BUILDING HEALTHY CITIES

Indore Data Use and Access Assessment

September 2018

Building Healthy Cities

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ACRONYMS

ANM	auxiliary nurse midwife
ASHA	accredited social health activist
BBNL	Bharat Broadband Network Limited
BHC	Building Healthy Cities
CCTV	closed-circuit television
CSC	common service center
DBT	direct benefit transfer
FGD	focus group discussion
GIS	geographic information system
GPS	global positioning system
HMIS	Health Management Information System
HRMIS	Human Resource Management Information System
ICCC	Integrated Command and Control Centre
ICT	information and communications technology
IDSP	Integrated Disease Surveillance Programme
IOM	International Organization for Migration
IMC	Indore Municipal Corporation
ISCDL	Indore Smart City Development Ltd.
ITMS	Integrated Traffic Management System
JSI	JSI Research & Training Institute, Inc.
KII	key informant interview
MCTS	Mother and Child Tracking System
MEITY	Ministry of Electronics and Information Technology
MIS	Management Information System
MMP	Mission Mode Project
MoHFW	Ministry of Health and Family Welfare

MoHUA	Ministry of Housing and Urban Affairs
NeGP	National Electronic Governance Plan
NHM	National Health Mission
NII	National Information Infrastructure
NUHM	National Urban Health Mission
OBU	on-board unit
PFMS	Public Financial Management System
PM	particulate matter
PwC	PricewaterhouseCoopers Pvt Ltd
SPV	special purpose vehicle
SWAN	State Wide Area Network
UID	unique identification number
ULB	urban local body
USAID	United States Agency for International Development
VTMS	Vehicle Tracking and Monitoring System

PREAMBLE: BUILDING HEALTHY CITIES BASELINE ASSESSMENT STRATEGY

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

Figure 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 & burdens?	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. BHC's continual process monitoring will follow changes in the themes emerging from this initial inquiry. These updates will be shared via multiple channels. Please check back on <u>BHC's website</u> for new reports and updates on our cities.

EXECUTIVE SUMMARY

Full citations for any secondary data cited in the Executive Summary can be found in the main text of this report.

The world is rapidly urbanizing, and cities must use smarter and more sustainable approaches in order to serve their growing populations. The pillars of a smart, sustainable city are often closely aligned with advances in information and communications technology (ICT). In India, the Smart City program represents one way the Government of India is preparing for sustainable, healthy future growth, and ICT has a central role.

JSI Research & Training Institute, Inc. (JSI), as part of the United States Agency for International Development (USAID)-funded Building Healthy Cities (BHC) project, conducted a data use assessment in one Indian Smart City. The assessment was done in the Smart City of Indore, Madhya Pradesh, where BHC is a partner with Indore Smart City Development Limited (ISCDL). The assessment goals were to understand current access to and use of data and ICT in Indore. The findings will inform the more detailed city workplans relating to data system interoperability and citizen reporting systems.

I.   Methodology

The four key themes pursued in this assessment were:

- Existing data systems.
- Use of data and information systems for city planning.
- Citizen access to data and ICT.
- Barriers to increasing data use.

This formative assessment used qualitative methods, including 21 key informant interviews (KIIs), four focus group discussions (FGDs), and a desk review, to gather information on these themes. Data collection tools were adapted from the MEASURE Evaluation "Tools for Data Demand and Use in the Health Sector" manual and the Cities Alliance report "An Innovative Data Toolkit for City Management." Data collection took place from April–May 2018, and data were validated in a multisectoral workshop in August 2018. Data collection focused on eight sectors: health, urban planning, transportation, education, waste management, police, social protection, and pollution control.

II.   Results

Existing data systems

This assessment found moderate penetration of the National Information Infrastructure (NII) and BharatNet (the national broadband infrastructure initiative) in Madhya Pradesh. Systems that support city services across seven health-related sectors were slowly digitizing, including citizen data such as for the Aadhaar program. However, it

appeared that privacy laws and guidelines may need to be expanded to ensure the safety of those data as digitization spreads, particularly in reference to health data. At the time of interviews, health sector data were spread across at least seven different national data systems led by the National Health Mission, but each facility may use many more systems than these. These information systems for health were reported to be useful, but were not integrated or interoperable, and many were still paper-based at the facility level.

Within city planning and Smart Cities specifically, ISCDL had good internal information systems for tracking Smart City projects. Online systems such as SmartNet and the state procurement system also were accessible, but ISCDL did not have management rights to those systems at the city level, limiting ISCDL'S ability to adapt the infrastructure of those systems to their needs. At the time of interviews, an Integrated Command and Control Centre (ICCC) was being developed for all seven Smart Cities in Madhya Pradesh by the state government; Indore will have its own ICCC eventually that is coordinated with the other cities and that reports to the state ICCC. This multilayered management structure will require coordination in order to customize the Indore ICCC to city needs. Some successful examples of existing city-level system interoperability include the Integrated Traffic Management System (ITMS) and Vehicle Tracking and Monitoring System (VTMS).

The ICCC presents a unique opportunity to coordinate the various systems related to city planning and healthy environments. Figure 1a illustrates the ICT systems found during this assessment, their level of management, and whether they are currently linked to the ICCC. Multiple levels of management of the system may mean greater difficulty in adapting systems to the needs of ISCDL and Indore Municipal Corporation (IMC), which could impact data use at the city level.

Figure 1a. Existing ICT Systems in Indore
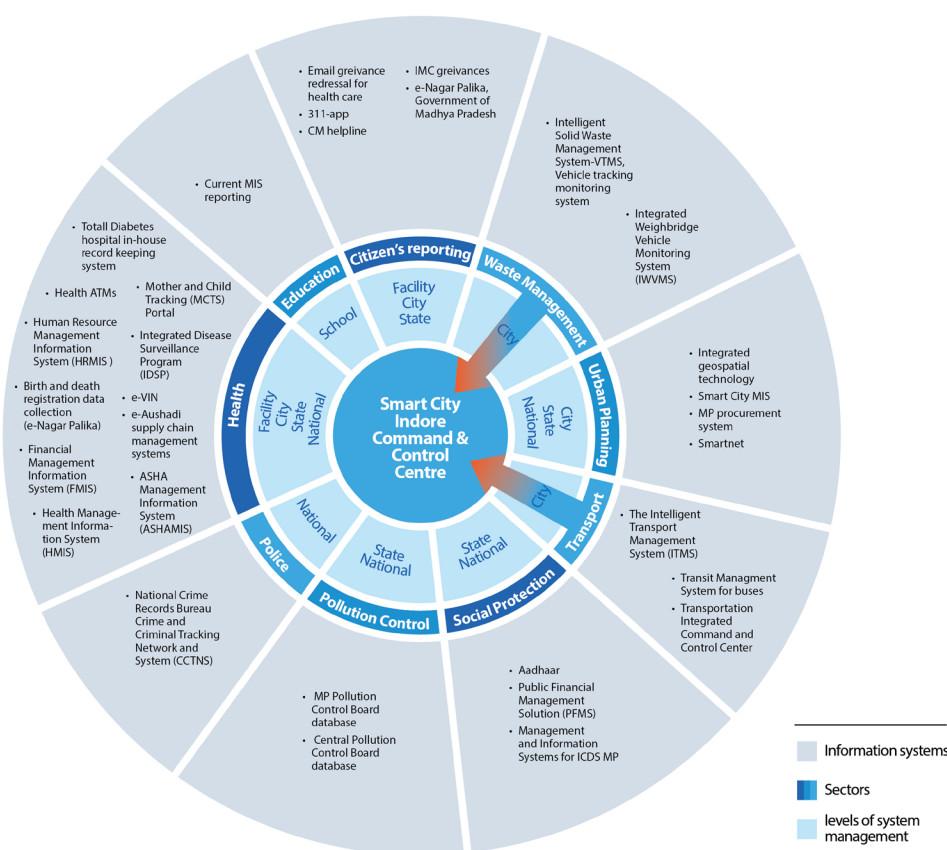
Use of data and information systems for city planning

Data use can be difficult to define. One definition is when people within an organization demand data, understand their role as data producers and users, and are motivated to act on those data for programming and/or decision-making. From the assessment interviews, it appeared that within each sector, there is demand for data, but use of that data at the city level varied widely by sector. There were few instances of requests for data outside of one's sector, but this may change once the ICCC has been launched. When data were used, it was most often for planning purposes and tracking of financial and physical progress. Data on outcomes or impacts of activities were used less often, especially for ISCDL. In the case of ISCDL, this may be because no formal national monitoring and evaluation framework for Smart Cities had been approved as of mid-2018, leaving them without guidance on what outcome indicators to track. In interviews, several sector respondents noted the need to increase ICT staff trained on electronic data collection, analysis, and use.

Citizen access to data and ICT

The 2011 census provides the most recent basic service statistics for Indore, which may not reflect the current coverage rates (Sinha 2012). More recent survey data are

needed to update these figures. As of 2011, only 8 percent of Indore homes had internet, and 62 percent had mobile phones. From the interviews, it appeared that mobile phone access was higher for men, and in middle-to-high income homes. There were multiple private broadband providers in Indore to supplement national government efforts. There were existing policies and guidelines issued by the Department of Administrative Reforms and Public Grievances which outline a clear set of minimum requirements that each department or city agency must meet to allow for citizen feedback. While it appeared that most Indore sectors complied with these requirements, it was unclear how feedback on resolution of grievances was handled for all but a few online applications.

ISCDL and IMC have invested in online options, including apps and social media outreach, to allow for grievance redressal. This appeared to work well for those who own smartphones, but may lead to exclusion of those who do not. Madhya Pradesh state government also initiated a phone service that appeared to be popular among middle-income citizens and health workers. For those without internet or phone access, the most popular grievance redressal mechanism appeared to be via local ward representatives (or in some cases community health workers) who they can speak to in person. Focus group participants expressed their satisfaction with going to one person to handle all complaints, though some of the women's self-help group members were unaware of, or intimidated by, the idea of speaking to the ward representative about their concerns. Further investigation is needed to define effective channels for communication of needs by the self-help groups and other vulnerable sub-populations.

Barriers to increasing data use

Organizational, technological, and socio-cultural barriers were identified in this assessment.

In terms of organization, availability of adequate manpower will need to be addressed across data generation, analysis, reporting, and ICT support. A culture of data use will also need to be cultivated both within service sectors and in the community. As noted previously, the multiple levels of management for information systems will complicate any efforts to improve system interoperability and usability at the city level. There is a clear need for establishing a national or state framework or guidelines for data-sharing across sectors. Finally, as of the time of this assessment, there were very few mechanisms for data-sharing between the private and public health sectors, which will need to be addressed in order for the city to have a more accurate picture of health needs and burden in Indore.

In terms of technological barriers, the slow expansion of internet infrastructure may be hindering development of more interconnected information systems. Duplicate data entry in siloed databases also have caused data quality issues in Indore and lowered the trust in key indicators coming out of those systems. There are also many potential technological barriers to improving system interoperability, as most existing systems are not aligned with the National Electronic Governance Plan (NeGP 2.0) launched in 2014.

Finally, sociocultural issues that may limit data use by citizens included the lack of feedback from most existing grievance redressal mechanisms (except for the new mobile applications) and lack of awareness among lower-income groups of grievance redressal mechanisms, mobile or otherwise. There may also be some hesitance to bring grievances forward among the most vulnerable subpopulations. Some form of outreach to ensure these citizens are more comfortable with basic service statistics could help empower them to speak up for their own communities and service needs.

III. Knowledge Gaps

The assessment was unable to find sufficient information relating to the following areas:

- E-governance policy for Indore City.
- Data systems and compatibility within private health facilities.
- Technical specifications on existing information systems.
- Potential new communication channels for vulnerable populations.
- Data security and privacy policies.

Further investigation is needed to fill these knowledge gaps.

IV. Conclusions

As Indore realizes its vision to be a smart, liveable city for all, it is important to ensure that data are used to effectively reach that goal. The findings from this assessment will be triangulated with findings from BHC's other studies examining the health needs, political economy, and noncommunicable disease risk factors for Indore residents. This information will 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.

1. INTRODUCTION

The world is rapidly urbanizing. By 2050, it is projected that 68 percent of the world's population will live in urban areas (United Nations 2018). To manage services for their growing population base, cities must consider smarter and more sustainable approaches (Misra et al. 2015).

The pillars of a smart, sustainable city are often closely aligned with advances in information and communications technology (ICT). Key ICT components include improved access, storage, transmission, and visualization of information; and increased access to the technology that communicates data containing this information (internet, hardware, software).

In India, the Smart City program (see Box 1) represents one way the Government of India is preparing for sustainable, healthy future growth, and ICT has a central role. Smart Cities often leverage technology to create an "internet of things," which can improve functionality in multiple sectors if there is good interoperability between applications (Misra et al. 2015).

Box 1. How Do Data and Information Play a Role in Indian Smart Cities?

Launched in 2015, the Government of India's Smart Cities Mission currently covers 109 cities, with 90 cities already selected through four rounds of proposals. Seated in the Ministry of Housing and Urban Affairs, the **Smart Cities Mission** provides winning cities with *financial support, policy support, and capacity building*.

The aim of the initiative is to provide residents with an efficient and reliable infrastructure, enhanced quality of life, and economic opportunities.

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

Source: National Informatics Centre, Ministry of Electronics and Information Technology, Government of India, 2016.

In 2016, the Indian Bureau of Standards listed 46 proposed core indicators to monitor India's Smart Cities (Bureau of Indian Standards 2016). While several indicators relate specifically to access to ICT, collection of all 46 indicators will require improved data and information systems across sectors, as many are not being collected currently. In addition, to facilitate local data use for Smart City decision-making and to ensure citizen inclusion in the process, the current interoperability of systems needs to be assessed.

In 2018, JSI Research & Training Institute, Inc. (JSI), as part of the United States Agency for International Development (USAID)-funded Building Healthy Cities (BHC) project, conducted a data use assessment in one Indian Smart City. The assessment was done in the Smart City of Indore, Madhya Pradesh, which is a BHC partner city. The assessment goals were to understand the functionality of the current information

systems in Indore, barriers to equitable access to ICT, barriers to coordination and management of data and information across Smart City sectors, and opportunities to improve access to and use of data for planning within Indore's Smart City initiative.

Indore's Smart City Initiative

Indore, one of the most densely populated cities in Madhya Pradesh, is the commercial capital of the state. It is also the budding center of entrepreneurship and start-up businesses. Indore was selected as an Indian Smart City during the first round of proposals in 2015. The city's proposal included upgrades for many sectors (see Figure 2). The Indore Smart City initiative is overseen by the Indore Municipal Corporation (IMC) and the semiautonomous Indore Smart City Development Ltd. (ISCDL), a special purpose vehicle (SPV) set up to manage the Smart City initiative.

Figure 2. Indore Smart City Components (as of June 2017)

Source: ISCDL 2017a.

The Smart City Mission proposal for Indore was a co-creation process, which solicited input from citizens. The proposed activities include the use of emerging technologies to simplify real-time data collection, including internet connection devices such as radio frequency identification, sensors, cameras, and smartphones to enable smarter

parking, transport, energy, and governance. Since 2016, e-health activities have also been proposed under ISCDL.

As these new technologies come online, Indore will need to consider rules and regulations about open data standards, e-governance strategies, frameworks, policies and guidelines, equitable access to services for citizens, public and private collaboration, privacy concerns, transparency, and accountability. It is crucial for ISCDL to ensure that 'smart' solutions are citizen-friendly, easily adoptable by the various departments, and that they account for social innovations and ever-expanding populations.

2. METHODOLOGY

I. Selection of Indore

During initial discussions with the Ministry of Health and Family Welfare (MoHFW) and the National Urban Health Mission (NUHM), Indore was suggested as one of a selection of Smart Cities that might be interested in exploring additional health activities.

II. Assessment Objectives and Scope

BHC and ISCDL are collaborating to build a healthier Indore through healthier city policies, plans, and services. BHC will support this goal by increasing the availability of data for decision-making, multisectoral collaboration, and the citizen's voice in city processes.

This report presents the findings of a rapid assessment of the access to and use of data in Indore. This will inform the more detailed city workplans relating to data system interoperability and citizen reporting systems in the city. This report covers the following items:

1. *Existing data systems*: What systems are in use for key sectors? What is the inter- and intra-sectoral functionality of those information and data systems? Are new systems being planned to support Smart Cities?
2. *Use of data and information systems for city planning*: How are data and information systems being used for e-governance now? What are the guidelines for data management, coordination, and sharing?
3. *Citizen access to data and ICT*: Do citizens have access to city data and ICT? Is that access or participation equitable? What is their perspective on the security and privacy of those data and ICT platforms? Are mechanisms available for citizens to participate in data collection, analysis, or interpretation? How do citizens communicate via ICT?
4. *Barriers to increasing data use*: What barriers are there to data system interoperability? To system functionality? To citizen use and accessibility?

This report is organized around these key themes.

This initial assessment in Indore explores systems and stakeholders directly relevant to Smart Cities and health, but it may miss indirect connections that will be revealed as BHC work gets fully underway. Follow-up data collection over the remaining two years of the project can explore these connections. In discussions with ISCDL, it was agreed that BHC would explore data systems for six city sectors: urban planning, transport, health, police, sanitation, and education.

III. Data Collection and Analysis

A combination of primary and secondary research approaches were used for this exploratory qualitative assessment. During two months (April–May 2018), information

was gathered using key informant interviews (KIIs), focus group discussions (FGDs), and a desk review. In August 2018, the results of this assessment were validated and revised with Indore residents and city officials.

Data collection tools were adapted from the MEASURE Evaluation "Tools for Data Demand and Use in the Health Sector" manual and the Cities Alliance report, "An Innovative Data Toolkit for City Management" (MEASURE Evaluation 2011; Development Gateway Inc. and Athena Infonomics 2017).

A total of 19 KIIs with 20 individuals were conducted with Smart City officials, health officers, United Nations agencies, the private sector, and academia, which represented the six sectors put forward by ISCDL, in line with the scope of the study. The selection of informants primarily focused on the individuals in the sectors who worked directly on ICT and monitoring of data, and who were data handlers and/or ISCDL decision-makers.

A total of four FGDs also were conducted with groups representing key subpopulations of citizens of Indore to understand their modes of communication, how they access information about public services, and how they advocate for services from the city. There was a mix of participants, with representation of both literate and illiterate and those who used mobile phones and those who did not.

A desk review uncovered the existing statistics and information on the data systems already in use in Indore. A qualitative survey identified the existing data systems, their efficiency, monitoring and evaluation of the systems, maintenance of the systems, and challenges and barriers in terms of access to and use of data.

The JSI Institutional Review Board determined that this activity was exempt from human subjects' oversight. The basis for this exemption is CFR 46.101(b)(2), which covers survey activities without identifiers or sensitive questions that could result in harm.

Limitations

During data collection, some key informants were reluctant to share information because of concerns about confidentiality and conflict. In addition, only the sectors that ISCDL prioritized—namely health, urban planning, transportation, education, waste management, police, social protection, and pollution control—were purposively included in this assessment because they would be involved in planned Smart City activities and required to report data to the ISCDL central database in the immediate future. The final selection of informants included city data producers and a selection of citizens—other perspectives on data use may be missed or covered in other BHC assessments. This exploratory assessment is the first step toward understanding the relationship between data producers and users in Indore; it should not be considered a comprehensive picture of all data use in the city.

3. RESULTS

I.   Existing Data Systems

Indore's ICT infrastructure and data systems are built on several national initiatives. In 2015, the Prime Minister of India launched the nationwide Digital India program (National E-Governance Division n.d.). The objectives of Digital India are to provide:

- Digital infrastructure as a utility to every citizen.
- Governance and services on demand.
- Digital empowerment for citizens (MEITY n.d.).

To provide access to digital infrastructure as a utility for every citizen, access to high-speed internet is needed nationwide. Infrastructure is being built to provide internet connectivity for institutions including government offices, public health centers, schools, banks, and other key offices, from the central level down to the village council (Gram Panchayat) level. This National Information Infrastructure (NII), led by the Ministry of Electronics and Information Technology (MEITY), covers a variety of initiatives, including BharatNet, which encompasses the National Optical Fiber Network and State Wide Area Network (SWAN), and is run by the SPV known as Bharat Broadband Network Limited (BBNL) (Department of Electronics and Information Technology 2015). Since its introduction in 2011, BharatNet has laid optical fiber to 150,000 village councils, with plans to connect all 250,000 village councils in India by March 2019 (Sharma 2018). By mid-2018, BharatNet had laid optical fiber in Madhya Pradesh to 12,464 village councils, approximately half of the total for the state (BBNL 2018). The SWAN connects districts to each state capital, while each individual department manages the connectivity between the block and district levels for reporting through broadband connectivity services provided by private players (MEITY 2016). Block-to-district connectivity for various departments is reliant on availability and market share of public and private telecommunication companies; the quality of connectivity fluctuates depending on who is providing services in each place. This has an impact on data management, coordination, and sharing.

Indore citizens, like all Indian citizens, must register for a unique identification number (UID). Each resident receives this 12-digit number based on their biometric and demographic details; the UID is also called an Aadhaar number (Unique Identification Authority of India n.d.). In Indore, more than 2.55 million Aadhaar numbers have been issued (Unique Identification Authority of India 2017). More information on the social and political benefits of the Aadhaar program is available in BHC's *Political Economy Analysis*. From an ICT standpoint, the UID is a digital fingerprint, and enables government programs—such as education, employment, health care, food distribution, and social security—to accurately, efficiently, and securely confirm the identity of beneficiaries or provide access to benefits (Unique Identification Authority of India n.d.).

Common service centers (CSC) serve as electronic access points for government services and scheme-based benefits, and are managed by local entrepreneurs for a nominal fee. Services that can be accessed at CSCs include government scheme

registration and updating facilities, vocational training and education services, banking and insurance services, utility services, etc. (MEITY n.d.). More than 60 CSCs operate in the Indore block (Common Service Centres in Indore n.d.).

To enable digital provision for government services, and to enable institutional strengthening through ICT-enabled solutions, the government revamped the National e-Governance Plan (2006). The plan initially comprised 27 Mission Mode Projects (MMP)[1]; four more MMPs—health, education, public distribution system, and posts—were added in 2011. However, the progress on health and education MMPs has been very slow: 25 out of 31 MMPs are live (Department of Electronics and Information Technology, Government of India 2015). Each MMP has been implemented separately as information silos; only the nodal department handles the reporting and analysis, with no data coordination or sharing mechanism across sectors. To overcome this major issue with the lack of integrated and interoperable services, MEITY envisaged E-Kranti-National Electronic Governance Plan (NeGP) 2.0 as an important pillar of the Digital India program; it was launched in 2014.

The objective of the E-Kranti-NeGP 2.0 is "To ensure a Government wide transformation by delivering all Government services electronically to the citizens through integrated and interoperable systems via multiple modes, while ensuring efficiency, transparency and reliability of such services at affordable costs (Department of Electronics and Information Technology 2015)." Ten new MMPs were added in 2014 under e-Kranti and they are planned to be rolled out by late 2018.

The e-governance MMPs are designed for central, state, or integrated implementation. None of Indore's 2018 Smart City projects have established interlinkages with NeGP 2.0. The Ministry of Housing and Urban Affairs (MoHUA) and MEITY need to develop a convergent, intersectoral, and interoperable e-governance project framework for Smart Cities. This should be initiated at the central level in order to establish a national standard for governance, project management, funding, and review mechanisms, which is currently a weak link in coordination between departments at the city level and the municipal corporation.

In Indore, a 2017 review of the e-governance portal found that none of the city's services were fully online (Katare and Banerjee 2017). The portal lagged behind Bhopal on several functional measures, and the authors of the review suggested that more public utility information should be posted, as well as contact information for services, easier search options and visitor counts, downloadable forms, and a functional feedback and grievance redressal mechanism. Observation of the IMC e-governance portal in mid-2018 showed that many of these improvements were made; however access to some service data, as well as budget information, was limited by slow connection speeds and broken links.

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[1] The MMPs include Ministry of Corporate Affairs 21 project; Pensions; Income Tax; Passport; Immigration, Visa and Foreigners Registration and Tracking; Central Excise; Banking; UID; e-Office; Insurance; CSC e-Courts; e-Trade; National Portal of India; National Service Delivery Gateway; e-Biz; e-Procurement; NLRMP; Road Transport; Agriculture; Crime and Criminal Tracking Network and System; Treasury Computerization; Municipalities; Commercial Taxes; e-Panchayat; and Employment Exchange, among others.

Overview of Smart City data systems

At the time of interviews, ISCDL used the following data systems to operate, monitor, and fund Smart City activities.

SmartNet

SmartNet, a national-level system, is designed for the MoHUA to support the 109 Smart Cities across the country. SmartNet is the primary repository of Smart City tender documents, including expressions of interests and requests for proposals, as well as documentation of the financial and physical progress of activities (Government of India 2018b). The site also provides contact information for Smart City officials, a resource library, and cross-city learning materials. Smart City microsites are planned for each city, and will include geographic information system (GIS) city maps linked to current projects.

Eventually, these sites can give users real-time information through city dashboards, capturing changes at the city level, project-level information through geo-tagging of projects, and the latest updates on the progress of the urban sector missions.

While SmartNet is a repository for procurement and bidding data for all Smart Cities, from interviews it appeared that for the day-to-day management of these projects, ISCDL used its own internal management information system (MIS).

Smart City MIS

ISCDL tracks physical and financial achievements for projects using an internal Excel-based tracking sheet. This is submitted to the National Smart City Mission and is not available in the public domain.

The tracking sheet, or monthly operational status report, is submitted to the Project Management Unit at State Headquarters at Bhopal. Data from all seven Smart Cities in Madhya Pradesh are then collated at the state level and submitted to the MoHUA, along with additional state-level information. Submitting the monthly operational report takes a significant amount of time and a real-time Smart City status tracking system was not available as of mid-2018.

Table 1 provides a snapshot of Smart City projects directly relevant to ICT and data systems. It lists approved projects for Indore as of February 2018 that are tracked in the MIS.

Table 1. Approved Projects for Indore (as of February 2018)

Approved Project	Source of Smart City Funds
Implementation of Integrated Command and Control Centre	Central
Citizen's reporting app for waste collection (Indore 311)	State
Networking work at Smart City Office, Nehru Park, Indore	Central
Establishment of building and interiors for C4	Central
Smart Poles Project including closed circuit television, environmental sensors, Wi-Fi, C4 integration, optical fiber cable, etc.	Central

Source: Smart City MIS provided to BHC by ISCDL as of February 2018.

Madhya Pradesh procurement system

Using the Madhya Pradesh procurement system (https://www.mpeproc.gov.in/), ISCDL grants follow a formal online tendering process. After a notice is issued, bidders must respond in one to two weeks. 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 based on tender specifications, and on bid and contract data sheet criteria, which differ based on the subject of the tender.

Integrated Command and Control Centre (in progress)

At the time interviews were conducted for this assessment, a centralized database for tracking Smart City data did not exist. However, the Madhya Pradesh state government has initiated India's first Integrated Command and Control Centre (ICCC), which is a centralized monitoring system for the seven Smart Cities in Madhya Pradesh—Bhopal, Indore, Ujjain, Gwalior, Jabalpur, Satna, and Sagar. The state-level ICCC is located at the Bhopal Smart City Development Corporation Ltd. facility in the Berkheda area; it was prelaunched on May 8, 2018. ISCDL has initiated the process for setting up an ICCC; a new building for that purpose was expected to be completed by October 2018. This model provides the benefits of a centrally managed and cloud-based data center infrastructure, while allowing each Smart City to have its own ICCC (Bhopal Smart City Development Corporation Limited n.d.).

The Hewlett Packard Enterprise won the bid to develop the ICCC, which was proposed as a cloud-based "universal internet of things" platform, enabling authorities, using global positioning system (GPS) sensors, to monitor the status of various civic utilities in real time. The ICCC is expected to include traffic cameras, solid waste management units, meteorological department centers, dial 100 police vehicles, 108 ambulance services, street lights, water supply centers, and public buses, among others. As of mid-2018, only the Bhopal ICCC was functional; it was linked to the Integrated Traffic Management System (ITMS) as the first system to be integrated into this platform.

As noted in the introduction, the Bureau of Indian Standards has defined a list of Smart Cities indicators to be tracked by each city. From the interview data, ISCDL noted the importance of monitoring and evaluating Smart City progress, and acknowledged that tracking these through a single platform would save time and money and provide an interface for the public. ISCDL officials are still discussing the list of indicators to be tracked via ICCC.

The mechanism for finalizing the sector-wise indicators for ICCC is not clear. Because the ICCC will operate across all seven Smart Cities in Madhya Pradesh, further discussions between these city SPVs may be needed to arrive at a consolidated list of indicators that will be relevant for all Smart City activities.

Health sector data systems

BHC's 2018 Indore *Health Needs Assessment* includes a full description of the non-data aspects of the health sector. For this assessment, the following health sector data systems were studied in detail to understand data use and access practices, including cross-sectional and multisectoral integration:

1. ICT solutions implemented under the National Health Mission (NHM).
2. ICT health solutions implemented by ISCDL.
3. ICT health solutions in the private sector.

ICT solutions implemented under the National Health Mission

The NHM is a flagship program under the MoHFW, and will operate through 2020. The NHM oversees two sub-missions, the NUHM and its rural counterpart. The NUHM addresses health concerns of the urban poor population within the overall mandate of the NHM, which is to achieve universal access to equitable, affordable, and quality health care services that are accountable and responsive to people's needs (MoHFW 2016). NHM projects in Indore include urban public health centers, accredited social health activists (ASHAs), and community health centers, among others. These services include most of the urban public primary care services in Indore (see BHC's *Health Needs Assessment* for more detail on these services).

Since NHM's inception in 2005, the MoHFW has implemented multiple ICT solutions to facilitate the smooth flow of information for effective decision-making, which is essential for decentralized health planning. Table 2 lists some of the national ICT solutions implemented under NHM and those that are operational in Indore.

Table 2. National ICT Solutions Implemented under NHM

NHM ICT Systems	Description
Health management information system (HMIS)	The HMIS captures information related to reproductive, maternal, child and adolescent health programs, urban health intervention, communicable diseases, noncommunicable diseases, and infrastructure maintenance. Most data are entered at the primary health facility level and then sent up and collated at the block, district, and state levels. All public health facilities in Indore provide relevant data to the HMIS. The HMIS is the backbone MIS for all initiatives under NHM. The HMIS supports routine activities via regular analysis of data and decision-making at state, district, city, and sub-district levels. However, currently, this information is used only annually for annual budget planning, target setting, & achievement purposes in the Program Implementation Plan for NHM.
Mother and Child Tracking System(MCTS) Portal	The MCTS captures and tracks data on all pregnant women (from conception up to 42 days post-partum) and all newborn children (up to 5 years of age) nationwide, to improve delivery of services.
Human Resource Management Information System (HRMIS)	The HRMIS simplifies the human resource management processes and quality improvement by automating the basic, routine objectives and activities. It was initiated and developed during the Madhya Pradesh Health System Reform Program (a DFID-UK-Aid funded project), which ended in December 2015.
ASHA Management Information System (ASHA-MIS)	ASHA-MIS, an online system, captures details of beneficiaries of services that ASHA gives to the community. The system also facilitates online payments of ASHA to their bank accounts and generates various reports to monitor the program's progress.
Financial Management Information System	This system caters to all the program budgets and dissemination of funds to the state treasury, which then handles disbursement down to the block level.
Integrated Disease Surveillance Programme (IDSP)	The IDSP collects data for epidemic-prone diseases (e.g., malaria, typhoid, tuberculosis, measles, polio, yellow fever) at the central, state, and district levels to monitor disease trends, identify potential outbreaks, and respond in a reasonable timeframe. Health workers, clinicians, and laboratory staff manually enter the data into a centralized IDSP portal (www.idsp.nic.in), which also provides resources around disease surveillance practices (NCDC n.d.).
Electronic Vaccine Intelligence Network	The Electronic Vaccine Intelligence Network is an online real-time vaccine logistics management system developed and implemented by the MoHFW and the United Nations Development Programme to electronically track vaccine stocks. It is currently in use at all vaccine storage points in Indore and sends real-time data on stock information and storage temperature to the district, state, and national level health department/ministry authorities. City-level aggregated/disaggregated data is not accessible to the IMC or ISCDL.

The systems listed in Table 2 were not integrated as of mid-2018; the systems work in silos, resulting in duplication of effort. There was limited ability for enabling solution-level interoperability because of differences in software, hardware, privacy settings, and levels of management. Health workers noted that entering sometimes identical data across the many systems is time consuming and takes away from time spent with patients. The case study in Box 2 illustrates some of the issues at the hospital level caused by the lack of interoperability.

BOX 2. CASE STUDY: INTEROPERABILITY OF ICT SOLUTIONS

P.C. Sethi Hospital, a large public secondary care hospital in Indore, provides an example of interoperability issues between the existing ICT solutions in the health sector. At the time of interviews, the hospital covered a catchment area of more than half a million people, most belonging to the urban poor demographic. The majority of patients were referred from the primary care units linked to the hospital, which included three urban public health centers and four civil dispensaries. The hospital was staffed with medical officers only; the facility did not have any specialists.

In addition to the NHM ICT systems, the hospital used a number of other ICT solutions, all requiring manual data entry:

- Outpatient department slip registration system for better queue management and patient tracking.
- e-Aushadhi supply chain management system to track health commodities and supplies from district warehouses to the hospital and down to the urban public health center, including distribution of drugs to patients. A centralized dashboard in each state managed this system.
- 'F' software for sonography and lab automation, which collected data to ensure compliance with laws that prevent misuse or malpractice of sex determination.
- Birth and death registration data collection.

While P.C. Sethi Hospital had many helpful ICT solutions in place that connect and report up to the state- and national-level systems, they lacked localized solutions that would serve the needs of their patients. Nearly all systems were accessed post-patient care, rather than as a way of facilitating care before or during visits. For example, at the time of interviews, the hospital did not use any form of electronic health record or health smart card to reliably access patient medical histories, and no automated referral system linked the primary and secondary health care facilities.

Data quality was often reported as a major issue across the information systems listed above. Further investigation is needed to understand the depth of this issue and how to improve data quality. However, from the interviews and from previous work published on this issue, one root cause may be that, often, the individual who produces the data does not use the data. Improving use of data by those at the facility level can improve the quality and utility of these data.
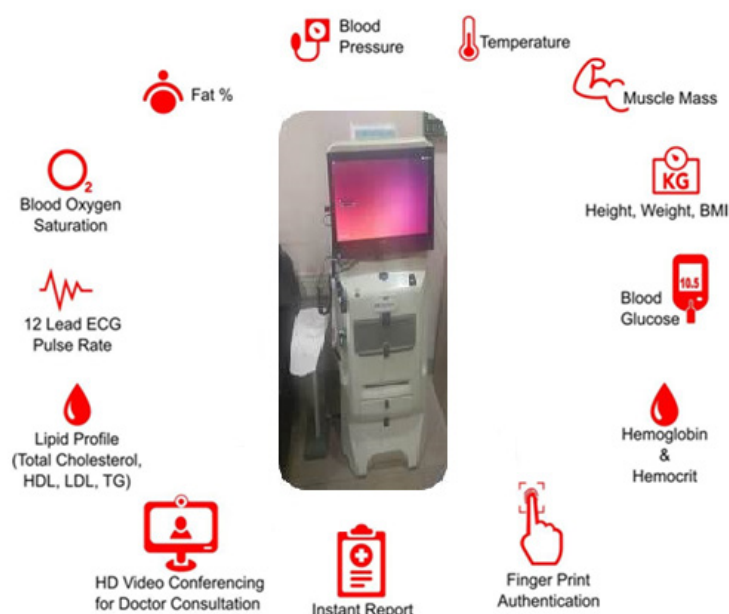
ICT health solutions implemented by ISCDL

In 2017, a Smart Health workshop brought together Smart City officials, consultants, and health stakeholders, including the chief medical and health officers, civil surgeon, hospital representatives, and representatives of the private health sector (KPMG 2017). The workshop identified several areas of interest for a "Smart Indore, Healthy Indore," with several having ICT components:

1. Integrate electronic medical records and health information systems across public facilities.
2. Facilitate telemedicine for unserved and underserved populations.
3. Make citizen-centric apps available to report health services.

Related to the second point, a health ATM was piloted in a few selected locations in Indore. Health ATMs are diagnostic testing machines to facilitate population-based noncommunicable disease screening (Figure 3 shows the tests included). Health ATMs were piloted for three months and are now proposed as a permanent solution. One of the priorities of Smart Health solutions was to link population-based screening with primary and secondary care pathways for urban populations. As of mid-2018, results were printed out for the patient, but were not linked to other health care databases.

Figure 3. Testing Available via Health ATMs

Source: ISCDL 2017a

ICT health solutions in the private sector

Based on interview data, it appeared that the private sector does not share data with the government, except for the notification of epidemic-prone diseases via the IDSP. Private sector hospitals each have their own database management systems for record keeping and tracking. For example, the private TOTALL Diabetes Hospital has an in-house record keeping system that is easy to use and manage. The TOTALL Touch phone app, launched in 2016, allows for citizen communication; it caters to activity management and awareness for registered patients (see Figure 4). The app and the software have a color-coded system that steps through the tasks required for each patient. The database system has graphs, tables, and visual effects, and is able to track patients' activities. Further investigation is needed to understand the full scope of private sector databases across Indore.

Figure 4. TOTALL Touch App

Source: TOTALL Touch App screenshot, downloaded from Android App Store (Google Play Store).

At the time of interviews conducted for this assessment, the private and public sectors did not have a data-sharing framework or guidelines in place. Further investigation will be needed to understand how these guidelines can be developed.

Other relevant sector data systems

Urban planning

IMC integrated geospatial technology for urban development in 2017. GIS maps currently cover the municipality of Indore. This technology provides grid maps, as well as pop-up maps, that can eventually be shared online for public access. ArcGIS and

AutoCAD software are used to create the GIS maps, while some data are based on satellite images.
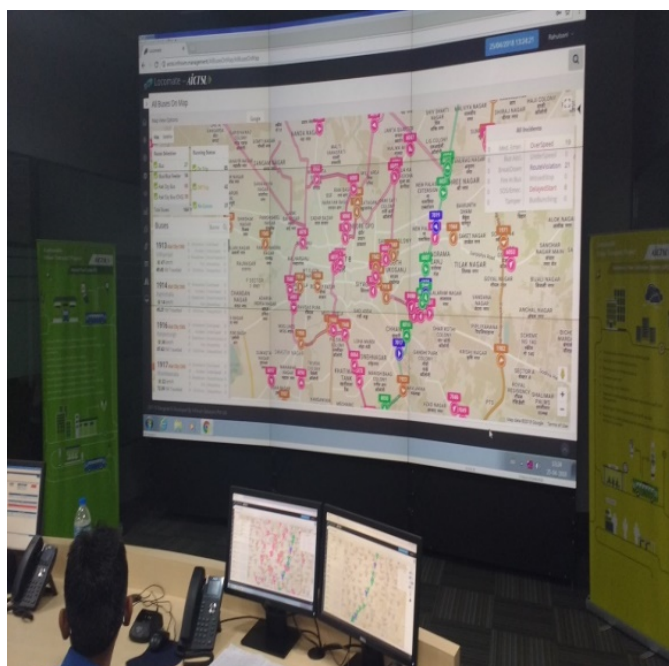
The geo-fenced areas cover the number of litter bins for pedestrians, water tanks, public toilets, and routes for garbage vehicles. The software displays the current work being done at various locations. According to interviews with IMC, as of mid-2018 the different GIS layers included IMC properties, Indore Development Authority properties, transportation points, hospitals, schools and colleges, hotels, markets, entertainment, and other miscellaneous utilities. The ADCC Company, Nagpur collects these GIS data points, which are then cross-verified by the E- Nagarpalika/Urban Administration Development and Environment Development to ensure accuracy; at the time of interviews however data were only guaranteed for 85 percent accuracy. In the future, IMC plans to add a layer for health facilities.

The maps support the working of the Vehicle Tracking and Monitoring System (VTMS) and other database systems. These maps create data for water, sanitation, electricity, and property tax management. The Madhya Pradesh government collects property tax data both manually and digitally.

Transportation

In 2006, Indore became the first city in India to have GPS installed in buses. Indore has had smart public transport for the last 10–20 years. The Atal Indore Smart City Transport Ltd. manages the transit management system for buses. This system has been operational since February 2018. Its integrated database system monitors the movement of buses on the bus rapid transit corridor. The data system has both manual and electronic entry.

There are various systems that feed into transport and traffic management, including the automatic fare collection system, transit management system, automatic vehicle location, and utilities (power backup systems). In addition 120 buses have on-board units (OBUs), which are small devices

Transportation Integrated Command and Control Centre.
Photo credit: Damodar Bachani, 2018

that the driver uses to select the destination and the route. OBUs have a real-time GPS tracker, a bus driver interface for route selection, and two-way voice communication. The call center-based software and the wireless communications are automatically recorded. If the driver does not turn on his OBU, he is penalized. The buses are owned

by the government and private operators, but are tracked and monitored by private operators. They send the city regular reports, including speed, number of kilometers traveled, and fleet size.

All of these data are sent to the Transportation ICCC, which automatically tracks and monitors a variety of other data sources. Analysis of these data is done both manually and in the database, which provides graphs and visualizations. Data-sharing is done via the ITMS, which is managed separately from the command center. The Smart City can check the data, but they do not have administration rights.

Education

Education did not have an MIS database system as of mid-2018, and sector dashboards for reporting and evaluating monitoring data were not available. However, work was almost complete for the Smart Education initiative, which installs smart devices in schools (described in Table 3). This is a Smart City initiative managed by ISCDL. As of August 2018, 100 smart classrooms were operational in Indore, with smart boards and internet connectivity (see photo at right). Training of teachers for using smart classrooms is planned for 2018.
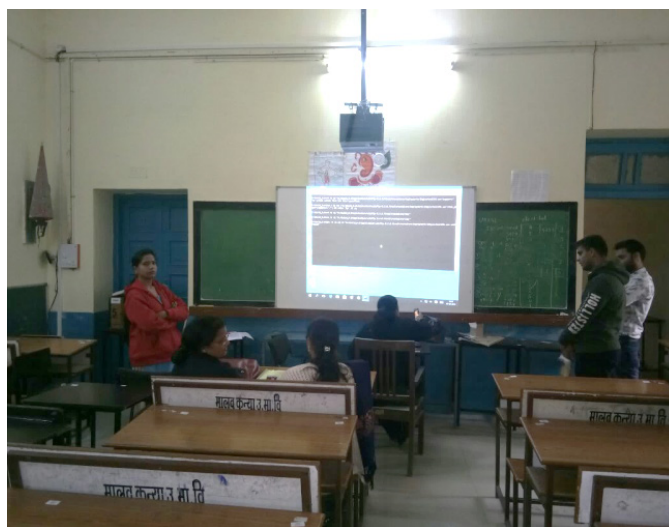
Smart School classroom in Indore.

Table 3. Proposed Steps for Implementing Smart Classrooms

Key Deliverables
Supply, installation and commissioning of computer, projection system, power backup and Smart Board.
Supply, installation, commissioning of hardware, networking, internet connection and other equipment.
Procurement customization and deployment of software, academic content and mobile app.
Training, hand holding, and go-live.
Operation, maintenance, and help desk services.

Source: ISCDL 2017b.

Waste management

In Indore, an intelligent solid waste management system is linked to the Swachh Bharat Mission and is tracked through the VTMS, integrated weighbridge vehicle monitoring system, and closed-circuit television (CCTV) systems (see Figure 5). The web-based ITMS system helps track garbage vehicle movement in real time, and uses data feeds to ensure route adherence (see Figure 6).

Figure 5. GPS Monitoring System for Garbage Disposal
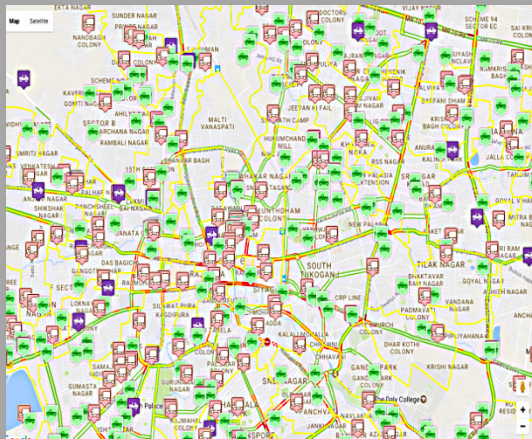
	Component of Work	
Vehicle Tracking and Monitoring Systems	Installation of GPS receivers in 700+ vehicles	
	Web-based vehicle tracking solution	
	Dashboard, live vehicle tracking, route replay, admin module	
	Reports, alerts, integration requirement	
	Integration with weight bridge	
Weight Bridge	Installation of RFID stickers in 500+ vehicles	
	Installation of RFID readers at landfill site and integration with vehicle tracking solution	
CCTV	Installation of analytics-based CCTV cameras in toilet blocks (community and public toilets)	

Figure 6. Solid Waste Management System

WASTE COLLECTION   TRANSFER STATION   TRENCHING GROUND

Police

The police use an integrated system which is centralized at the national level for record keeping, and is managed by the National Crime Records Bureau. All police stations from every state are connected to the web-based platform—the Crime and Criminal Tracking Network and System. Approximately 14,000 police stations share data across the country in real-time.

As the name suggests, the police management system is an application that allows all paperwork completed in police stations to be easily stored in one single system. All data are recorded and monitored at the national and state level—the National Crime Record Bureau and State Crime Record Bureau, respectively. Everything is digitalized and regularly monitored. Interviewees reported that the data entry staff were well-trained and received regular refresher trainings. As of mid-2018, there was cross-sectoral interaction between the police and ISCDL, however it was unclear if any data were shared in these interactions.

Social protection

The national Public Financial Management System (PFMS) was developed to enable direct benefit transfer (DBT) (i.e., direct payment of incentives/financial support under government schemes into the account of the beneficiary—both citizens and cadres like health workers). As of 2016, 40 DBT schemes had been included in the PFMS (PFMS 2016). The PFMS has been described as a network-of-networks, notably interoperating with, among other systems, the—

- NHM MCTS.
- Ministry of Rural Developments' National Social Assistance Program MIS, Employment Guarantee Scheme (MGNREGSoft).
- MoHUA's "Housing for all" scheme (AwasSoft).
- Public Food Distribution System MIS.

An Aadhaar card is preferred, but not required, for users to access this system (Government of India 2018a). Jan Dhan, Aadhaar, and mobile phones can all be used to access this system for DBT payments. In Indore, it was reported that social protection offices did not use a database management system for social protection activity monitoring, but if data were requested, they could send reports by email. From the desk review, it appears that MP ICDS does have a system for Anganwadi workers and other social workers to report online, via the site www.mpwcdmis.gov.in.

Pollution control

Under the current National Air Monitoring Program, the Madhya Pradesh Pollution Control Board has set up a regional center in Indore to monitor air and water pollution in the city. These data are then reported to the state office in Bhopal, and then to the Central Pollution Control Board database which covers the entire country; some are made publicly accessible on the Central Control Room for Air Quality Management System (https://app.cpcbccr.com). Using criteria related to the scale and level of pollution, as well as the potential for impact on human health (Vidyarthi, Singh, and

Shrivastava 2015), Indore City was found to have critically polluted air, water, and soil. Air pollution—sulphur dioxide (SO_2), nitrogen oxide (NO_2), and particulate matter (PM_{10}) are measured from three air pollution measuring stations in Indore, located in the Polo Ground (industrial area), Kothari Market (commercial area), and Kanodia Road, Vijay Nagar (residential area)(M.P. Pollution Control Board n.d.). Only the station at the Polo Ground measures and reports air pollution in real-time. Measurements at the other stations must be taken manually. Measurement of $PM_{2.5}$ began in 2016 for all three stations. Water pollution and soil pollution are also tracked (M.P. Pollution Control Board n.d.). Testing is done for soil pollution at nine sites across Indore.

Proposed plans

Some additional projects were started, but not completed, during the time of interviews:

- *Transportation:* Proposed additions for the transportation sector include automated flap gates, the ability to pay using a QR code on a mobile phone for the Bus Transit Management System, and a vehicle diagnostic system with a dashboard for all bus meter readings. In the future, an ATM ticketing machine will be added, which will also aid in informing when rolls are ending. Optical fiber is being laid for cameras so that the movement of bus and passengers can go live.
- *IT and Connectivity:* Smart Poles will be constructed on streets to provide Wi-Fi services for citizens. The IMC has proposed to develop 500 free Wi-Fi points at various identified public places.

As of mid-2018, as ICCC was being developed, only a few of the systems discussed in this assessment were interoperable with the ICCC. Figure 7 illustrates the ICT systems found during this assessment, their level of management, and whether they are currently linked to ICCC. Multiple levels of management of the system may mean greater difficulty in adapting systems to the needs of ISCDL and IMC, which could impact data use at the city level.

Figure 7. Existing ICT Systems in Indore
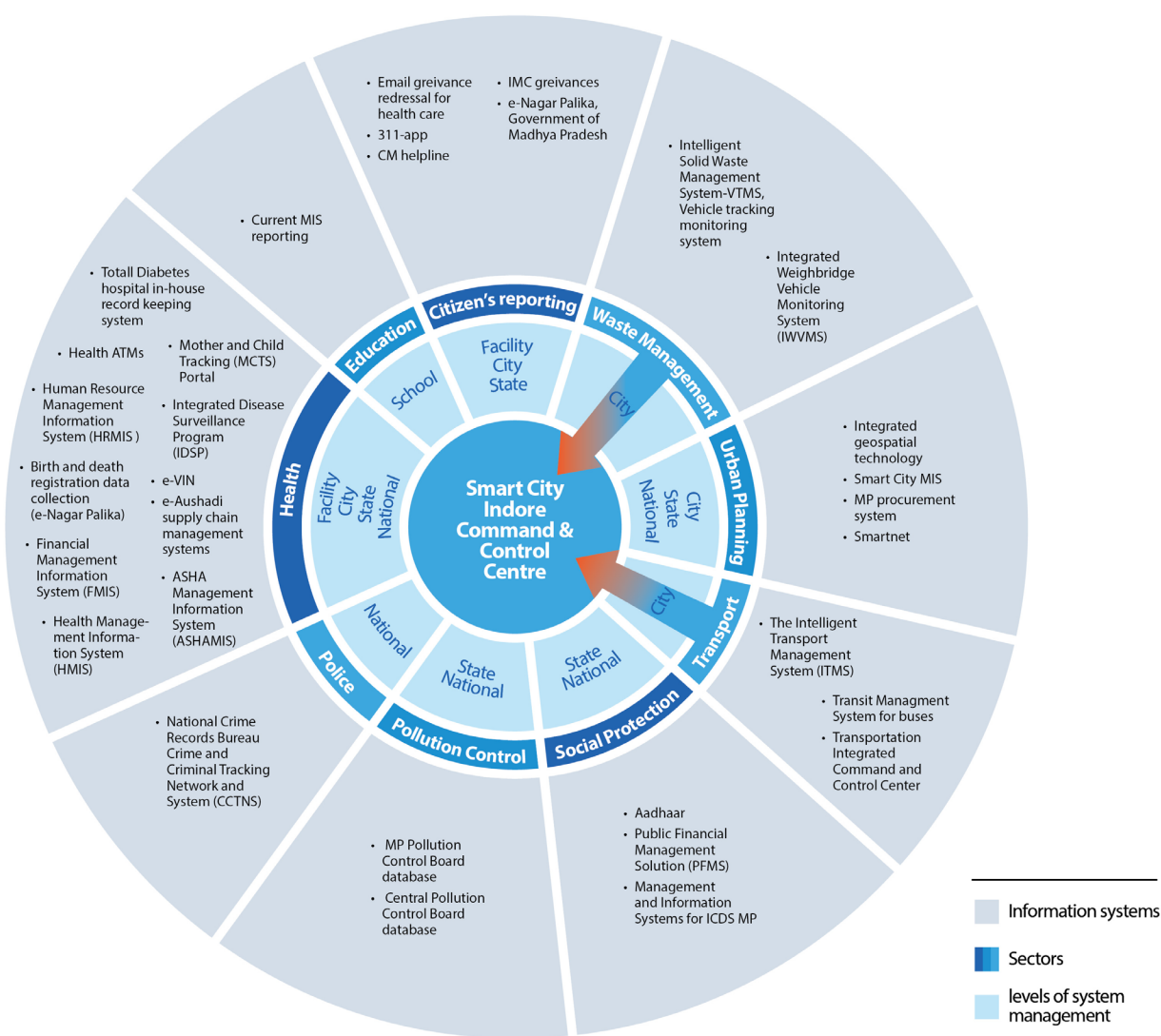
II.   Use of Data and Information Systems for City Planning

Data use can be difficult to define. Arenth et al. (2017) defines data use as when people demand data within an organization or agency, understand their role as producers and users, and are motivated to act on those data for programming and/or decision-making. Elements needed for a strong data use culture include established data collection and use policies, data use champions at all levels, and interoperable systems that provide timely, relevant, accessible, and accurate data.

Regarding demand for data, sector-specific respondents said they did not need additional data from outside their sector to make decisions required as a regular part of their work; although, in probing, one respondent noted that when data on impact were

low, implementation of programs was more difficult. Health respondents also noted the lack of data from the private sector within health as a gap. The development of the ICCC does seem to indicate a demand for cross-sector data by the ISCDL mechanism. Most data used in daily work came from government systems, especially the HMIS for health respondents and VTMS for urban planning. Other sources included health surveys, census data, and transport data. Excel was most often used for analysis (though several respondents did not answer this question).

Almost everyone interviewed acknowledged the importance of using data for decision-making, but when pressed for details on the type of decisions they used data for, most made very broad statements about needing the data for decision-making, implementation, or facilitation. As of mid-2018, there was no external motivation for any Smart City in India to report or act on monitoring data, aside from budget data on spending, because no national monitoring and evaluation framework has been approved, nor have targets been defined for Smart City indicators. Further observation of operations may be needed to fully understand if and how data are routinely used for other purposes.

Data-sharing is a first step toward interoperability. For urban planning, the data were collected either manually or through emails from different departments. The data for transport were shared between Smart City, ISCDL, and Atal Indore Smart City Transport Ltd. via the ITMS database. The Smart City office was able to check the data; however, they did not have the administration rights. The police, IMC, transport, and Smart City interact intersectorally, particularly for major construction or eviction actions, but it was unclear how data played a role in that collaboration.

Sharing of data between the health sector and urban planning bodies seemed to be quite limited. Recently, ISCDL requested that health data be shared for construction of the liveability index, but the respondent was told those indicators were not available. Respondents working with HMIS data stated that they had not been involved with any regular data-sharing efforts outside health. For ad hoc purposes, they sometimes emailed data in Excel or Word files when other offices asked for data, including ISCDL. The Pollution Control Board similarly noted that they have data they use for their own purposes, but had not received any recent requests for data sharing and, thus, did not have guidelines for how to proceed.

The IMC holds monthly data review meetings for its activities, but this did not include health. There is also the Urban Common Coordination Committee, which includes Smart City and other sectors such as health, but did not regularly include a review of data. It appeared from interview data that regular intersectoral data use or review meetings were not occurring in ISCDL or the Chief Medical Health Officer's office, although, with the new ICCC, this may change. Within ISCDL, board meetings and regular committee sessions, financial and construction data on Smart City projects are reviewed to see progress on bids and construction, but they do not yet review data on the impact of projects. One respondent, aware of ISCDL plans, said greater involvement in monitoring and evaluation is expected next year.

ISCDL noted the challenges that face any city in incorporating data across sectors, and that the new ICCC may provide opportunities to train staff and improve technology awareness as one way to begin to overcome the barriers to sharing. Some respondents also noted that if ISCDL wanted to see data from related sectors, the request for data may need to go up through the state government, because ISCDL does not have authority over any sector or ministry. After the ICCC in Indore comes online, respondents familiar with this new system mentioned an additional challenge would be how to integrate data from systems that are not yet digitized.

III. Citizen Access to Data and ICT

The citizen perspective was evaluated from four aspects: citizen communication channels, citizen feedback mechanisms, and city officials' perspective on citizen engagement and data use.

Citizen communication channels

ICT access in Indore is available from various government and private network service providers like BSNL, IDEA, Airtel, and Reliance. All major services are provided through online and offline platforms. Box 3 provides basic service statistics from the latest census data (2011), which may not reflect the current coverage rates (Sinha 2012). More recent survey data are needed to update these figures.

Box 3. Indore Communications	
Zones	19
Wards	85
Total households	615,334
Households with computer/laptop with internet	8%
Households with a landline phone	6%
Households with a mobile phone	62%
Households with both a landline and mobile phone	10%

Source: Sinha 2012

A summary of communication channels by focus group is provided below.

Low-income individuals

Among the FGD participants from slums and low-income areas, most of the families had only one mobile phone that all household members used. Men used mobile phones more often than women. Women reported using mobile phones only to talk to close friends and family. Almost all citizens interviewed in low-income areas used prepaid mobile phone connections that they recharged once a month for around INR 50–INR 100 (US$.70–$1.40).

Most low-income FGD participants in slum areas had access to basic phones. It was found that the women used the phone only for calling, especially in an emergency, while men used the phone for other purposes, as well.

23

Middle-income residents

The FGD with middle-income residents revealed that nearly all have access to smart phones and the internet, including most women, though elderly men and women may have lower ownership and usage. They were well-informed via newspapers; online portals; media, such as television commercials and radio, as well as communication with others through social media like Facebook and WhatsApp. In the group interviewed, approximately three-quarters not only had knowledge of, but also used, the redressal mechanisms to deal with neighborhood issues, and were satisfied with them. They were very happy with the initiatives taken by the government, such as the 311 app and CM Helpline. Some had postpaid mobile phone connections, while others had prepaid connections. The prepaid users recharged their phones with airtime when required.

> *Most of the FGD middle-income participants were smart phone users. They were aware of 311 app and CM-Helpline website.*

Service providers

A much lower percentage of the service providers interviewed knew about city communication channels. Some of the service providers had a smart phone, but most had only basic phones and one participant had no phone at all. Only one auxiliary nurse midwife (ANM) had previously used the CM Helpline, but found it useful for negotiating an increase in her salary. These community health workers felt that many people were not aware of health messages and how to live a healthier lifestyle; some of the health workers suggested using word of mouth and mass media as effective ways to spread healthy messages.

Current citizen feedback mechanisms

Citizen engagement in Indore appears to have four channels: in person, online, by telephone, and through social media.

Based on the grievance redressal guidelines issued by the Department of Administrative Reforms and Public Grievances, each department, at all levels, has to provide at least three options for complaint/grievance redressal registration: (1) a physical complaint box kept at the front office, for each office, (2) email of the nodal grievance redressal officer, and (3) telephone contact number of the nodal grievance redressal officer/office front desk. Departments appeared to comply with these minimum requirements; however, the effectiveness of these channels in successfully resolving the complaint/grievance should be investigated further. In Indore, because citizen engagement was a large part of the Smart City bidding process, social media has also become an important communication channel.

In-person

Based on discussions with the FGD participants from the lower income groups, it was observed that the most popular grievance redressal mechanism for matters related to

the IMC was through elected representatives of the urban local bodies (ULB). It was reported that the ULBs were often asked to help in resolving non-IMC issues. In the slums and low-income group areas, most citizens took their complaints to the representative of the area or the *Nagar Parishad* of that area. Some of the women from the self-help groups were unaware of and/or intimidated by the option to take their complaints to the representative. The representative corresponds with officials for retrieving information or for getting any work done. Representatives also refer them to the online portals where they get assistance either from the local internet shops or from their children, who may or may not use smart phones.

Another in-person communication channel is via the community health workers, although from BHC's *Health Needs Assessment* interviews, it appears that some citizens in slum areas do not have regular contact with these workers (Pomeroy-Stevens et al. 2018). Information on any resolution of issues is usually shared in community gatherings. Respondents were generally pleased with how this system works, and preferred to go to just one representative for all kinds of correspondence. The effectiveness in resolving grievances/complaints through this mechanism is explored in greater depth in BHC's *Political Economy Analysis*.

Online

The IMC launched the 311 app in Indore in October 2016. It enables citizens to submit complaints related to waste management and the Swachh Bharat Mission, though the technology does not limit the app from geo-tagging other civic issues that need to be resolved by IMC (Launched Indore-311 Successfully n.d.). The IMC officials claimed that more than 1,300 people downloaded the application in two days and more than 100 complaints were registered (Times of India 2016).

Figure 8. 311 App for Citizen and Safai Mitra for Data Compilation on Primary and Secondary Waste Collection (INDORE 311)

Feedback mechanism—Indore311:

- Report issues and complaints.
- Mandatory action in response to these complaints within 24 hours by the IMC.

The 311 app enables citizens to take and post photos of issues, such as garbage pile-ups (see Figure 8). Posts can be geo-tagged and automatically sent to the applicable department to be addressed. Citizens can continue to use the app to check the status of their report, and whether their complaint has been satisfactorily addressed (Times of India 2016).

After the Indore ICCC comes online, one of the first systems to be integrated will be the 311 app, which can be separated into different categories (i.e., complaints regarding improper sanitation). After the ICCC is functional, more categories will be added to the app and directly connected to the ICCC dashboard.

"The 311 app works really well. Within 15 minutes the authorities reply to the complaint so received. By evening it is mostly resolved. It's been more than 6 months since this app has come into use" – Indore citizen, April 2018

A mobile app for the citizen's feedback mechanism on bus transport is also available. The "iBus" app appeared to have over 10,000 downloads as of mid-2018 on the Google Play store, with average satisfaction score of 3.2 out of 5 (Quacito/INFOCRATS 2018).

Telephone

The CM Helpline, launched in 2014, is an initiative by the Madhya Pradesh state government which aims to improve communication between the government and the citizens (see Figure 9). Citizens can access information on the CM Helpline website. (State Agency for Public Service, Madhya Pradesh n.d.).

Figure 9. CM Helpline

According to the community health workers interviewed, more education is needed to inform citizens in informal settlements about government services, such as the helpline. In a crisis, these citizens may not know who to contact. Only the ANM knew about the CM Helpline number; however, she did not know about the 311 app. Other service providers did not know about the other citizen feedback mechanisms.

Social media

During the Smart City Challenge, IMC used multiple strategies to engage citizens in wider consultation as part of the Smart City strategy and proposal preparation phase (see Figure 10). The IMC launched a social media campaign in May 2015 to invite suggestions from residents on the Smart City project. The IMC used social media tools—including a Facebook page, Twitter handle (@IndoreSmartCity), and a website (www.smartcityindore.org)—to invite suggestions from citizens on city planning, water and sanitation, transport, facilities for pedestrians, social infrastructure, and safety and security.

Figure 10. Citizen Engagement in the Development of Smart City Proposal

Source: IMC 2016

The IMC also used social media as an effective tool for educating and creating awareness for the Swachh Bharat Mission. Officials across sectors seemed to appreciate this social media campaign, because it created awareness and effectively changed household-level waste management practices. Further investigation on whether this accurately represents the socio-demographics of Indore is documented in BHC's *Political Economy Analysis*.

To summarize, preferred feedback mechanisms appeared to differ by income group. Figure 11 shows a convenience sample of data collected during the FGDs. Preferred routes for lower income citizen feedback to city officials appear to be first via community leaders, then by telephone. The mobile app and internet mechanism appeared to be primarily used by the middle class. Further investigation is needed to understand the best routes for regular and trackable feedback for the most vulnerable populations in Indore.

Figure 11. Convenience Sample from FGDs on Preferred Feedback Mechanisms

Preferred Channels for Reporting Issues to City Officials
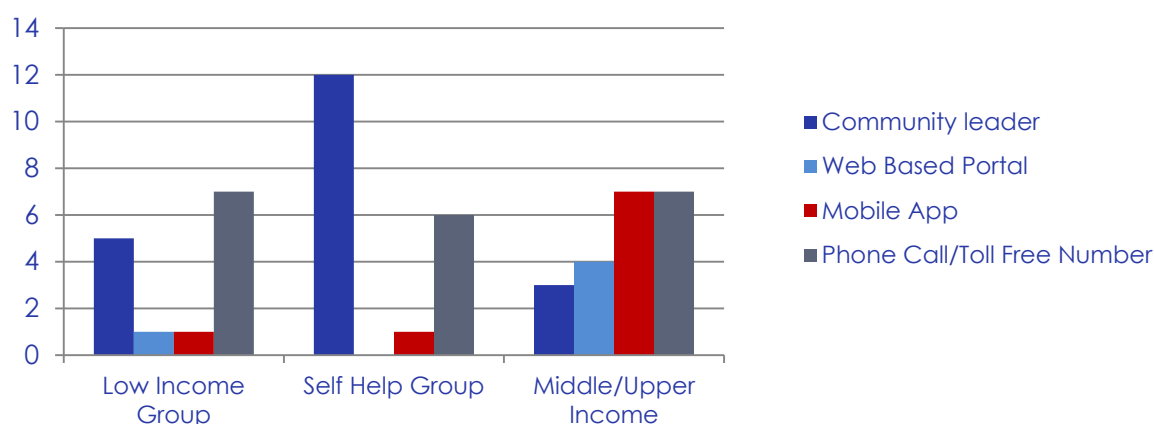
A digital reporting system plays a key role in the interaction between the citizens and the government. With the increased use of smart phones, it is more convenient to access information provided by the government. A digitalized system is often thought of as a characteristic of good governance and a developed city, but it may have implications for lower income citizens.

City official's perspective on citizen engagement and data use

Among those involved in Smart Cities and urban planning, respondents said citizen involvement was a very significant part of their proposal. One respondent even said that it was *the* factor that made the Indore proposal stand out. This engagement appeared to shift from previous planning processes where citizen's opinions were not solicited. Among community organizations who work with low income and disadvantaged communities, they were concerned that these groups could not engage in the process because of technological barriers. This may also explain why voting for areas that align more with basic needs, like improved water supply and public safety, ranked low in the citizen vote for Smart City activities.

Post-proposal process, urban planning and Smart City officials see the 311 app and the CM-Helpline as successes. They said it gave them helpful information on problem spots, and they think the city has responded to complaints in a timely manner, although no details were given on how resolution of issues was communicated back to citizens. Smart City officials would like to see these citizens information streams included in the new ICCC.

Within the health sector, other grievance redressal systems were discussed within the public hospitals. Complaints were collected verbally, which they noted made it difficult to provide feedback to citizens when the issue was resolved. A few respondents suggested this be converted to a digital system to better track complaints and resolution, but noted that this may exclude individuals who either do not have access to a phone or computer, or are uncomfortable with that technology.

"Having a dashboard for an integrated system will be an effective solution for the 10 percent of the population. For the rest of the population, particularly those with low education or income, it does not work so well. The two different socio-economic populations of Indore are vastly different, in terms of mentality and behavior."
—Respondent from local police force, Indore, May 2018.

IV. Barriers to Increasing Data Use

Organizational

Availability of adequate manpower

To implement smart solutions, adequate manpower must be deployed at all levels: from the point of data generation, to analysis, reporting, and ICT support. Many respondents noted the need for more staff trained on data use, system interoperability, and data quality. The health department appeared to be most acutely affected, as facilities were already understaffed and staff were overburdened with work; if these same staff are expected to enter data and use results, this will exacerbate this issue and result in poor data quality.

Culture of data use

Increasing demand for, and use of, data at the point of service and in the community could improve the quality and utility of multiple Indore data systems. Improving the feedback loops for data is one critical factor to improve data use by service providers, while increasing staff and training on data analysis and interpretation could also improve use at many levels.

Another measure that the IMC and ISCDL can promote—especially after the ICCC is operational—is to disseminate the analysis of key data like maternal and child mortality

or pollution data to community monitoring groups like ULB representatives and village health, sanitation and nutrition committees. The groups can assist to correct information gaps and engage community members in thinking about what the results might mean for them.

Level of management for information systems

As displayed in Figure 7, many critical systems for city management are managed at the district, state, or national level, making it hard for ISCDL or the Chief Medical Health Officer to adjust those systems to better fit Indore's needs or to interoperate with the ICCC. One example is that, currently, information in the HMIS is collected via standardized formats and is reported by each facility up to the block, district, and state level, and, finally, the national level. The aggregated information in the HMIS is not available at the city level, which limits usability in Indore; the NHM would need to clear any changes to indicators or formats.

Framework for data-sharing, planning, and decision making

Currently, there is no established national or state framework or guidelines for data-sharing across sectors. This may hinder city-level efforts to improve interoperability and data-sharing.

Cooperation with the private sector

Currently, Indore has very few mechanisms for data-sharing between the private and public health sectors. The data that the private sector currently shares with the public sector are notifiable diseases, such as those reported into the IDSP (e.g., malaria, typhoid, tuberculosis, measles, polio, yellow fever). Because many Indore residents access private sector health care, this means that information on a large percentage of the population is not reported into the public health information systems, reducing data representativeness and quality.

Technological

Infrastructure

Despite the expansion of the internet via BharatNet and private providers, significant gaps in coverage remain. This may explain why so many information systems are being developed for offline use. Others, like the HMIS online portal, are often quite slow and the software sometimes does not run properly, possibly because of connection issues.

Data quality and duplication of efforts

This was mentioned as a key barrier to improving data use in BHC's assessment data validation meetings held in August 2018. Using health as one example, multiple information systems across health result in duplication of data entry because of the multiple formats and systems into which the health worker must report data. This has caused data quality issues in Indore and makes it difficult to trust key health indicators

developed from those systems. This has also impacted health worker's time if they are inputting similar, or the same, data across multiple systems.

Interoperability

Few existing structures or guidelines are available to make the various information systems in Indore interoperable. To see data from multiple sectors, or on related activities within one system, the ICCC needs to address technical and operational barriers to system interoperability. The ITMS does this for some transport and waste management systems, providing a successful example of cross-sector data monitoring.

Another suggested starting point for testing interoperability was the IDSP, which reports epidemic-prone diseases. Because both public and private facilities are already required to report, this could be a testing ground for mutually acceptable ICT platforms. It could also serve as a good starting point for integrating health data into the ICCC. For example, dengue fever cases reported at a facility can trigger municipal corporation response for appropriate anti-dengue measures, such as fogging, cleaning stagnant water, etc.

Sociocultural

Feedback from grievance redressal channels

Outside the 311 app, this assessment did not find grievance redressal systems that regularly provided feedback on the resolution of complaints. The health sector only appeared to provide ad-hoc feedback. Further investigation is needed across the seven sectors related to Smart Cities in Indore to understand if any other systems are providing this feedback, and, if so, how effective it has been.

Lack of awareness among low-income groups

Currently, many of the low-income citizens are unaware of city services. These same citizens may also be unable to connect to phone or internet grievance redressal mechanisms to provide direct feedback to the city government. Further investigation is needed to better connect these citizens with services and communication channels where they can ask questions about those services and demand access when necessary. Some form of outreach to ensure these citizens are more comfortable with basic service statistics could help empower them to speak up for their own communities and service needs.

4. KNOWLEDGE GAPS

Based on the assessment findings, the following were identified as knowledge gaps for further investigation and planning:

I.   E-Governance Policy for Indore City

It is unclear if there are any local documented e-governance policies that could improve citizen's access to government services. The national e-governance framework does not discuss cities as administrative units for e-governance implementation. Cities are assumed to be covered by the state's e-governance guidelines. As a Smart City, where ICT is a critical component, Indore City will need to decide how to document its own e-governance policies; and, to guide harmonized ICT implementation in the city, they also need to decide who will oversee policy implementation. These guidelines should be aligned with the national and state e-governance frameworks.

II.   Data Systems and Compatibility within Private Health Facilities

More information is needed about how private health facility and provider data are collected, stored, and reported in Indore. This assessment focused on the public health system; however, because most urban citizens—both low- and high-income—use private sector health services, it is important to understand data flows in this sector and how they can be integrated with the public health information system. It may be helpful to learn about any successful private health sector ICT systems that could be used in the public sector and vice versa.

III.   Technical Specifications on Existing Information Systems

This assessment was unable to collect technical specifications for all of the information systems in use in Indore that may need to be communicated to the ICCC. Further investigation is needed to inventory the platforms, modes of storage, privacy and firewall considerations, and confidentiality needs across these systems to inform connectivity to the ICCC, including where efficiencies could be made across systems.

IV.   Potential New Communication Channels for Vulnerable Populations

This assessment established that low-income citizens often share mobile phones within the household, tend to have prepaid connections, and likely do not have smart phones. Low-income citizens may also be illiterate, and receive most of their information from community service providers and elected representatives. Within this context, it is necessary to understand what the best mechanism would be for leveraging technology to engage with low-income citizens, while preserving current structures with which they are satisfied.

V.   Data Security and Privacy Policies

It is unclear what, if any city-wide or system-wide privacy and security protocols are being followed, particularly for citizen data. As systems become more transparent, citizen and patient confidentiality will need to be protected in law and in practice.

5. CONCLUSIONS

As Indore realizes its vision to be a smart, liveable city for all, it is important to ensure that data are used to effectively reach that goal. This assessment of access to and use of data in Indore provides a context for what kind of data are available for Smart City and city planning, how those data are currently being used, how city residents currently engage with and provide feedback to city officials, and what barriers prevent improved data usage and sharing.

The findings from this assessment will be triangulated with findings from BHC's other studies examining the health needs, political economy, and noncommunicable disease risk factors for Indore residents. This information will 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 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 that continuously improve the health of all their citizens.

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ANNEX A

Key Informant Interview List

	Organization	Sector
1	ISCDL	Smart City, IMC
2	ISCDL Consultant	Smart Cities/ICT/dashboard/ monitoring/waste management and sanitation
3	ISCDL Consultant	Education (monitoring/ICT)
4	ISCDL	Smart City proposals
5	ISCDL Consultant	IEC expert
6	ISCDL Consultant	Urban planning/housing
7	ISCDL	Urban planning
8	IMC	Urban planning/housing
9	Office of the Chief Medical Health Officer	Health (HMIS oversight)
10	NHM	Health (HMIS oversight) (Monitoring/ICT)
11	NHM	Health
12	NHM	Health
13	MGM College	Local information systems expert, academia
14	AICTSL	Transport (monitoring /ICT)
15	Housing for All Mission	Housing
16	Diving Foundation	Social protection
17	United Nations Development Programme (e-VIN program)	Donor project working on HMIS
18	The Collectorate	Police protection
19	TOTALL Diabetes Institute	Private health care
20	M.P. Pollution Board	Environment/pollution control
21	P.C. Sethi Hospital	Public health care

ANNEX B

Typology of Resident Focus Group Discussions

FGDs were conducted with the following four groups:

- **Urban poor community** – Included to understand how the lower-income groups are affected by the data systems and how they help them live a healthier life. How they are made aware of various information about city services? How do they communicate, if they have a mobile phone what is the use of it in their daily lives?
- **Middle-class members of resident welfare associations** – Included to understand how they participate as citizens in retrieving or delivering information from or to the government, including what access they have in terms of information provided by the government and how it is useful for them to have a healthier life.
- **Women's self-help group (Mahila Arogya Samiti Group) constituted under National Urban Health Mission** – Included to understand how the self-help groups communicate and access information. How has forming a self-help group helped them in accessing information and data that they may need in their everyday life to make it sustainable?
- **Community health providers (auxiliary nurse midwife, accredited social health activities, aanganwadi workers, sahayika)** – Included to understand how they communicate both as a service provider and a consumer, including whether or not they have the facility of mobile phones, and what channels they use to communicate with the government officials for reporting and with any other stakeholders to successfully deliver their services.

ANNEX C

Assessment Tools

FORM 1: Data Use Assessment Questionnaire—Indore

Date	
Interviewer name	
Location of interview	

SECTION 1: Personal Information

S.No.	Respondent Background Information	
1.1	Name.	
1.2	Educational background.	
1.3	Current job title.	
1.4	How long have you been in this position?	
1.5	What is your role in improving health service delivery in your city?	

Part A: Data gatekeepers (ICT Smart City and sector staff)

Section 2: Data Systems

S.No.		
2.1	Please describe the data system that you manage.	
2.2	Re: the data system that you manage, is it a manual system/paper or digital/electronic or a combination of both?	
2.3	Who are these data collected for, i.e., who is the intended user of the information? Who has access to the outputs?	

S.No.		
2.4	If electronic, please describe details of this system:	
A	Name of system?	
B	Software platform?	
C	Web-based?	Yes/No
D	Password-protected?	Yes/No
E	Data visualization and analytics in graphs and reports?	Yes/No
F	Downloadable datasets and reports?	Yes/No
G	Who reports to this data source?	
H	In what format are data reported to this source?	
I	How often are data reported to this source?	Monthly/ Quarterly/Yearly or Other Other, please specify _____
J	How often do you access this source?	Monthly/ Quarterly/Yearly or Other Other, please specify _____
K	What kind of information do you obtain from this source?	
L	Is there any mechanism to provide feedback to reporting units/persons?	
2.5	How are these data used by you and others in your technical counterpart office? At all?	

S.No.		
2.6	Do you feel your office promotes the use of data for decision making? If yes, please answer the following:	Yes/No
A	Managerial and administrative decisions are based on data and information.	Yes/No
B	Data quality is emphasized in regular reports.	Yes/No
C	Superiors explain what they expect from staff.	Yes/No
D	Staff are appropriately trained to use data.	Yes/No
E	Staff are aware of their data-related responsibilities.	Yes/No
F	Staff rely on data for planning and monitoring targets.	Yes/No
G	Data are used for resource allocation including financial resources.	Yes/No
H	Data management team seeks feedback from staff about data/reports (requests for additional analyses, feedback on usefulness, etc.).	Yes/No
I	Data and information are presented and discussed regularly at staff meetings.	Yes/No
2.7	Have you encountered any of the following barriers when trying to use your data or information?	
A	Incomplete data.	Yes/No
B	Poor quality data.	Yes/No
C	Data produced late or not at all.	Yes/No
D	Data/information was not well presented.	Yes/No
E	Other	
2.8	Do you have suggestions about how to improve information use at your office?	

S.No.		
2.9	Do you report any data to any administrative levels above you? (state, national)	Yes/No
2.10 A	If yes: What data do you report?	
B	How often do you report these data?	
C	In what format do you report these data, paper reports, Excel spreadsheets, shared database, etc.?	
2.11	Do you receive feedback from administrative levels above you on the data you report?	Yes/No
2.12 A	If yes: From whom do you receive feedback?	
B	What kind of feedback do you receive? (data quality, content, etc.)	
C	How often do you receive feedback?	
D	In what format is this feedback relayed? (emails, letters, phone conversations, etc.)	

Section 3: E-Governance

S.No		
3.1	Does Indore have documented guidance for electronic systems in the **public sector** (e-governance framework, policy, or strategy)?	Yes/No
3.2	Does Indore have documented guidance for electronic systems in the **health sector** (e-health framework, policy, or strategy)?	Yes/No
3.3	If yes to either or both of the above, do these documents include guidance on:	
A	Data storage?	Yes/No
B	Data privacy and security?	Yes/No
C	Data standards?	Yes/No
3.4	If yes, are these guidelines (written or electronic) available to you?	Yes/No
	If yes, please provide a copy.	Written/Electronic

Section 4: Data-Sharing

S.No		
4.1	Are there existing frameworks and mechanisms for sharing data across sectors?	Yes/No
A	If yes, are these shared routinely or on request?	
4.2	How do you typically receive data from other sectors?	
4.3	How do you typically share data with other sectors?	
4.4	Are there cross-sectoral meetings to share information and challenges?	
4.5	Are there data from other sectors that you need but are not able to access? Please provide more information on the challenges of accessing these data.	

S.No		
4.6	Have you been asked to contribute data to the Smart City project?	Yes/No
A	What were you asked to contribute?	
B	In what format?	
4.7	What do you foresee as barriers to linking a data system like yours to a dashboard, or some other form of combined data center for Smart City decision-making?	
A	What about opportunities?	

PART B: Data users (government—SC and health only)

Section 5: Data Use Attitudes and Barriers

S.No.		
5.1	What kind of data do you need to make decisions regarding both health service delivery and public health promotion in your city? Other than the health office, where else would you look for these data?	
5.2	How do you get these data (government information system, paper report, internet, private provider, survey)?	
5.3	Are there data that you need that you cannot get from an existing source?	Yes/No
A	If yes, please provide details on these data, and how you currently get them.	
5.4	For each data source you access, please indicate:	Monthly/ Quarterly/Yearly or Other Other (specify) _____
A	Name of data source.	
B	How often do you access this source?	
C	What kind of information do you obtain from this source?	
D	How do you use data obtained from this source?	

S.No.		
5.5	What role do you feel health data play in your daily decision-making?	
5.6	Please give me yes/no answers to the following (related to health data):	
A	Managerial and administrative decisions are based on data and information.	Yes/No
B	Data quality is emphasized in regular reports.	Yes/No
C	Superiors explain what they expect from staff.	Yes/No
D	Staff are appropriately trained to use data.	Yes/No
E	Staff are aware of their data-related responsibilities.	Yes/No
F	Staff rely on data for planning and monitoring targets.	Yes/No
G	The data management team seeks feedback from staff about data/reports (requests for additional analyses, feedback on usefulness etc.).	Yes/No
H	Data and information are presented and discussed regularly at staff meetings.	Yes/No
5.7	Do staff in your office have adequate data analysis and interpretation skills?	Yes/No
A	If yes, do they use any of these data analytical applications? (Multiple answers possible)	Excel/STATA/SPSS/EPI-INFO/SAS/ others (specify) _____
5.8	In general, do you face any challenges in using data to make health-related decisions for Indore? Please explain.	

S.No.		
5.9	Have you encountered any of the following barriers when trying to use your data or information?	
A	Incomplete data.	Yes/No
B	Poor quality data.	Yes/No
C	Data produced late or not at all.	Yes/No
D	Data/information was not well presented.	Yes/No
E	Other.	
5.10	Do you have suggestions about how to improve information use at your office?	

I want to ask you now about data coming from citizens or residents of Indore.

5.11	Is there currently a mechanism for residents to provide feedback on health or Smart City activities in Indore?	Yes/No
	If Yes;	
A	What is this mechanism? What is the platform?	
B	How well does this work, in your opinion?	
C	What kind of feedback does it receive? Complaints? Compliments?	
D	If you could change anything about this mechanism to make it more useful to you, what would it be?	
E	Do you think this form of communication favors some types of residents over others? If yes, who is left out, or who is favored?	Yes/No
F	How do residents receive feedback from the city when they send information?	
	If No;	
A	Would you like there to be?	Yes/No
B	What type of information would you like to be able to send/receive through this mechanism?	
C	What are the barriers to starting such a mechanism?	

S.No.		
5.12	How does this information get incorporated into Smart City and health decision-making?	
5.13	In an ideal situation, how could this citizen feedback most effectively be incorporated into dashboards, reports, or other information visualization?	
A	What are some of the barriers to this incorporation?	
B	What are some of the opportunities (could include new technology, or training, or otherwise)?	

FORM 2: Data Use Assessment Questionnaire—Indore

Citizens Reporting Focus Group Guide

To be collected during registration/intake into group discussion room
Date:
Participant names:
Representing neighborhood of:

Introduction: Thank you for coming! I am a consultant hired by the USAID-funded Building Healthy Cities project. This project is going to be working with citizens and the city government over the next 2 and half years to try to improve the health of the city of Indore. We want to support activities that will make sure Smart City is providing a healthy, safe environment to live, learn, work, and play.

As residents of Indore, you know best what is needed in this area. We have asked you to come speak with us today about your preferred ways of communicating—to each other, to the city government, to people like us, to civic and religious leaders in your communities. This information will help us as we develop ways for you and others to share your needs, concerns, and questions through what we call a "citizen's reporting system." This system doesn't have to be high-tech, and we want it to be as easy for you to use as possible over time, and well after we leave. We will also be asking questions of Smart City officials, so that we know how best to make sure they listen and answer your communications.

The information we collect today is confidential, meaning we will never quote you or share your names, and the data that come out of this will only be shared as a group opinion, so no one person ever gets singled out. We are asking your consent to participate in this session, and for the session to be recorded.

Ok! Let us get started.

1. What is your preferred mode of communication with your neighbors, particularly regarding civic activities or news about the neighborhood? (face-to-face, phone, messenger, group meetings, WhatsApp, Facebook, letters, email, etc.)

    a. Why do you prefer this?

2. Whenever you chose phone for communication, how do you most often communicate? (voice calls, SMS, WhatsApp, other data applications)

    a. Why do you prefer this?
    b. Are there any barriers in using phone?
    c. If so, what are some barriers to using the phone for communicating amongst your neighbors?

3. How do you access/hear about information related to public health services in your city/neighborhood? (Probe: Conversation with health care providers (e.g., ANM, ASHA, Anganwadi workers), newspaper, flyers, radio, television, voice calls, SMS, WhatsApp, internet, email, etc.)

4. Do you hear about different health services in different ways? (e.g., immunization, antenatal care, nutritional supplementation, drug dispensing, etc.) Please indicate how you access information about each type of public health service.

5. How would you WANT to receive information related to public services in your city/neighborhood, if you could choose?

6. What kind of public services information and/or updates do you want to be able to receive from city officials? (Probe: health care services, education, public distribution of cereals, pulses, etc., employment-related services, cooking fuels, water supply, waste disposal, etc.)

7. Do you ever get asked to respond or give feedback on city services? If yes,

   a. How have they requested you give this feedback?
   b. Do you respond to city official requests for feedback/information on public services?
      i. (if yes) How do you respond?
      ii. (if no) What were the reasons you didn't respond?
   c. Have you noticed any difference in requests for feedback since the Smart City effort started?
      i. (if yes) What differences?

8. What kind of issues with public services would you want to be able to report to city officials? (Probe: garbage, water, electricity, health services, other)

9. What would make you most likely to respond to requests for feedback/information on public services? (Probe: pricing, timely services, financial incentives, appreciative messages, resolution of issue, etc.)

10. How would you like to be able to report issues to city officials? (verbal conversation, written letters, group meeting, through community leader, email, SMS, web-based portal, call center, WhatsApp, other data applications, etc.)

11. Currently, how confident are you that city officials would respond to your feedback, or resolve an issue you report? (Probe: possibly varied by department, Smart City versus non-Smart City)

12. If there was a way to share unprompted feedback or other concerns to city officials (i.e., not in response to a request, but the ability to report issues as you see them), would you be interested in that?

   a. (If yes), what are some attributes that communication channel would need to have to make you want to use it?

    b. What type of response from city officials would be needed for you to keep using it?

13. How concerned are you about the privacy and security of information you report to or receive from city officials?

    a. What privacy and security attributes would a communication channel need to have to make you feel comfortable communicating with city officials?

FORM 3: Data Use Assessment Questionnaire – Indore

Citizens Reporting Focus Group Additional Questions Form (individual)

Date:	
Interviewer name:	
Location of interview:	

Date:	
Participant names:	
Representing neighborhood of:	

S.No.		
1	Do you have a phone/cell phone, or access to a cell phone in your household?	Yes/No
2	Do you have your own phone/mobile/internet or it is shared within the household?	
3	If you have a cell phone, what kind of cell phone do you have?	Basic phone/ Feature phone/ Smart phone/ Tablet
4	Are you using pre-paid or post-paid services?	Pre-paid/ Post-paid
5	Do you have access to the internet or to 3G (and above) data?	Yes/No
6	What do you consider most important to have loaded on your phone?	Airtime For Voice/ Airtime For Data/ Airtime For SMS/ None
7	Which mobile network operator (MNO) do you use? (if more than one, list all)	
8	If you use more than one MNO, please explain why.	
9	How often do you run out of airtime?	
10	When you run out of airtime, how long does it typically take you to top up?	
11	What would lead you to top up airtime faster than usual?	

S.No.		
12	How much do the following cost on the MNO you use most often?	
A	Cost per SMS	
B	Cost per min of voice	
C	Cost per GB of data	

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