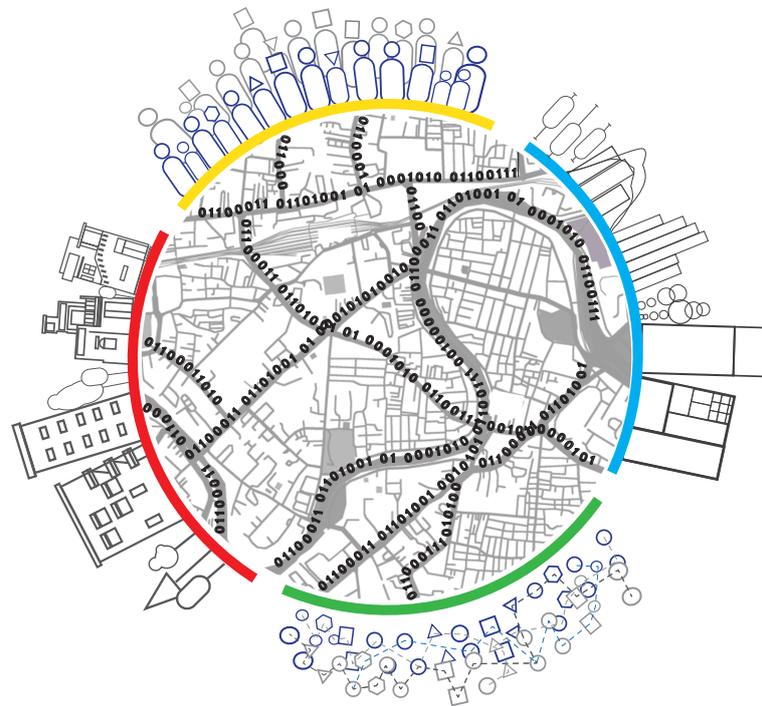# Leveraging Data for CoVID-19 Pandemic Management

An intelligent public health crisis management approach in Gwalior

CASE STUDY 7 | MARCH 2021

Data Driven Governance
URBAN
CASELETS SERIES

ABOUT SMART CITIES MISSION

The Ministry of Housing and Urban Affairs is the apex authority of Government of India at the national level to formulate policies, sponsor and support programme, coordinate the activities of various Central Ministries, State Governments and other nodal authorities and monitor the programmes concerning all the issues of housing and urban affairs in the country.

Ministry of Housing and Urban Affairs' Smart City Mission was launched on 25 June, 2015. The main objective of the mission is to promote cities that provide core infrastructure, clean and sustainable environment and a decent quality of life to their citizens through the application of 'smart solutions'. The mission aims to drive economic growth and improve quality of life through comprehensive work on social, economic, physical and institutional pillars of the city. The focus is on sustainable and inclusive development by creation of replicable models which act as lighthouses for other aspiring cities.

100 cities have been selected to be developed as Smart Cities through a two stage competitive process. In the context of our country, the six fundamental principles on which the concept of Smart Cities is based are (i) Community at the core of planning and implementation; (ii) Ability to generate greater outcomes with the use of lesser resources; (iii) Cooperative and competitive federalism; (iv) Integration, innovation and sustainability; (v) Technology as means, not goal; and (vi) Sectoral and financial convergence.

ABOUT TATA TRUSTS

Since inception in 1892, Tata Trusts, India's oldest philanthropic organisation, has played a pioneering role on bringing about an enduring difference in the lives of the communities it serves. Guided by the principles and the vision of proactive philanthropy of the founder, Jamsetji Tata, the Trusts' purpose is to catalyse development in the areas of health, nutrition, education, water, sanitation and hygiene, livelihood, digital transformation, migration and urban habitat, social justice and inclusion, environment and energy, skill development, sports, and arts and culture. The Trusts' programmes, achieved through direct implementation, partnerships and grant making, are marked by innovations, relevant to the country.

The Data Driven Governance (DDG) portfolio within Tata Trusts, works with rural & urban governance systems to enable inculcation of data as a way of life in the planning and delivery of government schemes-thereby creating significant impact for underserved and marginalized communities. The urban engagements under the portfolio, provide directed technology and capacity building support to urban administrations at central and city levels. Under their capacity building initiative, Delta Ace, DDG portfolio, has focused on addressing the capacity needs of officials within urban local bodies (ULBs) and municipalities to carry the mandate of Data Smart Cities forward. The first City Data Officer Training Program was rolled out in joint partnership with Smart Cities Mission to train CDOs across all smart cities, as the data leaders within their ULBs.

Data Driven Governance

URBAN
CASELETS SERIES

Levergaging Data for CoVID-19 Pandemic Management

An intelligent public health crisis management approach in Gwalior

TATA TRUSTS

Contributors

Gwalior Smart City

Virendra Kumar
City Data Officer
Gwalior Smart City

Manish Mishra
Consultant, PR & Branding
Gwalior Smart City

Tata Trusts

Simrat Swani
Program Officer
Tata Trusts

Shruti Yerramilli
Research Fellow
Data Driven Governance
Tata Trusts

Shruti Parija
Program Officer
Data Driven Governance
Tata Trusts

Poornima Dore
Head
Data Driven Governance
Tata Trusts

Suggested Citation:
Kumar,V, Mishra M, Swani, S, Yerramilli, Parija, S & Dore, P. 2021. "Leveraging Data for CoVID-19 Pandemic Management - An intelligent public health crisis management approach in Gwalior". Urban Caselet Series. Tata Trusts. March 2021.

CONTEXT

Gwalior is situated in the central state of Madhya Pradesh, and traces its origin to 8 AD. In 2011, the city had population of over 10 lakh and an average literacy rate of 84%. It is an important commercial and industrial center for distribution of agricultural produce, cloth fabric, building stone and iron ore.

Gwalior became a part of the Smart City Mission in 2016. Subsequently, to implement smart city initiatives, a special purpose vehicle, Gwalior Smart City Development Corporation Limited, was established under Indian Companies Act, 2013.   Some of the key initiatives that this smart city has undertaken, include:

- Restoration and creation of recreational public spaces such as parks & playgrounds

- Establishment of an incubation center, Dream Catcher, to nurture early-stage start-ups through infrastructural, management, financial and networking support

- Establishment of a digital library for citizens

- Heritage conservation by restoring historically important buildings

Other initiatives include public bike sharing, smart city bus services, use of solar energy, one city one app, variable messaging signboard, smart parking, smart class, rain water harvesting. Implementation of initiatives by Gwalior Smart City has been recognized and awarded by Ministry of Housing & Urban Affair.

This case study elaborates on the city's resilience and preparedness to respond to crisis situations. It details the steps taken by the city to respond to the Coronavirus (Covid-19) pandemic, particularly how the city was quick to engage the existing knowledge of data collection mechanisms, analyze the data, coordinate with different departments and take evidence based timely decisions that allowed the city to contain the spread of Covid-19.

Gwalior's success is a testament to the importance & potential of employing data centric tools, technology, and planning in bolstering decision making process. It provides layered insights into quantitative and qualitative development indicators, makes room for informed policy making, measurable performance indicators, facilitates meaningful collaborations and improves overall governance.

Tata Trusts, through their Data Driven Governance (DDG) portfolio have been working towards enabling stakeholders within a governance system to view & leverage data as a cornerstone

1

for decision making. Trusts collaborated with the Ministry of Housing & Urban Affairs (MoHUA) to implement a capacity building course for City Data Officers (CDOs) and urban local body officials across the 100 smart cities.

The course aims to support and enable civic officials in the adoption of evidence based decision making in day to day city planning and administration. The course focuses on an urban data governance framework that can be applied in achieving key city objectives, driving effective policy decisions and improving transparency. It includes topics such as, change management, tools and techniques for data gathering, cleaning, analysis, visualization, performance benchmarking, urban data policies, data governance & regulatory framework, urban data platforms, using data for policy to name a few.

2

Leveraging Data for Effective CoVID-19 Pandemic Management

The Challenge

On 11 March 2020, World Health Organization (WHO) declared Covid-19 outbreak a global pandemic.[1] Covid-19 is easily transmitted through direct contact with respiratory droplets of an infected person, by either being in contact with the person, or touching an infected surface.

In the first few months of the outbreak, there was little that was known about the virus and it was swiftly transmitting throughout the population, creating a state of paranoia.
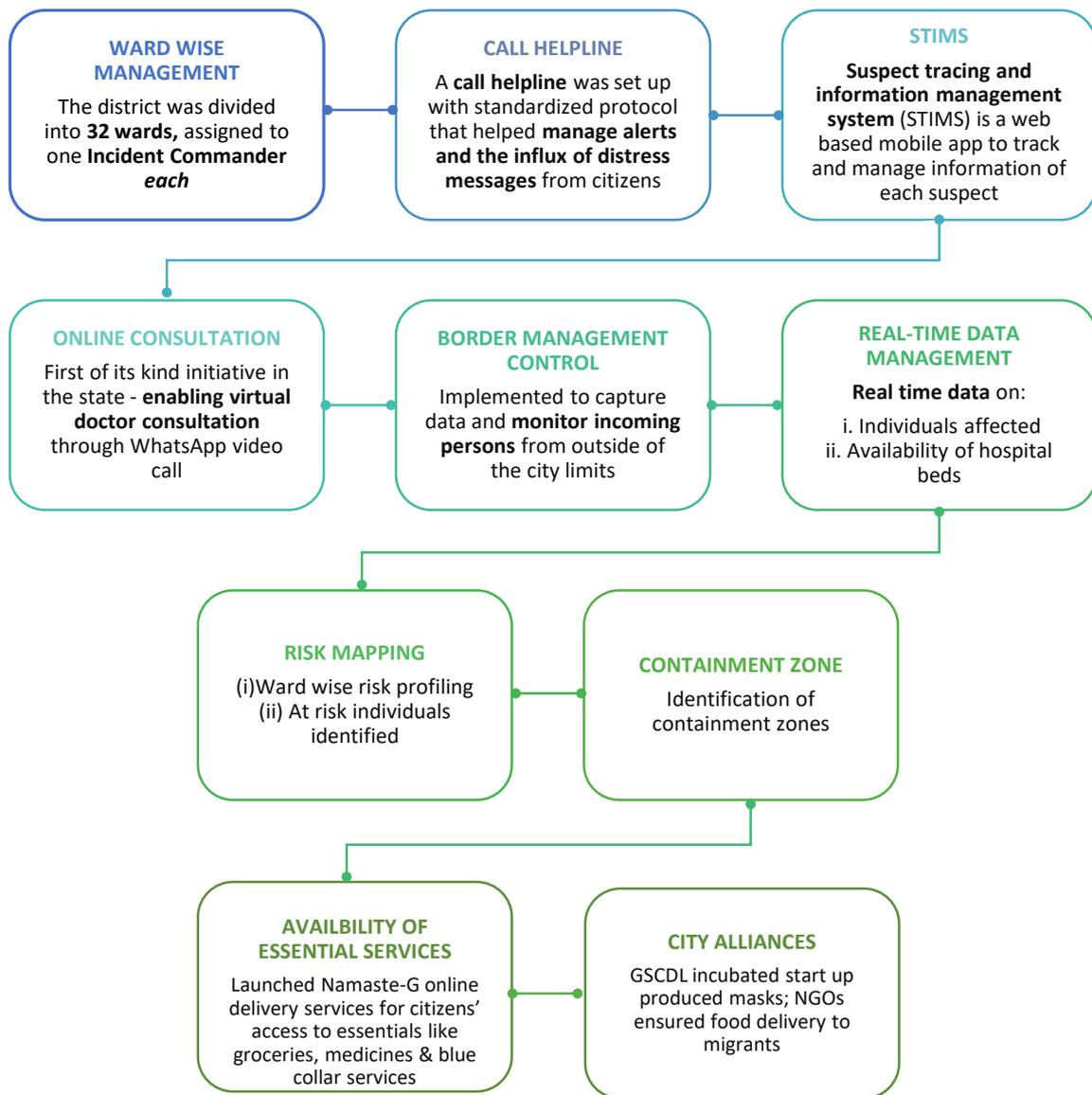
State owned and private healthcare systems found themselves burdened in a way that hadn't been experienced in several decades. In order to contain the spread of the virus and prevent the healthcare systems from collapsing, countries across the globe went into a strict lockdown restricting movement of people outside of their homes.

While guidelines for appropriate management were issued by the central government, cities were at the forefront of assessing the situation on the ground and responding appropriately in accordance to the guidelines.

In this regard, the outbreak tested the preparedness of cities to tackle a public health crisis. Some of the challenges included:

- **Information:** Counter-acting false information related to Covid-19 pandemic.

- **Services**: (i) Availability of hospital beds and ventilators (ii) Availability of food, medicine and basic everyday services to citizens (iii) Awareness about Covid-19 testing facilities

- **Staffing**: (i) Availability of healthcare workers (ii) Personal Protective Equipment (PPE) to frontline workers

- **Movement of People**: (i) Identification of containment zones (ii) Identification and availability of quarantine facilities (iii) Ensuring limited movement of people

- **Risk Mapping:** Identification of at-risk individuals and areas

- **Time:** Responding in a time sensitive manner

Gwalior leads the way in implementing national and state guidelines and regulations at a local level. It had to devise innovative ways to restrict

3

Figure 1: Pillars of the Pandemic Response Solution

movement of people, enable timely access to health care, maintain social distancing, whilst ensuring that the basic services to citizens continue.

Data became the sole arsenal in responding to and managing the situation.
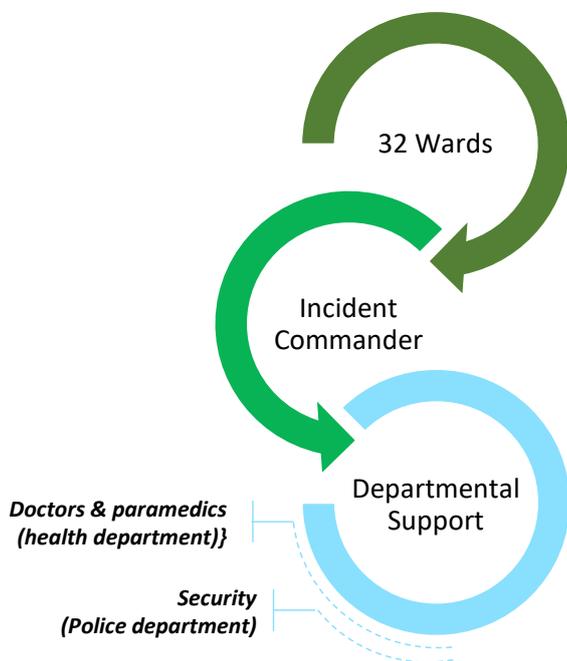
The Solution

A. Proposed Solution

From 16th March, 2020 onwards, Gwalior Smart City began to prepare responses for Covid-19 pandemic. Integrated Command and Control Centre (ICCC) was deployed as the 24x7

Covid-19 Emergency Management Centre (CEMC). First step was to operationalize the CEMC by improving information management, administrative operations and strengthening manpower with technical capabilities.

Teams of sub-divisional magistrates (SDM), doctors, Nagar Nigam medical workers, paramedical staff and police personnel were deployed. Training sessions were held to acquaint the teams with the new systems and platforms[2].

CEMC was the center for dissemination of information, data collection, analysis of data collected, data storage, and inter departmental coordination for further action.

32 Wards

Incident Commander

Departmental Support

Doctors & paramedics (health department)}

Security (Police department)

Figure 2: Operational Structure

B. How was it implemented?

B.1 Ward Wise Management

Every ward was mapped using ArcGIS software and was deputed a person in charge. City's grievance management system already had a division of human resources for every ward. This already existing data on human resource distribution was leveraged for Covid-19 public health emergency management and the roles of each individual were given a redefined scope. Incident Commander (IC) would receive real time data collected through call helplines, online medical counseling, and border management control system.

Based on the information received, screening would be done and suspected individuals would be tested by the medical team on ground and ground data would be reported back to ICCC. Every IC had access to real time data through a dashboard.

B.2 Call Helpline

4 helpline numbers were made operational through ICCC. The call helpline had a standardized protocol that helped manage alerts and the influx of distress messages from citizens. The calls received included questions on locations for Covid-19 testing, fever clinics and facilities provided therein, COVID symptoms and remedial measures, requests for ambulance. Once a call was received by the operator at ICCC, the case

5

was registered and complaint number would be issued by Suspect Tracing and Information Management System (STIMS) (explained below).

Incoming call data related to suspect cases was categorized based on symptoms. The details would then be electronically transferred to the concerned ICs of a given ward for subsequent testing and further appropriate action.

B.3 Suspect Tracing & Information Management System (STIMS)

Initially, the calls received were manually reported by the operator at ICCC. Quick inter-departmental coordination and information sharing was critical

for a timely response. Hence, once the influx of calls increased, Gwalior Smart City initiated the in house development of Suspect Tracing and Information Management System (STIMS) which automates call management.

STIMS also helps with data synchronization to know the impact of communication from ICCC to the field, and to analyze and process the data received at ICCC from the field.

STIMS was developed by Gwalior Smart City's City Data Officer (CDO) along with the support of a Geographic Information System (GIS) expert.

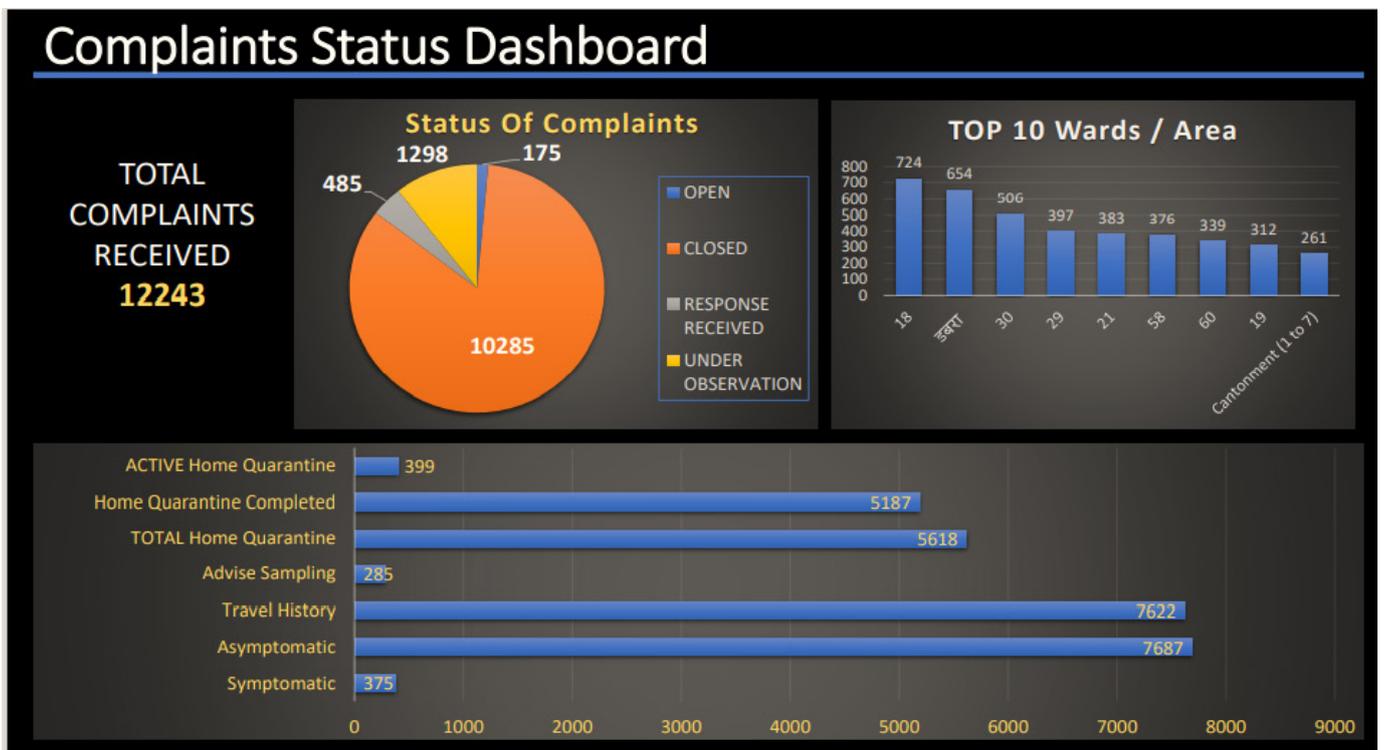The planning of the software was done by the CDO, including, stakeholder mapping and key

Figure 3: Snapshot of Gwalior's Incident Commander Dashboard
(Source: Provided by CDO, Gwalior)

responsibilities of each stakeholder which is embedded in STIMS. The CDO is also responsible for the maintenance of the application – web interface, programming, and database management.

B4. Online Medical Consultation

Gwalior Smart City along with the district administration and health department started the first of its kind initiative in the state, by enabling online doctor consultation through WhatsApp video call. If during the call, an individual was suspected of having Covid-19 symptoms, the doctor would alert the ward SDM for an appropriate action to be taken[3].

WhatsApp was the chosen platform as other potential platforms such as Microsoft Teams or Zoom or any other had either not been established or required purchase of licenses. Since WhatsApp

is a commonly used phone application, it has factors such as maximum outreach and user familiarity to its credit. One limitation, however, was stable internet connectivity on the callers' end. At ICCC a virtual emulator[4] was installed for the doctors.

B.5 Border Control Management

Border Management Control was an online portal that captured data on incoming persons from outside of the city limits, record Covid-19 screening results of incoming travelers and accordingly decide on need for further testing and/or quarantine. This was developed in-house by Gwalior Smart City's CDO.

Forms were created for ICs and police personnel deployed at the border control. The forms were embedded into STIMS and served as guidelines for collecting comprehensive and actionable data.
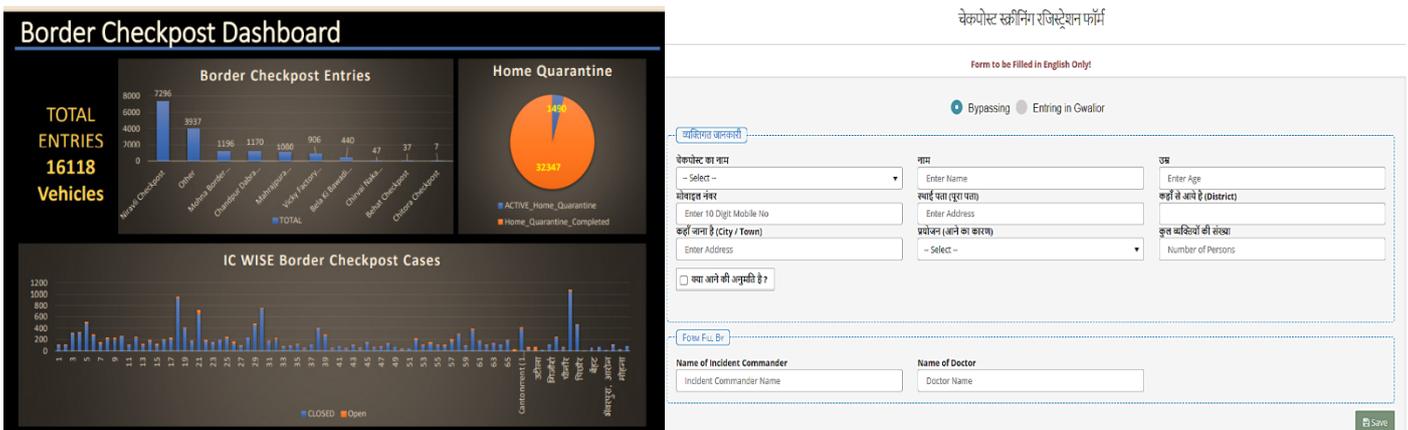
7

Figure 4: Border Check-post Dashboard & Survey Form
(Source: Snapshots provided by CDO, Gwalior)

For instance at the borders, police personnel collected data on name of an individual, vehicle number, owner name, mobile number, travel route, if the traveler(s) is(are) bypassing the city or traveling through the city, and so on. Health screening was done by a team of doctors at the border check-posts.

The collected data was fed into the forms using mobile application. The information would then be passed on to ICCC where it was categorized into ward wise data. This would then be visible on a dashboard for the ward IC to take appropriate actions on its basis.

ICs would receive real time data on how many people enter their ward and which area in the ward. They would then visit the houses to ensure that the individuals entering the city quarantine.

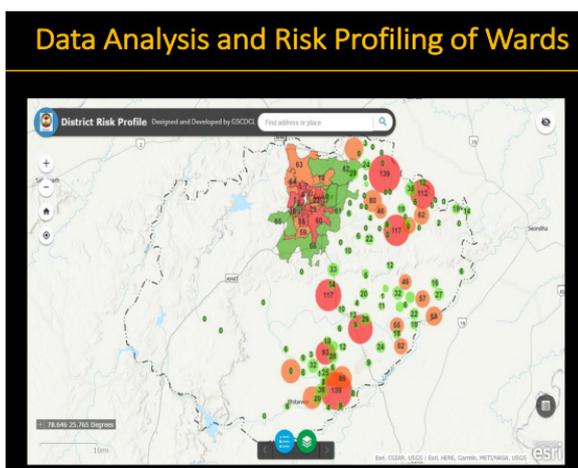This entire process helped obtain key data points on number of people coming in, people coming from hotspots, probability of positive cases on the basis of their travel, among others. This process helped to monitor the progress in real time, ensure better decision-making and move towards predictive analysis.

B6. Real Time data management

Real time data was collected for:

1. **People**: Total number of Covid-19 positive cases, new positive cases every day, total number of people tested, number of Covid-19 deaths, number of new admissions in hospitals, number of discharges from hospitals, movement of people into the city and in containment zones.

This information was maintained through call helpline, tele medical counselling, surveillance cameras, and border management

8

Figure 5: Risk profiling of wards into high, moderate and low
(Source: snapshot Provided by CDO, Gwalior)

Figure 6: Survey form for capturing ILI/SARI patients
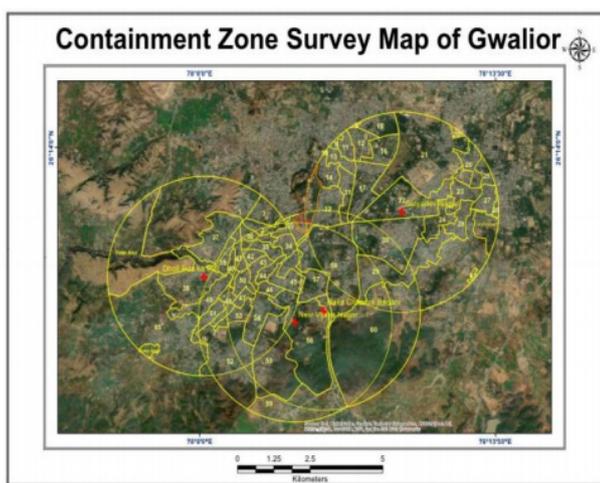*(Source: Provided by CDO, Gwalior)*

system. This was available to citizens and administration through dashboard and in print through newspapers.

2. **Infrastructure**: Number of hospital beds, number of ventilators, location of Covid-19 sample testing facilities. The hospitals were given a 4 digit pin which was an identification code, through which they would update data such as number of patients and number of beds onto the portal. This data was also available to the public through dashboard.

All of the mentioned data would be updated in real time, managed and processed at ICCC.

B.7 Risk Mapping

1. **Ward Wise Risk Mapping**: Detailed risk profiling was done for the entire district by generating vulnerability maps through geo

Figure 7: Containment zone survey map
(Source: Provided by CDO, Gwalior)

spatial mapping methods such as buffer[5], density pattern[6] and cluster analysis[7].

This was done in a scientific manner by taking into consideration population density, travel history (especially of migrant workers, students returning from other districts/cities and travelers returning under Vande Bharat Mission), socio-economic conditions etc.

Each ward was categorized into high, moderate and low vulnerable zones. The output from these maps helped in predicting and demarcating the exact administrative areas that could potentially witness increased numbers of Covid-19 positive cases.

2. **Individual Risk Mapping**: A dedicated portal for identifying at risk patients with Influenza like Illness (ILI) or Severe Acute Respiratory Infections (SARI) was created by the CDO.

Private hospitals, nursing homes, and clinics were instructed to keep a record of the risk prone patients in order to create a database and estimate the number of people who are more vulnerable. The data was updated on the dashboards by the hospitals.

Each hospital was trained on how to upload data on dashboard[8]. Through ICCC at risk individuals were contacted through phone and given precautionary advisory. In parallel, a district level survey was conducted to know how many people have fever or are symptomatic or have an underlying
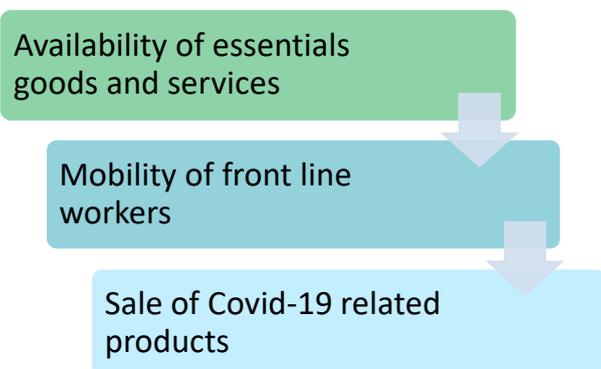
condition. This was a door to door survey by aanganwadi workers, general nursing and midwifery workers.

These efforts together allowed for ward wise risk profiling to know which ward has more vulnerable patients.

B.8 Containment Zones

In case of a positive test result, the individual would either be hospitalized or home quarantined. Quarantine houses would be marked with a banner on the façade to reinforce that the quarantine period is met.

Survey teams would reach the containment zone to capture data that would be shared with ICCC. An online survey form was designed for this purpose. This helped in contact tracing. Each of the identified suspects were put under observation through the Command Centre and follow-ups were ensured.

Figure 6: 3 Key Objectives of Namaste-G

If a Covid-19 positive person was in home quarantine, a 500m radius around the house would be marked through GIS, a surveillance camera which was operated through the ICCC would be installed to ensure restricted movement.

B.9 Citizens' Convenience

1. The lockdown restricted access to places. The city launched Namaste-G online delivery services through which essentials like groceries, fruits, vegetables, medicines and blue collar services like plumber, electrician, carpenter, etc. could be provided to residents of the city.

   Namaste G was a progressive web app that used a QR code. The platform was created by the CDO who further trained a team of individuals to maintain the platform[9].

2. To ease movement of people within the city limits, transportation facility was introduced by leveraging 20 buses under smart city bus service. These services were available for Covid-19 frontline workers (doctors, para medical staff, security officials).

3. Tourist Information Centres (TIC) became points of sale for Covid-19 related products developed by Aanganwadis and other district panchayat beneficiaries.

B.10   Engagement with Stakeholders in the Urban Ecosystem

1. In the initial stages of the pandemic, there was little clarity of the protocols for Covid-19 management response. The CDO reached out to a doctor from WHO in Gwalior, who provided guidance and study literature on standard guidelines for pandemic management.

2. Gwalior Smart City lead initiatives such as production of 30,000 face masks (similar to N-95 mask in properties) by collaborating with a start-up incubated under the Gwalior Smart City Incubation Centre.

3. Gwalior Smart City tied up with organisations such as Confederation of All India Traders, Rotary Club, Lions Club etc. to deliver food packets to migrant and daily wage workers.

B.11   Communication with State and Centre

1. State: Madhya Pradesh state created Sarthak app to maintain real time and updated data on hospital management, patient tracking, and flight passenger details. Gwalior City updated the data on Sarthak app using Application Programming Interface (API) or Comma Separated Values (CSV) format. Where both weren't possible, data was shared in forms.

2. Centre: Indian Council of Medical Research (ICMR) data helped in better planning. Covid-19 testing in India was regulated by ICMR. ICMR had data on- location of the test, name and mobile no. of the patients. This data was accorded a unique testing ID. CDO was given log in credentials through which the data could be downloaded on a daily basis in an Excel pdf format. Through this data, it was possible to analyze the trend, predict the positive cases for the next few days and ensure hospital and beds readiness.

B.12   Physical Infrastructure

At the start of the pandemic, Gwalior Smart City already had a license for a basic GIS tool- ArcGIS. Eventually ArcGIS gave a free license to all smart cities for 6 months to conduct Covid-19 related surveys. ArcGIS was instrumental in ward mapping and geographic mapping of at risk areas and individuals. For data analysis Microsoft BI was used- the desktop edition of this is free of cost for data visualization. The forms which were embedded in STIMS for data collection were created in house by CDO and were posted online through ICCC.

For database management, SQL server was used. For web based ICCC dashboard, free license for ArcGIC was used. No extra cost for IT infrastructure was borne. The CDO made bots to automatically synchronize data from all portals for which the city had log in access which allowed for quick turnaround time for real time data accessibility. No external firm or vendor was on boarded. In order to have been able to on board a third party at that time would have required

11

identification of budgets, of requirements, and paperwork of at least a month. Time was of essence, and the CDO was able to navigate the procurement process to respond swiftly to the pandemic containment requirements.

C. Solution Enablers

CDO's Experience

- CDO's past experience of being a software engineer allowed him to create and deploy data management systems that made it possible to take timely actions.

City's Proactive Management

- Most of the initiatives and management were initiated by the city. This was especially important to be able to adapt and respond to the speed at which the new instructions and advisories were being issued.

- Citizens were made aware of different services through public announcements, radio,and print media.

Real Time Data

- Use of technology was imperative in capturing accurate and real time data for swift action, for coordination in a lockdown situation. Use of ICCC for several operations helped departments get important information on time.

- ICCC was the single point of data collection and management. If any department required data, it would be shared through APIs or in CSV format. A software was created by the CDO using C deck for sharing data.

Leveraging Accessible Technology

- Web links instead of mobile apps were used to ensure compatibility with all phones.

- The forms that were created for data collection were protected with static 4 digit one time password which made it possible to identify which individuals submitted which data.

- WhatsApp group was utilized as information exchange platform between senior administrators of the district including officials in the ranks of Divisional Commissioner, Inspector General, District Magistrate, Superintendent of Police, and others. This group was extremely responsive with respect to day-to-day operations and monitoring. Each case reported in the group was captured at the Command Control Centre for further action.

Training Support

- All computer operators from Nagar Nigam were given training on digital data collection and they further trained operators, and police personnel. In case of challenges related to device not working or poor connectivity, data recharge they contacted the ICCC for the query to be resolved.

Use of Social Media

- Awareness through social media platforms played an important role in countering false information related to COVID-19, creating awareness about symptoms, precautionary measures and steps to be taken if infected.

  It should also be noted that this was the best way to reach out to individuals because of easy access and because many people had unsubscribed to newspapers for the fear of surface contamination.

D.   Challenges

Software Licenses

- One limitation was accessibility of licenses. City had to rely on licenses that were either open softwares that are available for free use by all or licenses that the city had already purchased.

  Buying a new license would have required setting into motion a purchase process which would have taken time[10].

Manual Data

- Data which was manually collected resulted in data duplication while reporting and also it was collected in a non-standardized format resulting in greater processing time.

Trained Personnel

- Lack of trained resources to work with specialized data like satellite imagery. This lead to lack of standard protocol for generation/ maintenance of such crucial data points.

- Initially, it took some time for individuals from various departments to regularly upload the data collected on portals in real time.

Communication with All Citizens

- Since there were restrictions on physical movement, and most communication was through digital mediums, it became a challenge to reach out to individuals who did not have access to digital channels of communication.

13

The Impact

Lessons Learned

1. The helpline number established was crucial in countering inaccurate information related to Covid-19. More than 70000 callers called on the helpline number.

2. The WhatsApp video consultation was effective in identifying positive cases. People were reluctant to move out of their homes even if they had symptoms. Having a team of experiences doctors helped by diagnosing the symptoms.

3. Border management during lockdown ensured that there was monitored movement and any suspect could be tracked through the system.

4. Containment zone mapping helped administration to identify and restrict any possible threat of the virus escaping identified clusters.

5. Effective management of home quarantine patients helped manage the stress on hospitals. Individuals in quarantine were regularly contacted for an update on their condition. In case of deteriorating condition, the medical team would visit the person at home and upon testing determine the need for hospitalization.

1. Proactive management: In a pandemic situation, it is imperative that the system is proactive as the biggest threat is delay. Gwalior Smart City was proactive and established a system even before the national lockdown was announced.

2. Integration of various departments: Covid-19 pandemic required a seamless operation & coordination amongst various government arms like the Smart City, Municipal Corporation, Health Administration, Police, among others

3. Use of technology to advantage: Use of technology was imperative in capturing accurate and real time data for swift action, for coordination in a lockdown situation. Use of ICCC for several operations helped departments get important information on time.

14

Key data-stories

Border Check-post Survey

Type of Journey by Location and Border Checkpost Surveys

● City Bypass ● Gwalior

(grey portion represents the influx of people by location – same as chart on the left – the blue bars correspond to specific cuts of the same data, by location)

Where were the most frequented entry points?

Which were the most risky? – most individuals were advised institutional quarantine

Most frequented locations by day – 16th May 2020 saw a one of the largest singe day influx of people

The data points bring interesting insights for the city – to identify movement patterns of people & plan better for restrictions such as lockdowns, also to identify vulnerable groups like migrants, daily-wages & students

● Coming to meet Family or going back to hometown ● medical reasons ● Other ● returning home ● student coming home or to study ● Work (Formal) ● Work (Informal/Labour)

Niravli Checkpost
Vicky Factory Checkpost
Other Mohna
Border Checkpost
Dabra Checkpost
Mahrajpura Checkpost
Bela ki Bawdi
Behat Checkpost
Chittora checkopoint
Chirwai Checkpost
Raj mohan palace
Lidhora check post
Singarpura
Baretha
Sky City
Sirol

Why were the people entering Gwalior? – a significant proportion were coming to the city for medical reasons

Influenza like Illness (ILI)/Severe Acute Respiratory Illness(SARI) Survey

Individuals who were found symptomatic in the survey

● Yes ● No

Where were most likely cases of CoVID-19 located? – The survey captured information on any COVID-19 related symptoms that the individual maybe showing. This map shows the location of the individuals who were surveyed (sampled representation, given the large size of the survey) – red circles indicate locations of symptomatic individuals

Non Communicable Disease
ILI
SARI
No value

> 13
10
7
4
< 1

Where were the most risk prone individuals? – These individuals were symptomatic and had comorbidities - bigger the circle – larger the number of symptomatic individuals. Red & Blue circles correspond to Non-communicable (like diabetes) & Influenza like illness
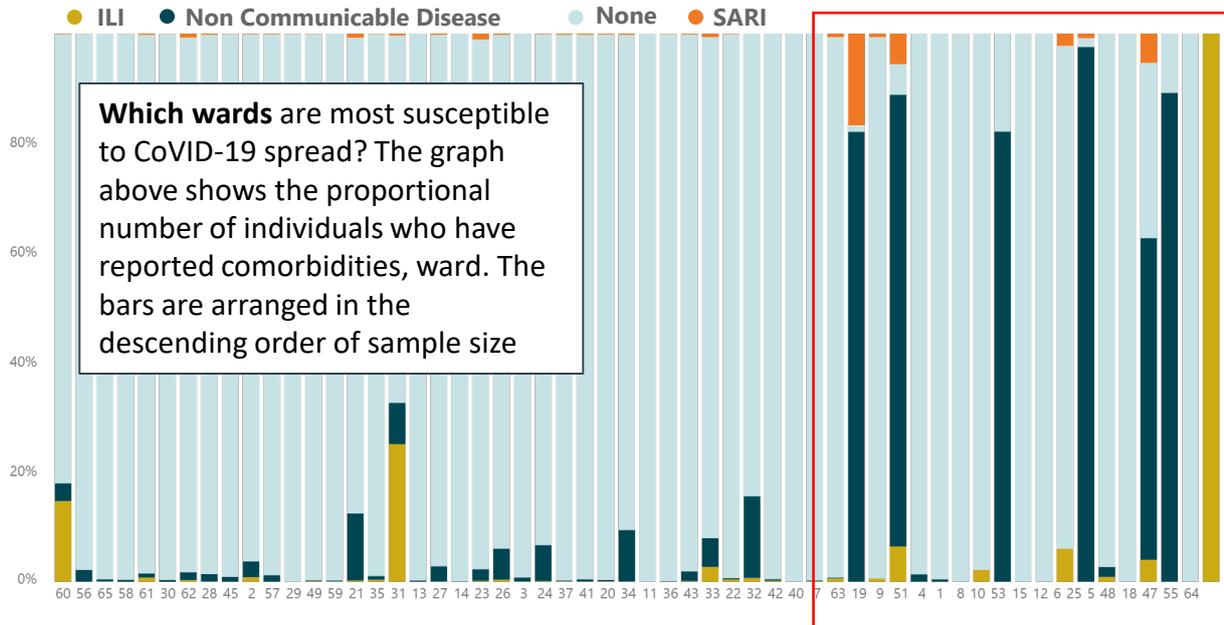
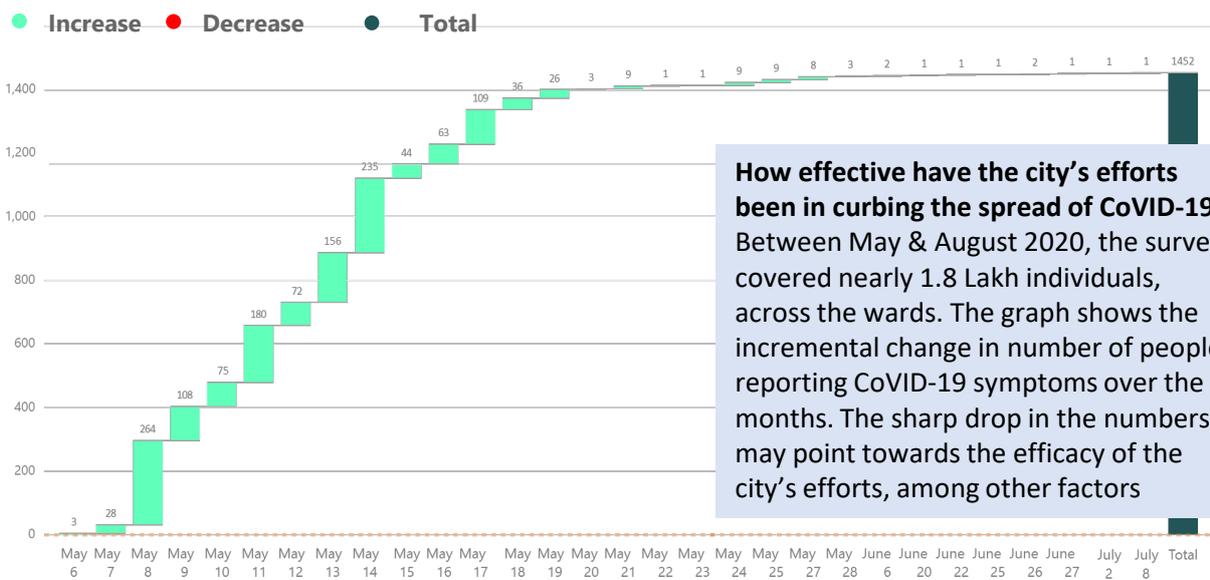**Symptomatic Individuals who also reported comorbidities**

The survey data points allow the city to do a risk mapping analysis. This data combined with demographic information, can be used to understand location of areas with higher susceptibility to the disease.

Influenza like Illness (ILI)/ Severe Acute Respiratory Illness(SARI) Survey

Proportion of Respondents entering Gwalior by Reason and Border Checkpoint Location

● ILI ● Non Communicable Disease ● None ● SARI

Which wards are most susceptible to CoVID-19 spread? The graph above shows the proportional number of individuals who have reported comorbidities, ward. The bars are arranged in the descending order of sample size

Incremental Change in number of individuals reporting symptoms of CoVID-19

● Increase ● Decrease ● Total

How effective have the city's efforts been in curbing the spread of CoVID-19? Between May & August 2020, the survey covered nearly 1.8 Lakh individuals, across the wards. The graph shows the incremental change in number of people reporting CoVID-19 symptoms over the months. The sharp drop in the numbers may point towards the efficacy of the city's efforts, among other factors

As an excellent extension of the current pandemic response, risk mapping can be overlapped with health care infrastructure and opens possibilities to design a standard public health crisis response or even public health care adequacy plan.

Conclusion

Covid-19 pandemic shed light on the importance of availability and accessibility of reliable data, not just for timely responses, but also for evidence based responses, for effective results. City Data Officers and other key stakeholders within urban local bodies found themselves on the front lines, supporting decision makers in taking the appropriate and informed decisions.

In the absence of data, there would have been reduced visibility on - movement of people, health infrastructure, availability of preventive substances such as sanitizers, personal protective equipment, economic impact and a host of other related concerns associated with the pandemic.

Data allowed analysts to determine trends related to the virus spread and risk mapping. Needless to say, in the absence of data would have seriously impacted the control rate of the virus spread. Gwalior has successfully demonstrated how data can be leveraged in a variety of different ways to yield result oriented measures, including:

- **City Alliance:** Collaboration with different stakeholders in the urban ecosystem. In case of Gwalior, civil society organizations, WHO expert, incubation center allowed the city to respond in a comprehensive manner.

- **Citizen engagement:** Effective management to a large extent depends on the degree of citizen's cooperation. This is where open communication comes into play. Keeping the citizens informed at every stage and actively engaging with them for the purpose of knowledge and data exchange and maintain transparency on how data is leveraged by the city goes a long way in building citizens' trust.

18

Integrated Command & Control Centre

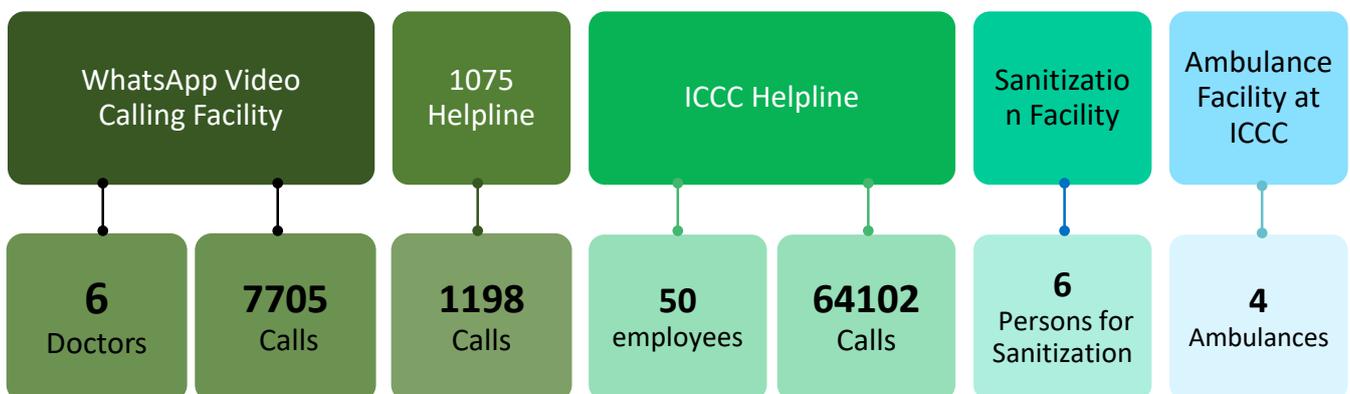| WhatsApp Video Calling Facility		1075 Helpline	ICCC Helpline		Sanitization Facility	Ambulance Facility at ICCC
6 Doctors	**7705** Calls	**1198** Calls	**50** employees	**64102** Calls	**6** Persons for Sanitization	**4** Ambulances

Figure 8: Pandemic Management Through ICCC

Looking Ahead

The success of Gwalior's pandemic response system and learnings from it, open opportunities for the city to also formalize its approach into a standard SoP for public health crisis response. Data collected during the surveys and systems established can be used to further enhance the picture of what the city knows about its public health infrastructure and systems and ways to improve it. For instance, many hospitals and clinics were part of the response mechanism the city was using.

These health centers were contributing to surveys in tracking susceptible, confirmed patients, as well as in providing necessary infrastructure like beds and ventilators and testing facilities. This experience can be used to formalize the public health network, to enhance data availability and adequacy of access to the facilities. The case leaves us with interesting possibilities and valid learnings that contemporary cities can also take back.

Endnotes

1. The infrastructure at ICCC was developed by Hewlett Packard (HP).

2. In addition to trainings, information exchange through informal peer networks was also very helpful.

3. Appropriate action comprised of COVID-19 testing, quarantine or hospitalization on a case basis.

4. Emulator was designed by Smart City Incubation Centre, which has been set up to nurture early-stage start-ups by providing them infrastructural, management, financial and networking support.

5. A buffer in geographic information system (GIS) is a zone around a map feature measured in units of distance or time. A buffer is useful for proximity analysis.

6. Density based techniques characterize the pattern in terms of its distribution vis-a-vis the study area

7. Cluster analysis is the task of grouping a set of objects based on degree on similarity.

8. Hospitals that did not submit any reports were sent letters from the Commissioner to update data

9. CDO also trained a team of individuals to maintain and run the platform. The basic structure of the system was ready which allowed for quick deployment during the crisis situation.

10. As mentioned in the case study, ARC GIS gave a free license for 6 months to all cities for Covid-19 surveys. This is a good example of how city alliances can help cities in times of distress.

Abbreviations

API	Application Programming Interface
CDO	City Data Officer
CSV	Comma Separated Values
CoVID-19	Coronavirus disease
CEMC	CoVID19 Emergency Management Centre
DDG	Data Driven Governance (Tata Trusts)
ICCC	Integrated Command & Control Centre
IC	Incident Commanders
ICMR	Indian Council for Medical Research
ILI	Influenza Like Illness
MoHUA	Ministry of Housing & Urban Affairs
PPE	Personal Protective Equipment
SARI	Severe acute respiratory infections
SDM	Sub-Divisional Magistrates
STIMS	Suspect Tracing and Information Management System
TIC	Tourist Information Centre
WHO	World Health Organisation

20

Related Content

Other Cases in the DeltaAce Edition of URBAN Caselets Series:

1. Responsive Public Grievance Redressal System for efficient Public Service Delivery - *Learnings from Surat*

2. Smart Solutions to overcome traffic congestion - *Intelligent Traffic Management System in Jabalpur*

3. Designing Systems for Water Security: *SCADA Based Water Management System in Nava Raipur*

Other Cases in the URBAN Caselets Series:

1. Pune's Open Data Story – *The What, Why and How of Open Data in Indian Smart Cities*

2. India's First City Data Officer - *Recounting our Learnings & Experiences from Pune*

3. Developing Resilience Scenarios and Strategies through Participatory Simulations – *Case of Metropolitan Chennai*

4. Improved & Mechanized Door to Door Waste Collection – *Learnings from Ahmedabad*

5. Moving Towards Intelligent Transportation System - *IOT driven buses in Ahmedabad*

6. Monitoring Air Quality through Smart Poles – *Case of Bhopal Smart City*

TATA TRUSTS