Policy and Strategic plan

for

The India- Integrated Health Information Platform (IHIP)

Version 05

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National Centre for Disease Control
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Chapter 1: Context and Purpose

Context:

1.1.   Surveillance- often referred to as 'Information for Action'- is an important function of public health. In 1968, the technical discussions of the 21st World Health Assembly did a comprehensive review of surveillance concept as established and essential function of public health. It adopted the concept of population surveillance and listed three basic characteristics: (a) systemic collection of data; (b) consolidation and analysis of collected data; and (c) dissemination of information by means of narrative epidemiological reports. In 1986, the US Center for Disease Control definition of surveillance provided the final link in surveillance chain "the application of these data to prevention and control". Figure 1.1 presents the four core elements of surveillance.
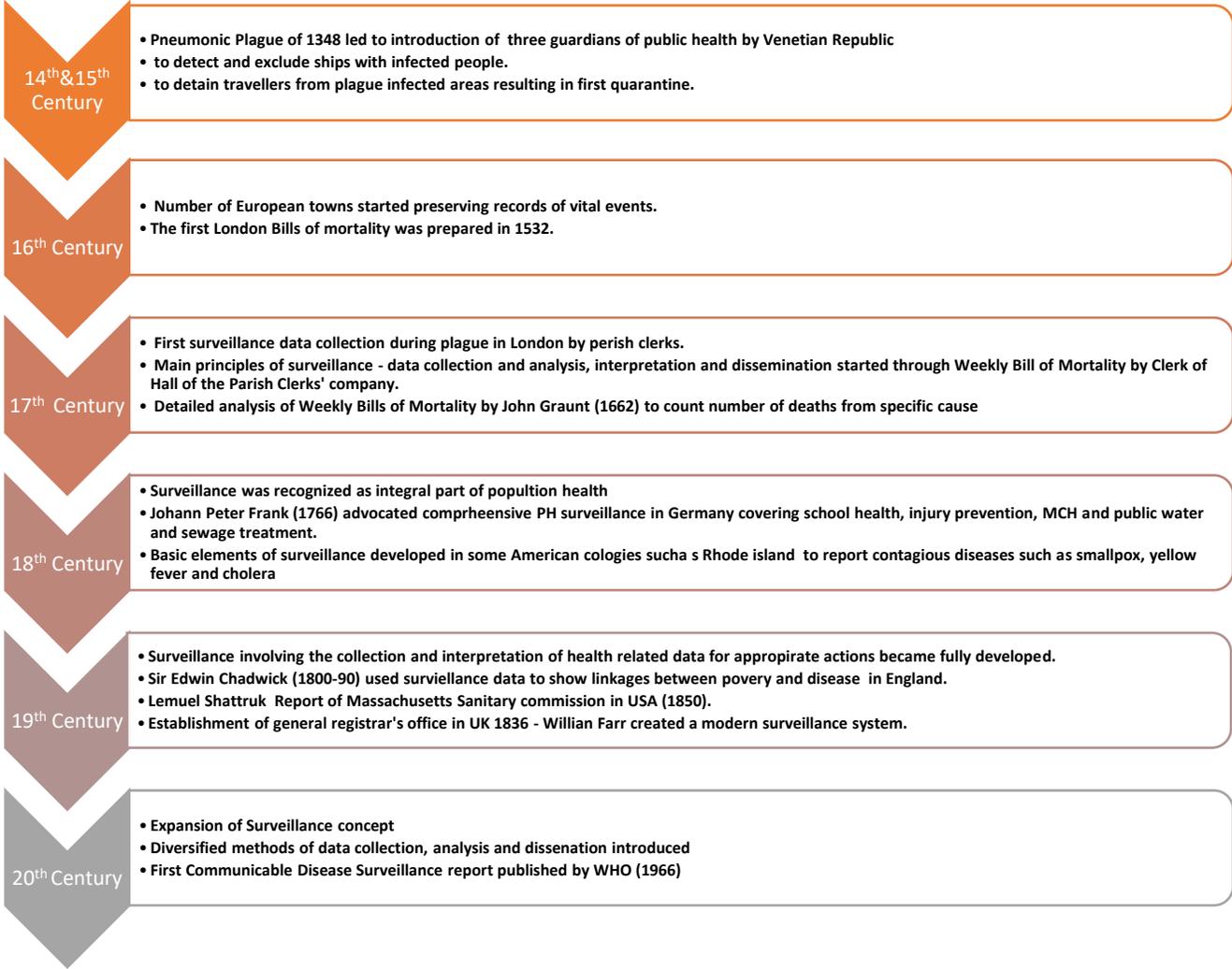
Figure 1. Core elements of surveillance
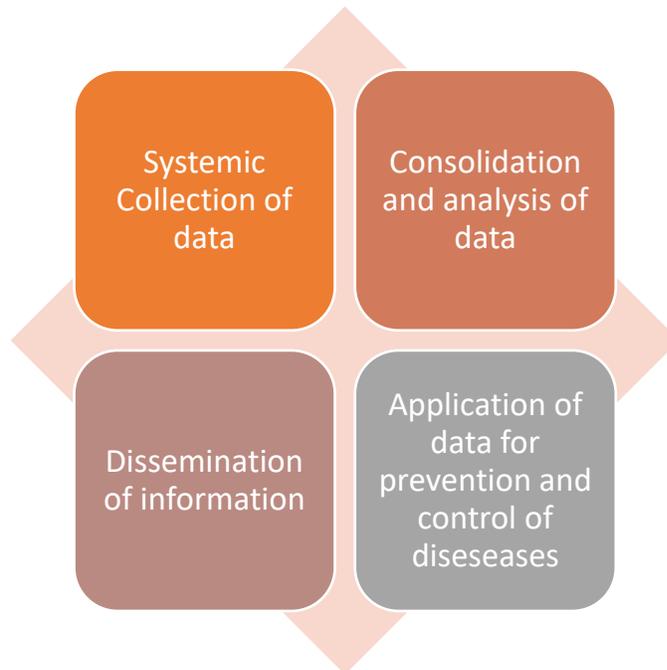
1.2.   Disease surveillance is an epidemiological practice by which the spread of disease is monitored to establish patterns of progression. The main role of disease surveillance is to predict, observe, and minimize the harm caused by outbreak, epidemic, and pandemic situations, as well as increase knowledge about which factors contribute to them[i]. In the last three decades, disease surveillance has grown into a complete discipline, quite distinct from epidemiology. This expansion into a separate scientific area within public health has not been accompanied by parallel growth in the literature about its principles and methods. The development of the fundamental concepts of surveillance systems provides a basis on which to build a better understanding of the subject. In addition, the concepts have practical value as they can be used in designing new systems as well as

understanding or evaluating currently operating systems[ii].   Figure 1.2. summarizes historical evolution of surveillance.

Figure 1.2 Historical Evolution of Surveillance

14th&15th Century
- Pneumonic Plague of 1348 led to introduction of three guardians of public health by Venetian Republic
- to detect and exclude ships with infected people.
- to detain travellers from plague infected areas resulting in first quarantine.

16th Century
- Number of European towns started preserving records of vital events.
- The first London Bills of mortality was prepared in 1532.

17th Century
- First surveillance data collection during plague in London by perish clerks.
- Main principles of surveillance - data collection and analysis, interpretation and dissemination started through Weekly Bill of Mortality by Clerk of Hall of the Parish Clerks' company.
- Detailed analysis of Weekly Bills of Mortality by John Graunt (1662) to count number of deaths from specific cause

18th Century
- Surveillance was recognized as integral part of popultion health
- Johann Peter Frank (1766) advocated comprheensive PH surveillance in Germany covering school health, injury prevention, MCH and public water and sewage treatment.
- Basic elements of surveillance developed in some American cologies sucha s Rhode island to report contagious diseases such as smallpox, yellow fever and cholera

19th Century
- Surveillance involving the collection and interpretation of health related data for appropirate actions became fully developed.
- Sir Edwin Chadwick (1800-90) used surveillance data to show linkages between povery and disease in England.
- Lemuel Shattruk Report of Massachusetts Sanitary commission in USA (1850).
- Establishment of general registrar's office in UK 1836 - Willian Farr created a modern surveillance system.

20th Century
- Expansion of Surveillance concept
- Diversified methods of data collection, analysis and dissenation introduced
- First Communicable Disease Surveillance report published by WHO (1966)

1.3.   Public health surveillance is the foundation for decision making in public health and empowers decision makers to lead and manage more effectively by providing timely, useful evidence[iii]. Public health decision making relies on real-time, accurate surveillance. Advancements in information and mobile technologies offer exciting opportunities to improve efficiency and effectiveness of public health surveillance. "Real-time disease surveillance" is a system that uses data from various sources such as hospitals, clinics, and laboratories to track and monitor the spread of infectious diseases in real-time. It helps public health officials detect outbreaks early, monitor disease trends, identify emerging new threats such as Anti-Microbial Resistance and respond quickly to prevent further spread of the disease. The system can also help identify new strains of viruses and

bacteria that may be resistant to current treatments. Real-time disease surveillance is an important tool in preventing pandemics and protecting public health.

1.4.   However, globally there is huge fragmentation of public health surveillance systems which require better integration and transformation to a modern system. India's initiative to create an Integrated Health Information Platform (IHIP) enables such transformation to a fully interconnected disease surveillance system. Future disease surveillance should comprise of well-integrated national systems based on 5 principles.[iv]

Table 1.1. Core Principles for Integrated Disease Surveillance		
Principle	**Benefits**	**Implementation requirement**
Population based	Provides denominators for mortality and disease burden	Civil or sample registration
Laboratory confirmation	Enables case identification and accurate tracking	Capacity to scaleup quality testing and sequencing
Digital data	Promotes interconnected systems ensuring privacy protection	Real time data with unique health identifiers. Web accessible meta data meeting national standards
Data Transparency	Offers visibility of local, national and global threats	Automated reporting and alert generation
Adequate financing	Ensures sustainable country-owned systems	Investment of US$ 1-4 per capita annually

1.5.   India's Integrated Disease Surveillance Program (IDSP) program started in 2004 with World Bank support envisaged a fit for purpose Information Technology solution using a combination of paper-based data collection complemented by data entry at the district level that enabled decentralized surveillance system to suit country's federal health architecture. The IDSP has now been expanded nation-wide under the National Health Mission and is fully financed through domestic resources.

1.6.   The IDSP initially depended on a weekly surveillance reporting system with peripheral units primarily using paper-based surveillance reports which got consolidated and entered in to the IDSP portal at the district level. Based on 2015 Joint Monitoring Mission (JMM) recommendations a comprehensive review of the IDSP program was undertaken including reprioritization of diseases and development of minimum data sets. The rapidly increased availability of mobile technology platforms and supply of mobile phones to frontline health workers have also opened new opportunities for real time data generation by reporting units. Building on these developments, the IDSP's data systems and portal were redesigned with technical support from WHO to create the Integrated Health Information Platform (IHIP) which is a web-enabled near real-time electronic

information system meeting Government's e-governance, IT, meta data standards and providing geospatial information. The IHIP platform is being expanded in phased manner since 2018. Ongoing efforts to scaleup and integrate other surveillance systems with IHIP received new impetus through two important initiatives.

- **The Ayushman Bharat Digital Mission (ABDM)** launched in 2021 aims to develop the backbone necessary to support the integrated digital health infrastructure of the country. It creates a digital ecosystem to bridge the existing gap amongst different stakeholders through digital highways creating an integrated healthcare system that links practitioners and patients digitally by giving them access to real-time health records. In addition to promoting UHC, the ABDM opens a new frontier for IHIP for real-time case-based surveillance through electronic medical records.

- **The Pradhan Mantri Ayushman Bharat Health Infrastructure Mission (PM ABHIM)** with an allocation of about US$ 8.4 billion equivalent, also launched in 2021, provides new impetus for India's efforts to augment pandemic prevention, preparedness and response while addressing critical gaps in essential health service delivery. The PM ABHIM aims to support the scaling up of integration and effective institutionalization of IHIP within the Ministry of Health and Family Welfare (MOHFW) and promote enhanced participation of private sector in surveillance reporting using innovative approaches. The IDSP is holding series of consultations with private sector players to find options for enhanced participation in surveillance reporting.

1.7.   In this context, the IDSP embarked on developing a policy and strategic plan for institutionalizing the IHIP proposing innovative approaches for private sector engagement.

Purpose:

1.8.   The purpose of this document is two-fold.

- First, to provide an overarching updated policy for the IHIP expansion describing its vision, strategy and core guiding principles for execution based on a detailed situation analysis of implementation experiences so far.
- Second, to articulate a specific time-bound strategic plan to be implemented over the next few years to make progress towards realization of policy goals including innovative strategies for augmenting private sector participation.

1.9.   While senior health policy makers at national and state levels are primary audience for the former, the strategic plan is to be spearheaded by the IDSP program managers working closely with implementing entities at different operational levels under the overall stewardship and financing from the MOHFW.

Benefits:

a) Helps timely implementation of updated IHIP policy through a time-bound Strategic Plan to enhance India's overall pandemic prevention, preparedness, and response.

b) Promotes real time analytics and automated alerts which will empower local public health authorities to promptly identify and guide effective response to health events with potential to impact population health.

c) Supports progress towards the key goal envisaged by the ABDM to integrate information systems from multiple sources including the private sector.

d) Improves compliance with data standards, privacy and security protocols which ensures better governance of data being generated.

e) Creates new opportunities to interlink data with other surveillance systems regionally and globally.

f) Enhances participation of private health sector which contributes to a significant share of India's health care delivery in surveillance building on lessons from COVID-19 - without which the IHIP will be sub optimal.

g) Provides opportunities for improved case-based reporting by aligning with rapidly expanding Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY), India's flagship program for providing Universal Health Coverage benefitting an estimated 550 million citizens.

1.10. The note is organized in 8 chapters starting with the context and purpose (Chapter 1). The second chapter provides the background and rationale while the third chapter describes the IHIP, and its salient features and advantages compared to the earlier system. The fourth chapter provides key technical features of the IHIP while the fifth chapter presents a Strengths Weakness Opportunities and Threats (SWOT) analysis of the IHIP. Chapter six describes the private healthcare sector in India and proposes options for its enhanced participation in surveillance. The Chapter seven articulates the vision, guiding principles and overarching strategy. The final chapter provides a five-year strategic plan with phasing for effective institutionalization of IHIP with key performance indicators for each phase.

Chapter II. Background and rationale

Brief history of IDSP-IHIP

2.1. The Government of India (GoI) had established a National Apical Advisory Committee (NAAC) in 1995, following the 1994 plague outbreak in Surat. This was followed by a National Surveillance Programme for Communicable Diseases (NSPCD), which was started as pilot program in 1997. The NSPCD was later expanded to entire country in a project mode through the Integrated Disease Surveillance project (IDSP) launched in November 2004 with World Bank support. The IDSP was administratively and financially merged with National Centre for Disease Control (NCDC) (which was then known as National Institute for Communicable Diseases) in June 2006. Later, IDSP was expanded to all states as a national program with full domestic financing during the 12th Plan period (2012-17) under the National Health Mission (NHM). IDSP has worked within the framework of NHM for 'Strengthening of Disease Surveillance System' for epidemic prone diseases to detect and respond to outbreaks. More details presented in Box 2.1.

2.2. Since its launch in 2004, IDSP has played a crucial role in carrying out surveillance for priority epidemic prone diseases in the country and built capacity for responding to outbreaks of such diseases through the establishment of trained Rapid Response Teams (RRTs) at the National, State and District levels. The IDSP has played a pivotal role in post disaster disease surveillance, extreme climate related health events and special surveillance. IDSP has shown its robustness during H1N1 Influenza surge in 2009, Crimean Congo Haemorrhagic fever (CCHF) outbreak in Gujarat (2010-11), Zika virus in Madhya Pradesh & Rajasthan (2018) and Nipah virus outbreak in Kerala (2021).

> **Box 2.1: Integrated Disease Surveillance Program (IDSP)**
>
> Aim: to monitor the incidence and prevalence of various outbreak prone diseases across the country.
> Objectives:
> - To detect the early warning signals of impending outbreaks of selected communicable diseases
> - Initiation of timely and effective public health actions
> - Creation of trained cadre of responders at the District, State & National levels (Rapid Response Teams)
> - Reducing mortality and morbidity due to communicable disease outbreaks
> - Three levels of data collection – Syndromic (S form) by ANMs, Presumptive (P form) by doctors at health facilities and Laboratory (L form) by laboratories
>
> Mission: to improve disease surveillance throughout the nation by establishing a decentralised State-based surveillance system for outbreak prone diseases and to identify early warning signs and launch timely and efficient public health initiatives.

Rationale for stronger public health surveillance

2.3. Improving the provision of health care services as per the population needs, has been long recognised goal of the MoHFW, Govt of India. The primary aim of the National Health Policy, 2017,

is to inform, clarify, strengthen and prioritize the role of the Government in shaping health systems in all its dimensions- investments in health, organization of healthcare services, prevention of diseases and promotion of good health through cross sectoral actions, access to technologies, developing human resources, encouraging medical pluralism, building knowledge base, developing better financial protection strategies, strengthening regulation and health assurance. Any such provision of services and prevention of outbreaks and epidemics require timely reporting and understanding of key health events in the communities. Recognising this need, the Govt of India expanded the Integrated Disease Surveillance Program nationwide to provide information technology (IT)-enabled nation-wide decentralised IHIP.

2.4.   In mixed healthcare systems such as India, where a key share of health services is accessed and delivered by private health sector, it requires proactive engagement of private health sector in the disease surveillance and response system. India's disease surveillance system has matured, and foundation has been created for the development and enhancement of surveillance reporting using the IHIP to provide near real-time surveillance data and provide early warnings of infectious disease epidemics. In nearly two decades since India launched IDSP in 2004, public health surveillance has strengthened in the country. However, the COVID-19 pandemic has underscored an ongoing need of stronger, real-time surveillance for epidemic-prone diseases in every state of India. The IHIP addresses the need for integrating multiple surveillance systems in a phased manner providing a foundation for population- representative data from different sources including disease specific surveillance systems for major disease control/elimination programs such as malaria, tuberculosis and vaccine preventable diseases, zoonotic diseases, and food safety surveillance systems. The IHIP provides near real-time public health information on 33 prioritized diseases along with critical population level attributes such as person, place and time with geocoded reference while ensuring data privacy and security. Thus, the IHIP will enable decision makers at national, state, district and local levels to effectively use data for better informed response.

Box. 2.2 Disease Surveillance for the COVID-19 era: time for bold changes

Piecemeal, antiquated public health surveillance must be robustly transformed into a modern system. Bold changes to implement fully interconnected disease surveillance are needed to manage the risks posed by SARS-Cov2 variants and future pandemics.

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Integrated Health Information Platform (IHIP): Need and context.

2.5.   In the year 2015, a Joint Monitoring Mission (JMM) comprising of national and international experts reviewed the IDSP and strongly recommended that it should be redesigned, including re-prioritization of the list of diseases under the IDSP, assessing the need for collecting more epidemiological data for action, and redefining the required surveillance deliverables. It also suggested that integration of other disease surveillance platforms must be explored to contribute towards a more efficient Early Warning Alert and Response system (EWARS). It was proposed there is a need for redesigning and upgrading the portal system and dashboard for real-time visualization of data and display of key indicators in the public domain, ensuring adequate numbers of trained human resources and strengthening laboratory systems.

2.6.   Following the JMM recommendations, the IDSP to undertake a disease re-prioritization workshop in December 2016 under the guidance of NCDC. This led to identification of 33 priority health conditions for real-time surveillance. In May 2017, IDSP conducted a second workshop to develop the Minimum Data Set to be reported for diseases and health conditions under IDSP.

2.7.   In this backdrop, MOHFW decided to develop and design the IHIP - an information platform that integrates data from various "registries" to provide real-time information on health surveillance across India to guide decision-makers to take appropriate public health action. IHIP has been designed to capture real-time, disaggregated epidemiological data of 33 priority health conditions. IHIP was initially rolled out in 2018 as pilot project in 7 States and was formally launched by the then Union Minister of Health & Family Welfare on 5 April 2021 in a virtual event that was attended by Hon. Health Ministers and/or their representatives from all 36 States/UTs. Table 1 summarizes key difference between the earlier electronic reporting system of IDSP and IDSP-IHIP.

Table 2.1: Key differences in the features of IDSP and IHIP

Key Area	IDSP- Pre-2021	IDSP IHIP
Data Capture	Captures aggregated data only	Captures disaggregated data (Case based surveillance)
Linkage among different surveillance forms	No linkage of data from S, P and L forms	Links data from S, P, L, EWS forms
Mode of data collection	Paper based primary data collection	Mobile and Electronic devices used for collection & transmission of surveillance data
Frequency of surveillance data reporting	Weekly	Near Realtime or daily
Health conditions monitored	18 health conditions	33+ health conditions
Mortality reporting	Can not record and report deaths	Capable of recording and reporting deaths
Geo-tagging	Data not geo-coded	All data geocoded for geographic reference
Analytical Engine	Not available	Advanced data modeling and analytical tools
Dashboard & automation	Not available	integrated dashboard with GIS enabled representation of data
Utilization	Limited only for disease surveillance	Provides a platform for integration of other priority health programs

Additional Features of IDSP-IHIP:

- Provides analyzed reports on mobile or other electronic devices.
- Facilitates initiation and monitoring of outbreak investigation activities electronically.
- Allows adding special surveillance modules e.g., COVID-19, INSACOG (WGS), Post disaster, Mass gatherings (Used successfully during Kumbh Mela 2019) etc.

WHO support and partnership.

2.8.   WHO India has supported the Government of India and various stakeholders in the development of IHIP with its team of public health and IT experts. The IHIP offers a refined digital surveillance platform which aims to provide real-time data and connect multiple surveillance systems to enable concerted action rooted in the 'One Health' approach. It will accelerate response to outbreaks and serve as an early warning system for potential outbreaks.

2.9.   WHO has also supported development of IHIP training modules and self-learning platforms including initial training. The support included refresher 'trainings of trainers' for all state-level officers, and more than 2,500 participants have been trained so far. At the district-level, trainings and refresher sessions have been completed in more than 600 districts out of India's 730 districts and more than 64,000 participants have been trained. In addition, WHO is helping development of IHIP virtual learning platforms and relevant modules. These virtual platforms were utilized extensively to fast-track the completion of IHIP related trainings during the COVID-19 pandemic. WHO is continuously supporting the National Centre for Disease Control (NCDC) to ensure a smooth roll out of IDSP-IHIP in all states and union territories through an IHIP Technical Support Unit with Seven IT engineers and three public health professionals. This dedicated team has contributed to the development of IHIP application and currently working closely with the NCDC to develop new modules and to provide additional functionalities of existing modules based on implementation experiences and evolving needs.

Private sector involvement in IDSP-IHIP

2.10.   India has a mixed healthcare system, where public and private sector together deliver a wide range of healthcare services. Though share of private sector varies across Indian states, in most cases, private sector provides majority of health services, be it in-patient or outpatient. At the time of India's independence, in 1947, only 8% of health care delivery was private. Today, however, 80–85% of the licensed physicians, 93% of the hospitals and 80% of the outpatient clinics in India operate, in whole or in part, within the for-profit private sector[v]. Unfortunately, the participation of private sector in disease surveillance systems and data recording and reporting is sub-optimal. One of the reasons for this situation is a non-alignment of priorities of the two sectors which limits the scope of collaboration and engagement. However, it is a well-recognised that an effective public and private collaboration can ensure optimal utilisation of available resources and help to maximise benefits to the community. As an example, the Public-Private Mix (PPM) approach for Tuberculosis elimination had significantly improved case detection. The Polio eradication efforts in India had large number of private healthcare providers actively participating in the surveillance system contributing to polio elimination from the country. Such learnings have the potential for application in disease surveillance systems such as IDSP-IHIP in India.

2.11.   There are, however, some genuine concerns in engagement of private sector. First, the geographic distribution of the formal private sector. The formal private sector, being primarily profit driven, has a large presence in urban and peri-urban areas leaving out the large rural areas out of its ambit. Secondly, private sector is a mixed bag. There are wide variations in the way the private sector

is organized ranging from a single physician clinic belonging to a formal or informal provider to large multispecialty corporate hospitals and private medical colleges. With a priority focus on individual health, the broader public health generally remains of low importance to the private sector and hence surveillance is considered as an additional burden. Further, there is inadequate training and lack of up-to-date knowledge on disease surveillance for the private sector. The frequent turn-over of critical staff who play important role in surveillance reporting such as paramedical staff and lab technicians and variations in quality of diagnostic and treatment services further adds to the complexity of the situation.

2.12. The confidentiality of the patient data, the complexity of the reporting procedures, lack of feedback, perceived poor recognition of the contribution and apprehension about losing the patient and higher income tax including the time constraints are other challenges. To address these concerns, IHIP started proactively engaging with private sector through a series of stakeholder meetings to better understand these constraints and collectively find solutions building on the successes and lessons learnt during COVID-19. In addition, IDSP is organizing dedicated training programs and capacity building initiatives targeting the private sector. The professional associations such as Indian Medical Association (IMA) and the Indian Academy of Paediatrics (IAP) are also being regularly engaged and sensitised for increased participation of private sector in IHIP reporting.

Chapter III. Understanding Integrated Health Information Platform (IHIP)

3.1. The IHIP is a web-based platform is built on the implementation experiences and learnings from the IDSP. It also addresses key recommendations of the JMM 2015 and aims to provide a comprehensive single window access to a variety of healthcare-related information. The platform is designed to be used by healthcare providers, policy makers, researchers, and other stakeholders in the healthcare sector. The IHIP in India aims to detect and respond to emerging and remerging and as well as endemic diseases through an expansion of IT enabled disease surveillance system. Expansion of IHIP would contribute to increased real time reporting of surveillance data by public and private sectors. The IHIP has been developed and implemented by the Ministry of Health and Family Welfare with support from the WHO.

3.2. The IHIP is a strategic intervention to help national, state and local Governments including municipalities to identify and address knowledge gaps caused due to delayed availability of surveillance data. It also addresses limitations caused due to lack of automated epidemiological data analysis applying AI tools and inadequate data visualization. Application of GIS tools enables IHIP to pinpoint hotspots of outbreaks and identify vulnerable geographic locations and population groups including risk factors within the broader One Health context.

3.3. The IHIP is an important tool for promoting "*collaborative surveillance*" in India by enabling systematic strengthening of capacity and collaboration among diverse stakeholders, both within and beyond the health sector, with the goal of enhancing public health intelligence and improving evidence for decision making[vi].

> **Box 3.1: Value addition of IHIP**
>
> - Near Real time data entry
> - Case-based information
> - Integrated analytics
> - AI tools integration
> - Advanced visualization
> - GIS enabled.
> - Automatic report generation
> - Integration of information from multiple sources
> - Compliance to prescribed GoI IT standards for interoperability.
> - Facilitates community participation and collaborative surveillance.

3.4. The IHIP platform aims to integrate health data sources from public and private sector health providers, including clinicians, hospitals, laboratories, and research centres under a single operating platform. The expansion and roll-out of IHIP is expected to accelerate detection and response to outbreaks and serve as an effective early warning system for potential outbreaks. Box 2 summarizes value addition contributed by IHIP.

Salient features of IHIP

- Integrates data from various "registries" to provide real-time information on health surveillance from across India for decision-makers to act.

- Provides a one stop solution for public health surveillance to decision-makers at different levels of government and to monitor emerging and re-emerging public health threats in the country.

- Applies the concept of One Health collaboration, communication and coordination (integration of human health, animal health, environment and food safety and relevant ecosystems).

- Captures disaggregated data of persons at all levels and link data fmdifferent sources such as Provisional, Laboratory, and Early Warning Systems (EWS) forms.

- Interprets geographic correlates of persons and provides analysis and trends of various diseases with their socio-demographic attributes.

- Offers near real-time oversight of health surveillance at various levels such as Union health ministry, State health ministries, local governments, municipalities from anywhere on any electronic device.

- Follows a modular architecture design approach that subdivides a system into smaller parts called modules that can be independently created and used. A modular system is characterized by functional partitioning into discrete scalable modules using well-defined standard modular interfaces. The benefits of modular design are flexibility in design and reduction in costs.

Data sharing features

3.5.   The IHIP, as the name suggests, has Application Program Interface (API) based integration and it enables Integration with other Hospital and Lab systems; with the Ayushman Bharat Health Account (ABHA) ecosystem – a new initiative, authentication-based record sharing under the Ayushman Bharat Digital Health Mission (ABHM). The IHIP follows the national policies and directives for data Integration across programs. Further, with real-time data entry being done at the source, the surveillance units at the district and State levels can focus on important public health actions such as monitoring of disease trends, investigating unusual events and capacity building of rapid response teams at district and sub-district levels rather than chasing paper based weekly data generation. Some of the examples of data output from IDSP are given in Figure A1 in Annex. Figure 3.1 describes API based integration of IDSP-IHIP.

Figure 3.1: IDSP- IHIP-API based integration.
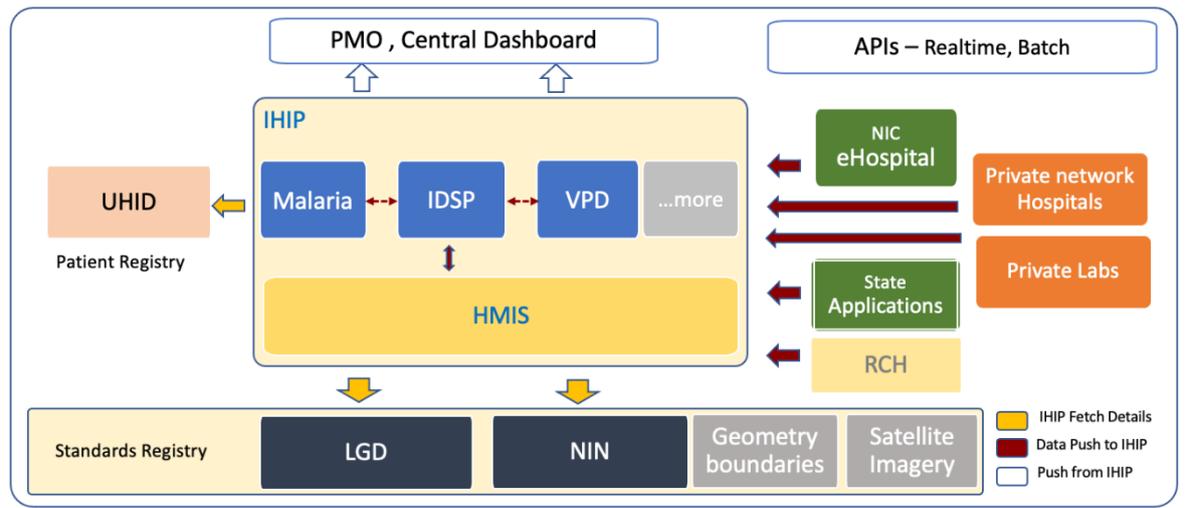

IHIP: The state-of-the-art digital surveillance platform

3.6.   Together, the IDSP and its new integrated information portal, the IHIP represent a significant step towards establishing a robust disease surveillance system in India that can detect and responding to public health threats in a timely and effective manner. The IHIP has been designed to and has a capacity to conduct real-time reporting generating alerts and visualization of spatial distribution of identified infectious diseases. This enables prompt identification of potential threats and initiation of investigations and mount appropriate response at the local level. The in-built Geographical Information System (GIS) in IHIP provides information in the form of a geographical map as interface data with real-time monitoring and enables district/state/national IDSP teams to undertake geospatial epidemiology to describe and analyse geographic variations in diseases. It also generates heat maps, spot maps and hot spots for the health events. Real-time monitoring is vital in timely identification and solving of public health issues and has a wide impact globally with regards to acute infectious disease outbreaks and their containment. Figure 3.2 describes the near-real time data flow envisaged under the IDSP-IHIP.

Figure 3.2: IHIP near real-time data flow process
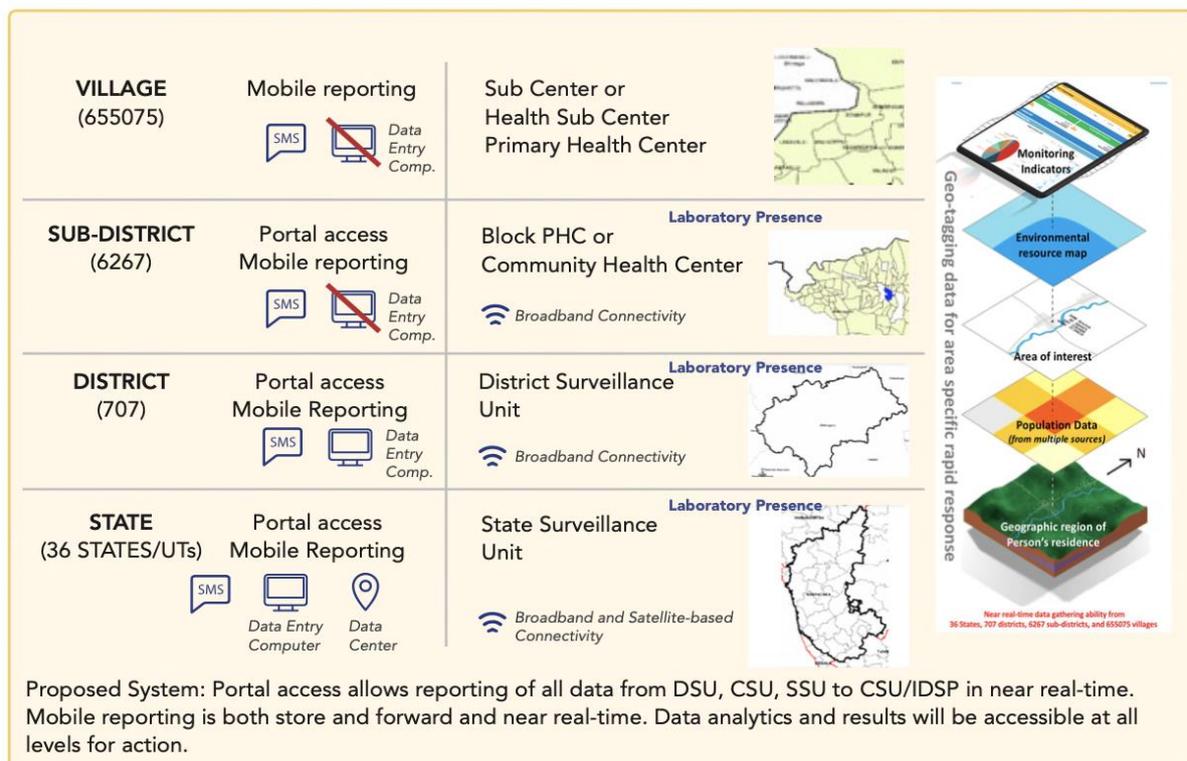
3.7.	The newer version of IDSP reporting on IHIP helps in reducing resource wastage, pooling of information from multiple sources, and providing near real-time information to guide informed response with better quality and efficiency in comparison to the earlier paper-based reporting system of IDSP. Thus, IHIP integrates data obtained from both public and private health sectors providing early warning signals for early detection of outbreaks. The IHIP data flow has been summarised in Figure 3.2. Recent initiatives such as PM-ABHIM and National Digital Health mission Blueprint provides thrust to accelerate the progress of IHIP.

3.8.	Overall, IHIP is a powerful tool for improving healthcare outcomes by providing a comprehensive view of health trends and risk factors at a population level. By analysing this data, healthcare providers and relevant national program can identify areas of need and implement targeted interventions to improve the health of communities. Figure 3.3 presents integration of different reporting systems under the IDSP-IHIP.

Figure 3.3: IHIP: Integrated platform
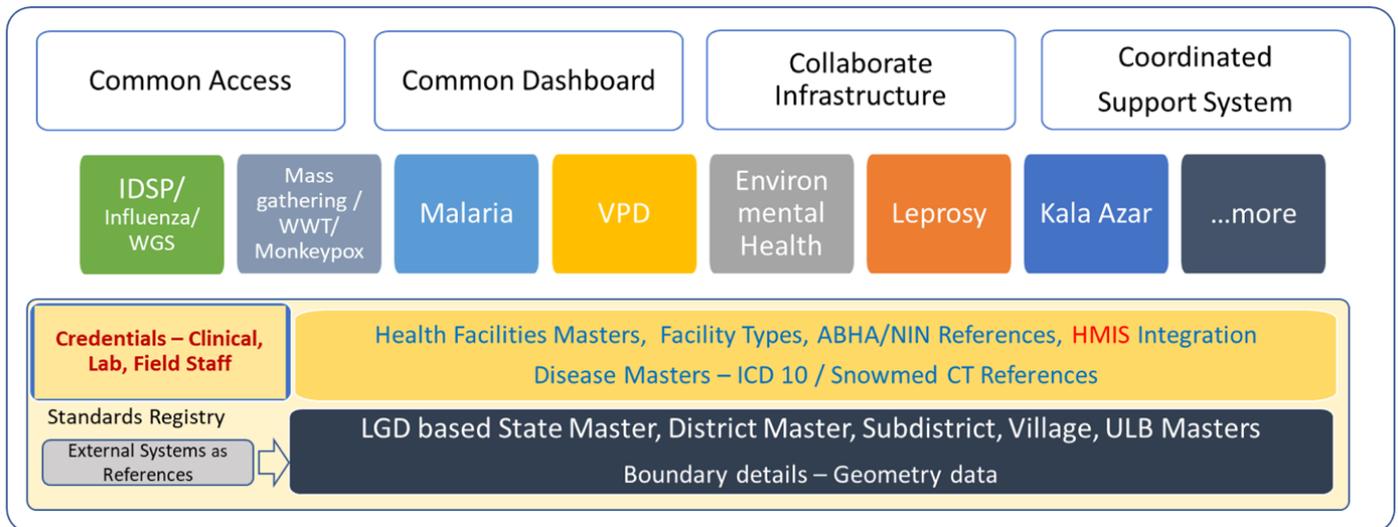
3.9.   The IHIP as of now, has been accepted by most Indian States/UT for reporting IDSP data, however, the implementation is patchy with the government sector reporting bulk of surveillance data. Some of the potentials of IHIP in data analytics such as data visualization including heat maps and line-listing of cases are depicted in Figure 3.4.

Figure 3.4: Data visualization and heat maps in IHIP
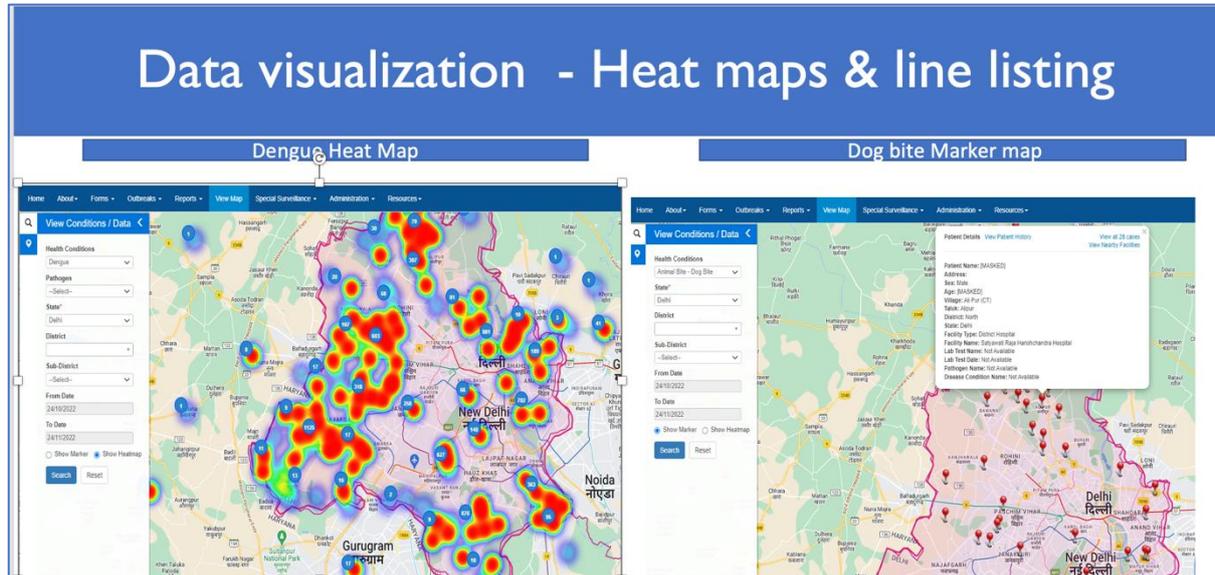
3.10.   In short, IHIP is a platform serving different applications. It provides a common web interface to sign-in and navigate to different applications through a desktop or mobile app. The IHIP has an integrated dashboard that provides a national view of data across different program applications. These applications are being developed and maintained with ownership of their data with respective program divisions. There is a program specific as well as integrated access based on specific user's role. The Data fetch by APIs from program-specific data systems

require adherence to common masters. The platform offers infrastructure optimization with common technologies and state-based common server setup.

IHIP is fully aligned with India's health policy and strategies including international reporting requirements.

3.11.   India's National Health Mission (NHM) places a strong emphasis on the integration of all vertical disease control programmes, the delivery of all health services, and universal and cashless access to a basic health package that includes critical medications. A priority was set for developing a health information system that links all providers, laboratories, and public health managers and collects data from the population, the community, and facilities to guide decisions and resource allocations. The International health regulations requires a strong public health surveillance for time-bound detection and verification of public health events and their reporting, if required. A near real time reporting envisaged under the IDSP-IHIP supports such an approach. The National Health Policy 2017 has articulated that India needs to accelerate progress to achieve the Sustainable Development Goals by 2030 which requires a robust disease surveillance and response system in the country.

3.12.   The Vision 2035 public health surveillance in India – A white paper envisaged that by 2035 India's public health surveillance will be a predictive, responsive, integrated and tiered system of disease and health surveillance that is inclusive of prioritized, emerging and re-emerging communicable and non-communicable diseases and conditions. It also envisioned public health surveillance in India by 2035 will be governed by an adequately resourced effective administrative and technical structure serving the public good. The IDSP-IHIP is well aligned with this important vision.

Possibility to achieve more.

3.13.   The explosion of digital technologies in health and launch of National Digital Health Mission Blueprint in July 2019 provides additional opportunities for the expansion of such surveillance platforms. Two key recommendations from the National Digital Health Mission document are the use of a unique health identity number (UHID) and the strengthening of electronic health records in the public and private healthcare sectors, which are also used by the IDSP IHIP, as appropriate.

3.14.   The Ayushman Bharat Health Account (ABHA) is an initiative of the Government of India under the ABDM. It establishes a centralized database of all health-related data for Indian citizens. ABHA is a fourteen-digit unique identifier for a person participating in India's digital healthcare ecosystem. It establishes a strong and trustable identity that will be accepted by healthcare providers and payers across the country. The ABHA enables linkages healthcare benefits from various public health programs to insurance schemes, helps avoiding long waiting lines for registration at health facilities and enables the registered person to access and share her/his health records digitally.

3.15.   The COVID-19 pandemic- more than ever- underscored and highlighted the need for further strengthening of public health surveillance. In October 2021, the Government of India announced the Pradhan Mantri- Ayushman Bharat health infrastructure mission (PM-

ABHIM), an initiative which aims to strengthen various forms of public health surveillance. As part of PM-ABHIM, there is a proposal to strengthen the relevant public health institutions and systems and to support real-time surveillance data generation and use.

IV. Key technical features of IDSP-IHIP

4.1.   The health event reporting and surveillance from Integrated Disease Surveillance Program (IDSP) to Integrated Health Information Platform (IHIP) is a major shift. A few key aspects have been described in earlier section. IHIP is an open platform, and thus may link to both the new National Health Management Information System and e-Hospital Systems. To enable the secure sharing of health data, it may therefore interact with both public and private hospitals, laboratories, and research facilities through a single platform.

IHIP key technical features

4.2.   Various dashboards under IDSP-IHIP provide a snapshot of the status of the reporting and occurrence of 33 disease conditions. These include charts, graphs, and other visual aids that convey important information in a clear and concise manner. These dashboards can be updated in real-time, allowing users to monitor key performance indicators (KPIs) and other metrics that are critical to monitor the reporting status and disease trends.

Some common features of dashboards under IDSP-IHIP include:

- KPIs: The dashboards display performance metrics in an easy-to-understand format, allowing users to quickly identify trends or issues.
- Charts and graphs: The dashboards include various types of charts and graphs, such as line charts, bar graphs, and pie charts. These visual aids help users to better understand complex data sets and identify evolving patterns or anomalies.
- Drill-down capabilities: Users can drill down into the data to view more detailed information about a specific metric or KPI.
- Customization: Dashboards can be customized to meet the specific needs of the user.
- The various dashboard available under IHIP are:

Reporting dashboard: Shows the status and trend of reporting by three types of forms used in IDSP (S, P and L Forms). This dashboard also shows the reporting pattern of the reporting units over time.

Disease dashboard: Allows tracking of the quantum, trend & location of different health conditions/syndromes reported under IDSP. The dashboard also displays different epidemiological characteristics for the reported cases and can generate the spot map and line list for the reported cases.

Performance dashboards: Shows the disease surveillance performance of different States/Districts based on set of standardized evaluation criteria including the reporting pattern, mapping and outbreak response.

Outbreak Dashboard: Shows EWS and outbreaks reported during defined period. It allows plotting of the location of event alert/health condition alerts and geographies affected by outbreaks including display of detailed information for a particular outbreak.

Outbreak Performance Dashboard: Provides the performance status of the State/District based on ten pre-set criteria covering timeliness and quality of outbreak investigations and response cycle.

Reports:

4.3.   The IDSP-IHIP allows users to extract insight from large sets of data by generating multiple reports. These reports help to analyse data, identify trends and patterns, and make informed decisions based on data-driven insights. The standardized reports include:

- S, P and L Form Summary reports
- Consolidated Disease Summary Report
- Consolidated Reporting Summary Status
- Lab Performance Report
- Outbreak Summary Report

Other critical technical features:

Master files:
- Health facility masters – Master record of all Health Facilities which are registered on the system with their key attributes.
- Health workforce masters and directory – Directory of health workforce involved with disease surveillance under IDSP with key information and contact details.

Training Modules and tracking:
- eLearning interfaces for IDSP: The IDSP-IHIP provides eLearning modules with video tutorials for to meet specific needs of different users based on their roles and functionalities. The users can enrol for the selected module and on successful completion will get the completion certificate.
- Visual updates on status of IDSP-IHIP training at various levels.

System Compliance and interoperability:
- LGD compliance/ICD: The IHIP platform is compliant with the Local Government Directory and ICD 10 for interoperability.
- Most of the health facilities registered on the portal are also compliant with National Identification Number (NIN) registry.
- Security audits compliance: The application is security audit complaints as per Computer Emergency Response Team-India standards and has been certified for the same.
- Ayushman Bharat Health Account (ABHA) ecosystem compliance: Currently work is in progress to make the application compliant to the ABHA ecosystem.

SMS alerts and monitoring

- The system provides auto-generated text messages (SMS alerts) to inform intended recipients the reporting performance as well as for event alerts and outbreak notifications.

Event and Outbreak reporting:

- A dedicated module is included to track event notification, outbreak investigations and response on a real-time basis.

Community reporting:

- The IHIP includes an open access functionality to enable reporting of any significant health-related event/case. Any community member can submit the information with an OTP based authentication.

Application of AI:

- An automated tool has been integrated with the IHIP for the media scanning and filter out and shortlist health-related events reported for further action.

Special surveillance modules:

- COVID-19: To provide detailed analytics of COVID-19 cases, deaths and tests. This also has a dashboard tracking the situation at the district level, generating alerts based on a set criterion.
- Whole Genomic Sequencing (WGS): More than 60 WGS labs and more than 400 sentinel sites are registered on the IDSP-IHIP portal. This module enables monitoring regularity of WGS sample sharing by sentinel sties as well as results.
- Influenza surveillance: A special Surveillance Module for Influenza linked to P Form & L Form reporting is functional on the portal. Provisions have been made to capture the additional clinical information and sample referral to the reference lab within the module.
- Wastewater surveillance: Sixteen labs undertaking wastewater testing and more than 160 sewage sampling sites are registered on the portal and are submitting the testing results.
- Mass gathering surveillance: A special surveillance module for disease surveillance during mass gathering events is included in the portal. This module was successfully during the last two Kumbh Melas (Prayag raj 2019 and Haridwar 2021) for disease surveillance.

Integration with other information systems:

4.4. The IDSP-IHIP also incorporates the following modules to integrate relevant health information systems within NCDC as well as other priority programs being implemented by the MOHFW.

- Modules to integrate information being generated by different programs within NCDC covering Environment, and Zoonosis- Modules for the National Programme for Climate Change and Human Health (NPCCHH) for Heat-Related Illnesses (HRI)

Surveillance and Air Pollution Related Illnesses (APRI) are functional across the nation. Work is underway to develop a module for Sentinel Surveillance sites of Zoonoses.

- Module to integrate National Vector Borne Diseases Control Program data is functional.
- A new module has been developed for the surveillance of Vaccine-Preventable Diseases. This is currently under piloting and soon will be ready for nationwide implementation.
- A new IHIP module under the National programme for Prevention & Management of Trauma & Burn Injuries (NPPMT&BI) for tracking Road Traffic Accident cases is currently under development.
- The HMIS portal in IHIP gathers data to support planning, management, and decision-making in health facilities and organizations across India. A new HMIS-IHIP (HMIS 2.0) was launched nationwide on 28th December 2020.
- There are plans to integrate with ABHA which will automatically strengthen case-based reporting.
- The MOHFW is in the process of establishing a National Public Health Observatory and Central Health Informatics Unit which will receive the surveillance data from the IHIP.

IHIP helpdesk:

- The WHO TSA operates a 24/7 helpdesk to report and resolve the issues for the end users including actively tracking & supporting the IDSP program managers at national, state and district levels.
- Under PM-ABHIM, the MOHFW has contracted a new TSA and a dedicated program management unit to continue this role as the transition of managing IDSP-IHIP from WHO to MOHFW/NCDC takes place.

V: SWOT Analysis of IDSP-IHIP

Developing the policy and strategic plan for IDSP-IHIP requires an in-depth and robust understanding of the system and feedback from key stakeholders about its strengths, weakness, opportunities and threats. Such analysis can inform and guide the process of developing a future roadmap. The SWOT analysis below is based upon literature review and discussion with senior programme managers, policy makers, WHO officials and other stakeholders.

Strengths

- Provides a near real time, case-based surveillance information with integrated analytics, automated alert generation and advanced visualization capability.

- Enables near-real-time health event data collection in digital mode, completely doing away with the paper based weekly reporting.

- Creates an opportunity to integrate all surveillance data from different sectors and different levels including the central, state, district and local levels with a strong IT component for effective One Health data analytics.

- Offers well-structured capacity building including in-built training modules for health personnel to develop and sustain new skills.

- Enables prompt identification, initiation and monitoring of outbreak investigation activities on a real-time basis remotely using a mobile phone or any electronic devise connected to the system.

- Captures disaggregated data at various levels of healthcare levels and aids in optimizing resources by pooling information from multiple sources, providing quick information and guiding response with better quality and efficiency.

- Offers Geographic Information System (GIS) enhanced data and geo-tagging of symptomatic cases and health facilities which helps better targeted follow-up and effective response.

- Uses artificial intelligence algorithms for capturing events and information reported in mass media (Event-based surveillance) through the Media scanning and verification cell.

- Encourages community participation to detect and respond to a health-related event through an open access community surveillance tool on IHIP platform which can be used by any citizen.

Weaknesses/ challenges

- Training of designated front line health workers is sub-optimal, and variable across states. So far, training of private sector staff is limited.

- Data-entry operations are currently being done by pharmacists and laboratory technicians, who consider this as an additional task and often are not sufficiently motivated.

- High OPD loads in major hospitals, especially in secondary and tertiary level health facilities, impact reporting.

- There is untapped urban geographical coverage, partly because of sub-optimal participation of private sector as well as due to limited coordination with local city health authorities.

- Inadequate private Sector Involvement in IHIP is a major limitation as the private health sector in India provides a large share of both outpatient and hospitalization services and is often the first point of contact for many. As a result, reporting of important health events are likely to be delayed or missed totally.

- The use of Artificial Intelligent (AI) in disease surveillance is presently less than optimal especially given the huge potential in Indian setting.

- Despite good progress, the IHIP is not yet operational in all the states.

- Disease surveillance in India continue to be in vertical silos across institutions and programmes which makes integration as envisaged by IHIP quite challenging.

- Limited use of emerging platforms such as social media for disease surveillance.

Opportunities

- India has started several initiatives such as Ayushman Bharat Programme, National Digital Health Mission and PM-ABHIM, all of which provide huge opportunity to strengthen IHIP and disease surveillance.

- Proposed establishment of Regional NCDCs will further enable strong technical backstopping to state and districts in data analytics, high quality investigation of outbreak alerts and effective response.

- The recent guidance note issued by the MOHFW for the Public Health Management Cadre (2022) will enable states to create appropriate positions at the cutting-edge levels, such as district, city and block, to effectively implement public health surveillance.

- India's NDHM aims to build the backbone required to support the country's integrated digital health system. Such system is critical for delivering "the right intervention at the right time to the right population". Both NDHM and IHIP have shared objective of improving health of citizens.

- Ongoing efforts to strengthen Intersectoral linkages and mechanisms between various Ministries such as health, animal husbandry, environment and wildlife to enhance One Health Coordination under the Principal Scientific Advisor provide new opportunity for surveillance data linkages beyond health sector.

- The renewed discourse and understanding on the need for functional integration of surveillance components of vertical programmes gives an opportunity for intersectoral integration.

- Wide access to mobile phones and increasing use of smart phones with internet access provide enormous new opportunities for real-time data transfer envisaged by IHIP.

According to the latest NFHS (1029-21), 93.3% of Indian households had a mobile phone while Pew Study reports that the share of Indians having smart mobile phone has increased from 24% in 2018 to 54% in 2020 and projected to reach 96% by 2040.

- Flexibility to add new modules to improve surveillance reporting such as COVID-19, whole genomic Surveillance, mass gathering events surveillance developed since March 2020, provide opportunities for further strengthening and scale up of IHIP.

Threats

- Communicable illnesses are re-emerging and becoming more prevalent, and several old ones have returned with mutant or resistant strains of pathogens. The emergence of such diseases and pathogen sometimes change and destabilise current priorities of IHIP.

- Shortage and high attrition of dedicated core Human Resource for surveillance and response at the State, District and Block levels. This includes key positions under the programme such as epidemiologists, data managers and data entry personnel. Non-uniform remuneration structures for public health consultants with similar skill sets across different programmes have been a major challenge in attracting and retaining talent.

- Gaps in coordination in the reporting mechanisms between a range of different agencies with differing health information mandates.

- Concerns of Private sector about reporting surveillance data may open challenges such as enhanced scrutiny by tax authorities and potential risks of compromising privacy of their clients.

- Increasing vulnerability of public databases to cyber security threats.

- Misinterpretation of data by media may generate rumours and can create panic.

# VI. Options for enhanced private sector participation in IDSP-IHIP

6.1. It is well known that Private health sector contributes a significant share of India's health care delivery. It is estimated that 80–85% of the licensed physicians, 93% of the hospitals and 80% of the outpatient clinics in India operate, in whole or in part, within the for-profit private sector. Therefore, without active engagement and participation of the private healthcare providers, the surveillance data collection and response will be incomplete.

6.2. The IDSP working with states has made notable effort in enrolling private sector. So far, more than 11,000 private sector health facilities are enrolled under IDSP-IHIP reporting network. The enrolled private health facilities include private hospitals, labs, medical colleges and super speciality hospitals. Currently, about 20% of reporting network under IDSP-IHIP (P & L Form) comprises of private-sector health facilities. The PHSPP support to the PM-ABIM envisages increasing reporting by identified private sector hospitals to 30% and 40% by FY 2025 and FY 2026 respectively. It is clear this effort needs to be further augmented and innovative out of box solutions need to be explored to enhance private sector reporting.

Private healthcare organization in India:

6.3. The private sector in India is a mixed bag consisting of informal providers, solo practitioners, small nursing/maternity homes (<10 beds), small hospitals (10-30 beds), large corporate hospitals (100+ beds) and private medical colleges. According to an analysis by the Center for Disease Dynamics, Economics & Policy in April 2020, of the total 18,99,228 hospital beds in India, 11,85,242 are in the private sector and 7,13,986 in the government sector. The same report also states that there are an estimated 69,000 public and private hospitals across India in 2019. Of these, 43,000 were private sector hospitals. (Figure 6.1)

Fig 6.1. Estimated distribution of hospitals and beds in India by ownership
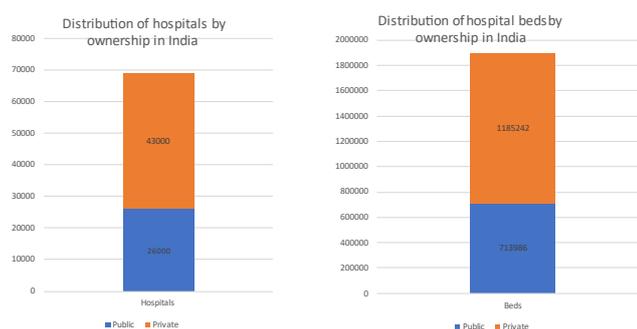
6.4. Ayushman Bharat or Pradhan Mantri Jan Arogya Yojana (PMJAY) scheme was launched with the purpose of benefiting the cashless treatment facilities of up to Rs. 5 Lakh to the Indian Citizens who are financially weak at the empanelled Ayushman Bharat hospitals spread across India. Since the inception of the PMJAY, several hospitals have been empanelled and the current estimates suggest that more than 15,000 hospitals are currently participating in the PMJAY scheme. Out of this 50% of the empanelled Ayushman hospitals are private

hospitals where the beneficiary can get cashless treatment. Under this scheme, a hospital would be Ayushman Bharat empanelled or PMJAY network hospital after approval by the respective State Health Authority based on the adherence to set guidelines and criteria.

6.5.   In addition to hospitals, the private sector also operates diagnostic laboratories. While most private hospitals have attached laboratories, there are also national & regional chains and stand-alone laboratories. In terms of market share the stand-alone laboratories contribute to the more than half of tests in terms of volume however the range of tests performed tends to be limited and generally they do not have microbiology testing which limits their contribution (Figure 6.2). The national & regional chains and laboratories attached to corporate hospitals offer a wide range of testing menus including confirmatory tests for bacteriological, viral and fungal infections.

Figure 6.2. Market shares of different types of private laboratories by revenue and volume
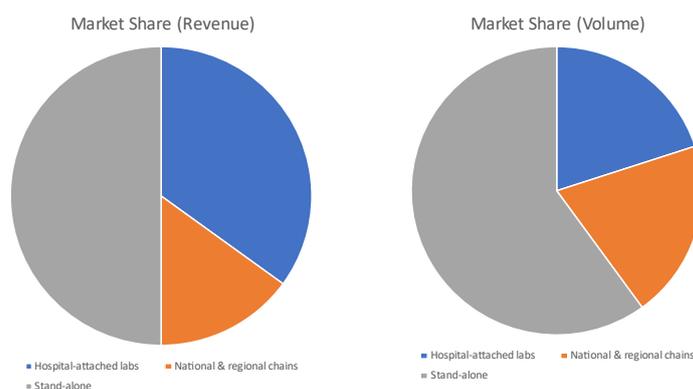
Way forward:

1. Strategic prioritization

6.6.   While private sector participation in IHIP remains critical, considering the wide segmentation, a phased approach starting with private sector that has potential to offer maximum information on priority conditions identified by the IDSP-IHIP would be desirable. The first such option therefore would be PM JAY hospitals and laboratories attached to these hospitals, the national & regional chains of private sector laboratories and private medical colleges.

6.7.   The PMJAY hospitals, however, offer a wide range of specializations and there are several dedicated facilities offering speciality services such as Cardiology, Oncology, Ophthalmology, Dentistry etc. Only those facilities offering general medical care, paediatric services or infectious diseases treatment will be relevant for routine reporting under IDSP-IHIP. Such detailed information on case mix of PMJAY hospitals is available only at the district level. To address this priority need, currently the IDSP Central Surveillance Unit is

working with states and districts to undertake a nation-wide listing of PMJAY hospitals that have potential to contribute under IDSP-IHIP. This task is expected to be completed by July 2023.

6.8.   As the laboratories provide confirmation of pathogens, their involvement remains a high priority. However, considering the market volume and the range of tests performed, the laboratories attached to larger private hospitals (medical college and PMJAY) and those operating as national/regional chains would be more important to initiate engagement.

6.9.   The solo practitioners and smaller hospitals/nursing homes as well as standalone laboratories could be sensitized through professional associations to report any unusual events through the community reporting module of IDSP-IHIP. If required, an additional module for reporting by medical/para medical professionals linked to a mobile application for SOS reporting rather than daily reporting could be developed.

2. Create a value proposition.

6.10.   The following options are identified based on implementation experiences within India from different national health programs such as Tuberculosis Elimination and National AIDs Control Program as well as evolving global lessons.

1. *Mandates*: Central and/or State level mandates asking selected private sector facilities to report on IDSP-IHIP.
2. *Accreditation linkage*: Making data-sharing as pre-requisite for current accreditations such as PMJAY or National Accreditation Board for Testing and Calibration laboratories (NABL).
3. *Non-monetary incentives*: Incentives without financial value attached that could contribute to enhanced business/growth of the private players.
4. *Coordination through a lead entity*: Contract a lead agency (either professional agency or an NGO) to facilitate private sector participation in a defined geographic area.
5. *Exploring non-traditional sources of information*: Obtaining data on sale of selected pharmaceuticals such as antibiotic from major manufacturers, population mobility data from cell phone companies and media scanning.

6.11.   Each of these options comes with its own pros and cons and ideally a combination of approaches with flexibility to local health authorities to combine models relevant to their context is desirable. This requires the CSO IDSP to create appropriate templates and provide strong institutional mechanism to monitor and compare effectiveness of these options. The establishment of a dedicated PMU to facilitate state engagement at the IDSP CSU will be able to facilitate this process. Table 6.1 presents pros and cons of these options.

Table 6.1. Pros and cons of different options for enhanced private sector participation in IDSP-IHIP

Option	Description	Pros	Cons	Comments
Mandates	Requires circulars or email notifications issued either by central or local health authorities to selected health.	• District/State health administrators familiar with such approach. • No additional cost implications.	• Interest may get diluted with passing time. • Poor follow-up and inability/reluctance to impose punishments for non-compliance.	Some states such as Chennai City Corporation are trying this approach
Accreditation linkage	Introduction of relevant clauses in PMJAY contracts and/or NABL accreditation protocols.	• Easy to implement as both are ongoing programs with good private sector participation. • No additional cost implications.	• Not all PMJAY hospitals offer comprehensive care. • Only a limited number of NABL accredited labs (less than 3000)	Urban bias of PMJAY and NABL accredited labs needs to be balanced.
	•		•	
Non-monetary incentives	• Rewards & recognition (display certification of participation) • Training of staff (Lab technicians) in new technologies. • Fast track approvals for starting new facilities if they comply with reporting. • Assured feedback on disease trends.	• Less resource demands on exchequer • Better trust building	• Requires out of box thinking and flexibility in implementation at state/district levels. • Requires constant updating of strategies/innovations to sustain interest.	Not much evidence on the ground on long term sustainability.

3. **Sustain advocacy stakeholder consultation**:

6.12. The IDSP has started an extensive process of private stakeholder consultations. So far, such consultations are held in Karnataka, Delhi and Gujarat and few more are planned. While there is general willingness to participate, the key areas identified for additional inputs included identification of designated staff and training them with a focus on P and L form reporting, support/incentive for additional staffing (data entry operator) for medical colleges and larger hospitals and API integration of existing IT systems of laboratories and hospitals.

4. **Create dedicated institutional mechanisms for Private sector engagement:**

6.13. Most programs that were successful in building trust and sustained partnerships with private sector have created dedicated focal points and institutional support systems to facilitate out of box thinking and innovations to promote private sector partnership. IDSP-IHIP may consider such mechanisms including the option of hiring appropriate agency to create strong foundation for private sector engagement during the formative period. The option of piloting and testing simplified reporting mechanisms for smaller private providers and solo practitioners using mobile applications and require priority attention.

VII: Implementation progress, Vision, guiding principles and strategy for IDSP-IHIP

7.1.   This section summarizes the implementation progress of IHIP since its launch in 2018 followed by articulation of IHIP Vision, guiding principles and overarching strategy for its institutionalization in the health system to augment India's pandemic prevention, preparedness and response.

Implementation Progress of IDSP-IHIP:

- NCDC has been identified the nodal agency for the IDSP - IHIP implementation.
- The portal had a soft launch in 7 States (Karnataka, Andhra Pradesh, Himachal Pradesh, Odisha, Uttar Pradesh, Telangana & Kerala) through Video conferencing by Secretary (HFW), Govt. of India on 26 November 2018
- A nationwide formal launch was done by Hon'ble Union Minister for Health and Family Welfare on 05 April 2021.
- During the first phase, migration of 11 States was completed on 30th Sept 2021 and the older IDSP data entry portal was disabled.
- Additional 13 States were migrated during the second phase on 31st Dec 2021.
- Of the remaining 12 States, 10 have been migrated as phase 3 on 31st May 2022, thus taking the total number to 34 States/UTs.
- The two remaining states are West Bengal and Kerala. West Bengal has is currently implementing a dual system and expected to move fully to IHIP soon. Kerala had an initial plan to develop a local platform, but this was subsequently dropped.
- The maintenance and technical support of the IHIP application is being taken over from the WHO by Health Ministry. The MOHFW is the process of contracting Technical Support Team with about 18 personnel to facilitate this.
- Recently an agency has been contracted to establish a dedicated Program Management Unit (PMU) to catalyse the IHIP institutionalization supporting IDSP in state interactions and training.

Vision

By 2035, IHIP will:

- offer a predictive, responsive, integrated and tiered system of disease and health surveillance that integrates prioritized, emerging and re-emerging communicable and non-communicable diseases and conditions.
- integrate all priority national health programs of India as envisaged by the National Digital Health Mission
- create a proactive system of disease and health surveillance that anticipates, promptly identifies and effectively responds to emerging health threats.

- use de-identified (anonymised), individual-level patient data that emanates from public and private health care facilities, laboratories and other sources.

- ensure strong data protection to safeguard data from unauthorized access, disclosure, modification, or destruction and prevent data breaches.

- protect rights and interests of data subjects by ensuring confidentiality so that only the authorized users can access the data and that the data is not disclosed to any third party without proper consent.

- enhance trust and confidence among various One health stakeholders involved and create a platform that enables communities and individuals to report unusual health events directly and actively participate in a well-coordinated response.

- adequately resourced through domestic financing and managed by an efficient and transparent administrative and technical framework.

Guiding Principles

- **Citizen centrality:** Aligns the disease surveillance system with a citizen-centricity highlighted in the National Health Policy 2017 and the National Digital Health Blueprint.

- **Cost-Effective:** Ensures that online system will be cost-effective, and it will eliminate the need for physical records and reduce the risk of human errors.

- **Integrated:** Strengthens integrated health care delivery across settings and sectors, including covering public and private hospitals.

- **Quality:** Ensures that all outbreaks will have a high-quality investigation by multi-specialty Rapid response team supported while laboratory confirmation.

- **Equity:** Contributes achievement of health outcomes in equitable manner by early identification enabling prompt actions against epidemic-prone diseases.

- **Timeliness and completeness:** Limits reporting gaps and ensures timely flow of information across the healthcare facilities.

- **Simplicity:** Ensures that data management, including collection, reporting and analysis in the surveillance system is simple.

- **Flexibility:** Provides system flexibility to accommodate new variables or modules depending on evolving needs.

- **Stability:** Complies with maintenance requirements of GOI and ensures timely resolution of technical glitches.

- **Sensitivity and representativeness:** Allows generation of appropriate outbreak alerts covering all critical risks and vulnerabilities across the species and disciplines.

- **Usefulness and acceptability:** Provides credible data on health-related events including magnitude, number of cases, deaths and vulnerable populations in time to guide informed response.

Strategy:

- Build upon nearly two decades of experience in rolling out and institutionalizing IDSP as a decentralized IT enabled disease surveillance system in India as a nation-wide program effectively working with States through the National Health Mission framework of engagement.

- Proactively engage different segments of private sector and involve them as partners in augmenting disease surveillance in India.

- Optimize the emerging opportunities such as Ayushman Bharat Digital Health mission that enables seamless management and sharing of medical records and the PM-ABHIM.

- Facilitate integration of surveillance data being generated by different One Health Sectors (animal husbandry, dairy, environment, wild-life, food safety etc.) to optimize coordination in identifying and responding to emerging and reemerging pathogens including tracking of antimicrobial resistance.

- Effective utilize the rapidly expanding of mobile and digital networks under ABHA for seamless integration of health data from various sources.

- Improve the efficiency in sharing information of the various disease control programs through a common platform and facilitate timely sharing of relevant information with appropriate authorities and communities on disease and risk factor trends over time.

- Leverage non-traditional sources to provide early warning about impending threats such as tends in climate change, population mobility, pharmaceutical sales, active listening on the social media etc.

VIII: Five-year Strategic plan for IDSP-IHIP

8.1.   Building on the Vision and SWOT analysis this section proposes a time-bound road map for institutionalization of the IDSP-IHIP within the MOHFW and the NCDC. Four distinct phases, some of which will run in parallel, are proposed for implementation of this roadmap.

I.   Institutionalization (2023-24):

8.2.   During this phase, the core IT and programming including cloud storage will shift from the WHO to the MOHFW/NCDC. The MOHFW has established a new central health information unit/health observatory at the National Institute of Health and Family Welfare to guide this process under the leadership of the Ministry's e-Health division.

8.3.   The MOHFW is in advanced stage of procuring services of an agency to operate a dedicated Technical Support Unit (TSU) with about eighteen IT experts including programmers, specialists in application development, data analytics and AI to facilitate full institutionalization of IHIP within its domain.

8.3.   Appropriate hardware and cloud servers need to be put in place quickly to support this process. In addition, the 24/7 help services and backup support systems should be sustained and further strengthened.

8.4.   As this process moves forward, The IDSP CSU team needs to develop core in-house skills to steer the process and effectively manage the TSU to ensure timely delivery of services and products as per the contract. The WHO has indicated its willingness to support this transition and provide required hand holding support to IDSP till the systems get established and fully functional. A transition team from WHO consisting of programmers, public health specialists and experts in data analytics including could backup is placed at the IDSP to facilitate this process.

Key performance Indicators:

- MOHFW approves financing plan for IHIP institutionalization and scaleup- July 31,2023
- IDSP-IHIP TSU is fully in position by August 1, 2023
- Transition of IDSP-IHIP to MOHFW/NCDC fully accomplished by March 31, 2024

II.   Expansion (2024-2025)

8.5.   During this phase four specific areas of expansion will receive priority focus by the IDSP CSU, NCDC and MOHFW.

- First, sustained high level advocacy will be undertaken with remaining two states (Kerala and West Bengal) to bring them on board to start real-time reporting using IHIP. Continued engagement with all States and UTs will be continued in this phase to sustain timely and high-quality reporting by public sector units including effective use of

automated alert systems to promptly identify unusual health events/outbreaks, pinpoint vulnerable populations through GIS to ensure a well-coordinated comprehensive response for containment. The CSU supported by the Regional NCDCs will support competency-based capacity building of States and District Surveillance Units in data analytics and high-quality outbreak response including documentation through weekly epidemiological bulletins. Back-up systems will be in place to ensure there is no down time during system glitches (if any) thereby minimizing risks of downtime.

- Second, introduction of innovations to augment engagement with the private sector. Building on the ongoing options emerging from consultations with the private sector (Chapter 6) a comprehensive engagement strategy including financing for enhanced private sector participation in India's disease surveillance will be developed. After obtaining MOHFW endorsement and budget, the private sector partnership strategy will be rolled out giving priority to PMJAY hospitals, medical colleges and attached laboratories.

- Third, continuation of ongoing data integration initiatives by linking more national health programs and establish linkages with other One health surveillance systems with the IHIP. There will be enhanced advocacy efforts to engage program managers and policy makers of remaining national health programs as well as improving case-based reporting by linking IHIP with ABHA health records.

- Fourth, establishing partnerships with other countries in South Asia region and international peers by creating a joint learning network in disease surveillance and applied epidemiology.

Key performance indicators:

1. Increase in public sector reporting units meeting performance parameters.
2. Endorsement of Private sector strategy by MOHFW for rolling out of private sector strategy by April 2024.
3. Increase in % of selected private hospitals and laboratories reporting regularly on IHIP.
4. The IHIP will have linkages with National Animal Disease Surveillance system.
5. Number of State/District Surveillance officers having competency in data analytics and implementing high-quality outbreak response.
6. Increase in national health programs/ABHA digital health records integrated with IHIP.

III.   Consolidation: (2025-2028)

8.6.   In this phase, the emphasis will be on consolidation of gains made and promote efforts improve quality and consistency of real-time reporting by both public and private sector players. Efforts will be made to further enhance private sector engagement involving smaller hospitals and solo practitioners including development of mobile applications for SOS reporting. The CSU will establish performance bench marking system for the IHIP in

consultation with states and assess system performance during outbreaks/simulation exercises. The feedback will be confidentially shared with states and additional hand holding support will be provided to those lagging. Weekly IDSP-IHIP bulletin will be published describing trends in priority diseases and syndromes including morbidity and mortality with case studies on outbreak investigations.

Key performance indicators:

1. IDSP-IHIP performance benchmarking system established through a consultative process.
2. Increase in private sector reporting with participation of smaller private hospitals and solo practitioners in IHIP.
3. Number performance appraisals/simulation exercise undertaken by CSU IDSP.
4. Number of new publications by the CSU, IDSP in peer reviewed journals.

IV.   Innovation (2028 onwards):

8.7.   By 2008 the IHIP system is expected to be fully stabilized, financing will be sustained, and more emphasis will be given to system improvements and introduction of new innovations in reporting and data analytics including application of AI. In addition, linkages with non-health information systems/data bases such as animal health, climate change, water and sanitation, population mobility etc. will be further enhanced.

Key performance indicators:

1. Sustained financing for IDSP-IHIP by MOHFW.
2. Number of new modules added to the IHIP to improve reporting.
3. Mobile application introduced to improve reporting of health events by citizens.
4. Increase in number of non-health information systems integrated with IHIP.

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Annexure

Annex A1: History and timeline of disease surveillance in India

The Integrated Disease Surveillance Programme (IDSP) was launched in 2004 to detect and respond to disease outbreaks quickly in India with the World Bank support. The project was extended for two years in March 2010, with funds available for a Central Surveillance Unit (CSU) at the National Centre for Disease Control (NCDC) and nine identified states. Surveillance units, known as SSU/DSUs, were established in all states and districts, and an IT network connecting 776 sites was established with the help of the National Informatics Centre (NIC) and Indian Space Research Organization (ISRO) for data entry, training, video conferencing, and outbreak discussions.

Weekly disease surveillance data on epidemic-prone diseases are collected from reporting units such as sub-centers, primary health centers, community health centers, hospitals, including government and private sector hospitals and medical colleges, and are analysed by SSU/DSUs for disease trends. Whenever there is a rising trend of illnesses, it is investigated by the Rapid Response Team (RRT) to diagnose and control the outbreak.

District laboratories are being strengthened for the diagnosis of epidemic-prone diseases, and a referral lab network has been established by utilizing the existing functional labs in the medical colleges and various other major centres in the States and linking them with adjoining districts for providing diagnostic services for epidemic-prone diseases during outbreaks. In addition, a network of 12 laboratories has been developed for influenza surveillance in the country.

Considering the non-availability of health professionals in the field of Epidemiology, Microbiology, and Entomology at district and state levels, the Ministry of Health and Family Welfare (MOHFW) approved the recruitment of trained professionals under the National Health Mission (NHM) to strengthen the disease surveillance and response system by placing one Epidemiologist each at state/district headquarters, one Microbiologist and Entomologist each at the state headquarters. The post of a Veterinary Consultant at the State Surveillance Unit has been approved by the MOHFW recognizing the Mission Statement of One Health Initiative. 408 Epidemiologists, 181 Microbiologists, 25 Entomologists and 3 Veterinary Consultants are in position as on 31st March 2015.

The IDSP has established linkages between the CSU, SSUs, DSUs, government medical colleges, and major premier institutions on a Satellite Broadband Hybrid Network. The Indian Space Research Organization (ISRO) has set up the satellite-based interactive network covering entire Maharashtra, Gujarat, and Tamil Nadu, Northeastern States, hilly States, and Islands. The Network Operation Centre (NOC) or main teaching end of this network is located at the National Centre for Disease Control and the SITs are located at the SSU, DSU, government medical colleges, and premier institutions.

Year	Events
1997-98	The National Centre for Disease Control (NCDC) initiated and coordinated the "National Surveillance Program for Communicable Diseases (NSPCD)," a pilot project that was conducted in five districts. Expanded to 101 districts by 2004.
March, 2003	**Central Surveillance Unit (CSU) was established (at Nirman Bhawan)** in Ministry of Health and Family Welfare.
Nov, 2004	World Bank funded project titled **"Integrated Disease Surveillance Project (IDSP)"** was Launched.
July, 2005	Development of comprehensive **guidelines for involvement of private sector and medical colleges.**
2005	For the operational ease, **the administrative unit was relocated at NICD** under the leadership of director NICD as Project Director (PD). A Senior officer (ADG level) was designated as National Project Officer (NPO) to coordinate the project activities.
Apr, 2006	Data reporting through e-mail started.
June, 2006	IDSP was administratively and financially merged with NCDC.
Nov, 2006	**"Focus state Strategy"** was applied to monitor the success of the project implementation in 14 identified states.
Jan, 2007	The fifth component was added to IDSP's component i.e., **Avian Influenza.**
Sept, 2007	**Weekly reporting of disease alerts/ outbreaks** through IDSP by States/UTs initiated.
Nov, 2007	A **weekly compilation/summary of outbreak reports** was introduced, which became boon in the management of epidemics like Avian Influenza (H5N1), H1N1 Pandemic, Chikungunya, JE, Dengue etc.
2007-08	Making of IDSP as part of **National Rural Health Mission (NRHM)**in 2007-08.
2007-08	IDSP initially aimed to support peripheral laboratories and microscopy centers also but discontinued as these are being strengthened by disease specific programs, like NVBDCP and RNTCP. In 2007-08, it was decided that the programme would only support District Public Health Laboratories (DPHL) and above (State, regional and national).
2007-08	**Infectious Disease Hospital Network** and **Urban Surveillance in 4 metro cities** were included.
Feb, 2008	**24X7, toll free call centre (1075)** established to receive disease alerts from all over the country.
March, 2008	IDSP/NCDC in consultation with WHO designed a **special 2-week FETP.**

July, 2008	**Media Scanning and Verification Cell** (MSVC) established for detection of early warning signals/unusual health events through various media. The information is shared with the districts affected to investigate and act.
2008-09	Due to limited availability of microbiologists to operate the labs and availability of equipment it was decided in 2008-09 to initially support only **50 District Public Health laboratories.**
June, 2009	**Competency Assessment Tool** for monitoring the quality of outbreak investigations by IDSP was introduced.
2009	Inclusion of 19 Regional Director (RD) offices and 8 NCDC branches for IT connectivity under IDSP
April, 2010	**Restructured IDSP** project implemented. As per the re-structured project, the World Bank provided funds from 1st April 2010 for Central Surveillance Unit and nine States **(Tamil Nadu, Karnataka, Gujarat, Punjab, West Bengal, Maharashtra, Uttarakhand, Andhra Pradesh and Rajasthan).** The domestic funds used for the remaining twenty-six States/UTs.
April, 2010	The Referral Laboratory Network initiated in the World Bank funded nine States.
May, 2010	Ministry authorized all State Health Societies for **decentralized recruitment** of sanctioned positions at State/Districts levels w.e.f. 1/6/2010.
May, 2011	Block level data entry module in portal developed and piloted in 2 blocks of Gujarat; Choyrashi (Surat) & Babna (Amreli).
Feb.- March, 2012	A **Joint Implementation Review (JIR)** of the Integrated Disease Surveillance Project (IDSP) was conducted by the World Bank with technical support from the World Health Organization (WHO) during February 20 - March 16, 2012.
Oct, 2012	Continuation of the IDS Project as Integrated Disease Surveillance Programme (IDSP) as a central scheme during 12th Plan Period (2012-17) was **approved by Empowered Programme Committee (EPC) of NRHM** on 04.10.2012.
Aug., 2013	**Strategic workshop on Disease Surveillance:** A two-day workshop was held on 8th & 9th August 2013, Delhi, with the objective to develop a road map for strengthening IDSP implementation in 12th Plan Period and identifying the role to be played by public health institutes/Medical Colleges in disease surveillance.
2013	The Strategic Health Operations Centre (SHOC) is established under IDSP to strengthen the outbreak detection and response capacities of the states and districts by utilizing state-of-the-art information technology.
2014-2015	National Review Workshop held from 26th to 28th November 2014, at NCDC, Delhi and 14th -16th May 2015 & JMM in Nov - Dec 2015.
2015	Block level data entry in phased manner in the country.
2016	Joint Monitoring Mission - IDSP
2017	Integrated Disease Surveillance Programme IT architecture revamp

2017	Integrated Disease Surveillance Programme Portal upgrade and real time data visualization
May 2017	**IDSP Surveillance Standards formed** based on National Consultative Workshop on Revised Reporting Format under IDSP.
Sept 2017	**ICT Master Plan was drafted** IDSP S, P, L and EWS Outbreak **Forms were revised**.
May 2018	**IDSP National Review Meeting** held at Lucknow, Uttar Pradesh.
Nov 2018	IDSP-IHIP Soft launch in 7 selected States by Secretary Health, GoI.
2018-2019	Pan India **Trainings of IDSP-IHIP** conducted in States, Districts & below.
May 2019	**IDSP National Review Meeting** held at Goa.
June 2021	**COVID-19: PHEOC activated.** Community Surveillance of COVID-19 initiated (surveillance of passenger coming from COVID affected countries). Call Centre established at NCDC
5th April 2021	**IDSP-IHIP National Roll-out by Hon' Minister of Health & Family Welfare.**
1st Oct 2021	**Older IDSP Weekly Reporting System discontinued** for Phase I States (Andhra Pradesh, Karnataka, Telangana, Goa, Gujarat, J&K, Ladakh, Madhya Pradesh, Sikkim, DNH & DD, Tripura)
1st June 2022	**Phase II States migrated** (A&NI, Arunachal Pradesh, Assam, Chandigarh, Chhattisgarh, Himachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Pondicherry, Tamil Nadu.
June 2022	**IDSP National Review Meeting** held at Delhi.
August 2022	**PHEOC activated for Monkey Pox**
Oct 2022	**Phase III States** (except Kerala) migrated - Bihar, Delhi, Haryana, Jharkhand, Lakshadweep, Maharashtra, Punjab, Rajasthan, Uttarakhand, Uttar Pradesh, West Bengal.

Annex A2: How to engage private sector in IHIP.

To enable private sector participation as equal partners in the planning, implementation, monitoring, and evaluation of public-private partnerships, it is necessary to establish legislative frameworks, policies, and operational strategies. At the operational level, public-private partnerships must be permitted to develop in the specific areas where they are to be carried out.

Drawing on best practises from India as well as experiences from other developing and developed countries, the document offers next measures for India to take to achieve this vision. All these approaches are consistent with the notion of elevating surveillance as a weapon for the public good. The phases are proposed as a continuous cycle as opposed to a sequential approach.

> **Box 5: Proposed strategies for ENHANCING IMPLEMENTATION OF PUBLIC-PRIVATE PARTNERSHIPS**
>
> - Partners are equal.
> - Mutual Trust between the counterparts
> - Thrust on confidentiality/ Trust building.
> - Fraternity feelings
> - Empowering and entrusting paramedical staff
> - Emphasis on need for surveillance rather than threatening.
> - Appreciating and recognising efforts of partners
> - To involve "private for-profit sector", speak business, not charity- Segment the market, involve segments on priority and compensate adequately.
> - Promote standards.
> - Ensure quality of care through a participatory body
> - Bring-in local partnerships.
> - Involve mutually acceptable interface-
> - Participatory approach to decision making.

- Develop a governance structure that involves political, policy, technical, and managerial leaders at both national and state levels.
- Determine the disease categories that will fall under the scope of Public Health Surveillance.
- Incrementally improve the monitoring of non-communicable diseases and conditions.
- Regularly prioritize diseases that can be eliminated as public health concerns.
- Strengthen the core support functions, functions, and system attributes for surveillance at all levels: national, state, district, and block.
- Establish systems to simplify data sharing, collection, analysis, and dissemination for effective action. These systems may incorporate real-time information from social media, mobile sensor networks, and participatory surveillance systems to detect outbreaks quickly.
- Foster innovation at every stage of surveillance activities.
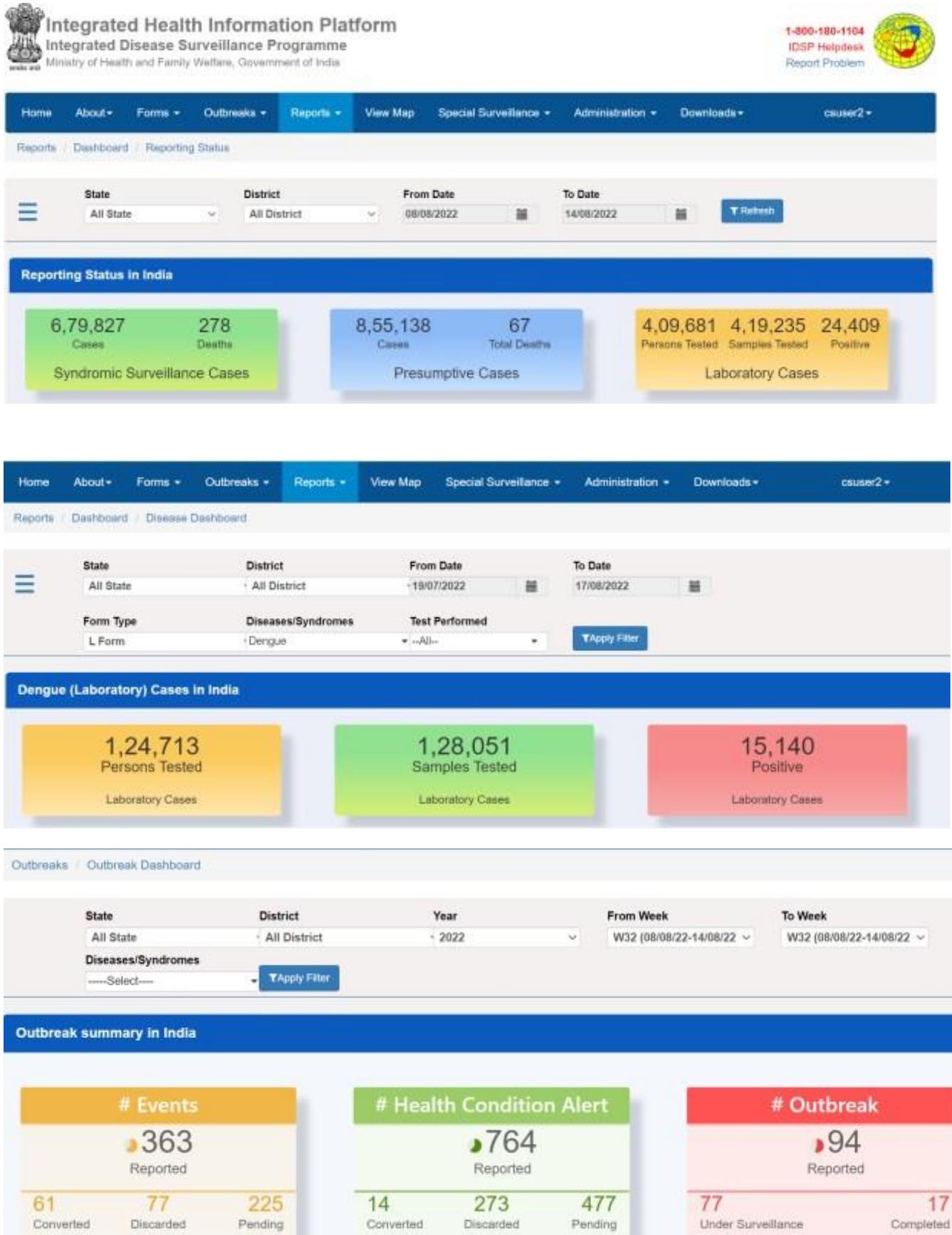
Figures A1: Snapshots of IDSP data output from IHIP

Table A1: Key syndromes and diseases under IHIP, India.

1. Only Fever >= 7 days
2. Only Fever < 7 days
3. Fever with Rash
4. Fever with Bleeding
5. Fever with Altered sensorium
6. Cough <= 2 weeks with fever
7. Cough <= 2 weeks without fever
8. Cough > 2 weeks with fever
9. Cough > 2 weeks without fever
10. Jaundice of < 4 weeks
11. Acute Flaccid Paralysis
12. Animal Bite - Snake Bite
13. Animal Bite - Dog Bite
14. Animal Bite – Others
15. Acute Diarrhoeal Disease
16. Acute Encephalitic Syndrome
17. Acute Hepatitis
18. ARI/Influenza Like Illness (ILI)
19. Severe Acute Respiratory Infection (SARI)
20. Dysentery
21. Anthrax
22. Chickenpox
23. Chikungunya
24. Crimean-Congo Haemorrhagic Fever
25. Dengue
26. Diphtheria
27. Human Rabies
28. Kayasanur Forest Disease
29. Leptospirosis
30. Malaria
31. Measles
32. Meningitis
33. Mumps
34. Pertussis
35. Scrub Typhus
36. Typhoid

18 diseases under IDSP plus 2 animal bite conditions plus 2 state specific / unusual syndromes

33 conditions under IDSP-IHIP plus 3 animal bite conditions

IDSP/IHIP Division
National Centre for Disease Control
Directorate General of Health Services, MoHFW, the Govt of India

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