliver 250,000 hot cooked meals daily at highly subsidized prices.

Under the National Urban Health Mission, the Corporation of Chennai plans to strengthen existing facilities, including upgrading of Emergency Obstetrics Centres into Urban Community Health Centres, and to create 20 new Urban Primary Health Centres in the city’s area of recent expansion. The establishment of 15 secondary hospitals is also proposed. However, the administrative
structure within the Corporation will remain the same, so that Urban Primary Health Centres will continue to be managed by the Department of Public Health and the upgraded Urban Community Health Centres will be under the Department of Family Welfare. To galvanize community involvement in health delivery under the National Urban Health Mission, it has been proposed that 15,000 *Mahila Arogya Samitis* be established – some of these will be adapted from already existing self-help groups. Non-governmental organizations are currently active in a variety of areas and would be effective partners, particularly for reaching populations in the expanded areas of Chennai.

**Bhubaneswar**

Applying the National Urban Health Mission’s objectives for facilities to population ratios would entail substantial expansion of the government health system in Bhubaneswar. Four Community Health Centres (two new and two upgraded) as well as six new Primary Health Centres have been proposed. Primary health services in Municipal Corporation facilities will shift to the responsibility of the state government under the National Urban Health Mission, while the Corporation is pursuing a public-private partnership to develop hospital services. The state government has established a Medical Corporation to improve procurement capacity and processes in order to implement the government’s plan to provide medicines free-of-charge to patients. The state government has also conducted a mapping exercise of all slums and has developed ward-level plans with inputs from communities. A vulnerability assessment of marginalized populations such as rag pickers, street children, sex workers, the homeless, and those suffering from stigmatized diseases, is planned. A budget of Rs 580 million (US$ 8.8 million) was proposed for activities under the National Urban Health Mission in 2014-15 in the entire state, out of which Bhubaneswar accounted for Rs 190 million (US$ 2.9 million), mostly aimed at infrastructure development.

Bhubaneswar benefits from active participation of civil society organizations and researchers in shaping health policy development. Discussions with academics made it evident that research, conducted by organizations such as the Indian Institute of Public Health, frequently influences dialogue on key service delivery issues.

In 2010, an urban health project financed by USAID targeted 400 authorized and non-authorized slums in Bhubaneswar, with 11 non-governmental organizations managing 11 health centres. Each centre, serving a population of 25,000, provided out-patient and outreach services, and was managed by one doctor, one staff nurse, two auxiliary nurse-midwives and one pharmacist. The project established *Mahila Arogya Samitis*, or Women’s Health Committees, a strategy which has been incorporated in the National Urban Health Mission guidelines. These committees were responsible for generating awareness within their communities about positive health behaviors such as immunization, antenatal checkups, and institutional deliveries. Committee members were also given responsibility to engage in participatory research and generate health resource maps for the communities to track pregnant mothers and newborn children.

During a visit to an unauthorized slum near BMC Hospital, we met with a 12-member *Mahila Arogya Samiti*. Among their activities were water and sanitation awareness, hygiene, family planning and preventive health education. The group covered 120 households totaling 480
individuals. The committee received Rs 5,000 (US$ 75) as untied funds for health-related activities, although the group mentioned that it was not enough to effect long-lasting changes in their communities. Among the most common ailments in their community were high blood pressure, diabetes, joint pains and gastric problems among adults. Among children it was fever, cough/cold, and diarrhea. When ill, most individuals go to the BMC Hospital because it neighbors their slum. Almost all families possess a smartcard for RSBY; however, the group knew of only one family that had availed the service (for a gallstone operation). Most were also unclear about the RSBY enrolment renewal process. A number of challenges were expressed by the group, including the problem of keeping track of families given ongoing migration in and out of the slum. (The auxiliary nurse-midwife is responsible for outreach and for keeping track of a total population of 6,500).

The slum centres run by non-governmental organizations were well-utilized, with an average of 50 out-patient cases per day. Contributing to this were evening opening hours convenient for daily wage laborers and other informal sector workers. Many of the doctors employed by the non-governmental organizations were retired from government service. With the end of the project, the slum centers are no longer functional and it is unclear whether the strategy will be pursued by the state government under the Urban Health Mission.

**Meerut**

There are two medical colleges in Meerut city (one private and one public) that provide subsidized services at their hospitals and urban health training centers. The latter are located in slum areas and provide primary care services to the poor. The two government District Hospitals in the city are important providers of care to the poor of the city and the district as a whole. At least ten deliveries take place daily at the women’s hospital while its out-patient department is visited by 300 women. Both hospitals suffer from staff shortages, especially for nurses and class IV employees such as sweepers.

The state Department of Health and Family Welfare plans to establish new Urban Health Posts and to strengthen infrastructure and staffing at existing facilities. Of the 19 health posts currently run by the Department in the city, 8 were established in 1986 by the state government. The remaining 11 are Reproductive and Child Health posts created in 2005 under the National Rural Health Mission. The posts suffer from staff shortages: 4 do not have medical officers and 4 of the 40 positions sanctioned for staff nurses and Lady Health Volunteers are currently vacant. During a visit to an Urban Health Post during operating hours, we found all staff (doctor, auxiliary nurse-midwife, or Lady Health Volunteer) to be absent. Following population-based norms, the 2014-15 budget proposal submitted by the district Chief Medical Officer to the state administration of the National Health Mission proposed ten new health posts for the city. The state approved five of these and has allocated funds for renovating five existing facilities. Two more new health posts are expected to be approved for the Cantonment area.

However, although the state Department of Health and Family Welfare has contracted a local non-governmental organization to build the capacity of Village Health and Sanitation Committees in twelve blocks of the district, no such collaboration is currently planned on urban health issues. The
proposed creation of *Mahila Arogya Samitis* and two Urban Health Coordinator posts for the district is expected to encourage community involvement. In addition, the Department expects the presence of ASHAs in urban areas to kindle demand for public health services. However, since the proposed budget for the Urban health Mission does not mention plans for collaborating with civil society organizations, it is unclear whether the latter’s experience and expertise will be used to train and support the planned new *Mahila Arogya Samitis* and ASHAs.

In addition, the Urban Health Mission could face challenges relating to infrastructure. For example, it is difficult for the Chief Medical Officer’s office to acquire space for health posts in the city because state guidelines stipulate that space for urban health posts can only be rented. This poses a challenge because private landowners are wary of taking their property off the market to rent to government agencies who will occupy it for a considerable duration at rates that could fall below market rates. Nor can the Chief Medical Officer purchase property from government authorities like the Meerut Development Authority, even though it designates space for health facilities in the authorized colonies it constructs.

Problems in the functioning of the current health system are likely to affect development of urban health services. For instance, although the current year’s budget was approved in March, funding from the state was yet to reach the district in August. It was reported that salaries for staff contracted under the National Rural Health Mission are presently delayed by three months or longer. Problems were also noted in the availability of drugs at government health facilities. For example, stock-outs of anti-tuberculosis drugs, supplied by the central government, were reportedly common over the past two years, while pediatric anti-tuberculosis drugs have not been supplied.

**Shillong**

In Shillong, government primary health care services are comprised of 4 dispensaries, 13 Urban Health Centres, 1 Primary Health Centre, and 1 Community Health Centre. In addition, there are four hospitals under the responsibility of the state Department of Health and Family Welfare: Civil Hospital, Ganesh Das Hospital, R.P. Chest Hospital and the Meghalaya Institute of Mental Health & Neurological Science. A tertiary-level facility in Shillong, the North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences, is operated by the central government’s Ministry of Health and Family Welfare. Lack of human resources, including medical specialists, is an important constraint for these facilities.

With regard to the National Urban Health Mission, mapping and planning exercises are being done to inform future investments. The state government has added resources to the central government funding available for RSBY in order to expand eligibility to the entire state population.

**3.3.3. Private sector**

In all four cities – even in Chennai which has the strongest government health system – the private sector is the provider of a majority health services. There are large numbers and different levels of private health care providers in each city, although in Shillong hospital services provided by faith-
based organizations are very important. Regulation of private sector providers is weak in each city, like in India as a whole. In each of the four cities, government-financed insurance schemes for inpatient hospital care are important examples of public-private engagement. In three cities, this is linked to the national RSBY program, including in Shillong where the state government has expanded eligibility to the entire population. Bhubaneswar Municipal Corporation is pursuing a substantial public-private partnership to develop hospital services linked to a network of primary health care services.

**Chennai**

Among the four case studies, Chennai has the strongest government health services, and there is evidence of a recent move towards the government system for maternal health care in particular. Nonetheless, like elsewhere, the public largely relies on the private sector for out-patient services. It is reported that 80 percent of the estimated 500,000 out-patient visits per day in the city are in the private sector. There is a perception of higher quality in the private sector. Patients cite dissatisfaction with public providers’ diagnoses because of the perceived lack of time and care given to them from overburdened doctors during visits. A high volume of patients in public facilities acts as a deterrent for other patients not only because of the long waiting times, but also because they perceive this as a signal of poorer quality. (Ergler et al., 2011) A study examining catastrophic payments for health care among households in urban Tamil Nadu found that of those who fell ill, 67 percent and 78 percent of patients sought private sector treatment for inpatient and outpatient services respectively. Those who sought care from private providers spent 29 percent and 20 percent of their household consumption expenditure on inpatient and outpatient services respectively. Moreover, of those households that used private services, 60 percent faced catastrophic payments at the 10 percent threshold level. (Vaishnavi and Dash, 2009)

There are significant private sector tertiary hospital care services in the city, which attracts patients from other states in India as well as from other countries. Regulation of private sector health care providers is the responsibility of the state government in accordance with the Tamil Nadu Private Clinical Establishments Act of 1997. The state has not adopted the 2010 national Clinical Establishments Act.

The government health system has engaged the private sector for provision of specific services (i.e. family planning and tuberculosis care), as well as ambulance and mortuary services. As mentioned above, NGO services may potentially be used as part of the National Urban Health Mission’s investments in improving urban health services, but this is not explicit in the city’s plans. Implementation of the state government’s Chief Minister’s Insurance Scheme is supported by private insurance companies and a significant proportion of the covered surgical services are purchased from private hospitals, although in 2009-10, only two Chennai-based institutions figured among the top 25 providers under the scheme. (La Forgia and Nagpal, 2012)

**Bhubaneswar**

According to officials, it is estimated that about 70 percent of health services are provided by the private sector in Bhubaneswar and it is often the first point of contact for patients with the health
system, including the poor. In a private hospital visited, a low-income patient was asked about his decision to visit the private provider as opposed to the public sector. The main reason given was the lack of attention and poor interaction with patients by health staff in public facilities. A state government ban on private practice by government doctors has been removed due to poor enforcement. The state government, through the Khorda District Chief Medical Officer, is responsible for regulation of private sector health care providers under the Odisha Clinical Establishments (Control and Regulation) Act of 1990. The 2010 national legislation has not been adopted by the state. Although the state Directorate of Medical Education and Training maintains a list of private medical facilities, it is thought that the number of private providers operating in the city is significantly higher than recorded.

The state government’s most significant engagement with the private health care sector is through the national program RSBY, in which 4.3 million BPL households enrolled. In addition, the state government has launched a similar scheme, named *Biju Krushak Kalyan Yojna*, that provides coverage to poor farmers and their families for inpatient care, up to a maximum of Rs 100,000 (US$ 1,515) annually.

The Bhubaneswar Municipal Corporation is taking a step further with the type of land-for-beds arrangement that other cities in India have used to encourage hospital development by the private sector. With advisory support from the World Bank Group’s International Finance Corporation (IFC), Bhubaneswar Municipal Corporation is currently in the process of selecting a private sector partner to implement a large public-private partnership centered on development of a tertiary hospital on Municipal Corporation land. The arrangement will also include development of the existing Municipal Corporation dispensaries as a network of primary health care facilities networked with the new hospital and operated by the private sector partner. Outpatient and family planning services would be the responsibility of the Municipal Corporation, implemented by the private sector partner, while preventive and outreach services (in the same facilities) would be operated by the state government. As part of its contract with the Municipal Corporation, the private sector partner will be required to guarantee that a proportion of services provided by the tertiary care hospital and network of primary care services will be provided at highly-subsidized rates to BPL patients. Outpatient services for BPL patients will be provided at 50 percent of the rates fixed by the central government’s health insurance program for government employees, while non-BPL patients will pay market rates. Inpatient care for BPL patients will be covered by RSBY according to its rates, while other state government schemes will pay for expenses above the RSBY annual limit of Rs 30,000 (US$ 455).

Bhubaneswar Municipal Corporation has also engaged the private sector in solid waste management. It is reported that almost 70 percent of slums (authorized and non-authorized) are covered by door-to-door waste collection managed by private firms. According to the Bhubaneswar Chief Medical Officer, although the private companies charge significant fees, waste collection and management have improved.

**Meerut**

Most health services in Meerut are provided by the private sector. Apart from the private medical
college’s tertiary hospital and urban health training center, 2,353 private health providers are registered with the District Chief Medical Officer. These include doctors working in 230 private nursing homes. Most of these providers operate in Meerut city. There are no estimates of the number of unqualified or traditional health care providers working in the city although they are a significant presence, especially in slum areas. In addition, proximity to Delhi affords access to private and government hospital services there. Overall, the activity of the private medical sector in Meerut is consistent with the city’s economic activity in general. Meerut was ranked fifth among 200 Indian cities on an economic “vibrancy index,” reflecting investment level, infrastructure, job opportunities and consumer services. (Morgan Stanley, 2011)

Private sector doctors informed us that they prefer not to collaborate with the public sector because of ensuing bureaucratic problems. Nonetheless, the RSBY program is functioning in the district, and there are 15 private institutions empaneled to provide care. About 14,000 families are enrolled, compared to a target of 21,000. However, only 234 hospitalizations in the district were covered during fiscal year 2014-15.  

Uttar Pradesh has adopted the national Clinical Establishments Act of 2010, but implementation of regulation of the private sector is still limited to the requirement to register with the District Chief Medical Officer. A District Anti-Quackery Cell was established by the Department of Health and Family Welfare in 2005, and in the past 18 months has filed 32 cases against unqualified healthcare providers in the district. Cases are investigated on the basis of complaints from the public.

Shillong

The Megha Health Insurance Scheme is a state government program incorporating RSBY, with state government resources added in order for the entire state population to be eligible for coverage. The scheme has achieved an initial goal of 600,000 individuals enrolled, equivalent to 41 percent of potentially eligible beneficiaries. ASHAs and auxiliary nurse-midwives are involved in enrolling beneficiaries at the community level. The hospitalization rate of among those enrolled is 4.8 percent. In two years since its launch, the scheme reimbursed claims totaling Rs 130 million (US$ 2 million). Private sector hospitals provide 80 percent of the inpatient services covered by the Megha Health Insurance Scheme. Nazareth Hospital, operated by a faith-based organization, provides 54 percent of total services. It is also a significant source of preventive and outpatient care, partnering with government programs such as the tuberculosis and HIV/AIDS programs.

It is reported that many patients seek tertiary services outside the state – in Guwahati, Assam, or even farther, such as the Christian Medical College in Vellore, Tamil Nadu.

Another public-private engagement by the state government is contracting of ambulance services under the National Health Mission. Demand for ambulance services is very high and a large proportion of calls are in Shillong. The service started in 2009 and has 47 ambulances.

---

Meghalaya has not adopted the national Clinical Establishments Act and there is little regulation of private sector health services. Private hospitals do not need to register with the government unless they wish to be empaneled by the Megha Health Insurance Scheme.
4. URBAN DEMOGRAPHICS AND EPIDEMIOLOGY

In this section we examine broad patterns in health at the national and state levels, and then drill down to look at the stories that emerge from the states and cities visited. We begin with understanding the demographic context of urbanizing India and then turn to the epidemiology of urban India.

4.1. The demographic context

India’s total population in 2014 was 1.267 billion. (World Bank, 2015) Between 1991 and 2011, the proportion of the population of India living in urban areas rose from 26 to 32 percent (about 380 million). However, these figures are based on an administrative definition for urban areas that is more restrictive than other measures. An alternative measure, the agglomeration index, indicates that 39 percent of India’s population lived in urban areas in 1991, rising to 52 percent, or around 630 million, by 2008.\(^{21}\) (World Bank, 2013; Uchida and Nelson, 2008) The latter estimates are more consistent with historical experience and with India’s economic growth, which averaged 7.2 percent annually during 2000-2010.

Urban population growth during the 2001-2011 decade was 31.8 percent (2.8 percent annual average), little changed from 31.5 percent in the previous decade. This compares to 12.2 percent growth in the rural population between 2001 and 2011 (1.2 percent annual average), slower than the 18.1 percent rural population growth during the previous decade. (Government of India, 2011) Urban population growth was largely driven by natural population growth (44 percent) and reclassification of rural settlements into urban areas (32 percent), with only 24 percent due to rural-urban migration. (India Institute for Urban Settlements, 2011)

A significant proportion of new urban areas are not recognized as such administratively on the ground. Applying the government’s more restrictive definition of urban areas,\(^{22}\) the 2011 census found that 3,894 settlements (called “census towns”), accounting for 53 million people, are urban but are governed as rural areas. Application of a less restrictive definition, such as the agglomeration index, suggests that a considerably greater population, perhaps an additional 300 million, live in places with urban characteristics but administered as part of rural areas. This is compared to 4,041 “statutory” urban areas, accounting for about 340 million, which are administered as urban areas. The majority of the current urban population (70 percent of the urban population) live in cities with a population of more than 100,000.

By 2050, India is projected to have 50 percent of its population living in urban areas (using the government’s definitions), and to add about 400 million urban dwellers between 2014 and 2050, making it the largest contributor to future urban populations globally. (United Nations, 2014) This pace of urban growth is unprecedented and the country will have to consciously equip itself to

---

\(^{21}\) The agglomeration index is based on population density (150 people per square kilometer), the minimum size of a large urban center (50,000 inhabitants), and travel time to that urban center (60 minutes). (World Bank, 2013)

\(^{22}\) A settlement is classified as urban if it has: (i) a population of at least 5,000; (ii) a population density of at least 400 persons per square kilometer, and (iii) at least 75 percent of its male workforce engaged in the non-farm sector. (World Bank, 2013)
handle the opportunities and challenges that lie ahead (IIHS, 2012; McKinsey & Company, 2010; World Bank, 2013). The pace of urbanization will increase, and it will be particularly high in the southern and western regions, and in medium to small-sized towns while growth in large metropolitans declines. (IIHS, 2012; Rob and Talukder, 2013)

Indian cities are very crowded at their centers and sprawling at the periphery. At present India’s top ten cities that are home to 8 percent of its population occupy only 0.1 percent of land, and the associated land density in metropolitan cities is extremely high. (World Bank, 2013). At the same time, due to increasing proportions of built-up areas spreading outside administrative boundaries and the associated urban sprawl, the density of built-up areas has actually decreased – this pattern is similar across the 53 million-plus cities (IIHS, 2012) and is a phenomenon that is common to other developing countries. This sprawl is related to manufacturing employment moving out of city cores into peripheries, often driven by the congestion forces mentioned earlier, related to poor infrastructure, economic stagnation, and policy constraints within the cities. (World Bank, 2013)

Thus, population growth in the four largest metropolitans has in fact slowed significantly (pre-expansion Chennai to around 8 percent) over the decade 2001-2011. Typical of urban sprawl, Chennai Municipal Corporation city expanded significantly, by about 2.5 times in geographic area and 1.5 times in population, by absorbing its suburbs in October 2011 – the city grew because of reclassification, not due to natural growth nor the movement of persons. The city now includes an additional nine municipalities, eight town panchayats and 25 village panchayats. The newly inducted regions are poorer and lack infrastructure.

Often the most congested parts of Indian cities are its slums –nearly one in every six urban residents (14 million households) lives in a slum according to the census. More than a third of these households are in the million-plus cities. By states, Orissa has one of the highest (23 percent) slum to-total urban household proportions in the country, while Tamil Nadu and Uttar Pradesh have the third and fifth largest number of slum households (1.5 million and 1.1 million respectively) in India.

Among the cities, Meerut has a slum-to-total city population proportion of 40 percent, making it the fifth highest in the country. (Census of India, 2011) In expanded Chennai, the slum population is around 2.7 million, and the slum-to-total city population proportion is reported around 36-39 percent. The number of slums has increased from 1,700 to more than 3,000, and only 751 are notified slums. (Chennai Corporation data)

Cities vary in terms of the location of their poorest households, and it is essential to identify where the most vulnerable reside so that they are not excluded from social programs. Slum definitions vary and they are broadly classified as ‘notified’ and ‘non-notified’ depending on whether they have been declared as such by authorities. Nationally about 59 percent of slums (37 percent of slum households) are estimated to be non-notified, and these tend to be smaller and have weaker infrastructure. (National Sample Survey Office, 2013) The census further divides the non-notified category into ‘recognized’ and ‘identified’ if they are acknowledged by authorities or identified by the Census depending on living conditions. Each of the three types represents about a third of the all-India slum population (with the ‘recognized’ population slightly smaller). Slum populations disproportionately comprise schedule castes, schedule tribes and illiterate persons compared with the rest of the urban population (28 percent and 21 percent and 22 percent respectively). The
majority of slum inhabitants (78 percent) live in permanent structures (Census of India, 2011), but residential crowding is high, about a third of slum households in both Meerut and Chennai have more than 4 persons sleeping in a room (National Family Health Survey, 2009). On average, perhaps surprisingly, on many dimensions slum populations are not very different from urban populations, for example on household size, asset ownership. (Registrar General, 2011) However, this depends on each city’s characteristics and, more broadly, also on the way slums are defined. The census defines identified slums as those with a minimum of 60-70 households, as compared with the National Sample Survey which uses a threshold of 20 households. Chennai is known to have had about 48 percent of slums with below 50 households in 2001, and these smaller, less organized clusters of households – which are not counted as slums – are often more vulnerable since they can constitute populations that did not have the wherewithal to be part of resettlements (Bhan and Jana, 2013) and have very limited collective bargaining powers.

Figure 4.1. Population age distribution, urban and rural India, 2011

Migrants and ‘floating populations’ are also important constituents of Indian cities. Chennai experiences a floating population of about 150,000 a day, and attracts substantial numbers who come to access its tertiary health care institutions for ‘medical tourism’. On the other hand, the slum population in Odisha surged in the 2000s due to the super cyclone along the coastal areas of Odisha, causing migration from rural areas into urban epicenters. Many of these migrants were from rural parts of Odisha, Andhra Pradesh and Bihar, relocating for better employment opportunities – over 1991-2001 the population of Khordha district increased by about 25 percent (but so did Meerut district and East Khasi Hill district grew by 23 percent).
In terms of the age distribution, the rural population in comparison with urban population has a greater proportion in the most economically productive ages between 20 and 59 years.\textsuperscript{23} (Figure 4.1) In urban areas, this age group accounts for about 56 percent of the population, compared to about 48 percent in rural areas. The rural population has a significantly greater proportion at younger ages (0-19 years), as well as to some extent at older ages (60-74 years). While India as a whole is projected to experience in the near future a so-called demographic dividend, with a bulge in the working-age population, this pattern is already in place for urban populations.

Similarly, all four cities represent youthful populations. The current dependency ratio (measuring the proportion of children and elderly to the working-age 15-49 year population-group) is low across the four cities. In 2011, almost one-thirds of the population in Bhubaneshwar and Meerut was below 14 years, and persons above 65 years constitute just between 3 percent (in Shillong) and 6 percent (in Chennai) of the population. This older population group is expected to increase over time, accounting for about 13 percent all-India by 2050. Importantly, this aging population will change the disease profile towards non-communicable diseases.

Figure 4.2. Age-structure of four cities and fertility rates in the four states

Sources: 2011 Census and 2013 Sample Registration System.

While urban women have reached replacement levels of fertility, rural women still have an average of 2.5 children. Following from this, the natural growth rate (birth rate minus death rate) of urban areas is lower than rural areas – Figure 4.2 illustrates the range of fertility rates in the states examined with all urban areas except Uttar Pradesh at below replacement rate.\textsuperscript{24} Fertility rates in urban areas are lower in all age-categories. Fertility rates are associated with education levels, and also with marital status – marital fertility rates in both areas are not as different. The mean household size in urban India is 4.6, compared with 4.9 in rural India. Bhubaneshwar has an average household size of 4.1, Chennai has 4, while Shillong has 4.6, and Meerut has 5.6 (Census of India, 2011).

\textsuperscript{23} These and subsequent figures on health, nutrition, and population indicators are based on the government’s definition of urban areas.

\textsuperscript{24} This information was not available for Meghalaya.
4.2. Epidemiology

If current mortality trends continue, males and females born in urban India today are expected to live five years longer than their rural counterparts. Similarly, life expectancy in Tamil Nadu is six years greater than in Uttar Pradesh. (Census of India, 2011)

4.2.1. Is there an urban health advantage? National and state patterns of morbidity

Health outcomes and service utilization are generally better in urban areas, and they have improved faster over time except for sex ratios. Yet patterns vary across states and cities and are characterized by local peculiarities. While communicable diseases have reduced over time, they still continue to contribute to a significant proportion of the disease burden. Also, with urbanization there is a growing burden of non-communicable diseases that exists along with communicable diseases.

Figure 4.3. Trends in health, nutrition and population outcome indicators, urban and rural India

Sources: 1991, 2001 and 2011 Census of India; 1992-93, 1998-99 and 2005-06 National Family Health Surveys (1, 2 and 3); 2013-14 Rapid Survey on Children; and Sample Registration System.
Average health, nutrition and population outcome indicators show that, overall, the urban health advantage in India is considerable, and has remained large over time. In 2012, average under-five mortality in urban areas was 32.0 per 1,000, 45 percent lower than the rate of 58.0 per 1,000 in rural areas. This is of similar magnitude, although somewhat larger, than the 40 percent difference in 1992-93. Similarly, the average rate of malnutrition (stunting) in 2013-14 was 32.0 percent (among under-five children) in urban areas, 23 percent lower than the rate of 41.6 percent in rural areas. This difference is also close, although larger, than the gap of 18 percent in 1992-93 (among under-three children). The total fertility rate among the urban population in 2012 was 1.8, 31 percent lower than the rate of 2.6 in rural areas, again similar but slightly larger than the 27 percent difference in 1992-93. These health, nutrition and population outcomes have all steadily improved over the past several decades, in both urban and rural areas, although improvements among urban populations have been slightly faster.

An important exception to the urban advantage in average outcomes is a consistently worse sex ratio in urban areas. After falling sharply in the 1990s, since 2001 the ratio of girls to boys aged 0-6 years in urban areas has been fairly stable at around 900 per 1,000, although the ratio in rural areas has deteriorated. The lower sex ratio in urban areas is consistent with persistent cultural preference for sons combined with lower fertility, growing household economic resources providing greater access to ultrasound and abortion services, and greater availability of such services in urban areas. (Jha et al., 2011)

Infectious diseases and their symptoms (fevers and gastrointestinal problems) continue to dominate both cases of hospitalization and reports of acute illness in both urban and rural areas. Broadly, among chronic diseases, cardiovascular along with respiratory diseases are the main symptoms and cases of hospitalization.

Proportionately more persons report hospitalizations in urban areas for all diseases except for those that are obstetrics-related. (2014 National Sample Survey). This urban bias in inpatient medical care could be driven by higher awareness, greater reporting, better detection and health care access in urban areas, or by an urban penalty (presence of more disease). Shown in Figure 4.4, about a quarter of all cases are admitted for infectious diseases in both locations, and the remaining inpatient care is for non-infectious disease, the majority of which are cardiovascular, gastro-intestinal and injury-related. Urban residents report higher levels for all ailments except for obstetrics and neonatal care.

According to the 2013 Global Burden of Disease estimates for India, high blood pressure, followed by fasting plasma glucose, household air pollution, unsafe water and childhood malnutrition are the leading risk factors in terms of attributable DALYs (disability-adjusted life-years)(GBD 2013 Risk Factors Collaborators, 2015). Similarly, a large recent practice-based study (POSEIDON study) in 880 cities collected one-day point-prevalence of diseases on February 1, 2011 from primary health care practitioners. The most common diagnoses were: hypertension (14.5 percent), obstructive airways diseases (14.5 percent), upper respiratory tract infections (13 percent), anemia (10 percent) and diabetes (8.85 percent). The most common symptoms reported were fever (35.5 percent), body
ache (19.5 percent), loss of appetite (10.2 percent) and accident/injury (3.1 percent). Related to these, the main cause of visit was respiratory illness (50.6 percent), digestive (25 percent) and circulatory (12.5 percent) problems (Salvi et al., 2015). The POSEIDON study is an improvement on self-reports by patients, but it also has shortcomings as it does not examine some key patients and providers: it is likely to underrepresent poorer households, who do not have access to or do not visit formal doctors; women may also be underrepresented since gynecologists were not included; similarly older patients may be disproportionately left out of practice-based data due to poor access. (Rao and Peters, 2015)

Figure 4.4. Inpatient use of hospitals by disease, India, 2014

Cases of hospitalisation on account of different ailments
Per 100,000 persons during the last 365 days (all-India)

<table>
<thead>
<tr>
<th>Ailment</th>
<th>Rural</th>
<th>Urban</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cardio-vascular</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gastro-intestinal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>injuries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>genito-urinary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>psychiatric, neurological</td>
<td></td>
<td></td>
</tr>
<tr>
<td>respiratory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>musculo-skeletal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>obstetric, neonatal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>eye</td>
<td></td>
<td></td>
</tr>
<tr>
<td>endocrine, metabolic, nutritional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>cancers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>blood disease/anemia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>skin infection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ear</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: 2014 National Sample Survey, 71st Round

District-level household data from 2012-13 (Figure 4.5) indicates a slight urban advantage exists in prevalence of acute diseases (those suffered for a week) and for injuries (those experienced in the last year) in both Tamil Nadu and Meghalaya (2012-13 District Level Household and Facility Survey). These patterns are evident from all four states where injuries are more prevalent in rural areas. Regarding gender, national data indicate that males are admitted disproportionately for cases of injury (14 percent of male hospitalizations in urban areas are injury-related, as compared to 6 percent among urban females). It is also known that about three-fourth of all road traffic injuries occur among individuals between 15-49 years, particularly males. (Patel et al., 2011)

Among acute diseases suffered by urban residents (Figure 4.6), diarrhea was the leading illness in Meghalaya (23 percent of disease burden) and malaria in Tamil Nadu (10 percent of the burden). However, in both states diarrhea and jaundice had a significantly higher urban than rural prevalence.
(diarrhea was 45 percent higher in urban as compared to rural Meghalaya), pointing to the challenge of urban hygiene, sanitation and waterborne diseases.

**Figure 4.5. Self-reported acute and chronic illnesses and injury, urban and rural Meghalaya and Tamil Nadu, India. 2012-13**

For chronic illness (illness that lasted for more than a month) the pattern is less clear; about 4 and 2.7 percent of urban households in Tamil Nadu and Meghalaya respectively reported a member suffering from these, which is only slightly different from in rural areas (3.8 percent and 3 percent in rural Tamil Nadu and Meghalaya respectively). Prevalence of chronic disease in Chennai city
was, however, higher at 5.2 percent. By gender, no striking differences exist except that in Meghalaya prevalence among females is slightly higher than males for all three, acute and chronic disease and injury, while in Tamil Nadu differences by gender are even less prominent, except for injuries where males report higher prevalence (5.4 as compared with 4.9 percent).

Within chronic diseases (Figure 4.7), the leading symptom reported was respiratory illness in Tamil Nadu (13.2 percent in urban) and gastrointestinal problems, similar to reports of acute illnesses, remained the main concern in Meghalaya (11.6 percent in urban). Respiratory illnesses were reported by just 1.1 percent of urban households in Meghalaya.

In terms of diagnosis (Figure 4.8), in Tamil Nadu about 78 percent (67 percent in Meghalaya) of those reporting chronic diseases were able to provide details about their diagnosis or treatment. Both diagnosis and treatment was reported by much greater proportions of urban households in both states and particularly in Meghalaya (86 and 61.6 percent in urban as compared with rural Meghalaya, and 81 percent and 74.5 percent in urban and rural Tamil Nadu), pointing to a combination of greater awareness among individuals and better access to health care. Among these households that reported their diagnoses, in Tamil Nadu, diabetes accounted for 41 percent of the urban diagnosed (and 28 percent rural) followed by hypertension by 18 percent urban (15 percent rural) households. In Meghalaya, diabetes accounted for 15 percent of urban diagnosed disease and hypertension 9 percent (4 percent and 6 percent in rural). Diabetes, hypertension and heart disease were the top diagnosed diseases in both states.

National estimates of chronic disease burden disaggregated by residence or wealth are difficult to come by, estimates based on the Global Burden of Disease 2004 are shown in Figure 4.9. They indicate that on average there is a slight urban advantage in chronic disease prevalence,
while the poorest (across urban and rural) experience the largest burden of chronic disease. It is estimated that 6 percent of the urban population suffer from 2 or more chronic diseases, while this estimate is 8 percent in rural areas. (Patel et al., 2011) Both the National Sample Survey data and POSEIDON study indicate that cardiovascular disease/hypertension is the leading ailment among urban Indians. Worryingly, the POSEIDON study also found that a fifth of patients with hypertension were below 40 years, and asthma or chronic obstructive pulmonary disease was more commonly diagnosed in smaller cities of less than 1 million.

Figure 4.8. Diagnoses for chronic illnesses among those who sought treatment, urban and rural Meghalaya and Tamil Nadu, India, 2012-13

Source: 2013-13 District Level Household and Facility Survey

Figure 4.9. Estimated prevalence of chronic diseases and tobacco use, India

Sources: Patel et al., 2011 and 2009-10 Global Adult Tobacco Survey
In terms of risk factors, urbanites smoke less, about one-fifth of urban adults use tobacco daily as compared to almost a third of adults in rural India. Adults in urban areas are also much more likely to notice anti-tobacco information, and urban smokers are more likely in the past 12 months to have been advised by a health care provider to quit (51 percent as compared to 45 percent). (2009-10 District Level Household and Facility Survey). However, these averages do not account for differences in education and socioeconomic status – there is evidence that tobacco use decreases with education and increases with age (2012-13 District Level Household and Facility Survey). Also, urban adults tend to perform less physical activity. (Patel et al., 2011) Almost a quarter of women between 15-49 years in urban India are overweight as compared with just 7 percent in rural areas (2005-06 National Family Health Survey). The urban advantage in risk factors is thus mixed, and depends on each disease and location.

4.2.1. What is the urban health penalty: intra-district and other evidence

Intra-district evidence from Meerut and Khordha on the disease burden

Information on Meerut and Khordha districts allows a comparison of differences by urban-rural locations within the same districts. (Table 4.1) The urban population – as defined by the census – in Meerut and Khordha districts constitutes 51 percent and 48 percent respectively of their total populations. (2011 Census) Both urban and rural areas within these districts have similar characteristics on information collected by the census: in terms of levels of literacy, workforce participation rates, caste makeup. Some differences exist, for example, in Meerut the rural population has a larger schedule caste population (21 percent as compared with 16 percent in urban parts) and a somewhat higher proportion of cultivators (10 percent as compared to 1 percent in urban parts).

In terms of health-related characteristics, however, differences can be marked. Compared with the national urban average, both urban Meerut and Khordha have worse indicators. Yet – as shown in Table 4.1 – in comparison with rural parts of the same districts, residence in urban areas is associated with more favorable infant and child mortality rates, crude birth and death rates. Similarly, in both districts contraceptive use is higher and number of children born is lower, immunization rates are, however, higher in rural Meerut and Khordha.

There is evidence of a gender penalty in urban areas, despite generally higher literacy (male and female) and greater female participation in the workforce. On average, sex ratios in urban India are lower than rural parts. For example, while Meerut has considerably better mortality rates than Khordha, it has worse gender indicators. Meerut has higher fertility rates, lower contraceptive use in urban parts, and most striking, urban Meerut has a sex ratio at birth of just 821 females to 1,000 males, which is lower than rural Meerut and urban and rural Khordha. Urban sex ratios are lower than rural parts in a number of areas in the country. Yet variation exists – as shown by urban Khordha where the sex ratio at birth is higher than rural parts.

Figure 4.10 Error! Reference source not found. provides information on self-reported chronic illness in urban and rural Khorda and Meerut Districts. Urban populations report higher prevalence of hypertension, diabetes, asthma and tuberculosis, though as mentioned earlier, not for asthma.

51
(2012-13 Annual Health Survey)

Table 4.1. Intra-district differences by residence in Khorda and Meerut Districts, India, 2012-13

<table>
<thead>
<tr>
<th></th>
<th>Khordha district</th>
<th>Meerut district</th>
<th>India*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Urban</td>
<td>Rural</td>
<td>Urban</td>
</tr>
<tr>
<td>Infant mortality rate</td>
<td>60</td>
<td>73</td>
<td>44</td>
</tr>
<tr>
<td>Neo-natal mortality rate</td>
<td>35</td>
<td>49</td>
<td>30</td>
</tr>
<tr>
<td>Post neo-natal mortality rate</td>
<td>25</td>
<td>24</td>
<td>14</td>
</tr>
<tr>
<td>Under-5 mortality rate</td>
<td>78</td>
<td>110</td>
<td>49</td>
</tr>
<tr>
<td>Sex ratio at birth</td>
<td>910</td>
<td>897</td>
<td>821</td>
</tr>
<tr>
<td>Sex ratio all ages**</td>
<td>915</td>
<td>973</td>
<td>901</td>
</tr>
<tr>
<td>Currently married Illiterate women 15-49 years (percent)</td>
<td>7.1</td>
<td>11.5</td>
<td>31.8</td>
</tr>
<tr>
<td>Total fertility rate (estimated across district)</td>
<td>2.0</td>
<td>2.0</td>
<td>3.1</td>
</tr>
<tr>
<td>Women 20-24 yrs reporting birth of order 2 &amp; above (percent)</td>
<td>22.5</td>
<td>24</td>
<td>59.5</td>
</tr>
<tr>
<td>Currently married women using any contraceptive method (percent)</td>
<td>68.7</td>
<td>59.3</td>
<td>60.9</td>
</tr>
<tr>
<td>Children aged 12-23 months fully Immunized (percent)</td>
<td>55.9</td>
<td>62.8</td>
<td>55.1</td>
</tr>
<tr>
<td>Natural growth rate</td>
<td>10.6</td>
<td>10.4</td>
<td>15.9</td>
</tr>
<tr>
<td>Crude birth rate (per 1,000)</td>
<td>17.5</td>
<td>19.7</td>
<td>21.9</td>
</tr>
<tr>
<td>Crude death rate (per 1,000)</td>
<td>6.9</td>
<td>9.3</td>
<td>6.0</td>
</tr>
</tbody>
</table>

Sources: Annual Health Survey, 2nd Updation Bulletins (2012-2013);
* **National data is from SRS 2013 and Census 2011

Figure 4.10. Self-reported chronic illness (per 100,000), Khorda and Meerut Districts, India, 2012-13

Source: 2012-13 Annual Health Survey
Intra-district evidence from Chennai and East Khasi Hills districts

Prevalence rates of non-communicable diseases are associated with socio-economic factors and health care systems but also genetic proclivities, local lifestyles and cultural practices. Information on the wide range of lifestyles and habits across Indian cities is conveyed by survey data for East Khasi Hills and Chennai districts in the table below. While in Chennai just 8.5 percent men report smoking, 68 percent do so in urban East Khasi and 90 percent of them use smokeless tobacco. Biomarkers measuring hypertension and blood sugar levels were collected by the District-level Health Surveys and indicate that outcomes in the two populations are not very different: between 15-20 percent of adults indicate high blood pressure and blood sugar. Compared with global data, these are low rates, and are reflective of the young population age-structure of India.

Table 4.2. Indicators of acute and chronic illnesses, Chennai and East Khasi Hills Districts, 2012-13, India

<table>
<thead>
<tr>
<th>Adults (15 years and above)</th>
<th>Chennai</th>
<th>East Khasi Hills</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>total</td>
<td>urban</td>
</tr>
<tr>
<td>Men who use any kind of smokeless tobacco</td>
<td>3.1</td>
<td>90</td>
</tr>
<tr>
<td>Men who smoke</td>
<td>8.5</td>
<td>67.8</td>
</tr>
<tr>
<td>Men who consume alcohol</td>
<td>12.2</td>
<td>48.5</td>
</tr>
<tr>
<td>Disease of respiratory system</td>
<td>23.7</td>
<td>5</td>
</tr>
<tr>
<td>Disease of cardiovascular system</td>
<td>1.9</td>
<td>5</td>
</tr>
<tr>
<td>Persons suffering from tuberculosis</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Hypertension: Above Normal Range (Systolic &gt;140 mm of Hg &amp; Diastolic &gt;90 mm of Hg )</td>
<td>22.2</td>
<td>21</td>
</tr>
<tr>
<td>Blood Sugar Level &gt;140 mg/dl (high)</td>
<td>15</td>
<td>11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Children</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Children age 0-5 months exclusively breastfed</td>
<td>59.1</td>
<td>50</td>
</tr>
<tr>
<td>Children (6-59 months) having any anemia</td>
<td>63.1</td>
<td>39</td>
</tr>
<tr>
<td>Prevalence of ARI in last 2 weeks for under 5 years old children</td>
<td>2.7</td>
<td>0.44</td>
</tr>
<tr>
<td>Stunting (under 5 years)</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

Source: 2012-13 District Level Household and Facility Survey

Other studies from Chennai confirm a 15 percent prevalence of diabetes (14.3 percent age-standardized), and also indicate that prevalence increased by 72 percent from 1989 to 2005 (Mohan et al., 2006). In more recent research using the same dataset, there was increased risk of type 2 diabetes associated with higher socioeconomic status, with rates increasing from 12 percent to 22 percent from low to high social class (Skar et al., 2013).

In terms of child health, episodes of diarrhea among children below three years over the past three weeks were reported at higher rates in urban areas (by 33 percent of urban households as compared with 24 percent of rural households) in 2005-06. (2005-06 National Family Health Survey).
Practices such as exclusive breastfeeding within the first hour and then up to six months, and the timing and nature of complementary foods are often shaped by cultural practices that are dynamic in nature and can change according to residence (Raman, et al., 2014). Thus, within a state, wide variation can exist, and urban residence does not always confer benefits. Exclusive breastfeeding up to five months is slightly lower in urban than in rural parts of Meghalaya (56.5 percent in urban and 60.4 percent in rural Meghalaya), and rates of child immunization are (marginally) lower in urban Tamil Nadu.

Air pollution: a toxic urban and rural challenge

Air pollution is a leading risk factor for the health of both urban and rural Indians. Ambient (outdoor) air pollution in the form of fine particulate matter (particularly particles that are less than 10 or even 2.5 microns in diameter, \( \text{PM}_{10} \) and \( \text{PM}_{2.5} \) respectively), penetrates deep into the lungs and is associated with cardiovascular and respiratory diseases, lung cancer and mortality. One study estimates that 650,000 premature deaths in India each year are associated with air pollution. (Lelieveld, Evans, Fnais, Giannadaki, & Pozzer, 2015) Concentrations of \( \text{PM}_{2.5} \) tend to be higher in larger and more densely populated cities. There is some evidence that this association is especially strong in South Asian cities (due to a combination of features but particularly their lack of public transportation). (Ellis and Roberts, 2016)

Figure 4.11. Mean annual air pollution levels (particulate matter) in Chennai, Shillong, Bhubaneshwar, Meerut and Delhi, latest information between 2010 and 2013

Source: World Health Organization (derived from Central Pollution Control Board India)

Data from 2012 from about 370 monitoring stations across India (rural and urban) indicates that ambient \( \text{PM}_{10} \) levels were rated as critically high in 60 percent and high in 23 percent of locations (Government of India, 2014d). National standards are, however, not very stringent. Pollution levels for \( \text{PM}_{10} \) are classified as high if above 60 microns and critical if above 90 microns as compared with the World Health Organization guideline of 20 microns, indicating potentially even greater health risks exist than acknowledged. (Balakrishnan, Cohen, & Smith, 2014; Government of India,
For the more dangerous PM$_{2.5}$, across India’s cities, Delhi had mean annual levels that were almost 15 times higher than guidelines in 2013 along with Patna and Gwalior. Within the case cities, Meerut had five times the recommended level of PM$_{2.5}$ and six times the recommended PM$_{10}$ while the other cities were closer to guidelines (Figure 4.11). (World Health Organization, 2014).

Prevalence of respiratory diseases is high in India but urban-rural differences are neither clear nor consistent. While the major source of urban air pollution is ambient pollution, for rural residents it is considered to be household (indoor) air pollution that comes from solid cooking fuels and heating. And indoor air pollution is more toxic. (Lelieveld, Evans, Fnais, Giannadaki, & Pozzer, 2015) In Chennai almost 24 percent of households reported that a household member suffered from chronic respiratory illness over the last year. But chronic respiratory disease and asthma was reported to be higher in rural as compared with urban Meerut (and similar in Uttar Pradesh). Asthma was almost 44 percent higher in rural Khordha than urban Khordha. (Annual Health Survey, 2012-13) Acute respiratory infections suffered by children tend to be associated with indoor cooking. In Khordha district 46.9 percent of children suffered from ARI over the last 15 days in rural areas as compared with areas 36 percent in urban areas. In Meerut 38 percent children reported ARIs in both urban and rural. (Annual Health Survey, 2012-13)

The increasing burden of dengue

The viral infection dengue seems to be more prevalent in urban centers$^{25}$ and incidence is linked to urbanization, rainfall and temperature. It is transmitted by aedes aegypti mosquitoes which have adapted to urban conditions and also carry chikungunya and zika viruses. While a large number of dengue cases are asymptomatic, dengue is associated with symptoms ranging from mild fevers to fatal dengue hemorrhagic fever or shock syndrome. Even as case-fatality rates have fallen over time with better case-management, wide variations exist within India and across countries. (Guha-Sapir & Schimmer, 2005) At present there is no vaccine, treatment is supportive and vector control efforts have not been successful at stopping the disease. (Bhatt et al., 2013) Over time, dengue transmission in rural areas has also increased, both within India and globally. The prevalence of the disease is now global and includes more than 100 countries compared with nine reporting countries in the 1950s. It is the leading cause of child mortality in several Asian and South American countries while there is also evidence of a shift in incidence of hemorrhagic fever towards older age-groups. While wealthier households may be able to better protect themselves from the disease there is no clear association between socioeconomic status and dengue transmission, in fact better nourished individuals appear to be more susceptible. (Guha-Sapir & Schimmer, 2005)

India is estimated to contribute one-third (33 million infections in 2010) of the global burden of apparent dengue infections. (Bhatt et al., 2013). A large additional number of cases are asymptomatic and unreported. (Bhatt et al., 2013; Kakkar 2012) In 2015, the number of reported dengue cases in Delhi was the highest in 20 years$^{26}$ and the city has the highest reported incidence in the country. A recent study of dengue transmission within Delhi over 2008-2010 found that dengue cases increased with population size and density of localities within the city and decreased

---

http://nvbdcp.gov.in.proxy1.library.jhu.edu/dengue5.html  

with distance from forests. The risk of transmission could not be predicted solely by socioeconomic factors because of daily population mobility within the city (for example to work and school), and also since both wealthy and poor areas can be densely populated. The study found that no permanent geographical clusters of cases existed over the three years examined, indicating the challenge of dengue control strategies and that they cannot be based only on surveillance information from previous years; though areas that experienced early dengue cases within a season were the most prone to higher incidence (Telle et al., 2016).

Figure 4.12. Patient age by health condition in seven major hospitals in Shillong, May-October 2013, India

<table>
<thead>
<tr>
<th>Health Condition</th>
<th>Patient Age (Mean)</th>
<th>Patient Age (std. deviation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastric problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnancy related</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fever/Malaria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cancer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain/weakness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumonia/respiratory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardio/hypertension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headache</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UTI/urinary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cataract</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female-reprod</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accident/Bleeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgery(-appendix)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typhoid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis/Jaundice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuberculosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sepsis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kidney</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulmonary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anemia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meningit/Enceph</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: World Bank staff estimates from Megha Health insurance scheme data.

4.2.2. **City-level evidence on the disease burden**

Further insight at the city-level on morbidity patterns and inpatient medical care is provided by data on Shillong extracted from the Megha Health insurance scheme that is based on the national *Rashtrya Swasthya Bima Yojna* (RSBY) program.27 (Figure 4.12) Similar to the national patterns

---

27 We examined information drawn from Megha Health insurance scheme from the seven major hospitals located in Shillong, representing information over May-Oct 2014. These constitute 12,794 cases, which is 94 percent of the cases within the program’s purview in East Khasi district. Based on further information from the scheme, it is estimated that these data represent about 1/4th of the total patient population in these hospitals – the remaining are not covered by the program. This data thus has important drawbacks: (1) it excludes those who did not use the insurance scheme, and (2) records in some cases have problems of double-counting where a single patient is recorded multiple time for each disease. Nevertheless, the information is instructive in terms of understanding broad patterns regarding the disease burden and health seeking behaviors within Shillong’s major hospitals.
(and data from the National Sample Survey presented above), infectious and vector-borne diseases such as gastric problems, diarrhea and vomiting, fever and malaria lead the disease symptoms indicating that an epidemiological transition is yet to take place. The high number of cancer cases (7 percent) in Shillong’s hospitals is, however, exceptional – the national rate is around 3 percent. A number of health officials during our team’s visit also raised concern over unusually high prevalence of cancer among their patients.

In terms of demographic characteristics, the mean age of patients seeking care in these hospitals in Shillong (covered by the insurance scheme) is 32 years. It is not surprising that older patients seek care for non-communicable diseases such as cataract, diabetes, pulmonary problems and cancer, while younger patients seek care for infectious diseases such as meningitis, fever/malaria, pneumonia and typhoid. Given the youthful demographic age-structure of Indian populations, the latter contribute to significant losses in economic productivity.

Caution over interpreting reports of morbidity

Finally, better awareness of health status and access to health services is known to drive recall and reporting of episodes of sickness. Reports of morbidity capture individuals’ social experiences, and are shaped by what they perceive as ‘normal’ (Sen, 2002). It is borne out by the 2014 National Sample Survey data (and also in previous rounds) that despite the urban health advantage reported earlier, the proportions of ailing persons per thousand in rural India is reported as 89 per 1,000 while in urban India it is 118 per 1,000. (Figure 4.13) Previously, the 2004 National Sample Survey reported these estimates as 88 in rural areas and 99 in urban areas, also suggesting that urban areas have changed more rapidly over the last ten years.

Figure 4.13. Self-reported illness, urban and rural, four states, India, 2014

![Morbidity reported by location (all ages)](image)


The highest rate of self-reported illness is reported in the state of Tamil Nadu which has the best health indicators among the states examined. Urban-rural patterns of reported morbidity are, however, not consistent across these states – higher rates are reported in urban Tamil Nadu and
Uttar Pradesh, but not in urban Meghalaya or Odisha. It is striking that persons surveyed in Meghalaya report considerably lower morbidity rates than the rest of the country including a state like Uttar Pradesh – indicating perhaps very low expectations of good health and that caution is required in interpreting self-reports of morbidity.

4.2.3. Heterogeneity within cities - slum populations

Health and other indicators are often worse in slums. In Meerut, the infant mortality rate in 2005-06 was 63 per 1000 live births in non-slum areas and 78 in slum areas of the city. (2005-06 National Family Health Survey) A survey conducted in 45 slums of Meerut in 2007-08 found that more than two-thirds of children below three years of age were stunted, with only about 12 percent having been exclusively breastfed till six months of age. Only a quarter of these children received their measles or DPT3 vaccine, and complete immunization between 12-23 months was around 12 percent. The incidence of diarrheal diseases and other water-borne illnesses was also high in the city’s slums. About a quarter of the children below five years were reported to suffer from diarrhea and 22 percent experienced signs of acute respiratory infection (ARI) in the 15 days prior to the survey (Urban Health Resource Centre, 2009). In Shillong, there are reports of high incidence of tuberculosis in these populations. The consumption of tobacco was highest among the poorest quartile of the city – 6 percent among women and 58 percent among men. In addition, almost 1 percent of poor males in Meerut suffered from medically treated tuberculosis and prevalence was higher in slum than non-slum areas (2005-06 National Family Health Survey) Nevertheless, in Meerut city, the prevalence of diabetes was two to three times lower in slum areas and lowest among the poor of the city.

These slum populations are often made of migrants and various disempowered groups. However, not all households living in slums are poor. In 2005-06, while 43 percent of Meerut city’s households lived in slums, only 16 percent belonged to the city’s lowest wealth quintile. Also, in Chennai, the child sex ratio in slums is better than other parts of the city, they have grown slower than the average populations over 2001-2011 and household sizes are smaller.

Finally, more than a third of street children in India are reported to be dealing with substance abuse and urban areas are home to 1.3 million child laborers. About 47 percent of the urban poor are malnourished (Save the Children and PwC, 2015).

4.3. Summary

In summary, data on India as a whole show that the urban population is growing in both absolute and relative terms, currently totaling 32 percent of the population, or around 380 million. These figures reflect the official definition of urban areas, while alternative measures would lead to larger estimates. Urban population growth is largely driven by natural growth as well as reclassification of settlements as urban, although rural-urban migration accounts about a quarter of the growth. About 14 percent of the urban population, or 53 million, are below the official poverty line for urban areas. Compared to the rural population, the urban population includes a greater proportion of people in the most economically-productive age groups, and lower proportions of children and elderly.
With regard to health, nutrition and population outcomes, overall averages show improving trends in both urban and rural areas, with a considerable urban advantage that has not diminished over time. An important exception is the ratio of females to males, which has remained consistently lower in the urban population than in the rural population, despite deterioration over time in the rural ratio. In terms of an urban penalty, urban populations in some ways experience a greater ‘double burden’ of disease, combining infectious diseases along with increasing prevalence of chronic illnesses (like diabetes, hypertension and heart disease). They are also exposed to greater ambient air pollution and diseases like dengue.

However, while diagnoses of these chronic diseases and inpatient use is greater in urban areas, self-reports are often lower (if not similar) in urban than rural populations. This indicates that part of the urban penalty arises from better identification of illnesses related with improved access to health care. Also, in the case of air pollution, the health risks of indoor air pollution which is related to cooking fuel in rural areas, is greater than ambient air pollution.

Given the size and diversity of the country, overall statistics on India mask considerable heterogeneity. The dynamics of how urban health advantages and penalties play out differently in different states or districts as illustrated by the case studies.
5. SERVICE UTILIZATION

5.1. Service utilization

A significant urban advantage is evident with regard to service utilization indicators, although urban-rural differences have narrowed considerably in recent years as coverage has improved faster in rural areas. (Figure 5.1) In 2013-14, 89.2 percent of 1 year old children in urban areas had received all basic vaccinations, compared to 79.6 percent in rural areas. The difference between these figures (15 percent of the rural level) is significantly less than the urban-rural gap in 1992-93 (64 percent of the rural level).

Figure 5.1. Trends in health, nutrition and population service coverage indicators, urban and rural India

While immunization coverage increased significantly in urban areas, it more than doubled in rural areas during the period. In 2013-14, 25.2 percent of pregnant women in urban areas received full antenatal care.
antenatal care, compared to 17.3 percent in rural areas. This urban-rural difference of 46 percent (of the rural level), while still large, was lower than the gap of 102 percent (of the rural level) in 2002-04. Although antenatal care coverage increased a bit in rural areas during the period, the 2013-14 estimate for urban areas is essentially the same as the 2002-04 estimate. Trends in delivery care are more similar to immunization coverage, as births in health facilities increased in both urban and rural areas, but increased faster in rural areas. The urban-rural difference in delivery care coverage dropped from 251 percent (of the rural level) in 1992-93 to just 12 percent in 2014, when 89.2 percent of births among the urban population took place in health facilities, compared to 79.6 percent of births among the rural population. Growth in coverage of modern contraceptives was slower, but again faster in rural areas. In 2013-14, modern contraceptive use among married women in the urban population was 53.0 percent, compared to 44.4 percent in the rural population. The urban-rural difference of 19 percent (of the rural level) is lower than 36 percent gap in 1992.93. Thus, overall, utilization of basic maternal, child, and reproductive health care services has been increasing in both urban and rural areas, while improvement has been faster in rural areas.

Figure 5.2. Trends in sources of outpatient and inpatient treatment, urban and rural India

Utilization of general outpatient health care services has remained fairly stable in urban areas, while increasing somewhat in recent years in rural areas. (Figure 5.2) In 2014, in urban areas 88.1 percent of people who were ill in the previous 15 days received treatment, little different from 87.1 percent in rural areas. In contrast, utilization of inpatient hospital services has increased significantly in both urban and rural areas, although the urban-rural gap remains large. In 2014, in urban areas the hospitalization rate in the previous 1 year was 44 per 1,000 population, more than double the rate of 20 per 1,000 in 1995-96. The hospitalization rate in rural areas similarly more than doubled during the period, but the difference between the urban and rural rates remained similar at 26% in 2014, compared to 33% in 1995-96.

In contrast, data on utilization of nutrition services show a decided urban penalty. In 2005-06, 18.5 percent of children aged 0 to 71 months in urban areas were beneficiaries of supplementary food from the Integrated Child Development Services (ICDS), compared to 28.1 percent in rural areas.
Coverage increased since then in both urban and rural areas while remaining substantially higher in rural areas. In 2013-14, 36.7 percent of children aged 6 to 35 months in urban areas received supplementary nutrition, compared to 53.8 percent in rural areas. In the 36 to 71 months age group, these proportions were 31.1 percent in urban areas and 48.7 percent in rural areas. (2013-14 Rapid Survey on Children)

Figure 5.3. Trends in utilization of government and private health care services, urban and rural India

Sources: 1992-93, 1998-99 and 2005-06 National Family Health Surveys (1, 2 and 3); 2002-04 and 2007-08 District Level Household and Facility Survey (2 and 3); 2009 Coverage Evaluation Survey; and 2014 National Sample Survey (71st Round).

5.2. Use of government and private-sector health care services

Error! Reference source not found. makes clear that the private sector is the most important provider of general outpatient and inpatient services in urban areas. The private sector has consistently accounted for about 70 percent of outpatient care and 80 percent of inpatient care for urban populations. Utilization of both private and government outpatient services in urban areas has remained relatively stable over time, while utilization of both sources of inpatient services has
increased. The private sector is also important in rural areas, accounting for around 60 percent of outpatient care and 70 percent of inpatient care in 2014.

Data on treatment of children with respiratory infections follow the pattern of general outpatient services, as the provider sector provides most care in urban (as well as rural) areas, with little change over time. (Figure 5.3) In 2009, 73.3 percent of children with symptoms of respiratory infection received treatment from private providers, compared to 19.0 percent who were taken to government health care services. However, the private sector is less important for other basic maternal, child and reproductive health care. In 2014, in the urban population, 47.5 percent of births were in private sector health facilities, compared to 41.7 percent in government facilities. Since 2005-06, growth in institutional deliveries in urban areas was due to increased use of both private and public facilities, although there was a greater increase in the use of government facilities. The role of the private sector is less important, although still larger than in rural areas, with regard to preventive services. In 2005-06, the proportion of currently-married women in urban areas who obtained modern contraceptives from the private sector was 19.7 percent, compared to 31.7 percent from the public sector, although there was more growth over time in use of the private sector. Similarly, in 2009 in urban areas, among children under-3 with any vaccination, 21.1 percent were vaccinated by a private sector health care provider, compared to 73.8 percent from a government provider. Although this proportion is higher than in rural areas (where it is 5.8 percent private and 84.1 percent public), it is evident that in urban areas government services are more important for immunization than are private services.

Figure 5.4. Utilization of maternal and child health services, urban and rural in four states, India, 2012-13

![Graph showing utilization of maternal and child health services](image)

Sources: 2012-13 District Level Household and Facility Survey; 2012-13 Annual Health Survey

5.3. Evidence from the cities and their states

As shown by national patterns, there has been convergence over time in maternal and child health
service utilization measures in urban and rural areas such that, as shown in Figure 5.4, the difference by residence is small in three out of the four states we examine. The difference between urban and rural coverage in proportions of women who used antenatal care services during their last pregnancy; who registered this birth; fully immunized their child and had an institutional delivery, was not very different by residence. These rates are very high for all four states (around 90 percent), except for child immunization which is below 70 percent in all four states. Meghalaya is the exception where the urban advantage in service utilization is substantial. In urban Meghalaya 83 percent of women reported institutional delivery, and this is 45 percentage points higher than reported by rural residents. In fact, on average, institutional deliveries were reported to have reduced in Meghalaya from about a third to a quarter between 1998-99 and 2007-08, before they picked up to 47 percent in 2012-13.

Figure 5.5. Institutional delivery by district, India, 2012-13

Sources: 2012-13 District Level Household and Facility Survey; 2012-13 Annual Health Survey

Figure 5.6. Expenditure on child birth and other hospitalization cases, by type of hospital and residence, 2014

Source: 2014 National Sample Survey

In terms of location, public providers (which include hospitals, health sub-centers and primary health centers) are slightly favored for institutional delivery by urban residents of East Khasi Hills, Chennai and Khordha districts. However, in urban Meerut, only 21 percent of women deliver in
government care, and private care accounts for a little over a third of deliveries – institutional deliveries account for 55.5 percent of births. (Figure 5.5)

Average expenditure on childbirth at a hospital in urban areas is about 9 times more at private hospitals all-India. In Tamil Nadu, patients in private hospitals pay as much as 45 times more than in the public sector. On the converse, the out of pocket expenditure in public hospitals in Tamil Nadu is nominal at just Rs. 661 and it is considerably less than reported by women in the other states. (Figure 5.6)

Similarly, in urban areas the amount spent on inpatient care per episode of hospitalization (this includes medical and non-medical costs, but excludes cases of childbirth over the last year) is considerably higher than in rural locations. On average, patients paid 1.5 times more in urban areas than rural areas across India, with patients in urban Meghalaya paying about 5.3 times more than in rural parts of the state. While the average total expenditure per hospitalization case was around Rs 26,455 in urban parts of the country, a patient paid about 15 percent of this in rural Meghalaya and 126 percent of it in urban Uttar Pradesh.

Figure 5.7. Reported cases covered by Megha Health insurance scheme in Shillong, India, May-October 2013

Further insight on hospitalization cases is provided by data extracted from the Megha Health insurance scheme for poor families in Meghalaya. (Figure 5.7) Private hospitals provide 80 percent of the care for these patients covered by the scheme. For diseases like cancer, however, with high recurrent costs, public hospitals are sought more, and provide about three-fourths of the care.

Shillong attracts a high number of patients from surrounding areas who come to seek care due to the lack of hospitals in neighboring regions, putting pressure on the city’s services, while also providing an opportunity for coordination of care. The figures shows the proportion of cases that
are from within East Khasi Hills district as compared to those from outside: 56 percent of patients in these seven major hospitals report being from East Khasi, the remaining come from outside the city and district (14 percent from neighboring Ri Bhoi, 13 percent from Jaintia Hills, 10 percent from West Khasi Hills, and the remaining from further afield). Patients from outside seek a variety of care including for gastric problems, pregnancy and fever. An exceptional number from outside the district seeks care for Typhoid (62 percent), Meningitis/encephalitis (59 percent), kidney problems (56 percent) and Tuberculosis (54 percent), while the majority of cancer patients (68 percent) come from within East Khasi district. The age difference between patients coming from within East Khasi and outside is not much (33 versus 31 years), indicating that patients of all age come to Shillong’s hospitals from outside the district.

Figure 5.8. Reported cases covered by Megha Health insurance scheme in Shillong, India, May-October 2013: Amounts claimed and resident status of patients

5.4. Summary

A significant urban advantage is also evident in terms of utilization of maternal, child and reproductive health services, although urban-rural differences have narrowed in recent years as coverage has improved faster in rural areas. Government nutrition services are an exception, as coverage levels are higher in rural areas. Utilization of general outpatient services has remained stable in urban areas, while increasing somewhat in rural areas so that there is now little urban-rural difference. In contrast, while growing in both urban and rural areas, utilization of inpatient hospital services is significantly higher in rural areas. In both urban and rural areas, the majority of general outpatient and inpatient health services are provided by the private sector. Government services are more important for delivery of maternal, child and reproductive health services, although the role of the private sector remains significant and is greater in urban areas than in rural areas.

Source: World Bank staff analysis of Megha Health insurance scheme data.
An urban penalty may be evident with regard to household out-of-pocket spending on health services, as on average, consistent with its generally higher utilization and greater use of the private sector, the urban population spends more on health care than the rural populations. On the other hand, because average income is higher in urban areas, average household health spending as proportion of total household expenditures is similar to rural areas. In addition, on average, coverage of health insurance is higher among the urban population, which is also less likely to need to resort to borrowing or selling assets in order to meet health care costs.

Analysis of socio-economic differences indicates that the urban poor have worse health, nutrition and population outcomes and are less likely to use health services than the urban better-off, but generally still benefit from an urban advantage in that they have better indicators than the rural poor. However, in comparison with higher quintiles, the urban-rural gap is quite small at the poorest quintile. Like the rural poor, the urban poor are more likely to use government services for basic maternal, child and reproductive health care, but their use of private sector services is higher than the rural poor. As household socio-economic status increases in both urban and rural areas, use of private sector services increases, but the increases are much greater among urban populations.

Overall averages indicate that the urban population as a whole spends more out-of-pocket on health care in absolute terms compared to the rural population, but spends less as a proportion of total consumption. However, when looking at the lower quintiles, and particularly the poorest quintile, spending on health care by urban and rural households is similar both in rupee terms and as a proportion of total consumption. At the same time, although the urban population a whole is more likely to be covered by health insurance and less likely to need to resort to coping mechanisms to meet health care costs, the poorest urban quintile is fairly similar in these respects to the poorest rural quintile. The urban advantage is considerably more pronounced on these issues at higher socio-economic levels.

In general, when looking at the poorest quintile, an urban health advantage is evident, but it is considerably less significant than at the higher socio-economic levels. Urban populations benefit from an overall health advantage, but this is clearly linked to socio-economic status.

Finally, considerable heterogeneity exists across states and cities in utilization of services by residence and by the type of services used (public or private), even if for the same disease.
6. DISPARITIES

This section examines different types of disparities in health, nutrition and population outcomes and access to services involving urban populations. Although there are a number of different cleavages that could be examined, such as inequalities in outcomes and access between genders, migrants and non-migrants, castes, and ethnic or tribal groups, the chapter focuses on urban-rural differences and disparities related to household economic status. (Differences in household economic levels and distributions between the four states where our city case studies are located are discussed in Box 6.1). Drawing on available data as well as our four case studies, the chapter explores disparities in outcomes, service utilization, use of government and private sector services, household health spending, and the situation of slum populations.

Figure 6.1. Household economic differences in health, population and nutrition outcomes, urban and rural India, 2005-06

India’s estimated per capita gross national income in 2014 was US$ 1,610. (World Bank, 2015) Applying the government’s 2011-12 poverty line of Rs 12,000 per capita (US$ 250) in urban areas, it estimated that 13.7 percent of the urban population, or 53 million, were below the poverty line. This compares to 25.7 percent of the rural population, or 217 million, below the rural poverty line of Rs 9,792 (US$ 204). 28 (Government of India, 2013d) The urban poor do not all live in slums,
while slum inhabitants also include better-off households. For example, an analysis of 2005-06 household survey data in eight cities finds that the proportion of households living in areas defined as slums is consistently higher than the proportion of households ranked in the bottom quartile of a wealth index. (Gupta, Arnold and Lhungdim, 2009)

6.1. Disparities in outcomes

With the important exception of sex ratio, health and nutrition outcome indicators are better among urban populations than among rural populations at every level of household economic status. Figure 6.1 presents estimates from a 2005-06 household survey. Among the poorest 20 percent of the population, under-five mortality was 45 per 1,000 among the urban population compared to 63.2 per 1,000 among the rural population. There was similarly a large urban-rural difference in fertility at the poorest quintile, with total fertility rates of 2.8 and 3.8 in urban and rural areas respectively, although this difference narrowed at higher economic levels. Child malnutrition (stunting) among the poorest quintile was 53.6 percent in urban areas and 58.8 percent in rural areas, with the difference widening at the higher quintiles.

Figure 6.2. Child malnutrition among the poorest, urban and rural India, 2005-06

With one exception, this pattern is also evident in data from the states in which our four city case studies are located. (Figure 6.2) In 2005-06, in Odisha, Uttar Pradesh and Meghalaya, among the poorest quintile, child malnutrition was lower in urban populations than in rural populations. However, in Tamil Nadu, in the lowest quintile, the proportion of under-five children who were stunted was 42.3 percent, compared to 35.6 percent in rural areas. This is an anomaly, given both the overall pattern across the country and the generally better indicators in Tamil Nadu compared to other states.

Going back to Figure 6.1, the graph also illustrates disparities between household economic levels within both urban and rural populations in India. Under-five mortality in the poorest quintile in

29 We estimated household economic status separately for urban and rural populations making use of data on household assets and other characteristics. When referring to urban populations, a household in the poorest quintile is thus ranked in the poorest 20 percent of all urban households (not all households in India). Because both remuneration and the cost of living are higher in urban areas, the distribution of urban households by economic status is to the right of the distribution of rural households.

70
urban areas in 2005-06 was 45 per 1,000, more than double the rate of 19.9 in the highest quintile. The total fertility rate among the poorest quintile in urban areas was 2.8, compared to 1.6 among the highest quintile. Similarly, the proportion of under-five children who are stunted among the poorest urban population was 53.6 percent, more than double the figure of 18.4 percent among the highest quintile.

Figure 6.3. Child malnutrition among the lowest and highest household economic quintiles in urban populations, India, 2005-06

<table>
<thead>
<tr>
<th></th>
<th>% under-5 children &lt; 2 SD height/age</th>
</tr>
</thead>
<tbody>
<tr>
<td>national</td>
<td>53.6</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>42.3</td>
</tr>
<tr>
<td>Odisha</td>
<td>48.1</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>63.5</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>52.6</td>
</tr>
</tbody>
</table>


Again, this pattern is replicated when looking at urban-rural differences in the four states where the case studies are located. (Figure 6.3) In all four states, child malnutrition is higher among the poorest than among the highest household economic quintile in urban populations. The differences are very large in Tamil Nadu, Odisha and Uttar Pradesh, but not as extreme in Meghalaya.

Figure 6.4. Outcomes among the poorest quartile and overall, Chennai and Meerut, India, 2005-06

The 2005-06 National Family Health Survey over-sampled eight cities which enabled estimation of health indicators for their populations as a whole as well as sub-populations, including the poor (measured by the poorest 25 percent of the population, or quartile) and slum dwellers. These included our case study cities of Chennai and Meerut. (Gupta, Arnold and Lhungdim, 2009) Data from this survey on under-five mortality, stunting and fertility in Chennai and Meerut cities show...
disparities in health outcomes between the poor and the better off among urban populations. (Figure 6.4) For example, in 2005-06, under-five mortality in Chennai among the poorest 25 percent of the population was 44.8 percent, almost 20 percentage points higher than the overall average in the city. In Meerut, at much higher levels of child mortality, the difference was similarly 20 percentage points, but narrower in relative terms. It is again notable that child malnutrition among the poorest in Chennai (55.7 percent) was very high, indeed high enough to exceed the overall average in Meerut (43.8 percent). Also, child malnutrition among the poorest in Chennai (Figure 6.4) exceeds the estimate for the poorest among urban populations in Tamil Nadu as a whole (Figure 6.3). However, with regard to fertility, the total fertility rate among the poorest quartile in Chennai, although higher than the overall average for the city, is still below the replacement level (2.1). Fertility in Meerut is much higher and there is a greater gap between the poorest and the overall average.

Figure 6.5. Adult nutritional status among the poorest quartile and overall, Chennai and Meerut, India, 2005-06

![Nutritional status graph](image)

Source: 2005-06 National Family Health Survey 3.

Figure 6.6. Tobacco use by adult men among the poorest quartile and overall, Chennai and Meerut, India, 2005-06

![Tobacco use graph](image)

Source: 2005-06 National Family Health Survey 3.
Data on adult nutritional status among the urban poor are also available for Chennai and Meerut. (Figure 6.5) In both cities, an indicator of poor nutritional status among women (body mass index less than 18.5) was higher in the poorest quartile compared to city averages. In Chennai, in 2005-06, 26.2 percent of adult women in the poorest quartile had a low body mass index, while in Meerut the proportion was 32.0 percent. Under-nutrition among adult women is more common in Meerut than in Chennai for both the poor and on average.

Figure 6.7. Household economic differences in child sex ratio, urban and rural India, 2005-06

Prevalence of over-nutrition among adults provide some indication of the burden of non-communicable diseases among the urban poor. In both cities, adult women in the poorest quartile are less likely to have a body mass index over 25.0 compared to the overall average. In Chennai, this proportion is 26.5 percent in the poorest quartile, compared to 39.2 percent overall in the city. In Meerut, these proportions are lower – 8.8 percent among the poor and 29.6 percent overall, a significantly larger difference than in Chennai. It is notable that in Chennai, the prevalence of high BMI among poor women (26.5 percent) is similar to the prevalence of low BMI among poor women (26.2 percent), an indication that the urban poor suffer from a dual burden of disease. Another signal of the importance of non-communicable diseases is tobacco use. (Figure 6.6) Use of tobacco by adult men on average in both cities is quite high. However, tobacco use among the poor in Chennai (61.2 percent) is significantly higher than the average (35.9 percent) and also significantly higher than tobacco use by the poor in Meerut (41.8 percent). In contrast with Chennai, tobacco use by poor adult men in Meerut is lower than the average for the city (58.1 percent). These patterns may be related to the overall higher economic level in Chennai.

The ratio of females to males is the major exception to the patterns described above: (i) it is worse in urban populations compared to rural populations at all household economic levels; and (ii) it is worse among higher quintiles compared to lower quintiles in both urban and rural areas. (Figure 6.7) For example, in 2005-06, in the poorest quintile in urban areas, the number of girls for every 1,000 boys was 910, lower than in the poorest quintile in rural areas, where it was 923, but significantly higher than in the highest quintile in urban areas, where it was 820. Worse sex ratios
are thus associated with both urbanization and higher economic status.

Table 6.1. Child sex ratio (number of girls per 1,000 boys, age 0-6 years), selected districts, India, 2011

<table>
<thead>
<tr>
<th>District</th>
<th>urban</th>
<th>rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chennai District</td>
<td>950</td>
<td>-</td>
</tr>
<tr>
<td>Khorda District (includes Bhubaneswar)</td>
<td>906</td>
<td>924</td>
</tr>
<tr>
<td>Meerut District</td>
<td>848</td>
<td>855</td>
</tr>
<tr>
<td>East Khasi Hills District (includes Shillong)</td>
<td>937</td>
<td>976</td>
</tr>
</tbody>
</table>

Source: 2011 Census.

Figure 6.8. Household economic differences in health, nutrition and population service utilization indicators, urban and rural India, 2005-06

The urban-rural difference in sex ratios is apparent in 2011 Census data for the districts where our city case studies are located. (Table 6.1) Consistent with national patterns, the lowest ratios are in Meerut District and the highest in Chennai and East Khasi Hills.
Worse ratios in urban areas compared to rural areas of these districts are observed in Khorda District (which includes Bhubaneswar), Meerut District, and East Khasi Hills District (which includes Shillong). Nonetheless, Chennai provides an exception to the general pattern, as the ratio of 950 in urban Chennai is better than the rural average of 936 for the state.

6.2. Disparities in service utilization

Reproductive and child health service indicators show the familiar pattern of better results in urban areas compared to rural – at all household economic levels – and better results at the higher household economic quintiles compared to the poorest – both urban and rural areas. (Figure 6.8) For example, in 2005-06, among the poorest quintile, 35.3 percent of one year old children were fully vaccinated in urban areas, compared to 25.1 percent in rural areas.

At the same time, 71.2 percent of children in the highest household economic quintile in urban areas were fully vaccinated. The same pattern is evident with coverage of full antenatal care and modern contraceptive use.

The exception is the proportion of under-six children who have received supplementary nutrition from an Anganwadi Centre as part of the Integrated Child Development Services (ICDS). This proportion is higher both in rural areas, compared to urban, and higher among the lower quintiles, in both urban and rural areas.

In 2005-06, among the poorest quintile, 16.9 percent of children received supplementary nutrition from this program, compared to 25.9 percent in rural areas. At the same time, just 1.3 percent of children in the highest quintile in urban areas received supplementary nutrition from an Anganwadi Centre. The contrast with other service utilization indicators is due to: (i) this indicator refers only to government services (while vaccination, antenatal and contraceptive services are provided by both the government and private sectors); (ii) the ICDS is not very present in urban areas; and (iii) there is a self-targeting aspect to ICDS services in that, while the poor and better-off alike will demand child and reproductive health services, the better-off are less likely than the poor to want to avail of ICDS services.

These patterns are replicated in the states where our case studies are located (data not shown), with the exception of vaccination in Tamil Nadu, where the poor in rural areas had higher coverage (79.8 percent) than the poor in urban areas (70.2 percent).

Figure 6.9 provides 2005-06 data comparing service utilization indicators between the lowest and highest quintiles in urban populations in the states where our case study cities are located. The national pattern was evident of child and reproductive health services, but higher utilization of government nutrition services, among the urban poor across these states. Urban populations in Uttar Pradesh had the lowest utilization levels for vaccination and antenatal care, as well as the greatest disparities between the poor and better-off, while contraceptive use was lowest in Meghalaya among both the poor and better-off. Again, Tamil Nadu had the best service coverage rates for both the lowest and highest quintiles. In Odisha, coverage rates for the highest urban quintile approached those in Tamil Nadu and even exceeded it in the case of contraceptive use, but rates for the poorest quintile in Odisha were far lower than in Tamil Nadu. Again, use of
government nutrition services was highest among the urban poor, with the highest coverage observed in Tamil Nadu and the lowest in Meghalaya and Uttar Pradesh.

Figure 6.9. Health, nutrition and population service utilization among the lowest and highest household economic quintiles in urban populations, India, 2005-06
Data on the distribution of service coverage indicators are also available for the cities of Chennai and Meerut. (Error! Not a valid bookmark self-reference.) These are consistent with the data...
on urban populations in these states as a whole as generally the urban poor had lower coverage than urban populations as a whole. Vaccination coverage in Chennai is an exception, as children in the poorest quartile of the population of the city were significantly more likely to be fully vaccinated (90.3 percent) than the average for the city as a whole (77.7 percent). Vaccination coverage of the poor in Chennai (Figure 3.9) is also higher than the average for the urban poor statewide (Figure 3.10), but the poor in Chennai seem to have less access to antenatal care, contraception and nutrition services than the urban poor in general in Tamil Nadu. In Meerut, vaccination and contraception coverage among the poor is higher than the statewide averages for the urban population, but similar with regard to antenatal care.

Figure 6.10. Service utilization among the poorest quartile and overall, Chennai and Meerut, India, 2005-06

* Insufficient sample size.
Source: 2005-06 National Family Health Survey 3.

6.3. Differences in private sector health service utilization

More recent data on delivery care repeats the above-described patterns: higher utilization by urban populations at all economic levels, and lower utilization by the poor compared to the better off in both urban and rural areas. (Figure 6.11) In 2014, in the poorest quintile of the urban population, 85.2 percent of mothers delivered in health facilities, compared to 74.9 percent among the poorest
quintile of the rural population. In the highest quintile of the urban population, 95.9 percent of mothers delivered in a health facility.

**Figure 6.11. Delivery care in health facilities by household expenditure quintile, urban and rural India, 2014**

<table>
<thead>
<tr>
<th>Household Expenditure Quintile</th>
<th>Urban % Deliveries in Health Facilities</th>
<th>Rural % Deliveries in Health Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>85.2%</td>
<td>88.4%</td>
</tr>
<tr>
<td>2</td>
<td>89.1%</td>
<td>91.6%</td>
</tr>
<tr>
<td>3</td>
<td>91.6%</td>
<td>95.9%</td>
</tr>
<tr>
<td>4</td>
<td>74.9%</td>
<td>78.2%</td>
</tr>
<tr>
<td>5</td>
<td>79.5%</td>
<td>82.1%</td>
</tr>
</tbody>
</table>


The data also provide information on the use of government and private sector facilities for delivery. Utilization of private sector services was higher in urban areas at every economic level and increased as household economic level increased. Among the poorest quintile in urban areas, 31.7 percent of all deliveries were in private institutions, compared to 16.9 percent in rural areas. Greater use of private sector facilities explains the urban advantage in delivery care, since use of government facilities is higher among the rural population at every economic level. Among the poorest urban quintile, 53.5 percent of all deliveries are in government facilities, compared to 58.0 percent among the poorest quintile in rural areas. This drops to 18.9 percent at the highest urban quintile, while still remaining high at 47.8 percent at the highest quintile in rural areas.

Data on general use of health services, which implies outpatient care, for Chennai and Meerut are provided in Figure 6.12. The difference between the two cities is striking, representing two extremes of the situation in urban India, where overall in 2014, 79 percent of outpatient care was provided by the private sector. (2014 National Sample Survey, 74th Round). In Meerut, where use of the private sector for outpatient care is on average 89.6 percent, the poorest quartile tend to use the private sector slightly more, at 93 percent. In contrast, the poorest quartile in Chennai reports using the private sector considerably less (36.6 percent) than the average for the city (65.2 percent).

Reasons provided by those households who report not using government services when a household member is ill are provided in Table 6.2. Both the poor and the city population as a whole in Meerut is much more likely to report that the lack of a government facility nearby is an important reason for not using government services. The poorest quartile are somewhat more likely to provide this reason (67.7 percent) than the average (58.4 percent). Poor quality of care is also significantly more likely to be a reason for not using government services in Meerut, for both the poorest (63.1 percent) and overall (65.1 percent). Conversely, inconvenient opening hours are cited
as more important in Chennai than in Meerut. Nonetheless, the main reported reasons in both cities are similar: lack of a facility nearby, inconvenient timing of services, long waiting time, and poor quality. In both cities, differences between the poorest quartile and the overall average are not large, except with regard to facility availability in Meerut. Interestingly, issues that were raised as important by key informants during our research in the four cities – human resources and medicine supply – were not reported as significant barriers.

Figure 6.12. Use of private sector for general illness, Chennai and Meerut, India, 2005-06

![Graph showing private sector use in Chennai and Meerut]

Source: 2005-06 National Family Health Survey 3.

Table 6.2. Reasons for not using government health services among the poorest quartile and overall, Chennai and Meerut, India, 2005-06

<table>
<thead>
<tr>
<th>Reason</th>
<th>Chennai</th>
<th>Meerut</th>
<th>Chennai</th>
<th>Meerut</th>
</tr>
</thead>
<tbody>
<tr>
<td>no facility nearby</td>
<td>30.2  30.6  67.7  58.4</td>
<td>26.9  26.7  10.0  11.7</td>
<td>1.2  2.9  2.1  5.2</td>
<td>34.3  38.4  22.3  29.9</td>
</tr>
<tr>
<td>facility timing not convenient</td>
<td>38.6  42.0  63.1  65.1</td>
<td>0.0  0.1  1.6  1.3</td>
<td>0.0  0.0  0.9  1.4</td>
<td>1.8  4.8  4.9  6.3</td>
</tr>
<tr>
<td>poor quality of care</td>
<td>0.0  0.0  0.9  1.4</td>
<td>0.0  0.0  0.9  1.4</td>
<td>0.0  0.0  0.9  1.4</td>
<td>0.0  0.0  0.9  1.4</td>
</tr>
<tr>
<td>other</td>
<td>0.0  0.0  0.9  1.4</td>
<td>0.0  0.0  0.9  1.4</td>
<td>0.0  0.0  0.9  1.4</td>
<td>0.0  0.0  0.9  1.4</td>
</tr>
</tbody>
</table>

Source: 2005-06 National Family Health Survey 3.

6.4. Differences in household health expenditures

Urban populations spend more on health services than do rural populations. In 2011-12, average monthly health expenditures by urban households totaled Rs 146 (US$ 2.90), compared to Rs 95 (US$ 1.89) by rural households. (2011-12 National Sample Survey, 68th Round) This is consistent
with urban populations using more health services (Figure 1.3), using more private sector services (Figure 1.4), as well as with the fact that urban households pay more for each case of illness or hospitalization. In addition, this urban-rural difference held at each level of economic status, although health spending by the poorest in both urban and rural areas was quite similar. (Figure 3.13) In 2011-12, among the poorest quintile in urban areas, monthly health spending averaged Rs 37 (US$ 0.74), compared to Rs 26 (US$ 0.52) among the poorest in rural areas. In both urban and rural areas, health spending rose sharply with increasing economic status, so that it doubled from the lowest to the second quintile and was almost ten times larger in the highest quintile.

**Figure 6.13. Household health expenditures by household economic status, urban and rural India, 2011-12**

![Graph showing monthly household health expenditures and as a proportion of total expenditures in urban and rural areas by household expenditure quintile.](source)

However, because average urban income and consumption expenditure levels are higher, as a proportion of total household expenditures, household health spending in urban areas is in fact lower than in rural areas. On average, in 2011-12, spending on health care by urban households represented 5.5 percent of their total consumption expenditures, compared to 6.7 percent for rural households. Nonetheless, health expenditures as a proportion of total household expenditures are similar for the majority of urban and rural populations who are situated in the first four quintiles. The difference in urban and rural averages is largely driven by significantly higher health spending as a proportion of total expenditures in the highest rural quintile. (Figure 6.13) The poorest quintiles in both urban and rural areas spend similar amounts on health care (3.8 percent) as a proportion of their total household expenditures.

In 2014, on average, urban households spent Rs 639 (US$ 10.51) on outpatient care per case of illness, compared to Rs 509 (US$ 8.37) paid by rural households. The difference is much larger for hospital services, as on average, urban households paid Rs 26,455 (US$ 435) per hospitalization, compared by Rs 16,956 (US$ 279) paid by rural households. (2014 National Sample Survey, 71st Round) These urban-rural differences in average unit costs for health care are driven by differences at higher socio-economic levels, while the amounts paid by the poorest quintiles in both urban and rural areas are similar. (Figure 6.14)
In 2014, in the lowest quintile among the urban population, the average amount paid for outpatient care per ill household member was Rs 472 (US$ 7.76), similar to the average of Rs 524 (US$ 8.62) paid by the poorest quintile in rural areas. Similarly, on average, the poorest urban quintile paid Rs 12,516 (US$ 206) per hospitalization, compared to Rs 11,805 (US$ 194) among the poorest rural quintile. These amounts can compare to the range of monthly total per capita expenditure that defines the poorest quintile in this analysis: Rs 0-1,182 (US$ 0-19) for the urban population and Rs 0-800 (US$ 0-13) for the rural population. In other words, the average cost paid for a hospitalization by the poorest urban quintile is at least ten times greater than total monthly per capita expenditures in this quintile, about equivalent to the maximum annual per capita annual expenditures in this quintile. Like total household health spending, the unit costs paid by households rise rapidly with increasing economic status (and rise more rapidly in urban areas than in rural areas).

**Figure 6.14. Unit costs of health care to households by household economic status, urban and rural India, 2014**

In addition, on average, urban households are more likely to be covered by some form of health insurance; in 2014, 18.1 percent of urban households had coverage, compared to 14.1 percent of rural households. This difference is largely driven by higher coverage of private health insurance among the urban population (6.1 percent versus 1.0 percent among the rural population), while coverage by government-supported health insurance programs is similar in urban areas (12.0 percent) compared to rural areas (13.1 percent). (2014 National Sample Survey, 71st Round)

However, health insurance coverage of the poorest quintile in urban areas is similar to the poorest quintile in rural areas. (Figure 6.15) While 9.5 percent of individuals in the poorest urban quintile were covered by some type of health insurance, this is less than the 11.8 percent in the poorest rural quintile, a difference which is due to slightly higher coverage of government-supported insurance. Disparities in insurance coverage are greater in urban areas, due to increasing coverage

---

30 Ranking of households by total expenditures in order to form quintiles is done separately in urban and rural areas.
of private health insurance at higher socio-economic levels. Nonetheless, coverage of private-sector health insurance rises to a significant level, exceeding coverage of government-supported insurance, only in the highest urban quintile (18.3 percent). Coverage of government-supported insurance also increases with household economic level in urban areas, with the proportions covered by quintile quite similar to rural areas. (Government-supported insurance includes insurance for government employees as well as government programs targeting the poor).

On average, urban residents less likely to need to resort to borrowing, selling assets or seeking contributions from friends or relatives in order to meet health care costs (as opposed to meeting expenses from their own income and savings). In 2014, these were the primary sources of financing for the health care costs of 25.1 percent of urban residents, compared to 32.2 percent of rural residents. (2014 National Sample Survey, 71st Round) The proportions of households who primarily rely on sources of financing other than their own income or savings are similar in the poorest quintiles in urban (31.6 percent) and rural (34.4 percent) areas. The urban advantage on this issue widens as household economic status increases and the better-off in urban areas are more likely to be able to cover health costs from their own resources. (Figure 6.15)

Figure 6.15. Health insurance benefits and sources of financing to meet health care costs, by household economic status, urban and rural India, 2014

6.5. Urban slums

Slums are the most visible manifestation of disparities in urban areas and a stated focus of public policy, including the main national urban development program as well as the National Health Mission, whose objective is “to improve the health status of the urban population particularly slum dwellers and other vulnerable sections by facilitating their access to quality health care.” (Government of India, 2013a) The 2011 Census measured three types of slums: (i) “notified” slums are those designated as such by national, state or local governments, in accordance with national or state legislation; (ii) “recognized” slums that are not formally notified but nonetheless designated as slums by government; and (iii) “identified” slums determined by census officials to

83
be compact areas with at least 60-70 households with poorly-built and congested housing, unhygienic conditions and poor water and sanitation facilities.

The census enumerated a total of 65.5 million people living in slums, divided about evenly into the three types. This was 17.4 percent of the total urban population reported by the census. Uttar Pradesh, with 9.5 percent of the total slum population, counted among the top five states with the largest slum populations. Meerut, with 40 percent of its total population living in slums, was among the cities with the largest proportions of their populations living in slums (the highest proportion was in Mumbai, with 41 percent). In 2011, there were 185 slums in Meerut city of which 43 percent were not notified or registered and thus less likely to have access to public services. Tamil Nadu, where 8.9 percent of the country’s slum population lived in 2011, was similarly among the states with the largest slum populations. Chennai, with 28.5 percent of its population living in slums in 2011, was also among the cities with the largest proportions of their populations living in slums. After expansion of its administrative boundaries, Chennai’s slum population grew to over 36 percent of the city’s total population. The number of slums increased from 1,700 to more than 3,000, of which only 751 are notified. In addition, the Chennai Municipal Corporation estimates that there is a population of about 15,000 homeless persons (who often have difficulty in accessing social benefits for the poor due to lack of identification documents).

Odisha had a slum population of 1.6 million in 2011. In 2011, the census reported that 18.5 percent of the population of Bhubaneswar lived in slums. Presently, it is reported that Bhubaneswar has 436 slums, only 99 of which are authorized. The slum population is reported to have surged due to migration after a cyclone along the coastal areas of Odisha in 2000. Many migrants are also from rural parts or Odisha, Andhra Pradesh and Bihar, relocating for better employment opportunities. (Population Foundation of India, 2013) In Meghalaya, the 2011 census reported a slum population of only 57,000, of which about 15,000 were in Shillong.

The 2011 census found that 20.4 percent of the total slum population in India were from Scheduled Castes, while 3.4 percent were from Scheduled Tribes, compared to 12.6 percent and 2.8 percent respectively in the urban population as a whole. In Meerut, 24 percent of the slum population was from Scheduled Castes, compared to 16 percent of the city’s population as a whole. In Chennai, over 30 percent of the slum population was from Scheduled Castes in 2011, compared to 17 percent among the city’s overall population. About half of the Scheduled Caste population in Chennai live in slums. In Shillong, non-tribal groups, such as economic migrants from other states, are more likely to live in slums, as only 23 percent of the slum population is from Scheduled Tribes, compared to 77.5 percent in the East Khasi District (containing Shillong).

Household survey data from eight cities in 2005-06 provide estimates for under-five mortality among slum and non-slum populations, as well as among the poorest quartile of the populations of each city. (Table 6.3) This indicates that slum populations experience worse health outcomes than urban populations not living in slums. For example, in Chennai, under-five mortality was 46.3 per 1,000 among the slum population, compared to 31.5 among the non-slum populations.

31 Scheduled Castes and Scheduled Tribes are historically disadvantaged groups recognized under the India’s constitution.
Similarly, in Meerut, under-five mortality experienced by families living in slums was 86.1 per 1,000, compared to 69.4 among those living outside of slums. However, it is notable that under-five mortality rates in slums in Kolkata, Mumbai and Hyderabad, were lower than for non-slum populations, a reflection of the heterogeneity of slum populations. That is, these data, along with other data on household economic status, indicate that slum populations do not necessarily coincide with the poorest urban populations. In other words, better-off households often live in slums, while poor households often live outside of slums. (Nolan, 2015) In four of the five cities for which under-five mortality was estimated for the poorest quartile, rates were considerably worse than for slum populations. In Chennai, under-five mortality among the poorest quartile was 69.9 per 1,000, compared to 46.3 among the slum population. In Meerut, under-five mortality among the poor was 118.7 per 1,000, compared to 86.1 among the slum population.

Table 6.3. Under-five mortality in eight cities, India, 2005-06

<table>
<thead>
<tr>
<th>City</th>
<th>Non-slum</th>
<th>Slum</th>
<th>Poorest quartile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delhi</td>
<td>40.4</td>
<td>72.8</td>
<td>70.8</td>
</tr>
<tr>
<td>Meerut</td>
<td>69.4</td>
<td>86.1</td>
<td>118.7</td>
</tr>
<tr>
<td>Kolkata</td>
<td>51.6</td>
<td>44.7</td>
<td>83.3</td>
</tr>
<tr>
<td>Indore</td>
<td>48.2</td>
<td>64.4</td>
<td>*</td>
</tr>
<tr>
<td>Mumbai</td>
<td>43.6</td>
<td>32.7</td>
<td>*</td>
</tr>
<tr>
<td>Nagpur</td>
<td>43.6</td>
<td>59.5</td>
<td>71.4</td>
</tr>
<tr>
<td>Hyderabad</td>
<td>42.3</td>
<td>33.7</td>
<td>83.5</td>
</tr>
<tr>
<td>Chennai</td>
<td>31.5</td>
<td>46.3</td>
<td>69.9</td>
</tr>
</tbody>
</table>

* Insufficient sample size.
Source: 2005-06 National Family Health Survey 3.

The above-described typology of slums is a reflection of how legal status may differ for different urban slums and neighborhoods in India, which in turn affects extension of government services (along with other issues, notably property tenure and vulnerability to eviction). Eight different types of legal status have been observed in Delhi, for example, including “designated slums,” “unauthorized colonies,” “regularized unauthorized colonies” and “planned colonies.” (Bhan, 2013) While political and administrative structures tend to be responsive to the urban middle class, poor and slum populations often struggle to influence local governments to make the necessary investments in public infrastructure such as sanitation systems. (Chaplin, 2011) At the same time, the urban poor may have access to politicians and administrators in order to receive services and reduce vulnerability to eviction, often mediated through informal community leaders, particularly in the case of poorer and more recent migrants. (Jha, Rao and Woolcock, 2007)

Resettlement colonies are often set up for households who are move from unauthorized slums (voluntarily or involuntarily). For example, in Chennai, while resettlement colonies set up by the municipality generally fare much better than slums in terms of sanitation, most resettlement colonies are located on the periphery of the city, so that in contrast with more centrally-located slums, employment is more difficult, commuting longer, and subsequently incomes of poor
households are reduced. (Coelho, Venkat and Chandrika, 2012)

In Chennai, government primary health care facilities are located in only 168 of the 751 notified slums (out of over 3,000 slums). Poor access to health services is mirrored by health service utilization indicators. Such indicators for slum populations are worse than for urban populations not living in slums, but usually better than indicators for the poorest quartile of the urban population. For example, in Meerut in 2005-06, 15.6 percent of pregnant women living in slums received all recommended components of antenatal care, compared to 26.3 percent among the non-slum population, but only 3.9 percent among the poorest quartile of the total population of the city. Similarly, in Chennai, antenatal care coverage among the slum population was as high as 40.5 percent, lower than 52.1 percent among the non-slum population, but higher than 30.4 percent among the poor.

**Figure 6.16. Delivery care and conditional cash transfers by zone, Chennai, 2014**

Although overall access to health services is lower among slum populations, they are generally more likely to use government services than non-slum populations. In 2005-06, this was the case in seven of eight cities studied. In Chennai, 47.2 percent of slum households generally would go to a government health care provider when a household member was ill, compared to 31.1 percent of non-slum households. (2005-06 National Family Health Survey 3) Figure 6.16 illustrates data on 12,600 institutional deliveries between January and May 2014 in Chennai. It indicates that use of government services is highest in zones with the largest slum populations. In Roypuram zone,
which has the lowest proportion of its population living in slums (25 percent), 59 percent of women chose the private sector for delivery care. In contrast, in Tondiarpet, which has the highest proportion of its population living in slums (64 percent), only 19 percent used private health services. Figure 3.16 also indicates that Tondiarpet makes most use of Tamil Nadu’s conditional cash transfer program encouraging maternal health care provided by government services.

An exception to the pattern of greater use of government services by slum populations is Meerut, where around 90 percent both slum and non-slum households would generally go to the private sector if a household member were sick. Slum households were marginally less likely to use government services (8.3 percent) than non-slum households (10.3 percent). Key informants in Meerut indicated that poor residents favor local healers and private doctors over government health services. Government providers are perceived as either being absent or providing poor quality care and the poor only use the government system when they cannot afford private practitioners. A 2007-08 survey of over 15,000 mothers found that only about 60 percent of pregnant women living in slums had registered with a health facility. Of these registered pregnancies, 40 percent accessed private care, 25 percent used NGO services and the remaining 25 percent used government facilities. Reasons reported for not using the government health system included “poor physical accessibility, irregular supplies and absence of adequate staff including lady doctors” (UHRC, 2009).

In general, slum populations are also more likely to use government nutrition services. In Chennai, in contrast with primary health care facilities, there are Anganwadi Centres in about half of the over 3,000 slums in the city. Thus, in Chennai in 2005-06, 24.1 percent of under-six children living in slums received supplementary food from an Anganwadi Centre, compared to 12.3 percent among the non-slum population. This pattern is also seen in other cities. Even in Meerut, 5.6 percent of children living in slums received supplementary nutrition, compared to 0.0 percent of children living outside of slums. (2005-06 National Family Health Survey 3)
7. URBAN WATER AND SANITATION

Poor hygiene and sanitation lead to a number of diseases and the poor absorption of nutrients. This section focuses on drinking water and sanitation in Indian cities and describes the challenges in increasing coverage and improving quality of these services.

7.1. The state of urban water and toilets: coverage

Indian cities can be filthy, congested and polluted, and their poorest inhabitants often live without basic water and sanitation services, in what is regularly described as squalor. The country has some of the worst sanitation in the world – the majority of people who defecate in the open live in India. In urban areas, one in five households does not have a latrine facility within their premises, and the majority end up defecating in the open (Figure 7.1). Odisha, Tamil Nadu and Uttar Pradesh are among the eight worst states in the country and report urban open defecation that is higher than the national average (with 35 percent, 25 percent and 17 percent of urban households lacking toilets respectively in each state). In contrast, 96 percent of urban households in Meghalaya have toilets within their premises. (2011 Census)

Figure 7.1. Households without latrines and alternatives used, urban areas, India, 2011

The absence of a private space for sanitation, apart from depriving individuals of discretion, is associated with challenges of venturing out in bad weather, in the night, encountering stalkers or animals, and the risk of contracting infections. Urban women in particular (compared with rural women) report high stress regarding rape and sexual assault and the challenge of crossing physical barriers to find a place for sanitation, and they also acknowledge being stressed over concerns of reputation. In addition, these women often rely on public sources for water which can be unpredictable and sporadic, making hygiene and sanitation an unpleasant – and most likely unhealthy – experience. (Hulland et al., 2015)

India is also one of the most unequal countries in terms of urban sanitation. Nationally, one in two of the poorest urban households did not have a toilet in 2005-06. (Figure 7.2) In Odisha, 84 percent of these most vulnerable urban households were without toilets, and even in a more
developmentally advanced state like Tamil Nadu 61 percent of urban households in the poorest quintile did not have toilets (2005-06 National Family Health Survey 3). As household wealth increases, access to toilets increases but there is a large gap between the richest and poorest quintiles in use of improved sanitation. As a result, India ranks with a country like Namibia in terms of inequality (UNICEF and World Health Organization, 2015). This inequality across wealth quintiles is also generally larger in urban than in rural areas. In urban areas, for households with improved toilet facilities, there is a difference of 79 percentage points between the poorest and richest quintiles nationally, and it is as high as 94 percentage points in Odisha, although also just 15 percentage points in Meghalaya.\(^3\) (2005-06 National Family Health Survey 3)

**Figure 7.2. Poorest urban households with no toilet facility, urban areas, India, 2005-06**

<table>
<thead>
<tr>
<th>Quintile</th>
<th>India</th>
<th>Meghalaya</th>
<th>Orissa</th>
<th>Tamil Nadu</th>
<th>Uttar Pradesh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poorest 2</td>
<td>54</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Poorest 3</td>
<td>16</td>
<td>7</td>
<td>0</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>poorest 2</td>
<td>38</td>
<td>11</td>
<td>5</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>poorest 3</td>
<td>61</td>
<td>19</td>
<td>5</td>
<td>49</td>
<td>14</td>
</tr>
</tbody>
</table>


Drinking water is more accessible with 71 percent of urban residents in India having access within their premises. (Figure 7.3) However, in Meghalaya, Odisha and Tamil Nadu, just a little more than half of urban households access water within their premises, and the rest use shared sources (in Odisha about 18 percent of households’ water sources are “away” from their premises, as compared to “within” or “near”). A little more than 60 percent of urban Indians have access to piped and treated water, with only 42 percent having this luxury in Odisha. More than a third of urban residents in Odisha get their drinking water from a well (tubewell, covered or uncovered well), and 37 percent in Uttar Pradesh use a hand pump.

Urban households can draw some solace that they tend to have better drinking water and sanitation services than in rural areas – but this is also largely because of very poor sanitation in rural India. The urban advantage exists: In rural parts 70 percent of households are without a latrine facility and 97 percent of these households defecate in the open. As mentioned above, in urban India about 20 percent of households do not have toilets, and 68 percent of these residents defecate in the open (another 32 percent use public toilets). (2011 Census)

The urban advantage in sanitation, in terms of access to improved toilet facilities, is large and it

\(^3\) An improved toilet facility is one that is not shared; it includes flush/pour flush to a piped sewer system, a septic tank, or pit latrines.
existed across the household economic distribution in 2005-06 (with a 57 percentage point gap nationally between urban and rural residents). (Figure 7.4) However, poorer households benefit from a smaller urban advantage than do better-off households. The urban advantage is largest for households in the middle of the wealth distribution – this broad pattern holds nationally and in the states examined except for Meghalaya. In Meghalaya, the largest advantage of being an urban resident is for the poorest and the smallest is for the wealthiest. As shown in the figure, the average urban resident tends to have the largest urban advantage in a poorer state like Uttar Pradesh, but even in a state like Tamil Nadu the advantage in sanitation is large.

Figure 7.3. Drinking water within premises and sources of drinking water, urban areas, India, 2011

Source: 2005-06 National Family Health Survey 3.

Figure 7.4. Urban-rural differences in access to improved toilet facilities, India, 2005-06


For drinking water, residents have a smaller urban advantage (11 percentage point difference nationally). (Figure 7.5) The difference is also slightly progressive as the urban-rural difference among poor households is larger than the urban-rural difference among all households. Meghalaya stands out with a large (38 percentage points) advantage for urban residents, and particularly for poorest households (53 percentage point gap in access between the urban and rural poor).
Figure 7.5. Urban-rural differences in access to improved drinking water supply, India, 2005-06

Within slums, about 65 percent of households have access to tapped water from a treated source (similar to the overall average for the urban population). Yet the water source is located within household premises for only 42 percent of slum residents (as compared with 71 percent among the urban population as a whole), implying that public or shared sources of water are being used by the majority of slum households. Thus, for 11 percent the source of water is ‘away’ from their premises (2011 Census).

Figure 7.6. Slum households without latrines, India, 2011

However, the most striking difference between slum and non-slum populations is their access to toilets: about a third of slum households have no latrine on their premises (compared with less than a fifth of the urban population as a whole). (Figure 7.6) Almost one in five slum households defecates in the open. Half of slum residents in Odisha 39 percent in Tamil Nadu do not have latrines. The poorest, however, do not necessarily live in slums – particularly since the Census
defines slums as areas with at least 60-70 households. Smaller clusters of households are excluded, and these households are often more vulnerable, poor and mobile and are less likely to have access to basic services (Bhan and Jana, 2013). Within the non-slum population 11 percent of households defecate in the open, indicating that poverty and poor access to services are also concerns outside of slums. (2011 Census)

Public toilets are used by about 4 percent of non-slum households but by 15 percent of slum households in India. They are essential particularly for persons in slums and for floating populations such as the homeless, street vendors, taxi and auto drivers, and other workers in informal markets. Mapping by a non-governmental organization in Chennai finds that public toilets are too few (against a norm of 1 seat for 60 persons there exists 1 seat for every 1,050 persons), their spatial location is not well planned, they are poorly maintained and monitored, and that the Corporation of Chennai needs to creatively manage these challenges, given constraints of capacity, land and poor coordination (for example, private contractors may not have the incentive to maintain public sanitation).³³

Figure 7.7. Source and location of drinking water, Chennai, 2011

Finally, a great deal of variation in service provision exists within cities. For example, access to water and sanitation in Chennai may be superior to other parts of Tamil Nadu and India, but there is heterogeneity within the city. As shown in Figure 7.7, 79 percent of households in Chennai access tap water from a treated source as their main source of drinking water (as compared with 66 percent in urban Tamil Nadu). About 76 percent also report that this water source is within their premises. Yet, access to drinking water ranges from 46 percent in ward 110 (in zone 9) to 94 percent in ward 15 (in zone 2), and this water supply is often sporadic and not round-the-clock

(2011 Census). Post-expansion, Chennai city faces greater challenges, as access to clean water is lower in the annexed areas.

**Figure 7.8. Use of public latrines and open defecation, Chennai, 2011**

![Graph showing latrine facilities not within premises and alternatives used, by zone](image)

Source: 2011 Census.

Similarly, while in urban Tamil Nadu one in four households report not having latrine facilities within their premises, in Chennai it is only 4 percent. Nevertheless, within Chennai, 57 percent of households in ward 80 and 41 percent in ward 110 (in zone 9) do not have latrines on their premises. (Figure 7.8) Related to this, open defecation continues to be a problem for the city, particularly in the expansion areas.

**Figure 7.9. Drinking water sources, Shillong, 2011**

![Bar chart showing main source of drinking water in Greater Shillong](image)

Source: 2011 Census.

In Greater Shillong, the majority of households receive water within their premises. Yet, there are areas such as Nongmynsong, where only 13 percent get water within their premises and 68 percent
of this water is sourced from springs. (Figure 7.9) Springs are the main source of water in Meghalaya and given the prevalence of open defecation in these streams, they can be a disease vector.

7.2. The importance of public sanitation

The disappearance of the urban health penalty in developed countries is strongly associated with improvements in hygiene and sanitation. For example, the use of clean water technologies (chlorination and filtration) in the major cities of the United States is estimated to have accounted for a large proportion of reductions in infant and child mortality. Public health innovations in sanitation, waste management, food quality control, along with improved living standards, nutritional practices, better private hygiene and health-behaviors, have made major contributions to longer and better lives around the world (Cutler and Miller, 2005).

In India, poor sanitation and hygiene lead to the spread of a number of fecal-transmitted and other infectious diseases including diarrhea, typhoid, malaria and dengue, which account for a large proportion of infant and child deaths and disease. Diarrhea, along with pneumonia, is the leading cause of death among Indian children below five years of age (Million Death Study Collaborators, 2010). The incidence of diarrhea among children is similar in urban and rural India. (2005-06 National Family Health Survey 3)

Poor neighborhood sanitation has been linked to high levels of child stunting in India (Chambers and Medeazza, 2013; Hammer and Spears, 2013; Ngure et al., 2014; Rah et al., 2015; Spears, Ghosh and Cumming, 2013), and also to large geographic variations in infant mortality (Geruso and Spears, 2015). There is also growing awareness regarding subclinical conditions such as enteropathy, that are often undiagnosed, untreated and comorbid due to their asymptomatic nature but prevent the proper absorption of nutrients. This may be a factor behind the exceptionally high levels of child stunting in India – and related consequences such as poor cognitive outcomes and school attendance (Chambers and Medeazza, 2013).

Cultural factors, along with economic status and other household characteristics, affect the use of toilets and these are being appreciated more in understanding how to improve hygiene. For example, despite worse socioeconomic indicators, India’s minority Muslim population is more likely to use toilets than Hindus. Traditional concepts of pollution and purity have been central in Hindu society and the use of latrines in close proximity to living quarters has been considered polluting – this explains the reticence in some cases regarding use of toilets even when access is provided (Coffey et al., 2015). A recent study found that the paradoxical lower infant mortality rate among Muslims may be influenced by higher latrine use by Muslims and their neighbors (Geruso and Spears, 2015).

7.3. Increasing coverage and improving quality of services: the challenges

Coverage of sanitation services is not keeping up with urban growth. India has made moderate progress since 1990. (UNICEF and World Health Organization, 2015) In 2014 the government announced the Swachh Bharat Abhiyan (Clean India Mission) which by 2019 aims to end open defecation, eradicate manual scavenging and bring about behavior change in sanitation practices.
(among other things) in rural and urban India. With the involvement of celebrities and the private sector, and operated in ‘campaign mode’, this intervention aims to build over ten million household toilets/latrines and 500,000 public toilets in urban India. The program follows in the tradition of earlier interventions to address drinking water and sanitation, such as the Accelerated Rural Water Supply Program in 1972-73, the Rajiv Gandhi National Drinking Water Mission in 1991, the Swajaldhara program in 2002 and the Nirmal Bharat Abhiyaan (Total Sanitation Campaign) from 2012. Previous interventions have encountered limited success (Patil et al., 2014), and the current intervention is similarly described as over-ambitious also given the financial resources that have been subsequently allocated. (Ali, 2015; Coffey et al., 2014; Government of India, 2014a)

A number of problems exist in increasing coverage and maintaining quality of urban water and sanitation services – these include poor planning, lack of skilled manpower, poor political will, but also corruption and that services tend to be geared towards better-off neighborhoods and more articulate citizens. The provision of basic services such as water and sanitation declines as one moves away from the city core, it is inversely proportional to the size of the city, and worst in rural areas (World Bank, 2013). There is some evidence of political capture of sanitary services such as cleaning or paving of roads for the gain of local politicians. (Ban et al., 2009) Regulation of liquid waste management is lacking. For example, officials in Shillong mentioned that there is no Water Act in place in the state, nor clear governance systems, nor legislation to protect rivers.

No major city in India provides continuous water supply to its population (as compared with 90 percent in Jakarta, 88 percent in Manila and 60 percent in Colombo) and this is often not associated with the quantity of water available for distribution – since large amounts go unaccounted in the absence of metering (World Bank, 2012; World Bank, 2013). Lack of continuous supply (24 hours a day) of water reduces the quality of the water in pipes, and increases the risk of waterborne diseases (as water that has leaked out of faulty joints or holes is sucked back in when the pressure drops). (Satapathy, 2014) Thiruvananthapuram provides the highest duration at 18 hours. The average duration of water supply in 18 Indian cities was found to be 3.3 hours/day, (Satapathy, 2014) and this supply is often unreliable so that alternative sources are regularly used despite being expensive. In Shillong, the average hours of water supply range from 1 to 6 hours a day, while in Bhubaneswar it is two hours. In Chennai, a sizeable proportion of the population buys water from informal water markets and incurs significant costs, with lower-income households incurring higher costs. (Venkatachalam, 2014)

Drinking water is defined as water from an improved source, which includes piped water, public taps, hand pumps and bottled water. (2011 Census) Assessments of the quality of drinking water in India have found that this water can have high levels of contamination in both urban and rural areas. (Johri et al., 2014) In terms of water quality at source and point-of-use, Bhubaneswar fares more poorly than cities like Pune or Jaipur (but is similar to Delhi). Contamination was found to be as high as 43 percent percent at source and 65 percent at point-of-use – highlighting the need for better water treatment, storage and handling. (Satapathy, 2014)

Slum populations do not have access to basic services such as piped water within their premises also because agencies responsible for providing water require valid house ownership certificates. (Satapathy, 2014)

Sanitation behaviors rely on access to water and on cultural preferences. Yet water and sanitation services are often organized separately and the focus of current sanitation campaigns has been on building toilet infrastructure (Hulland et al., 2015). Hand-washing with soap after defecation and before eating is actively being promoted. However, this can be redundant if water is not accessible when needed. Moreover, a significant proportion of (male, older, and rural) Indians are noted to have a preference for defecating in the open even if their household has a toilet, indicating that constructing toilets does not solve the problem of open defecation (Coffey et al., 2014).

Solid waste management in India’s cities is also a major challenge for public health. In Chennai, like most Indian cities, residents of even affluent areas complain of poor waste management services, with street dumpsters regularly overflowing. A study by a local non-governmental organization found that in Ward 173 where this service has been privatized, only 20 percent of households reported that door-to-door collection of waste was in place, and only one slum area in eight is provided some services. In the absence of such basic services, households resort to dumping waste on the streets and in waterways. Interlinked with these challenges are also concerns about the training and capacity building of street cleaners, and engaging informal waste workers in a sustainable manner.

Problems of management and coordination appear to be the main challenge for service provision as compared with concerns around willingness to pay or affordability (World Bank, 2012; World Bank, 2013). Coordination across agencies is a challenge for public health purposes since the mandate cuts across so many agencies, while citizens are often not organized in making demands on these issues. Similarly, politicians may not appreciate the health benefits of sanitation and the associated negative externalities of poor sanitation (Ban, Gupta and Rao, 2010). A number of agencies including municipal boards, public health engineering departments, and directorates of health and family welfare, may conduct tests of water quality. However, their findings and procedures are seldom shared with the public and they are often reticent about sharing data. (Satapathy, 2014) Similarly, local government officials in Chennai cite instances where it has been difficult to coordinate with Chennai Metrowater on permissions for road repair, and suggest that most coordination happens informally between ward level engineers of the different agencies.

Raising revenue is a challenge. A study of 23 cities found that none met their revenue potential and many failed to cover up to 80 percent of their operational costs particularly because of inefficient operational practices, but also since tariffs in Indian cities tend to be far lower than operational costs let alone capital costs. (Gupta, 2011) Consumption subsidies are common but they generally benefit households who consume more water, and do not confer any benefit on poor households with shared connections. In Chennai, a city that has been considerably innovative on the supply-side with desalination plants, only about 5 percent of domestic connections were

---

metered in 2002. (Brocklehurst, Pandurangi and Ramanathan, 2002)

The Public Health Engineering Department provides water for 80 percent of Greater Shillong. Within the Shillong municipal area, water is provided to the Municipal Board, and for the rest of Shillong it is generally provided to the local *durbars*, and these durbars generally charge households for services (water is then piped or provided from public taps). The Shillong Municipal Board has a liability of Rs 380 million (US$ 5.8 million) to the Public Health Engineering Department but plans to meter the water supply to all users by 2016 in order to improve revenue. The local *Durbars* generally charge households for water supplies.
8. REFERENCES


Kakkar, Manish. 2012. “Dengue fever is massively under-reported in India, hampering our response.” BMJ 345: e8574.


Salvi, Sundeep, Komalkirti Apte, Sapna Madas, Monica Barne, Sushmeeta Chhowala, Tavpritesh Sethi, Kunal Aggarwal, Anurag Agrawal, and Jaideep Gogtay. 2015. “Symptoms and medical conditions in 204,912 patients visiting primary health-care practitioners in India: a 1-day point prevalence study (the POSEIDON study).” *Lancet Global Health* 3 (12): e776-e784.


