5. Action plan for recommendations

Table 29: Implementation/action plan matrix for overall surveillance and response system

Time frame	Objectives	Activities	Office responsible	Partners support	Measure(s) of success and means of verification
	Formation of a surveillance committee under MoHFW	Define members of the task force. Form TORs. Meet on periodic basis	MoHFW/NC DC/other ministries	WHO/CDC/ other partners	Surveillance committee in place. Terms of reference completed and meeting periodically
	Development of a surveillance manual to include IBS and EBS components	Surveillance committee to guide development of the updated surveillance manual	MoHFW/NC DC/other ministries	WHO/CDC/ other partners	Surveillance manual in place
	Experts to define the data exchange, access and publications processes under IDSP	Consultation workshop to develop principles of collaboration on data exchange, procedure on collaboration and aligning data collection and reporting methods with key stakeholders Implement protocols for sharing of data and information for action between surveillance units and other stakeholders of the programmes at district, state and central levels	MoHFW/NC DC/	WHO/CDC/ other partners	Workshops completed, protocol implemented for sharing of data.

Expand the reporting network to the private sector	Inclusion of the private sector hospitals at the state and district levels by formal enrolment, with induction and regular follow up and visits for reporting of the disease conditions under IDSP.	NCDC	WHO/NPSP	Increase in the number of private reporting units and reporting regularly on disease conditions to IDSP
Appoint disease-specific contact points in IDSP to coordinate with other disease control programmes	Developing disease-specific contact points or task force members such as for food and water borne diseases, vector-borne diseases, diseases under elimination and eradication, zoonosis, emerging and remerging diseases. Define ToR for surveillance of disease-specific contact points. Meet regularly for convergence meetings.	MoHFW/NCDC		Disease-specific contact points in place with defined ToRs and regular meetings for surveillance convergence with other disease control programmes (DCPs)
Need to report on trends of public health importance	To report on the trends of public health importance for India regarding communicable diseases in an appropriate manner for all stakeholders and foster transfer into public health action; communicate the results; develop web portal outputs for various audiences and ensure regular updates; improve and expand on	MoHFW/NCDC	WHO	Reporting on trends of CD to stakeholders and foster transfer to public health action

		existing communication channels; hold or participate in various annual meetings to present results and contribute to an improved Annual Epidemiological Report			
	Develop and foster the principle of information for action	Foster the principle of information for action; promote the use by policy-makers of the main conclusions from the surveillance reports; monitor the key stakeholders to use IDSP surveillance data	MoHFW/NCDC	WHO	IDSP data is used by policy-makers for decision making and monitoring the trends using surveillance information.
	The network of ID hospitals may be extended to other ID hospitals in the country	Expand the network of infectious diseases hospitals in a phased manner across the country Improve reporting from the ID hospitals on the IDSP list of diseases to district state and centre.	NCDC/IDSP		ID hospitals network expanded in a phased manner. Reports from ID hospital network improved
	To have a system for QA	To have a system for QA and control of the surveillance data in place and work towards comparability of data between all reporting surveillance data; develop self-assessment tool for surveillance systems; develop a tool to evaluate the quality of data in surveillance systems	MoHFW/NCDC	WHO/CDC	Tool developed and in place for self-assessment for surveillance systems and quality of data in surveillance systems Training conducted and tool being used

Develop good communication systems	Develop good communication systems that ensure that the right information for action is reported and disseminated to policy-makers, key technical stakeholders and the general public, thus facilitating the transfer into public health action	MoHFW/NCDC	WHO/other UN agencies	Key information reported and disseminated to policy-makers, key technical stakeholders and the general public periodically.
Develop data quality management and assurance protocols	Develop data quality management and assurance protocols for data being captured under IDSP including presumptive, laboratory and epidemiological data; study how to improve the comparability of data; implement recommendations to improve comparability of data; implement procedures for assessing under-reporting.	MoHFW/NCDC	WHO/CDC	Centre, states and districts using better data quality management and assurance protocols for data being captured under IDSP including presumptive, laboratory and epidemiological data.
Expand on GIS, introduce signal detection algorithms and modules	Surveillance committee to implement and expand on GIS, introduce signal detection algorithms and modules, develop links to other databases and data sources, find ways and means to developing accessibility to the databases by the general public	MoHFW/NCDC/	WHO	GIS in place, signal detection algorithms and modules done, mechanisms for links to other databases and data sources, ways and means to developing accessibility to the databases by the general public completed.

Table 30: Implementation/action plan matrix for surveillance and response – indicator based surveillance

Time frame	Objectives	Activities	Office responsible	Partners	Measure(s) of success and means of verification
Short term	Expert committee for revision of case definitions	Discuss and agree on new definitions (if considered necessary. A network committee approves new definitions (if considered necessary) and promotes and evaluates the implementation of standard case definitions	MoHFW/ NCDC	WHO/CDC/ other partners	Revised case definitions in place at central, state and district levels
	Consultant workshop for reprioritization of diseases under IDSP for surveillance	Form an expert consultation workshop to develop and agree on disease/disease group-specific objectives; develop and agree on criteria for prioritisation of diseases; apply criteria and revise list of diseases; conclude on surveillance deliverables disease-wise at central, state, district and block levels. Revision of the forms and updating the portal system with new surveillance deliverables	MoHFW/ NCDC/	WHO/CDC/ other partners	Disease prioritization completed with revision of the list of diseases and a set of surveillance deliverables for action.

	Consider case-based reporting for selected high-priority diseases	Expert consultation to conclude on the feasibility and outline mechanisms for the collection of case-based data for selected high-priority diseases in few selected states. This can be expanded later across the country.	MoHFW/ NCDC	WHO/CDC	Case-based reporting for selected high priority diseases in place in a few states on a pilot basis
Medium term	Mechanisms to improve analysis of the L form data at various levels under IDSP	Develop regular analysis of the L form data which is appropriate for the respective disease; Develop advanced methods of analysis and integrate new analytical approaches to identify areas and issues for action and building competency at the district, state and Central levels.	MoHFW/ NCDC	WHO/CDC/ Expanded Programme of Immunizatio n(EPI)	Mechanisms in place with regular analysis of data with identified issues for action.
	Inclusion of death and minimum datasets for top high-priority diseases	To explore for inclusion of death and minimum data like age breakup, sex and location for top high-priority selected diseases through experts.	MoHFW/ NCDC	WHO/CDC/ other partners	Time, person, place data available for top high-priority diseases in India in the L form

Table 31: Implementation/action plan matrix for surveillance and response – event based surveillance

Time frame	Objectives	Activities	Office responsible	Partners	Measure(s) of success and means of verification
Short term	Have procedures and tools in place for EWAR through EBS mechanisms.	Have procedures and tools in place to monitor and assess early threats detected through EBS.	MoHFW/ NCDC	WHO/CDC	Tools for EWAR developed and in place at state and district levels Manuals, guidelines and SOPs for strengthening EWAR–EBS component developed
	Reporting mechanisms for EWAR.	Develop mechanisms to routinely report communicable disease threats through the EWAR system, once the assessment has confirmed the existence of a threat.	MoHFW/ NCDC/	WHO/CDC	Routine reporting mechanisms in place for EWAR from district and state levels is functional
	Development of guidelines for the Media Scanning and Verification Cell.	Development of guidelines for media scanning and verification at the Central and state surveillance units. Definitions for events standardized and disseminated at state, district and block levels.	NCDC		Guidelines for media scanning and verification cell in place and definition of EBS events standardized.
Medium term	Upgrading the portal for maintaining the event/outbreak tracking list.	Inclusion in the portal of an event/outbreak tracking list, analysed and shared with relevant stakeholders.	MoHFW/ NCDC	WHO/CDC	Event/outbreak tracking list, analysed and shared with relevant stakeholders and in place in the portal system

Medium term	Upgrading the portal for maintaining the event/outbreak tracking list.	Inclusion in the portal of an event/outbreak tracking list, analysed and shared with relevant stakeholders.	MoHFW/ NCDC	WHO/CDC	Event/outbreak tracking list, analysed and shared with relevant stakeholders and in place in the portal system
	Strengthening of Participatory Rapid Appraisal approaches for involvement of ASHAs and ANMs in IDSP	Develop mechanisms for strengthening PRA approaches for the involvement of ASHAs and ANMs in the IDSP network	MoHFW/ NCDC		PRA mechanisms in place for involvement of Accredited social health activists (ASHAs) and ANMs
Long term	Expanding the EBS information sources – strengthening digital disease detection	Expand on the syndromic surveillance data, e.g. through emergency department data as the EHR uptake increases	MoHFW/ NCDC	WHO/CDC	Number of health facilities reporting EHR data Number of SSUs using data for syndromic surveillance Number of DSUs using EHR data for syndromic surveillance
	Social media in Urban areas	Using social media information from urban areas for EBS	NCDC		Number of SSUs using social media information for syndromic surveillance

Table 32: Implementation/action plan matrix for special surveillance and response – influenza/zoonosis/VPDs

Time frame	Objectives	Activities	Office responsible	Partners	Measure(s) of success and means of verification
	Update the Influenza India preparedness plan	Workshop to build the road map on updating the influenza preparedness plan using experts, both national and international	NCDC/IDSP	WHO/CDC	Influenza preparedness plan updated
Short term	Strengthening data collection and epidemiological analysis	Collecting baseline data for comparing data from annual influenza outbreaks	MoHFW/NCDC/ICMR	WHO/CDC	Number of states and districts with baseline data available for influenza cases
		Better use of influenza data collected through its sentinel sites with systematic epidemiological analysis to be enhanced	NCDC		No of hospitals conducting systematic epidemiological analysis
		Develop a standard training module on influenza for doctors and paramedical staff	NCDC		Standard train module for doctors in place
		Influenza network must be utilized to monitor other emerging/re-emerging infections and viruses such as MERS and Zika	NCDC	WHO	Network utilised for other emerging and re-emerging infections
		Upgrade the software for data collection and analysis and facilitate routine epidemiologic analysis of laboratory data	MoHFW/NCDC	WHO/CDC	Software upgraded. Indicators for epidemiologic analysis of influenza surveillance data defined Epidemiological analysis report shared

	WHO AFP/measles and VPD system	Both surveillance systems need to combine and join forces for data sharing and outbreak response to VPDs at district, state and national level on a weekly basis.	MoHFW/Maternal and Child Health/National Polio Surveillance Project	WHO	Data sharing on going for AFP/measles and VPD on a weekly basis
	Harmonizing ICMR and NCDC data	Harmonising of ICMR influenza laboratory network as well as IDSP network with a unified surveillance strategy.	MoHFW/ICMR/NCDC	WHO/CDC	Availability of protocol for data sharing between ICMR and IDSP laboratories
		Routine data sharing between IDSP and ICMR influenza laboratory network .	NCDC/ICMR/SSUs	WHO/CDC	Standard protocols for influenza carried out by NCDC and ICMR
Medium term	Strengthening governance and unified surveillance and response	Expanding the scope of the Joint Monitoring Group on Avian Influenza to undertake the monitoring of other zoonotic diseases of public health importance.	MoHFW/ NCDC/ ICMR	WHO	Number of JMG reviews that included zoonotic diseases
		Expanding the scope of the State Surveillance Committees to establish Zoonoses Task Force at state level by including Departments of Health, Animal Husbandry, Wildlife, Environment and Forests, Agriculture and Food Safety.	MoHFW/ NCDC/ SSUs	WHO	Number of states with zoonosis task force in place and meeting regularly.

		Integration of IDSP, NADRS and NADRES	MoHFW/Department of Animal Husbandry		Data sharing between IDSP, NADRS and NADRES initiated and ongoing.
		Development of operational guidelines for establishing intersectoral coordination	MoHFW/ NCDC/ ICMR		Availability of operational guidelines for intersectoral coordination
Long term	Strengthening the laboratory surveillance	Introduction of virus isolation by cell culture at least in a few laboratories	MoHFW/ NCDC/ ICMR		Number of laboratories conducting virus isolation by cell culture
		Strengthening of sentinel surveillance to include typing and subtyping of influenza viruses	MoHFW/ NCDC/ ICMR	WHO/CDC	Number of sentinel sites contributing samples for influenza typing and subtyping

Table 33: Implementation/action plan matrix for laboratory, surveillance and response

Time frame	Objectives	Activities	Office responsible	Partners	Measure(s) of success and means of verification
Short term	Strengthening laboratory surveillance and governance	Development of a vision document and action plan for strengthening of laboratory-based surveillance, with adequate funding	NCDC/Laboratory task force	WHO/CDC	Vision document for laboratory surveillance developed.
		Collaboration with professional societies/associations of laboratory professionals – IAMM, HISI, and IDSI for strengthening laboratory-based surveillance	Laboratory task force	WHO/CDC	Number of Professional societies meeting together on regular basis.
		Forging mechanisms for intersectoral collaboration to strengthen the national laboratory system and facilities to tackle biosafety/biosecurity, zoonoses, influenza, hepatitis and other emerging infectious diseases	MoHFW/ NCDC/	WHO/CDC	One stakeholder meeting for intersectoral coordination to strengthen the national laboratory system.
		Monitor/review the progress of the roadmap to strengthen IDSP laboratories and action plan to network laboratories for diseases of public health importance	Laboratory task force	WHO/CDC	Network laboratories for diseases of public health importance in place

		Facilitate development of national strategic action/operational plan for laboratory surveillance and develop implementation plan for strengthening IDSP labs	Laboratory task force	WHO/CDC	National strategic action/operational plan for laboratory surveillance developed
Medium term	Strengthen diagnostic capacity of IDSP laboratories	Review/revise laboratory standards (tests, methodology, formats, testing algorithms) including quality and biosafety/biosecurity	Laboratory task force	WHO/CDC	Number and list of manuals updated
	Establish quality systems in IDSP laboratories	Strengthen laboratory QA and coordinate EQAS	NCDC	WHO/CDC	Quality assurance updated and number of IDSP labs participating in EQAS
		Establish IDSP/NCDC laboratories for QA and training	NCDC	WHO/CDC	Trainings completed on QA
		Appoint/designate IDSP quality managers at national and state levels	NCDC/SSUs		Number of states with quality managers
	Strengthening governance and finance	Allocating adequate financial resources as per the laboratory strengthening vision document and action plan	MoHFW/NCDC		Availability of financial resources for laboratory services

	Expanding the network for laboratory surveillance	Developing an online inventory and mapping of IDSP laboratories to facilitate access to laboratory services and networking of laboratories (within and outside IDSP)	Laboratory task force		All IDSP health laboratories mapped by SSUs and DSUs
	Strengthen HR	Development of a laboratory HR programme, roster for lab professionals	NCDC/SSU		Roster for laboratory professionals exists
	Strengthen the logistics for laboratories	Ensure availability of laboratory reagents/supplies; develop guidelines for state level procurement of lab supplies, sample collection and transport	NCDC/laboratory task force	CDC	Guidelines and logistics streamlined.
Long term	Strengthening partnerships and collaborations	Strengthening partnerships with disease control programmes to strengthen laboratory quality	MoHFW/ NCDC	WHO/CDC	Number of DCPs with convergent laboratory network
	Expanding laboratory surveillance to tackle emerging health threats	Strengthen laboratory surveillance of antimicrobial resistance under the national programme for containment of antimicrobial resistance (AMR) at NCDC	MoHFW/ NCDC	WHO/CDC	Number of participating laboratories conducting AMR surveillance Number of surveillance newsletter reports being generated with AMR data

Monitor performance of IDSP labs	Develop a monitoring and evaluation plan to review performance of IDSP laboratories	Laboratory task force	WHO/CDC	Number of monitoring and evaluation reports generated at national and sub-national level
Strengthening epidemiologic analysis of laboratory data	Improve the use of laboratory data for surveillance and outbreak detection; establish a laboratory information management system in IDSP laboratories	NCDC/laboratory task force	WHO/CDC	Number of states with laboratory management information in place.

Table 34: Implementation/action plan matrix for management – communications and information technology

Time frame	Objectives	Activities	Office responsible	Partners	Measure(s) of success and means of verification
Short term	Creating and operationalizing a vision document	Establish a National IDSP Health Informatics Workgroup with the mandate to produce a costed information management master plan and implementation strategy through leveraging innovation	MoHFW/NCDC/NIC	WHO/CDC	Health Informatics Working Group in place
	Strengthening the ICT services using WHO specified standards for strengthening of health information systems	Based on WHO standards, develop a National Framework and PHEOC for national and sub-national levels, implementation strategy and costed operational plan	MoHFW/NCDC/CSU	WHO	PHEOCs in place at national and subnational levels.
		Adoption of WHO frameworks and standards to strengthen the Health Information System in ICT under IDSP including validity checks, outliers, data forwarding protocols, etc.	MoHFW/NCDC/	WHO	Availability of functionality for validity checks and data forwarding protocols

[a]WHO (2015). Framework for a Public Health Emergency Operations Centre. Geneva: World Health Organization (http://www.who.int/ihr/publications/9789241565134_eng/en/, accessed 14 July 2016).

Upgradation of the web portal for enhanced features for data collection	Revamping of IDSP portal to develop GIS-enabled software application, mobile technology and IVR Systems for real-time data collection and integration of SMS gateway and automated e-mail alertsDevelopment of offline data entry module, macro-enabled excel sheets for data entry in areas of inconsistent Internet connectivity	MoHFW/NCDC/NIC	WHO	Number of states/districts using IVR technology and SMS for data collection and EBS Number of DSUs using offline mode for data entry
Strengthening the connectivity and network between surveillance units at all levels	Use of video conferencing for review meetings up to district level	NCDC /IDSP		Number of video conferencing held by the CSU with the states Number of SSUs conducting meeting with DSUs using VC
	Use of satellite connectivity in SHOC and in isolated, remote, hilly areas in absence of terrestrial connectivity	MoHFW/NCDC		Number of meeting/reviews held using SHOC satellite connectivity for hilly and remote areas

Medium term	Operationalization of the vision document master plan	Implement the operational plan of the Information Management Master Plan through a systematic and phased approach	NCDC/SSUs/DSUs	WHO	Information management master plan in place.
	Strengthening EOCs using ICT	Conduct national and sub-national needs assessment of PHEOCs	MoHFW/NCDC/SSUs	WHO	Number of states with needs assessment of PHEOCs conducted.
		Commence phased upgradation of EOCs to conform to the national framework at all levels	MoHFW/NCDC	WHO	Number of EOCs upgraded
	Enhancing the use of social media for EBS	Using social media and mobile applications for communications, sending alerts as well as data collections in limited settings	NCDC/SSUs/DSUs		Number of states using mobile technology for data collection and dissemination
	Strengthening interoperability of the information system	Compliance to integrate e-governance standards in master data including incorporation of ICD coding for diseases under surveillance	MoHFW/NCDC		IDSP, MIS using ICD codes
	Upgradation of the web portal features for enhanced web analytics and information dissemination	Introducing basic and advanced web analyticalal features in the portal within the scope of disease dynamics for better monitoring of the programme	MoHFW/NCDC	WHO	Number of SSUs with web analytics in place.

		Ensuring of a decision dashboard at the state surveillance units.	MoHFW/NCDC	WHO	Number of SSUs with a decision dashboard in place.
	Decision dashboard	Testing and deploying user friendly role-based model for the portal and provision of customized facility for enhanced surveillance for specified time frames, e.g. post-disaster daily surveillance of epidemic-prone diseases or preparation of village-wise disease profile.	NCDC	WHO	Enhanced surveillance during respected time frame in place.
Long term	Strengthening quality assessment and improvement	Conduct performance assessment of quality and use of data at national and sub-national levels.	NCDC/SSUs	WHO	Number of SSUs where quality assessment is completed.
	Enhancing web portal features	To ensure use of call centre data integration into the IDSP portal system.	NCDC	WHO	Call centre data integration in IDSP portal system complete.

Table 35: Implementation/action plan matrix for management – governance and HR

Time frame	Objectives	Activities	Office responsible	Partners	Measure(s) of success and means of verification
Medium term	Strengthening accountability mechanisms	Developing and implementing accountability for completeness, quality and timeliness at all stages of the process of data collection, transmission, analysis and dissemination action	NCDC	WHO/CDC	ToRs for staff availabile
		Establishment of a high-level laboratory surveillance task force	MoHFW/ICMR/NCDC/	WHO/CDC	Task force established and first meeting held
	Developing and implementing a HR Development strategy aligned to the vision document and strategy	Re-assessment and clarity on definition of core competencies for all surveillance functionaries	MoHFW/NCDC/CSU		Core competencies defined
		Development and operationalization of a HR development strategy, with a component on training strategy for public health surveillance	MoHFW/NCDC/CSU		Availability of HR development strategy along with training strategy component
		Operationalizing a HR management system within the portal	NCDC	WHO	HRM management integrated in portal

Harnessing technology for HR capacity building	Development and deployment of a portfolio of e-learning modules for different cadres of surveillance functionaries	NCDC/SSUs		Module e-learning courses available
Expanding the stakeholder base in the IDSP	Involving private sector through CEA and signing of MoU with IMA,	NCDC/SSU	WHO/CDC	Professional associations formed and meeting regularly.
Aligning the HR development strategy of IDSP with the national agenda on Public Health Cadre development	Systematic documentation of states with the Public Health Cadre for surveillance and response systems, e.g. in Gujarat and Tamil Nadu, and hand-holding the states operationalizing the Public Health Cadre to ensure inclusion of surveillance and response system HR	NCDC		Public Health Cadre best practices explored and adopted
Unifying the surveillance component of selected disease control programmes	Developing protocols and processes for integration of surveillance and response across all disease control programmes	MoHFW/NCDC/MCH/NPSP/NVBDCP	WHO/CDC/ other partners	Number of selected disease control programmes participating in unified surveillance strategy

Conduct an evaluation of the training institutes	Conduct an evaluation of the training institutes to study the GAP analysis and make recommendations to MoHFW	MoHFW/IDSP	WHO and other partners	Evaluation of IDSP training institutes completed
Conduct a performance evaluation of the contractual staff at Central, state and district levels	Develop mechanisms and protocols for a performance assessment of the contractual staff at the central, state and district levels	MoHFW/NCDC		Performance evaluation for contractual staff in place
Develop and implement monitoring mechanisms to involve medical colleges	Develop guidelines, protocols and monitoring mechanisms to involve medical colleges in reporting data to the IDSP network	MoHFW/NCDC		Monitoring mechanism for medical colleges for IDSP data reporting in place

Table 36: Implementation/action plan matrix for management – finance

Time frame	Objectives	Activities	Office responsible	Partners	Measure(s) of success and means of verification
Short term	Improving timeliness of fund release	Timely compliance with the conditions of the release of funds.	MoHFW/ NCDC/ SSUs/ DSUs		Timeliness of release of GoI funds
Medium term	Strengthening finance MIS for monitoring and streamlining financial flows	Management information reports to be prepared for further strengthening of the financial monitoring at CSU level	MoHFW/ NCDC/CSU		Frequency of FMR reviews by the CSU
	Strengthening the GIA for special surveillance activities	Review of the GIA to avian influenza laboratories to identify the reasons for low fund utilization by some of the labs and analyse if any changes are required in the quantum of fund release by financial monitoring	MoHFW/ NCDC		Review of GIA for special surveillance networks completed and implemented
Long term	Initiating staged outcome-based budgeting in IDSP	Outcome-based budgeting of IDSP needs to be strengthened	MoHFW/NC DC/SSUs/D SUs		Number of district and state PIPs with outcome-based budgeting for IDSP

6. Way forward

The primary and foremost priority for the central and state governments in India is to strengthen the existing surveillance infrastructure, resources and network for further consolidation of the IDSP in order to comply with IHR 2005 and improve health security.

It is important to consolidate India's strategy for IDSR in order to efficiently predict, detect and adequately respond to health threats, as well as to ensure health security at all levels.

IDSP has to be venerated for shifting India's focus from vertical programmes to an integrated approach. A robust surveillance platform has been established, building on existing infrastructure for disease surveillance in nearly every district/block of the country. The IDSP platform has evolved in providing district-wise data on listed diseases and syndromes that can be used to estimate the country-specific disease burden in future.

A more coordinated approach to surveillance will improve the state and district comparability of data; reduce the complexity in surveillance across India; allow tackling of surveillance in a synergistic way; avoid duplication of work; provide better quality public health evidence in the long term. Make it easier to strengthen the national surveillance systems; most likely be economically more efficient and sustainable; allow easier access to and use of the data; enhance the detection and monitoring of international outbreaks; contribute to capacity building; and ensure the inclusion of diseases into surveillance and research agendas according to Indian priorities.

Accurate laboratory results are essential for the true comparability of laboratory data. Standardization of analysis methods should be promoted whenever feasible. Similarly, the procedures when taking samples should be standardized. MoHFW must work hard to ensure that every state has state laboratory services available either directly or indirectly, enabling all states to confirm the diagnosis, isolation and further characterization of pathogens as a basis for reporting confirmed and probable cases during normal times and emergencies. MoHFW should link with these laboratories and help them to integrate their data with the epidemiological (and clinical) data at the national level. QA of laboratory methods is essential to ensure valid and accurate data. Indian standards will also be promoted over this period.

For zoonoses/food-borne diseases, a strong link between data from public health, animal health, food safety laboratories and epidemiological data should be the ultimate goal.

A good surveillance system needs to link with, or incorporate, other sources such as mortality data (particularly useful for rapid surveillance during major outbreaks or surveillance in a pandemic); morbidity reports from health service patient records or hospital discharge data (especially in the surveillance of severe disease and infections such as SARI); laboratory data and activity (including serological status and molecular studies); outbreak data and field reports (linking outbreaks); primary care surveillance (including sentinel systems, especially good for EWSs of seasonal disease); various other sources like sickness absence data, sentinel system data, data on determinants of health and disease (including individual and population behavioural aspects); and in certain circumstances systematic survey data. Linking this data to other systems such as animal health data enhances the effectiveness of the surveillance.

6.1   Action points
However, there are several action points for the programme to address.

6.1.1   Political support
The political support for raising the profile of integrated disease surveillance has to be accomplished in line with WHO's regional long-term vision of strengthening this surveillance system. It is important for India to increase investment to sustain and further strengthen ongoing disease control programmes. Efforts will have to be made to intensify advocacy at central and state governments for accelerating spending and commitment. In order to achieve this, political will must be increased, with the following steps:
- Sensitize politicians and media on the importance of IDSP;
- Ensure that DCPs receive adequate attention and funding within the central and state priorities;
- Ensure that existing excellent communication mechanisms of MoHFW are part of a holistic IDSP and not treated as individual programmes.

6.1.2   Existing policies/guidelines
It is important to ensure that existing policies and guidelines are effectively coordinated and implemented. As part of this, IBS has to be prioritized for EWAR. In addition, strengthening of the EBS component will enable the detection and reporting of all acute public health events. A strong review and monitoring mechanism has to be established for the assessment of these priorities at district, state and national level.

6.1.3   Coordination and integration

It is critical that collaboration and integration efforts be amplified, concurring with the conceptualization and vision of IDSP of converging all the surveillance activities in the country into a common public service. An integrated platform can carry out many functions using similar structures, processes and personnel. This integration and collaboration between the surveillance components of all DCPs in India is long overdue and has become imperative in the current context.

MoHFW should authorize and empower NCDC to establish mechanisms for functional linkages adapted to the respective structures of the DCPs. Despite multiple PHSs for disease-specific programmes and multiple sources of data collection, it is possible to integrate vertical disease-specific PHSs, without losing the valuable elements necessary to each programme.

The process of integration finds synergistic opportunities to enhance disease-specific programme performance and empowers areas of unrealized effectiveness and efficiency. It is possible to design the process of integration in such a way that synergistic opportunities are exploited without disturbing the structures, funding mechanisms and autonomy. For example, processes such as data collection and reporting forms, data analysis, feedback, supervision, training, monitoring and evaluation of PHSs can be integrated without major problems for individual programmes.

However, certain disease-specific and programmatic functions can remain part of the vertical programmes such as monitoring of programme effectiveness, monitoring of antimicrobial resistance and specialized research based on programme objectives and needs. Such a dynamic integration will enable PHSs to perform better, faster and in a more cost-effective manner. IDSP aims to build and strengthen the PHS using existing resources; yet all existing PHS activities link (interoperate) in a national PHS in a manner that should enhance effective and efficient global public health and response systems.

The surveillance activities that are well developed in one area may act as driving forces for strengthening other surveillance activities, offering possible synergies and common resources. Surveillance is based on collecting only the information that is required to achieve control objectives of diseases. Data requested may differ from disease to disease, and some diseases may have specific information needs and require specialized systems.

The country can possibly interweave a stronger integrated surveillance programme by building upon the platform of the NPSP, a network that has won laurels for quality from all over the world.   In addition, enacting necessary public health legislation and

issue of government orders can create a truly world-class surveillance network across the country. Such an approach will have statutory and economic powers, allowing successful planning and implementation of integrated surveillance for all important diseases. This is a necessary and crucial step, not only from the perspective of health promotion, but also for preparing the country against the threat of highly dangerous biological weapons.

6.1.4 Operationalising convergence

MoHFW should consider operationalizing several possibilities of convergence of the existing surveillance models in India. Some of these possibilities are listed below:

- NPSP follows active surveillance with more than 40,000 hospitals and informers enrolled in a nationwide reporting network. These are responsible for collecting epidemiological and virological information for each reported case of AFP. The last polio case was detected in January 2011. The South-East Asia Regional Certification Commission for Polio Eradication declared the South-East Asia Region of WHO polio-free on 27 March 2014. Presently, the project is involved in high quality AFP, measles, rubella and VPD surveillance. India will therefore greatly benefit if NPSP data are shared with IDSP at district, state and national levels.

- MoHFW can explore better integration of data and response between the NVBDCP and IDSP, which will strengthen the integration of disease surveillance efforts in India.
  - o Malaria Surveillance system contains both active and passive components. The programme is already part of the NVBDCP. Under the malaria surveillance programme, health workers would visit every dwelling unit fortnightly to detect fever cases and to give presumptive treatment against malaria. This provides a wonderful opportunity to screen for other diseases as well.
  - o Acute Encephalitis Syndrome requires collection of valid information on epidemiological aspects, case reporting, laboratory diagnosis, reservoir host and entomological parameters through involvement of sentinel sites. These can be easily integrated into IDSP at the level of reporting units.
  - o Other diseases like dengue and chikungunya are important; these have fairly good sentinel systems of reporting and testing cases.
- Sharing of information betwen the human and veterinary sectors is important. NADRS and NADRES and IDSP in Public Health must synergise with greater participation.

6.1.5 Integration of surveillance functions

The integration of surveillance functions in the DCPs with IDSP and such other policy actions will have to be driven by evidence. Small-scale studies could be conducted to generate evidence and data that will be useful for informed decisions on integration. As such, studies might include: (i) expected cost savings for PHS following integration; (ii) reduction of work load of health-care workers (HCWs) for data collection at different levels following integration; (iii) ways to maximize the use of these resources for integration; (iv) mapping of the resources, including laboratory capacity currently available with different DCPs and ways to economize these resources for integration; (v) systematic review of the experiences gained by countries around the world in establishing IDSR and the risks involved in design; (vi) PHS thresholds, and data collection and reporting; (vii) programmes versus a unified form at the peripheral level; (viii) mapping of community-level HCWs used by different DCPs and feasibility of using them for detection and notification of all diseases instead of for specific diseases.

The process of integration will have to be tested through pilots for feasibility of implementation before being scaled up in a phased manner in the entire country. Learning through experience, the strategy can be fine-tuned and refined before it is scaled up. Integration of all PHSs, once piloted and scaling up is completed, can be expanded to include NCDs and other diseases and public health events. MoHFW will need to establish an IDSP Task or Steering Committee to spearhead the process of integration of PHSs and also to elaborate a plan of action (PoA) with a timeline for implementation of the recommendations presented in this report.

6.1.6 Reprioritization of reportable diseases

The Ministry should use the current opportunity to strengthen IDSP and re-prioritize the reportable disease list state and region wise. A retrospective review of disease patterns and epidemiology at the national and state levels over the past 10 years would inform a prioritization of the public health problems and support the revision of the list of reportable diseases into the following criteria: (i) diseases requiring immediate notification; (ii) diseases that are epidemic-prone but do not require immediate notification; (iii) diseases targeted for elimination and eradication; (iv) diseases that are endemic in the country and are of public health importance in accordance with IHR 2005. Subsequently, other chronic health conditions based on national priorities and policies can be included into the system in a phased manner. This can be carried out through the work of these disease-specific consultation groups, which can be formed and coordinated with that of the main disease task force coordination group.

Also, the process of integration and strengthening should harness the digital resources available and be prompted by government actors in the health sector.

IDSP strengthening plans will need to take into account interoperability of the information systems for data and information sharing within and across programmes.

6.1.7 Surveillance

Surveillance is information for action and a functional vision of surveillance must include adequate linkages of the surveillance with response functions. The IDSP strengthening strategy thus needs to include assessment and strengthening of capacity of the health system to use surveillance information for acute and planned types of responses. Capacities need to be built for risk communication and risk mitigation, as well as for the ability to use surveillance information for disease control. IDSP should lead to generation of good quality information and its use for timely and adequate response to acute health events, and planning, implementation and management of DCPs in order to ensure health security and promote health equity.

India has made considerable accomplishments in setting up an integrated platform for disease surveillance. Thereby, the programme has unravelled the burden of infectious diseases and improved the outbreak detection and response. However, it has abundant opportunities for amplifying the integration of other disease surveillance platforms from both the human and animal sectors and contribute towards efficient EWAR to ensure health security and to strengthen disease control and promote health equity for India's large population.

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