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Indore Health Needs Assessment

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ACRONYMS

ABD	area-based development
ANM	auxiliary nurse midwife
ASHA	accredited social health activist
BCG	Bacille Calmette Guerin
BHC	Building Healthy Cities
CEO	Chief Executive Officer
CHC	community health center
CMHO	Chief Medical and Health Officer
FGD	focus group discussion
ICDS	Integrated Child Development Services
IMC	Indore Municipal Corporation
ISCDL	Indore Smart City Development Ltd.
JSI	JSI Research & Training Institute, Inc.
KII	key informant interviews
MP	Madhya Pradesh
MOHUA	Ministry of Housing and Urban Affairs
NCD	non-communicable disease
NGO	nongovernmental organization
NUHM	National Urban Health Mission
PwC	PricewaterhouseCoopers Private Limited
RSBY	Rashtriya Swasthya Bima Yojana
RWA	resident welfare association
SPV	special purpose vehicle
UPHC	urban primary health center
USAID	United States Agency for International Development
WHO	World Health Organization

PREAMBLE: BUILDING HEALTHY CITIES BASELINE ASSESSMENT STRATEGY

Building Healthy Cities (BHC) is a three-year (2017–2020), USAID-funded learning project conducted in three cities in India, Indonesia, and Vietnam. Implemented by JSI Research & Training Institute, Inc. (JSI) with Urban Institute, International Organization for Migration (IOM), and PricewaterhouseCoopers Pvt Ltd (PwC), BHC is designed to increase understanding of the best routes for improving the social determinants of health in urban contexts. To inform this approach, several exploratory data collection activities are being completed in Year 1 of this project in each city. The resulting data will be discussed, validated, and used by city stakeholders to define potential barriers to implementation, unintended consequences, and key leverage points for improving urban health. Based on the current understanding of Smart City activities and city contexts, BHC has identified specific questions and data collection approaches best suited to answer them. Table 1 on the next page provides an overview of which questions will be answered by which activity.

Table 1: Overview of BHC Year 1 Exploratory Assessments

	Secondary Survey Analysis (Quantitative)	Health Needs Assessment (HNA) (Qualitative)	Political Economy Analysis (PEA) (Qualitative)	Data Use Assessment (DUA) (Qualitative)
What are the health needs & burden?	Included	Included		
What health services are available & to whom?		Included		
Who is underserved by current health & city services?		Included		
How are non-health sectors engaging in building a healthy environment?		Included		
How are health & Smart Cities being coordinated, managed, and financed?		Included		
Who makes the decisions about coordination, management and financing?			Included	
What is the functionality and equity of the coordination, management and financing systems?			Included	
What is the inter- and intra-sectoral functionality of information systems?				Included
What are the barriers to equitable service provision and a healthy environment within this city and system?		Included	Included	Included
What are the data and information barriers to coordination and management across sectors and actors?				Included
What are the opportunities to improve citizen agency & equity of service provision?			Included	Included

These data are only a beginning. JSI's continual process monitoring was designed to follow changes in the themes emerging from this initial inquiry. These updates will be shared via multiple channels. Please check back on BHC's website for new reports and updates on our cities.

EXECUTIVE SUMMARY

Urban living can offer increased proximity to health services, but many urban dwellers still experience difficulty accessing basic care and may live in environments that adversely affect their health. Given that India's urban population is expected to grow from 377 million to 590 million by 2030 (Agarwal 2016), there is a need to plan now to develop innovative strategies to address predicted and emerging challenges.

India's Smart Cities Initiative shows the country's willingness to build to meet future needs. Indore, in the state of Madhya Pradesh (MP), became one of the first Smart Cities in India in 2015, and is a fast-growing urban center with a diversity of industry, income levels, and health needs. JSI Research & Training Institute, Inc. (JSI) conducted a needs assessment in Indore in 2017 and 2018. The assessment was implemented as part of the United States Agency for International Development (USAID)-funded Building Healthy Cities (BHC) project (2017—2020). Indore was selected for this assessment because it is a BHC partner city.

This health needs assessment addressed two main objectives: 1) improving understanding of access, barriers, knowledge, and opportunities for healthy living in the city of Indore, India across a range of stakeholders; and 2) investigating multisectoral activities related to health and urban planning within Indore's Smart City Initiative.

METHODOLOGY

The assessment was designed to answer questions relating to the following themes:

1. Health sector and services
2. Underserved populations
3. Coordination, management, and funding of Smart City Indore and the various sectors related, directly or indirectly, to health
4. Health engagement

JSI completed initial health needs assessment interviews in Indore in April 2017. A second round of data collection was carried out in February 2018. Data collection methods included 28 key informant interviews (KIIs) with 51 city officials, 4 focus group discussions (FGDs)with residents, direct observation of 12 health service delivery points, and a desk review.

RESULTS

Health Sector and Services in Indore

There are three tertiary care hospitals and five secondary care facilities in Indore. Specialty secondary care is also offered at private sector facilities. Primary care is available at 14 urban primary health centers (UPHCs) staffed by a mix of clinical providers, as well as through 760 Anganwadi centers (which provide services for mothers and children) staffed by Anganwadi workers, auxiliary nurse midwives (ANMs), and accredited social health activists (ASHAs). All services in public facilities are

mandated to be provided free of charge. There is a proliferation of private facilities and providers, with high demand across income levels. According to staff in the office of the Chief Medical & Health Officer, 209 private hospitals and 59 clinics (called nursing homes) also serve Indore. The desk review found that over half of all urban MP residents used the private sector as their usual source of health care (IIPS and ICF 2017). ASHAs and Anganwadi centers are hubs for promoting healthy behaviors and basic health care, and often provide food rations and nutrition services for vulnerable populations, particularly children under 5 years.

Indore is experiencing a shortage of qualified health workers. Many posts have been left vacant, including medical officers and positions at the UPHCs in Indore. This finding echoes documented vacancy issues across MP. The shortage of qualified providers is seen as one of the primary reasons many residents have sought care at private and charitable facilities, despite the cost; a survey of MP found that 76% of qualified doctors were employed by the private sector. Informants also described a near-universal shortage of urban ASHA workers, as well as changes to government contracting of ANMs which reduced their compensation and has had a negative impact on recruitment of new workers.

Indore citizens do have access to care for non-communicable diseases (NCDs); as of 2017, two public NCD clinics, and at least one private hospital devoted to diabetes care, existed in Indore. However, the assessment found gaps in capacity in this area, particularly related to prevention, which compounded the staffing shortages that all disease areas faced. NCD providers lacked the time to measure patients' weight and height, or discuss other NCD risk factors (unhealthy eating, lack of physical activity, smoking, and alcohol use). Doctors were present during site visits to NCD facilities, but one doctor noted that nurse positions are difficult to keep filled. Intensive care for acute NCD cases was not available. In 2018, screening for common NCDs had begun in four rural district subdivisions, but no similar effort has been undertaken for the urban poor. Currently, UPHCs do not screen for NCDs. There are potential partners to train health providers on NCD treatment, but currently, both training and community outreach (to promote healthy lifestyles[1] and behaviors) are conducted on an ad hoc basis.

The assessment interviews and visits to clinical building identified several areas for improvement, including that:

- Many lower-income residents were not aware of the availability of UPHC services—though UPHCs seemed crowded, so some segment of the Indore population is aware and using these facilities.
- There is a severe shortage of ASHAs and qualified health care providers, especially at public primary care facilities.
- There are frequent stockouts of medicine, even for essential medicines and vaccines.
- There is a shortage of qualified allopathic doctors, and some facilities are hiring homeopathic or ayurvedic doctors to fill those vacancies.

[1] As defined by the World Health Organization: "A way of living that lowers the risk of being seriously ill or dying early" (WHO Regional Office for Europe 1999).

Nearly one-quarter (23%) of households in urban MP are covered by insurance schemes, with about half of those households covered by the state health insurance scheme (IIPS 2017). Only about 5% of urban MP residents have private insurance, though another 7% received insurance through their employers, and it is unclear from the survey how many of those plans are private carriers. Over 20 private insurance agencies and 4 public schemes are available in Indore. A recent evaluation of Rashtriya Swasthya Bima Yojana (RSBY) insurance scheme found low utilization nationally by poor households, and the scheme appeared to provide no significant financial protection (Karan, Yip, and Mahal 2017). The figures above for MP would support underutilization of RBSY (only about 3% of all MP's urban residents were using this scheme, and 36% of urban MP residents had a below-poverty line card in 2015–2016). Formal employers provide their employees with access to group health insurance. Nine "critical illnesses," including high blood pressure and diabetes, are excluded from nearly all insurance plans.

Underserved Populations in Indore

A more complex picture of the term “underserved” was developed across assessment interviews. Five groups were noted by interviewees as either under-represented or as having low access to services affecting health and healthy lifestyles: people living alone with prolonged illness, the elderly, rag pickers, migrants from neighboring districts/states, and residents of informal settlements. Surprisingly, gender was not mentioned. There may be other “invisible” sub-populations missed by this assessment.

These sub-populations may require varying levels of support to achieve equitable access to city services and agency to live healthier lifestyles. Four types of potentially underserved neighborhoods in Indore were engaged through focus groups to better understand these nuances and how health is affected by the built environment.

Common barriers were identified in the following areas:

- *Built environment in neighborhoods*. Dangerous conditions were identified, particularly related to poor drainage and infrastructure for storm and waste water, narrow roads and lanes, and unsafe pedestrian infrastructure.
- *Housing.* The lack of land rights for informal settlements and housing tenure for those with undocumented status were concerns.
- *Knowledge of social protection schemes*. Knowledge of these schemes appeared to decrease with income—meaning that those who most needed services least used them.
- *Health center locations and staffing*. Physical inaccessibility was an issue in every neighborhood visited, as were staff vacancies.
- *Knowledge of healthy environments.* In the informal settlements, the focus and understanding was related to immediate risks, such as open drains or disease.
- *Knowledge of health risks and symptoms.* It appeared to be that understanding of the long term risks of malnutrition, tobacco chewing, smoking, and alcohol consumption was low, though this needs to be confirmed by BHC’s forthcoming NCD risk factor survey.

- *Clinical compliance.* Providers noted that due to lack of continuity of care, practice of harmful medical traditions, and a lack of awareness of symptoms, many patients do not comply with care for chronic disease.

Coordination, Management, and Funding

The barriers to healthy lifestyles noted above reinforce the need to focus on the causes of disease beyond the health care sector. Beyond health, interviews were conducted with stakeholders involved in urban planning (including housing and transport), education, environment, information technology, solid waste management and sanitation, communication, and social protection. Brief profiles of the management structure and activities in each sector are provided in the full assessment report.

Urban planning coordination, management, and funding is conducted through the Indore Municipal Corporation (IMC) and the semi-autonomous Smart City Project, known as Indore Smart City Development Limited (ISCDL). ISCDL is a special purpose vehicle (SPV) created to plan, appraise, approve, and release funds to implement, manage, operate, monitor, and evaluate the Smart City development projects (Smart Cities Mission, MOHUA 2017). The Ministry of Housing and Urban Affairs (MOHUA) issues broad guidelines for utilization of funds; MOHUA releases funds directly to Smart Cities and receives online reports through SmartNet. ISCDL makes decisions on investments based on local needs and demands. Each Smart City has an SPV committee that oversees a subset of the city called the area-based development (ABD) zone, covering 120,000 people, including 29,000 slum-dwellers (Pandit 2016).

It is nationally mandated that a Smart City Advisory Forum be created to advise and enable collaboration among stakeholders. The advisory forum includes the district collector, a Member of Parliament, a Member of the Legislative Assembly, the mayor, the Chief Executive Officer (CEO) of the SPV, local youth, technical experts, and at least one representative of a community organization.

Of the seven city sector representatives interviewed in 2017, five were not involved in Smart Cities. ISCDL acknowledged that health representation is needed on the committee and was interested in pursuing options to assure this. ISCDL noted that the committee currently includes representatives from a variety of other sectors.

All health-sector stakeholders interviewed noted that they were not invited to participate in any public policy processes—not just those of Smart City. One possible reason given for why health sector representatives were not regular members of the Smart City committee was that health is managed through the District Health Office, chaired by the Chief Medical & Health Officer (CMHO), rather than the municipality. Thus, defining roles and responsibilities for who represents Indore City could be complicated. At the time of the 2017 interviews, health sector actors were consulted by the assistant commissioner or commissioner on an as-needed basis only. There was interest by Smart City to include health, but a lack of human resources prevented these initiatives from moving forward.

Among private-sector representatives interviewed who were engaged in Smart City activities, the mode of engagement was contracting with ISCDL to provide technical

support or services. Once contracted, these representatives participate substantially and regularly. Private sector representatives who were not engaged with Smart City also expressed a preference to engage through formalized, paid relationships rather than, for instance, a seat on a committee. Interviewees expressed positive opinions about Smart City's engagement of community groups on waste management and in some cases, sanitation. Community representatives on the Smart City committee were not mentioned.

Within the Smart City office, nearly all reporting tools were in electronic formats (or are being converted from paper formats). A mayor's helpline for citizen reporting has been put into place (Indore 311, an app for reporting waste management); and in 2018, plans were made to build a command and control center that will feature the Smart City data dashboard. In contrast, currently most urban health monitoring and reporting systems were still paper-based.

Funding for Smart City activities is allocated through a formal online tendering process via the MP procurement system. Once an order is placed with the selected bid, Smart City projects are tracked on SMARTNET, a website hosted by the Government of India's MOHUA for all Smart Cities in the country. As of 2017, Rs 3,000 crore (about USD$435 million) was allocated for Smart City activities in Indore and Bhopal, with 80% of those funds provided by each city's Smart City Development Corporation. Of that total, Rs 500 crore (about USD$73 million) was provided by the government (*Times of India* 2017). The IMC budget for 2018 focused on public safety (including pedestrians), garbage services, roads and transport, and green spaces (*The Free Press Journal* 2018). Smart City budgeting will be further explored in the upcoming BHC 2018 Political Economy Analysis.

Health Engagement

Of the seven city sector representatives interviewed, six stated that they play a role in improving urban health, such as awareness-raising, prevention, and hiring and retaining clinical providers. Discussion around how city officials could engage with health focused primarily on prevention and advocacy.

The importance of support for health workers was echoed by interviewees from the health sector. Those working in the NCD clinics stated that constraints on providers' time force clinicians to focus exclusively on treatment, with no time given to prevention. The system is strained even further when doctors are called away by the state government for other tasks. It was also noted that addressing the lack of a real linkage between providers and their communities could improve counseling, screening, and other prevention-related activities.

The relationship between urban planning and health was discussed during interviews with Smart City officials. Two interviewees defined the basis for engagement in an activity as having sustainable, viable, social benefits. Interviewees noted that health is tied to happiness, which is an important measure of Smart City's success, and that any future work for Smart Health should cover youth to old age. In addition, increased ties with insurance (particularly the RSBY scheme) were identified as important.

KNOWLEDGE GAPS

The findings from this assessment suggest gaps in information on some key areas affecting health and healthy living in Indore. ISCDL and BHC can explore options for filling these knowledge gaps over the next two years.

Areas in need of further investigation include:

- Scope and depth of the private sector health care market in Indore
- Differentials in quality of care received by vulnerable populations
- Best incentives to hire and retain qualified health providers in Indore
- Dynamics of health insurance in this mixed market system, particularly given the imminent launch of the Ayushman Bharat National Health Protection Scheme
- Dynamics of existing food subsidies in Indore
- Dynamics of social protection schemes in Indore
- Ecology of pollution in Indore
- Impact of, and solutions for, insecure housing tenure and land rights in Indore

CONCLUSIONS

The substantial growth expected in India's cities will require new approaches to urban health and well-being. The findings from this assessment, along with other studies conducted by BHC to examine the political economy, NCD risk factors, and data use of Indore residents, can be used to help city government assess vulnerabilities, barriers, and opportunities for improvement.

BHC will work with city officials through 2020 to capitalize on the opportunities identified. Some of the key stories uncovered in assessment interviews and focus groups will be followed to understand how life is changing in Indore, for better or worse. These specific "journeys" will illustrate what problems citizens face; how they are advocating for change; and what barriers and successes ISCDL and IMC face as they try to solve those problems. This information is intended to illustrate to other Smart Cities how they can grow and maintain strong systems to continuously improve health.

1. INTRODUCTION

Urban living can offer increased proximity to health services, but many urban dwellers still experience difficulty accessing basic care, which results in increased risk of contracting communicable diseases. The risk of non-communicable diseases (NCDs) also increases in urban areas due to barriers to healthy living. Beyond the risk of NCDs, urbanization has a significant impact on the social determinants of health, defined as those things outside the control of individuals that affect daily living conditions, and ultimately health outcomes. Housing, energy, education, transport, green/recreational spaces, and social protection have been identified by the World Health Organization (WHO) as just a few of the sectors that influence one's health (WHO n.d.).

Given that India's urban population is expected to grow from 377 million to 590 million by 2030 (Agarwal 2016), there is a need to plan *now* to develop innovative strategies to address predicted and emerging challenges. The Smart City program (see Box 1) represents one way in which the Government of India is seeking to prepare for sustainable, healthy future growth. Indore was selected as a Smart City during the first round of Smart City proposals in 2015. The city's proposal included upgrades to transport systems, improved solid waste management, riverfront development, and pedestrian paths within the area-based development (ABD) zone. The Indore Smart City initiative is overseen by the Indore Municipality Corporation (IMC) and the semi-autonomous Smart City Project, known as Indore Smart City Development Ltd. (ISCDL).This health needs assessment was conducted by John Snow, Inc. (JSI) as

Box 1. What Does It mean to Be a Smart City in India?

Launched in 2015, the Government of India's Smart Cities Mission currently has the capacity to cover 109 cities, with 90 cities already selected through four rounds of proposals. The aim of the initiative is to provide residents with an efficient and reliable infrastructure, enhanced quality of life, and economic opportunities (*The Hindu* 2017).

Although initiatives vary by country, Smart Cities generally leverage information and communication technology, the built environment, and the "internet of things" to improve their citizens' lives. Activities cut across sectors.

Seated in the Ministry of Urban Development, the **Smart Cities Mission** provides winning cities with:

Financial support: Cities can raise funds to supplement government funding (coordinated through the Ministry of Urban Development but including other ministries) allocated for Smart City development.

Policy support: The national government, along with state and city officials, supports policies that provide a framework for urbanization.

Capacity building: The national government provides capacity building to state and city officials for processes like preparing action plans, prioritizing activities, and supporting the municipal corporation in each city.

part of the U.S. Agency for International Development (USAID)-funded Building Healthy Cities (BHC) project. The purpose of the assessment was to understand access, barriers, knowledge, and opportunities for healthy living in Indore across a range of stakeholders, and to investigate multisectoral activities related to health and urban planning within Indore's Smart City Initiative.

2. METHODOLOGY

I. Selection of Indore

During initial discussions with the Ministry of Health and Family Welfare and the National Urban Health Mission (NUHM), Indore was suggested as one of a selection of Smart Cities that might be interested in exploring further health activities. Indore is the largest city in Madhya Pradesh (MP), and is the state's commercial capital. It is also one of the fastest-growing cities in India, with a population of just under 2 million in 2014 and a 10-year growth rate of about 3% (*Encyclopaedia Britannica* 2017). As its population has grown, so has the number of slum dwellers, who are estimated to make up 30% of the total city population (KPMG 2017).

Indore is known for its delicious street food. Although safe food preparation has been improved by Smart Cities, these calorically dense, nutrient-poor foods contribute to the increase of diabetes and obesity (*Hindustan Times* 2014). This overlies an existing burden of micronutrient deficiencies; across urban MP, 24% of women and 18% of men are overweight, and 50% of women are anemic (IIPS 2017). Other considerations with relevance to healthy lifestyles include low antenatal care coverage, relatively limited rates of exclusive breastfeeding, and low levels of cancer screenings. In 2017 Indore achieved a rare distinction as the cleanest city in India, based on major improvements to waste management and sanitation. The city has experienced modest improvements in air, noise, and water pollution, but they remain concerning environmental risk factors for disease (Borkhade 2016).

II. Assessment Objectives and Questions

The objectives of this assessment were to:

- Improve understanding of access, barriers, knowledge, and opportunities for healthy living in the city of Indore across a range of stakeholders
- Investigate multisectoral activities related to health and urban planning within Indore's Smart City Initiative

The assessment was designed to answer questions relating to the following themes:

1. *Health sector and services:* How is the health system organized? What current health services are provided in the city (with emphasis on prevention and lifestyle-related disease)? How does the health sector promote healthy lifestyles?
2. *Underserved populations*: Whose voices may be marginalized this context? Who are the current representatives of underserved or marginalized populations?
3. *Health engagement:* How receptive are city officials and municipal decision-makers to improving healthy lifestyles in their communities?
4. *Coordination, management, and funding:* How are city services (including health) coordinated, selected, funded, and distributed, especially within the Smart Cities structure? Which sectors and stakeholders are represented in these choices?

This report is organized around these key themes.

III. Data Collection and Analysis

JSI completed initial interviews in Indore in April 2017. A second round of data collection was done in February 2018, after the BHC project began. Data were collected via key informant interviews (KIIs), focus group discussions (FGDs), direct observation, and desk review. These methods were deployed to reach saturation on the key themes and to triangulate data where possible. Structured interview tools were used to collect all data, and Excel and Nvivo were used for analysis.

To develop a clearer picture of city officials and their partners, a total of 51 stakeholders were included via 28 KIIs. Participants included state and municipal representatives, civil society, and private-sector stakeholders from across health, education, urban planning, information and communication technology (ICT), waste management and sanitation, social protection, communications and civil society. A list of interviewees is provided in Annex A.

To understand the needs of underserved citizens living in Indore, four neighborhoods were purposively selected for resident FGDs and direct observation sessions (one from a middle-class area and three from the 649 neighborhoods designated as slums in Indore). The areas chosen provided a diversity of perspectives across income level, housing type and property rights, religious and caste composition, and migrant and non-migrant populations (more detail is provided in Annex B).

To supplement the data collected from health service providers and citizens regarding health services, direct observation was completed for a total of 12 health service delivery points (two hospitals, three Anganwadi centers, four urban primary health centers (UPHCs), two private providers, and one newly built community health center).

Finally, a desk review was conducted to supplement primary data collection (see Reference section).

3. RESULTS

I. Health Sector and Services in Indore

Structure of health services in Indore

Indore is home to 313 public and private hospitals, according to the latest information available from the IMC (IMC 2018). These include three tertiary care hospitals (MY Hospital, which is public, and CHL and Bombay Hospitals, which are private). According to the office of the CMHO, Indore also has three hospitals that provide comprehensive emergency obstetric and newborn care services. Secondary care is provided via the district hospital and four community health centers (CHCs) in the public sector (Gupta and Bhatia 2016).

Primary care is provided by 14 UPHCs[2] that are tasked with providing basic health care and nutrition services to women and children, and are supported by 760 Anganwadi centers[3] (within Indore proper; the district has 1,839). Anganwadi centers are local gathering spots for key CHC providers, including Anganwadi workers, auxiliary nurse midwives (ANMs), and accredited social health activists (ASHAs). ANMs and ASHAs provide community-based services, including at the Anganwadi centers. ANMs also ensure that ASHAs receive on-the-job training and performance-based compensation.

Ambulance owned by a private clinic.
Monica Biradavolu, 2018

As part of the National Health Mission, all services at government facilities are mandated to be free of charge to all citizens (including preventive and primary care, diagnostic services, and outpatient and inpatient hospital care)(Gupta and Bhatia 2016). Medications on the essential drug list are also provided free of charge; non-listed prescription drugs are purchased from private pharmacies.

There is a proliferation of private providers at every level of the system in India, and Indore is no exception. Private care is poorly regulated; an estimated 40% of private care nationally is delivered by unqualified providers (Gupta and

[2] UPHCs, often located close to slum areas, are meant to provide core primary health care services. According to NUHM, UPHCs are meant to have catchment areas of about 25,000 – 30,000 population.
[3] Anganwadi centers are mother and child health care facilities. They were established under Integrated Child Development Services at the community level to target pregnant and lactating women, pre-school children, and adolescents. Services are provided by Anganwadi workers.

Bhatia 2016). Private providers fill a need among poor and vulnerable populations, but there are also found in highly specialized private clinics with skilled providers catering to wealthy clients, creating a care-quality divide in the private health care market. According to staff in the office of the CMHO, 209 private hospitals and 59 clinics (called nursing homes) also serve Indore.

The desk review did not yield any results on a census of private-sector services in Indore, but the literature from MP provides insights into usage of private services for the state as a whole. According to the National Family Health Survey 2015–2016, the majority (56%) of urban MP residents use the private sector as their usual source of health care (IIPS and ICF 2017). Three-quarters of that group used a private doctor or clinic. Of the 43% who usually went to the public sector, the majority used either a public hospital or a CHC.

KII data supports these figures. UPHCs and other public health clinics were not often mentioned by city residents when they were asked where they sought treatment. Interviewees did mention using private clinics and doctors or charitable hospitals in their neighborhoods for routine visits. One of the more popular private clinics has its own ambulance. Run by a family of doctors, it provides services at reasonable rates. In theory, however, these services should be provided free of charge at public facilities. Most of the residents interviewed did mention using public hospitals for more serious health problems.

In a qualitative study done in MP, public- and private-sector providers alike described a passive privatization of health care, which they attributed to underfunding and poor performance in the public health sector (De Costa and Johannson 2011). Further exploration is needed to understand these dynamics in Indore.

Services for vulnerable populations

ASHAs provide community-based care for mothers and children, and are a key part of the government system to ensure health care for the urban and rural poor. Though ANMs and Anganwadi center workers do not necessarily reside in the communities they serve, ASHAs are selected on that basis. Broadly, ASHAs are meant to be responsible for promoting universal immunization, referral, and escort services for reproductive and child health care and other health care delivery programs (Mishra 2012). ASHAs interviewed for this assessment listed among their responsibilities immunization, institutional delivery, family planning, conducting surveys, and accompanying patients to centers for treatment.

The Anganwadi centers also serve as hubs for promoting healthy behaviors and health care, and often provide food and nutrition services for vulnerable populations. The mid-day meal for children at the centers visited during this assessment included a range of white rice, vegetables (potato or gourd), khichdi, roti-sabzi (roti and vegetable), kheer-puri, and other dishes, though a worker at one center stated that the children preferred to eat only rice. Further exploration is needed to understand how pervasive this preference is, and why children choose not to eat other foods. Children in the 0–5-year age range were also provided take-home ration packs, and all Anganwadi centers are

supposed to distribute pre-rationed food packs to women and adolescent girls, although one worker noted that these are often not consumed because the mixture is tasteless. The centers also provide health education for girls and women; and children are taught about various health practices, such as handwashing.

Pre-rationed food packs distributed at Anganwadi Centers.
Monica Biradavolu, 2018

Health workforce

There is a shortage of qualified health workers across India. A 2016 WHO study found that India had significantly fewer doctors per person than its regional counterparts, and many individuals claiming to be doctors in India did not have the requisite professional qualifications (Anand and Fan 2016). MP is particularly short staffed, with high vacancy rates in public positions for both doctors and nurses (National Health Systems Resource Centre 2012). The statewide density of all qualified health workers in 2011–2012 was 5.1/10,000 population, as compared to a national average of 9.1/10,000 (Rao, Shahrawat, and Bhatnagar 2016). There is less than one doctor per 10,000 population in MP; only Himachal Pradesh ranks lower on this measure.

These statistics are supported by the assessment visits to UPHCs. Two had no doctor on staff, and the remaining two had one doctor each, neither of whom was present on the days BHC visited. At one UPHC, a lab technician ran the outpatient department because no one else was available to do so. At one hospital, a lack of qualified applicants for allopathic physician positions resulted in the hiring of homeopathic or ayurvedic doctors to fill those positions.

The shortage of providers has been seen as one of the primary reasons many residents seek care at private and charitable facilities, despite the cost. Although no Indore-specific figures were published, a survey of all health care providers in MP was completed in 2004. Of the 24,807 qualified doctors covered in that survey, 18,757 (76%) worked in the private sector, and 80% worked in urban areas (De Costa and Diwan 2007). BHC provider interviewees noted that the private facilities serving middle to lower-income residents did not pay doctors high salaries, but pay was regular and reliable.

A near-universal shortage of urban ASHA workers was also mentioned in interviews. In mid-2017, the density of ASHAs in rural MP was one per 849 population (this measure was not calculated for urban MP). The July 2016 version of this bi-annual report notes

that "the program is yet to stabilize" in urban areas (NHSRC 2017). In 2017, there were 61,912 ASHAs working in rural areas and 3,907 in urban areas. The 2014 guidelines for ASHA in the urban context recommend one AHSA per 1,000-2,500 population.

ASHAs do not receive salaries; they are compensated specific amounts for specific tasks. Multiple interviewees at UPHCs said that it was difficult to recruit ASHA workers because of the lack of appropriate incentive structures, delays in payment, inaccurate targeting of pay-for-performance systems, and a coverage area that was too vast. The latter appears to be tied to how the rural concept of ASHAs has been applied to urban areas via the NUHM, though further discussions with ASHAs themselves will be needed to confirm this statement. Although ANMs are crucial to the functioning of the ASHAs, recently the government switched to contract labor, so newer ANMs are paid less than half the previous ANM salary. In addition, contracted staff must take and pass annual exams for their contracts to be renewed.

NCD services

As of 2017, there were only two public NCD clinics in Indore—one in a community health center and one in the district hospital. Each was staffed with one doctor, two nurses, and one other position (one doctor noted that nurse positions were hard to keep filled). These clinics were 100% funded by the state, though one clinic appeared to also receive in-kind support from Novo Nordisk for diabetes screening. A private hospital devoted to diabetes care was also visited. Neither the district nor the private hospital had intensive care units for acute NCD care. According to interviews, the district hospital did not have a catheterization lab for cardiac cases, so patients were referred to private hospitals for those procedures.

At the NCD clinics, providers stated that body mass index was supposed to be measured as part of intake screening, but clinic staff did not have the time or the proper equipment to do so. For example, the measuring tape in one NCD clinic did not reach the ground and was not used during the observation period. There was an NCD treatment tracking card that all patients were supposed to bring to every visit. All recording and reporting was done by hand (as was prescription management), which frustrated the clinicians interviewed. There was some subsidy available for low-income patients needing NCD care, which also covers the cost of surgery.

NCD clinic with short measuring tape.
Amanda Pomeroy-Stevens, 2018

By 2018, screening for common NCDs had begun in four district subdivisions of the rural areas, but no similar plan had been developed for the urban poor. No UPHCs currently screened for NCDs. According to national NCD guidelines, primary NCD screening should actually be done first by ANMs, while ASHAs

help them to motivate and mobilize persons aged 30 years and higher who are at risk to go for confirmation of diagnosis to CHC or District Hospital. However providers interviewed for this assessment said that this was not happening.

Training for providers both within and beyond Indore and Dewas District is provided by two outlets. The All India Institutes of Medical Sciences provides once-yearly trainings on NCDs, though in some cases these trainings are staffed by doctors who have not received training in this area. The Public Health Foundation of India also fielded a one-time, 6-month program on NCDs for clinicians several years ago. The medical college in Indore teaches one full semester on NCDs based on the national curriculum. The NUHM is meant to provide training to improve providers' and frontline workers' capacity to deliver NCD treatment (among other areas, but it is unclear if and how this is happening in MP and Indore.

The providers interviewed stated that they:

- Followed the latest National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke operational guidelines.
- Established standardized treatment and prevention protocols consistent with national evidence-informed guidelines to prevent heart disease, stroke, and related health risks. One clinic had these guidelines on hand and was able to provide copies.

Community outreach

Some ad-hoc community training on health and healthy lifestyles has already taken place. Interviewees stated that the medical school had no official community-based outreach. The NUHM had no preventive programming for NCDs in the community; counselors and outreach support staff would need to be hired to handle the additional workload. ASHAs and ANMs should be involved, but the evidence gathered in this assessment suggests that this was not the case in urban areas.

The MP Voluntary Health Association was interviewed to learn how groups in Indore that have the potential to support community coalitions and partnerships (e.g., food policy council, tobacco-free partnership, neighborhood safety coalition) could address chronic disease and related risk factors, and support improvements to the built environment to promote health. This association supported the Tobacco Control Program via mass media campaigns, advocacy and sensitization of law enforcers and stakeholders, capacity building, community mobilization, public awareness, effective enforcement of legislative provisions for smoke-free areas, and monitoring and evaluation in Indore.

Use of health services and quality of care

A 2017 report by PricewaterhouseCoopers Private Limited (PwC) India rated 10 Smart Cities, including Indore, in terms of sectoral performance and planned improvements (PwC Private Limited 2017). Indore's health sector (considering factors such as number of hospitals, facilities, and emergency response) rated well, and was considered about

average across the 10 cities evaluated. Indore's ambulance response times received middling scores on the PwC ranking. More specific information on the quality of care (and differentials in care between the private and public sectors) in Indore was not found in the formal literature.

Data from interviews and observations suggest several dimensions where quality of care falls short (see Box 2). In summary, it appears that:

- Many lower-income residents were not aware of the availability of UPHC services—though UPHCs seemed crowded, so some segment of the Indore population is aware and using these facilities
- There is a severe shortage of ASHAs and qualified health care providers, especially at public primary care facilities
- There are frequent stockouts of medicine, even for essential medicines and vaccines
- There is a shortage of qualified allopathic doctors, and some facilities are hiring homeopathic or ayurvedic doctors to fill those vacancies

Further investigation is needed to document whether or not there are other quality of care concerns relating to discrimination or disrespect of certain sub-populations within the health system.

Box 2. CASE STUDY: BARRIERS TO USE OF PUBLIC HEALTH SERVICES

One woman's case provides an example of the barriers to use of public health services. She arrived at an UPHC with her two-month-old infant for the baby's first Bacille Calmette Guerin (BCG) dose, which should be given immediately after birth. The woman had given birth at a private hospital that had charged Rs. 20,000 (about USD$290) for the delivery, and she could not afford the additional Rs. 700 (about USD$10) for the BCG dose at that time. She had already visited an Anganwadi to have her infant vaccinated, but was told that the BCG dose vial would only be opened if there were five children requiring the vaccination (each vial contains multiple doses).

She was continuing to pursue this first BCG dosage when she visited the UPHC that day, which was a designated immunization day. However, no one was available to administer the injection. When the ANM arrived, she learned that there was no stock available. The woman was told to return on the next immunization day.

Had she delivered in a government facility, the woman's delivery would have been, in theory, free of charge. She would have also received payment for an institutional delivery, and her infant's BCG dose would have been administered without charge (if in stock). The woman said she was not aware of these services. She also said that she had no contact with an ASHA, though ASHAs are paid to bring women to the UPHC for antenatal check-ups and ensure delivery at the government facility. This woman's story is a single example, but highlights some of the key points identified in this assessment—UPHCs with too few resources, a shortage of ASHAs, lack of knowledge about available services, and use of private facilities.

Insurance coverage

According to the 2015–2016 National Family Health Survey, 23% of urban MP households were covered by insurance schemes (IIPS and ICF 2017). The majority of those covered were enrolled in the state health insurance scheme (52%), with another 12.4% enrolled in the Central Government Health Scheme and 11.5% in the Rashtriya Swasthya Bima Yojana (RSBY) scheme, a government-run scheme for individuals and families living below poverty level (IIPS and ICF 2017). Only about 5% of MP's urban residents purchased private insurance, though another 7% received insurance through their employers, and it is unclear from the survey how many of those plans are private carriers.

A recent evaluation of RSBY found low utilization nationally by poor households, and the scheme appeared to provide no significant financial protection (Karan, Yip, and Mahal 2017). The figures above for MP would support underutilization of RBSY (only about 3% of all MP's urban residents were using this scheme, and 36% of urban MP residents had a below-poverty line card in 2015–2016).

Indore-specific estimates of insurance coverage were not found in the desk review. Interview data indicate that there is a range of insurance options available to the average Indore citizen. Over 20 private insurance agencies are available and offer both group and personal health insurance. Four public schemes are also available—National, New India, United, and Oriental. Formal employers provide their employees with access to group health insurance, which is more attractive because a larger risk pool means companies can offer lower premiums compared to individual private insurance. Some community groups have tried to form group insurance pools, but insurance companies are reluctant to cover them because of the undefined risk pool. Many plans bar those older than 65 from applying for insurance; many also bar anyone who already has one of the nine "critical illnesses," which include high blood pressure and diabetes. Apollo Munich is the only company that will cover a diabetic, but the cost of its insurance is high. Outpatient care, such as preventive care, is covered only in group plans.

One interviewee familiar with the insurance market in Indore believed that there was high awareness of health insurance in Indore, but that further efforts would be needed to encourage people to enroll. Further inquiry is needed to accurately assess the demand for health insurance, particularly once the new Ayushman Bharat National Health Protection Scheme (“Modicare”) is launched near the end of 2018. A larger concern may be whether the current capacity of the health care system in Indore can absorb the additional patients expected to be covered by the new plan.

II. Underserved Populations in Indore

A more complex picture of the term “underserved” was developed across assessment interviews. Interviewees in positions of power mentioned the following groups as either under-represented or having low access to health-related services and healthy lifestyles:

- People with prolonged illness who live alone
- The elderly
- Rag pickers
- Migrants
- Others living in Indore's informal settlements (including those living in poverty)

Interviewees who noted migrants were primarily referring to internal migrants. This appears to be backed up by data from a 2014 participatory data collection activity showing that 79% of families living in informal settlements are migrants, of whom 51% are interstate and 28% are intrastate migrants (PRIA 2014). Nearly two-thirds (62%) had lived in Indore for more than 5 years.

Surprisingly, gender was not mentioned as a dimension of vulnerability in any interviews. Further, during discussions about safety concerns, no one mentioned gender discrimination or harassment. When probed, several interviewees (especially those from slum areas) noted that domestic violence is common, but it was spoken of as a part of daily life, rather than a barrier to healthy living for women in Indore. There may be other "invisible" sub-populations missed by this assessment. These sub-populations may require varying levels of support to achieve equitable access to city services and agency to live healthier lifestyles.

Barriers to healthy lifestyles

The WHO definition of healthy lifestyles (Box 3) is used to guide BHC project implementation (WHO Regional Office for Europe 1999). Citizen focus groups and health sector interviewees were asked about barriers to healthy lifestyles and social determinants of health in each community and across Indore, as well as about their perception of access to city services and its relationship to health. Barriers varied by neighborhood and income level, but some common themes emerged.

Box 3. What is a Healthy Lifestyle?

"A healthy lifestyle is a way of living that lowers the risk of being seriously ill or dying early.

Not all diseases are preventable, but a large proportion of deaths, particularly those from coronary heart disease and lung cancer, can be avoided... Health is not just about avoiding disease. It is also about physical, mental and social well-being." – WHO 1999

Built environments in neighborhoods

A major concern in the informal settlements is poor drainage and infrastructure for storm and waste water, which is exacerbated during monsoon season. Open drains were a pervasive problem among slum communities, with the potential impact on health increasing the closer one lived to them. This qualitative finding is supported by data collected in 2006 that found that 78% of poor Indore neighborhoods are water logged, and nearly 60% had garbage visible in drains, suggesting this was contributing to water logging (IMC, UN-Habitat, and WaterAid 2006). This same study found very low coverage of city-built, properly lined drains in poor areas. Compounding the problem was informal housing built too close together, leaving the roads and lanes too narrow

for trucks to automate clean-up of solid or water waste. Unsafe infrastructure—for example, a rickety bridge over one open drain (see picture at right)—had also caused several child deaths and injuries in one settlement.

Open drain with rickety bridge crossing.
Monica Biradavolu, 2018

Settlements that were located close to or mixed with middle-class neighborhoods benefited from the improved city services and infrastructure that the middle-class neighborhoods received. In some cases this was due to having the same elected official representing both populations; in others, because of deliberate outreach from one middle-class community to their informal neighbors.

Across neighborhood types, residents mentioned that they thought the best way to improve poor city services or infrastructure was through elected officials. Citizens seem to see voting as a viable recourse (one study found that 79% of urban poor had voting cards and used them) (PRIA 2014). However, interviewees from one Muslim area felt that officials were not responsive to their requests. Other sub-populations in Indore may also have insufficient effective representation, something that will be explored further in BHC's Political Economy Analysis.

Housing

Lack of land rights and housing tenure—the right to live in a house or apartment—were reported as major barriers to healthy living, but only in those neighborhoods without formal registration. There was imminent risk of eviction (indeed, community members from one interviewed neighborhood had been evicted by mid-2018, when BHC returned to complete the next assessment). Residents of settlements said that they would not mind moving if the government gave them access to plots elsewhere, but often this was not the case. Instead they relied on private landowners to help them when evicted. In some middle-class neighborhoods with housing tenure, BHC found that there were homes filled with large groups of migrants, who could be evicted at any time for overcrowding.

Informal housing where risk of eviction is high.
Monica Biradavolu, 2018

Knowledge of social protection schemes

Awareness of social protection schemes varied widely, even among long-term Indore residents. Further exploration is needed to understand the barriers to this information. It appeared that in the case communities interviewed, the poorer an area was, the less likely residents were to be aware of these services, meaning that those who had the most need used them least. The literature shows that enrollment in social protection among those in informal settlements is low—68% of eligible families had a ration card, only 2% received an old age pension, and 73% were enrolled in Aadhar (India's biometric identification program) (PRIA 2014). None received benefits from the urban wage employment scheme, housing assistance, skill training, or a disability pension. This was especially true of health schemes. Even among the poorest households, residents used private care instead of free government health care because they lacked knowledge of free care schemes and resources at public centers. This may not be isolated to Indore, but it appears to compound other reasons for low utilization of government health insurance and health care (see "Health Sector and Services" above).

Health center locations and staffing

The physical accessibility of UPHCs was identified as an issue in every neighborhood visited. In some cases distance was the issue, but nearly all UPHCs were open for fewer hours than the 12–8pm schedule indicated in the NUHM guidelines. Open times at clinics were posted for 12–7pm and 12–4pm, and in one case, even during those hours, no clinical providers were in attendance and no patients were seen. For one informal settlement, even getting to the Anganwadi center was difficult. Although it was nearby, the center was across a very busy road that had no crosswalk, so often those with limited mobility or small children did not go to the center. The next-closest health facility was 4 kilometers away.

Knowledge of healthy environments

In the informal settlements, the focus was on immediate risks, such as open drains or disease. Although environmental and sanitation problems clearly increase people's risk of communicable diseases, only one person in the resident focus groups made that connection, and it was for an NCD. The woman said that the stress from constant threat of flooding made it hard for her to maintain healthy blood sugar levels.

When asked what they think of when they hear the term "healthy lifestyles," respondents in one of the middle-class neighborhoods associated


eTimes

Indore cyclists ask for dedicated cycling tracks, safety and sensitivity

Article on interest for healthy environments, Indore.
Amanda Pomeroy-Stevens, 2018

the phrase with happiness and social cohesion, including access to public spaces to bring people together. Larger built-environment aspects or improvements to pollution or traffic concerns were not mentioned. This group did note that time was a big constraint to exercise and other healthy behaviors, as was the lack of communal meeting places in which to promote exercise and social cohesion. They reported that they would be happy to participate and help run community incentives for cycling, working out, and other exercise. The respondents had previously collaborated successfully with three adjacent community organizations to lobby their district officials to shut down an illegal alcohol shop nearby.

Some perspectives from Indore are not captured here, in particular those of youth. Further exploration is needed to capture these perspectives.

Knowledge of health risks

Communicable diseases (including tuberculosis) and NCDs (diabetes, hypertension) were both mentioned by providers and residents. Both disease groups appear to impact nearly every income level and neighborhood, as do many forms of malnutrition. Tobacco chewing, smoking, and alcohol consumption are common among all residents. Knowledge of the risks of these activities did not appear to be high, though a forthcoming NCD risk-factor survey will better capture the level of knowledge in this area.

One health professional cited a lack of understanding about the effect of lifestyle on disease risk as the reason behind the burden of morbidity, even among those who seek care. A clinical provider noted that lack of exercise is the primary cause of the conditions most NCD patients come to him for—a change from earlier in his career, he said.

Doctors interviewed in several clinical settings said that limited knowledge of symptoms and lack of care-seeking delayed diagnosis of diseases, leading to complications, poor outcomes, and high costs. Respondents from one hospital suggested that screening for lifestyle diseases should include updating citizens on their knowledge of diseases and risk profile. Technology should be used for follow-up of chronic diseases. The private diabetes institute has developed an application that can be downloaded on smartphones for education, compliance, and monitoring.

Poor clinical compliance

When asked about health care-related barriers for their patients, one clinician said that 90% of patients who come in regularly for care will follow their protocol. The 10% who do not often say that they stopped because they were feeling better, indicating a lack of awareness about the chronic nature of some NCDs.

Poor compliance with treatment protocols among those who do not seek care or attend regularly was reportedly a problem, especially in lower-income groups. Also one NCD clinician said that there is no real concept of a family physician or continuity of clinical care, so the patient's history is lost and must be retaken at each clinical visit.

Further investigation is needed to understand variation in continuity of care across providers and insurance coverage.

Another provider said that poor treatment compliance can be due to myths (e.g., that taking medicines for a long time is harmful) and switching to other "medications" (consisting of methi, jamun, karela) for which there is no evidence of efficacy. Interviewees also reported a lack of awareness that NCDs may be asymptomatic for years, and that untreated diseases may lead to complications.

III. Coordination, Management, and Funding

The barriers to healthy lifestyles noted in the last section reinforce the need to focus on the causes of disease beyond the health care sector. This section provides background information on how these health-related sectors work and how they and the health sector are represented in urban planning, and specifically in Smart Cities. Finally, the section explores how Smart City investments are coordinated and funded.

Background on Indore's health-related sectors

Housing

Housing is overseen by IMC and ISCDL. A 2016 study among 640 migrants in Indore found that temporary and more recent urban migrants faced immediate and significant challenges to accessing adequate housing and basic services, especially without the requisite identification for Indore (Agarwal 2016).

Education

Education programs are overseen by the Department of Secondary Education, and in Indore, the District Education Officer is the authority. Seventy-seven percent of women and 88% of men in urban MP are literate (IIPS 2017). There are 12 centrally-funded schemes and two state schemes covering primary and secondary school students, most of which make provisions for low-income or marginalized students. Smart Cities currently funds some building of schools as part of its program.

Transport

IMC manages transport, but there is also a public-private partnership with Atal Indore City Transport Service buses that covers the new intelligent bus (iBus) system (World Business Center for Sustainable Development and ICLEI 2015). While metro construction is well underway, Indore "still suffers one of the highest traffic accident fatality rates in India, logging 444 deaths in 2015, fourth after Mumbai, Delhi, and Chennai" (Ross 2016). As part of the Atal partnership, Indore is installing cameras and left-turn filtering at all intersections, and is instituting punishment for traffic law violations. The city has activated CitizenCop, a mobile application that allows

Indore iBus in April 2017.
Fareed Uddin Syed, 2017

people to report traffic incidents. Many of Indore's Smart City efforts focus on transport.

Environment

Most environmental issues are overseen by ISCDL in Indore. Air and water pollution control scored poorly in the 2017 PwC report, with only moderate plans for technological interventions to improve the situation going forward. Indore sits on the banks of two tributaries of the Kshipra River, Saraswati and Kanh. ISCDL plans to clean these rivers (Pandit 2016).

Solid waste management

Solid waste management is overseen by both IMC and ISCDL. As noted in discussions with Smart City officials and indicated in the national Swachh Survekshan survey, Indore has made major improvements in the last few years. The city placed 149th in a ranking of India's cleanest cities in 2014, but moved to the 25th position in 2016, and then to first place in all of India in 2017 (Khanna 2017). Activities noted by interviewees included mechanized road sweeping, which reduces air pollution; segregation and composting of waste materials; and litter picking to reduce the amount of garbage on major roads. Middle-class residential areas and slums alike are receiving attention; in unmapped slums, a local nongovernment organization (NGO) has developed hand-drawn maps of households to facilitate trash pickup. Composting has also risen dramatically, and according to interviewees, the sale of composted fruit and vegetable waste from Indore farmers' markets has created a new revenue stream.

One of many garbage trucks in Indore.
Amanda Pomeroy-Stevens, 2018

Water and sanitation

Water management is carried out by IMC and the MP Public Health Engineering Department. With good municipal treatment facilities and household connection to waste-water city systems, Indore scored relatively well on an independent review, but storm drainage scored very poorly (PwC Private Limited 2017). Evidence of drainage problems was apparent in neighborhood visits conducted during this assessment. While Indore's use of treated water is good, water improvement plays a small role in Smart City activities. At the individual level,

Community toilets in Indore.
Amanda Pomeroy-Stevens, 2018

97% of urban MP dwellers used an improved water supply, and 67% used improved toilet facilities (IIPS 2017). Interviewees from local NGOs mentioned recent advances in access to improved toilets for slum dwellers, which contributed to an "open defecation free" designation in the city. Indore has built more than 17,000 household toilets and nearly 200,000 community toilets, and a private contractor continues to oversee subcontractors for maintenance of these facilities.

Public safety

Public safety is primarily the purview of the police force, though some community public safety groups have been formed. None of the residents who were visited in informal settlements mentioned public safety as an issue. On the contrary, they said that neighbors looked out for each other and there were no public safety concerns. The bigger issue, according to residents, is domestic disputes within families.

Social protection

Social protection measures outside health are managed by ISCDL. There are multiple schemes available to those who live below the designated poverty line, but utilization is low.

Smart City management structure and location

The management structure of Indore's Smart Cities flows from the IMC and ISCDL through a special purpose vehicle (SPV) created to plan, appraise, approve, release funds, implement, manage, operate, monitor, and evaluate Smart City development projects (Smart Cities Mission, Ministry of Housing and Urban Affairs 2017). The SPV is intended to increase funding flexibility—for instance, in developing joint ventures, subsidiaries, public-private partnerships, and other innovative revenue streams. Each Smart City has an SPV committee that is headed by a Chief Executive Officer (CEO) and has a board of directors.

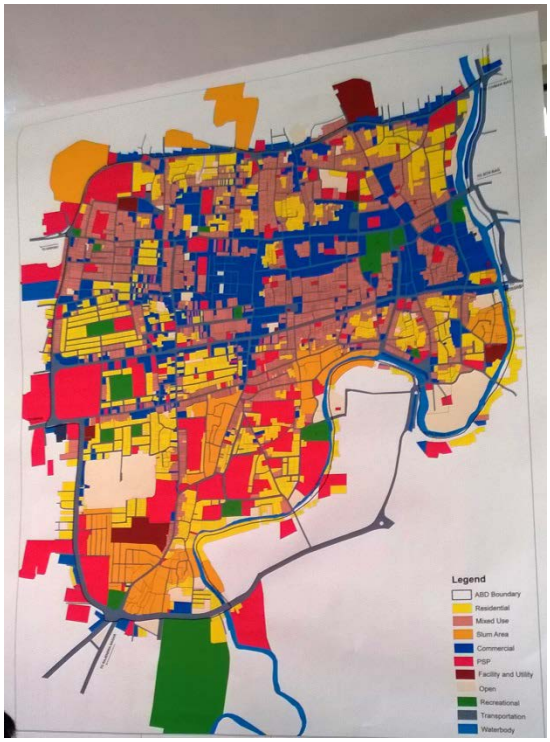

Figure 1. Map of Indore's Area-Based Development Zone

Interviewees involved in Smart Cities leadership reported that SPV committees met once a month, and consisted of the Board of Directors, four to five sector representatives, and the District Administrator, who is the chair of the committee. IMC oversees urban development for all 85 wards (each of which has 30,000 inhabitants) and 19 zones in Indore. The SPV committees oversee a slightly smaller area that is covered by the ABD, centered on

the Rajwada. Figure 1 shows that area, within the dark grey border, which covers 1.2 lakh (120,000) people, including 29,000 slum-dwellers (Pandit 2016). There are plans to turn some of the open spaces—the light cream colored areas in Figure 1—into parking, while the green spaces along the river are meant to be rehabilitated into usable park space. The orange in the figure denotes slum areas; yellow denotes established residential areas.

Sectors and stakeholders

It is nationally mandated that a Smart City Advisory Forum be created to advise and enable collaboration among various stakeholders. The advisory forum includes the district collector, a member of Parliament, a member of the Legislative Assembly, mayor, CEO of the SPV (who convenes the forum), local youth, technical experts, and at least one person who is *one* of the following:

- President/secretary of a registered resident welfare association (RWA)[4]
- Member of a registered taxpayers association/rate payers association
- President/secretary of slum-level federation
- Member of an NGO or mahila mandali/chamber of commerce/youth association

The Indore SPV structure shown in Figure 2 was proposed in 2016.

[4] An RWA is an association that represents the interests of the residents of a specific urban or suburban locality.

Figure 2. Indore SPV Structure

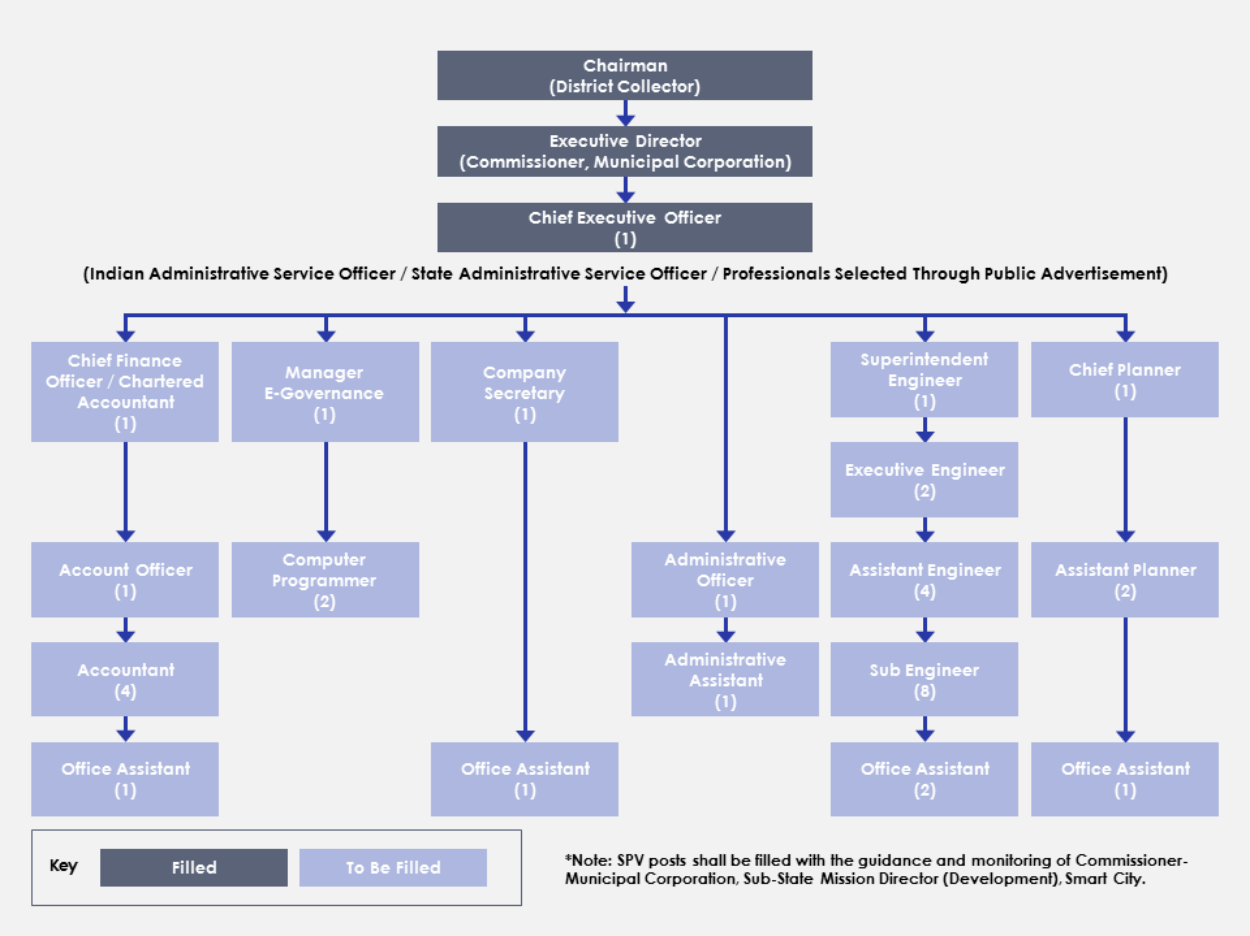

Figure source: ISCDL

Multisectorality of the Smart City mechanism

Of the representatives from the city sectors interviewed in 2017, five were not involved in Smart Cities. The uninvolved sectors were: 1) Integrated Child Development Services (ICDS), 2) pollution control, though their data are used for Smart City reporting, 3) field publicity, 4) commerce, and 5) health. ISCDL acknowledged that health representation is needed on the committee, and was interested in pursuing options to assure this. ISCDL respondents noted that the committee has representatives for education, finance, urban development, information and communication technology, transport, and solid waste management.

Health sector

All interviewees who were health sector stakeholders said that they were not invited to participate in any public policy processes—not just Smart Cities. One health stakeholder

was particularly frustrated with the exclusion of health from policy discussions; he said the process was very top-down, from the state and national levels.

One reason given for this exclusion of health sector representatives as regular members of the Smart City committee was that health is usually managed through the district rather than the municipality—which could complicate the definition of roles and responsibilities decisions about who should represent Indore. During the 2017 interviews, health sector actors were consulted by the assistant commissioner or commissioner on an as-needed basis only.

However, there appeared to be interest in health sector representation in the future. One Smart City consultant said that ISCDL was one of the first cities to bring up Smart Health during the last two discussions with the Ministry of Urban Development (prior to April 2017). When asked why this was, the person suggested that it is because Indore has been a leader in medicine. In 2017, a Smart Health workshop convened Smart City officials, consultants, and health stakeholders including chief medical and health officers, the civil surgeon, hospital representatives, and representatives of the private health sector (KPMG 2017). The workshop identified several areas of interest for future "Smart Indore, Healthy Indore," including:

- Leveraging Anganwadi and school infrastructure to deliver health services
- Integrating electronic medical records and health information systems across public facilities
- Facilitating telemedicine for unserved and underserved populations
- Increasing focus on ICDS and malnutrition
- Improving emergency medical care services
- Improving access to high-quality medications
- Availing citizen-centric apps to report health services

Steps for taking action on these points were laid out at the workshop, but several attendees expressed concern about a lack of human resources to take these initiatives forward.

Private sector

Contracts seem to be the mode of engagement for those private sector representative involved in ISCDL. Once contracted, these representatives participate substantially and regularly. Interviewees mentioned several public-private partnerships in solid waste management, water and sanitation, and transport and parking. As to consultation or coordination with the wider business community, it appears that urban planning officials and Smart Cities have tried to engage the Chamber of Commerce, but member businesses did not partake because of a lack of fit or lack of a business case for engagement. Thus the situation continues to be that when a business in Indore needs changes to the built environment, it lobbies for those changes. Interviewees did not mention a permanent business representative sitting on the Smart City or Municipal planning committee.

Community engagement

Interviewees mentioned that community groups have been engaged with Smart Cities on issues of waste management and in some cases, sanitation.

During a group discussion with residents of one middle-class neighborhood, participants said they were well-represented in citywide activities, that IMC heard their concerns, and that they had contact with local representatives. Members of this group said that they wanted more public participation in city affairs. Infrastructure is important, they said, but district officials need to pay attention to the city's social strength (i.e., citizens' voices); and there is no current platform for this. Lower-income residents reported using elected officials to voice general concerns, but were unaware of ways to engage in Smart Cities.

Local NGO providers from the waste management sector reported that there were many opportunities to advise Smart Cities on local needs, but this may not be true for all sectors. It was stated that the IMC commissioner and assistant commissioner have been engaged, and have gone on visits to the slums to observe waste management activities. One of the private-sector Smart City contractors mentioned community outreach activities to clean parks in conjunction with health checkups and community yoga activities and workouts.

The head of a self-help group for slum women (there are about 900 such groups across the city) was also interviewed. It was unclear how directly these groups were linked to Smart City activities, other than through involvement with the local NGO, which was one of multiple conduits for conveying the needs of slums and informal settlements to city officials.

Reporting structure

Within the Smart City office in Indore, nearly all monitoring and reporting was completed in electronic format, or were being converted from paper to electronic formats. There is a mayor's helpline for citizen reporting—Indore 311—which is an app for reporting waste management that anyone with a smartphone can download. In addition, in 2018 Hewlett-Packard Enterprise India Pvt Ltd. won a bid to build a command and control center for ISCDL, which will include data dashboard where data from multiple sectors can be monitored at the same time. However, nearly all the stakeholders interviewed in 2017 reported that current urban health systems were still paper-based, which may hinder local data sharing. BHC's Data Use Assessment will delve further into data systems and data inter-operability for these information systems.

Across India, Smart Cities are expected to report progress. However, the formal reporting structure and monitoring and evaluation framework are still in development because, at the time of interviews, the Ministry of Urban Development and National Institute of Urban Affairs were still deliberating on which indicators to report. Current reporting is only on procurements, conducted semi-monthly. There is a Citizen Consumer & Civic Action Group project that aims to create a framework for monitoring and evaluating Smart City projects across India to promote transparency,

accountability, and participatory inclusion of citizen views and concerns, but it is unclear how this will feed into government monitoring efforts.

Funding for Smart City activities

ISCDL grants follow a formal online tendering process via the MP procurement system (https://www.mpeproc.gov.in/). Bidders have one to two weeks to respond to a tender once notice is issued. Bids must be submitted online, with a requirement that hard copies of certain supporting documents (e.g., licenses and Goods and Services Tax certificates) be submitted. Bids are evaluated on the basis of tender specifications, and on bid and contract data sheet criteria, which differ based on the subject of the tender. Once an order is placed with the selected bid, Smart City projects are tracked on SMARTNET (www.smartnet.niua.org), a website hosted by the MOHUA for all Smart Cities in the country.

As of 2017, Rs 3,000 crore (about USD$435 million) was allocated for Smart City activities in Indore and Bhopal, with 80% of those funds provided by each city's Smart City development corporation. Of that total, Rs 500 crore (about USD$73 million) was provided by the government (*Times of India* 2017). Indore has performed well compared with other Smart Cities, coming second to Ahmedabad in spending of allocated funds. According to MOHUA data, only 7% of total national Smart City funds for 2017 had been spent by the start of 2018 (*Business Today* 2017).

Indore's 2018 IMC budget focused on public safety (including pedestrians), garbage services, roads and transport, and green spaces (*The Free Press Journal* 2018). Smart City budgeting will be further explored in the upcoming BHC 2018 Political Economy Analysis.

IV. Health Engagement

This section discusses the receptivity of city officials and municipal decision-makers to taking available opportunities to improve healthy lifestyles in their communities. Six interviewees from the seven city sectors included in the assessment said that they have a role to play in improving urban health, including awareness-raising, prevention, and hiring and retaining clinical providers.

Across these city officials, ideas for how they could engage with health focused primarily on prevention and advocacy; one interviewee cautioned against involvement with treatment, since "that is for the clinicians." Other interviewees described ways of improving health and quality of life in Indore, including improving female empowerment (reducing child marriage, improving girl's education); making health for all a universal right; improving equity though area-based allotments; and supporting the health sector by improving retention of specialists in outreach centers and enhancing training and support for frontline workers.

The importance of supporting frontline health workers was echoed by interviewees from the health sector, though providers said that given staff shortages delivering services beyond treatment would be difficult. Those working in NCD clinics, for example, stated

that constraints on providers' time force clinicians to exclusively focus on treatment, with no time given to prevention services. The system is strained even further when doctors are called away by the state government for other tasks. Because urban and rural communities are subject to NCDs and are attended by doctors who are too busy to provide more than treatment, "there should be a counselor to talk to the patients" about how to manage their conditions. There was in fact a provision by the MP state government to provide counselors in all departments of all hospitals, but this was subsequently reduced to only one counselor per facility.

The relationship between urban planning and health was discussed during interviews with Smart City officials. The basis for engagement in an activity was defined by two people as having sustainable, viable social benefits. It was noted that health is tied to happiness, which is an important measure of Smart City's success. Interviewees mentioned that any future work for Smart Health should cover youth to old age. In addition, increased ties with insurance (particularly the RSBY scheme) were identified as important.

4. KNOWLEDGE GAPS

The findings from this assessment suggest gaps in information on some key areas affecting health and healthy living in Indore. ISCDL and BHC can explore options for filling these knowledge gaps over the next two years. Knowledge gaps will also be identified in BHC's Political Economy Analysis and Data Use Assessment, so the gaps included here should be considered alongside gaps identified by other resources.

Private-sector health care

More information is needed on the extent and nature of private-sector health care in Indore, including what factors drive privatization. Key questions to be answered include the types of providers within the private sector; how they are being regulated; if the private sector segments the Indore population by income or other sociodemographic factors; and if this affects the equity or quality of care. This is important not just for ensuring a minimum of care for the urban poor, but also ensuring that the middle class are not being targeted for higher-cost, elective procedures that may risk their long-term health (or drive insurance costs up).

Quality of care

Overall, little information was found on quality of care in Indore's health sector. Within this area, there is a need for research on differentials in quality of care between private and public facilities, and for citizens of different income levels. Findings from such research, along with standard health outcome data, can be used to judge what, if anything, needs to be done to adjust trends in private care and care for the urban poor.

Provider incentives

This assessment documented extensive problems with vacancies in health posts and overburdened staff, including ASHAs, qualified allopathic doctors, nurses, and support staff. There are tools available to assess how to design more effective incentive structures for ASHAs and qualified medical providers, including discrete choice analysis. Further research is needed to guide the NUHM and state and city health officials on developing appropriate, effective incentive structures for providers.

Health insurance

Given the imminent launch of the Ayushman Bharat National Health Protection Scheme and the growing, segmented private insurance market, further research is needed to ensure that the common pitfalls of a mixed market system are avoided, and that those at risk of catastrophic health costs take part in available free schemes. Currently about 64% of the 3638 Rs (about USD$53) in total health expenditures per capita comes "out-of-pocket," so there is a real need to shift to prepayment plan schemes (NHSRC 2016). However, given the shortage of health care staff in Indore, it is unclear how the current health care system could absorb the increased participation spurred by increased

insurance coverage. There needs to be a study on the RSBY scheme to understand whether the low uptake of this scheme is due to deficits in knowledge about the program or discrimination or stigma related to the program; or if it is because enrollment has so far resulted in access to care, discouraging continued use.

Food subsidies

Many aspects of food subsidies in Indore need to be explored further. This report touched upon the low palatability of healthy foods in Anganwadi centers and women's food rations, the quality of which is being debated nationally (*Times of India* 2018). The public distribution system is one of the most important food security networks, and the related ration cards are in the process of being linked to the Aadhaar card. Schools also provide a mid-day meal, but the safety and nutrient quality of these meals vary, as their primary purpose until recently has been to increase enrollment (Times of India 2017a). There is a need for research to understand how to maximize health benefits to those in need and minimize cost of these programs.

Social protection schemes

While this assessment found limited knowledge about social protection schemes among the underserved in Indore, it did not identify the reason for this low knowledge. Key questions in this area include which community actors could act as educators and connectors to social protection schemes; what structural and/or cultural barriers may be inhibit uptake; and if the programs are effective once people are enrolled.

Ecology of pollution

ISCDL has made reduction of air pollution a priority, and there is a documented need to push further on reductions in water and noise pollution. BHC's observational data revealed needs for reducing water pollution within slum populations; yet pollution was not mentioned in discussions with citizens as a barrier to healthy living. Further research linking pollution to health outcomes in Indore would be useful to help educate communities on what pollution is and how it affects healthy living in Indore. Such documentation could also help city officials prioritize pollution mitigation projects via ISCDL.

Housing tenure and land rights

Indore residents at risk of forced eviction are very likely to be at higher risk of physical and mental stress, and will be less likely to seek and stay in treatment for health conditions (Desmond and Kimbro 2015). BHC was unable to find recent data for India or Indore on the impact of insecure housing tenure on health outcomes, which weakens the case for advocacy to secure land rights.

5. CONCLUSIONS

India is expecting significant population growth—over 50% by 2030—that will demand innovative approaches to urban health and well-being. Designing these approaches requires information to identify needs, determine the most effective strategies, and refine these strategies over time. This assessment provides a multisectoral overview of critical issues from multiple stakeholders at various levels. In terms of health, the findings indicate a need to integrate health concerns (including NCDs) within all aspects of planning for Smart Cities and Indore's future development.

The findings from this assessment will be triangulated with findings from BHC's other studies examining the political economy, NCD risk factors, and data use among Indore residents. These data will be used to help the city government assess vulnerabilities, barriers, and opportunities for improvement.

BHC will work with city officials through 2020 to fill knowledge gaps and identify opportunities for engagement. The project will follow developments on some of the key stories uncovered in assessment interviews and focus groups to understand how life is changing in Indore, for better or worse. These specific "journeys" will illustrate what problems citizens face, how they are advocating for change, and what barriers and successes the ISCDL and IMC encounter as they try to solve those problems. This information is intended to illustrate to other Smart Cities how they can grow while maintaining strong systems to continuously improve the health of all their citizens.

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ANNEX A: KEY INFORMANT INTERVIEW LIST

Type of Respondent	# of Participants	Type of Discussion
Civil Society	1	Interview
Civil Society	3	Interview
Education	5	Interview
Field Publicity (Communications)	1	Interview
Health	1	Interview
Health	1	Interview
Health	1	Interview
Health	1	Interview
Health	1	Interview
Health	1	Interview
Health	1	Interview
Health	1	Interview
Health	1	Interview
Health	1	Interview
Health, Academia	1	Interview
Health Insurance	1	Interview
Health, NCDs	3	Interview
Health, NCDs	2	Interview
Health, NCDs	3	Interview
Health, NCDs	1	Interview
Pollution Control/Environment	2	Interview
Private Sector	1	Interview
Private sector, ICT	1	Interview
Private Sector, Waste Mgmt	1	Interview
Private Sector/ISCDL	1	Interview
Resident/Civil Society	1	Partial Interview
Social Protection (ICDS)	4	Interview
Social Protection (Livelihoods)	3	Interview
Urban Planning	1	Interview
Urban Planning	1	Interview
Urban Planning	2	Interview
Waste and Sanitation, Civil Society	3	Interview

ANNEX B: TYPOLOGY OF RESIDENT FOCUS GROUP DISCUSSIONS

1.	Formal housing stock with secure property rights but outside of the ABD zone, open community layout with well-maintained infrastructure, stable population, primarily Hindu, majority formally employed but with notable elderly population; good access to city services.
2.	Informal housing stock with secure property rights inside ABD zone, stable population, primarily Muslim population, crowded semi-formal community layout with infrastructure issues, majority are informally employed in service sector, good access to city services.
3.	Mixed housing stock with no property rights for those in informal areas, outside of ABD zone, mixed religions, crowded informal (shanty) community layout with infrastructure issues layered onto formal zoning, majority are formal and informal manual labor, limited access to city services.
4.	Formal Housing stock, secure property rights but outside of ABD zone, predominantly Hindu, rapidly growing population, formally zoned layout with good infrastructure, well-educated but with high unemployment, especially among youth.

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