

Public Health Emergency Preparedness, Response and Resilience in India: Vision 2047

Rajeev Sharma¹; Raju Thapa^{2*}; Surya Parkash³; Harjeet Kaur²

Abstract

The consequences of public health impacts of recent infectious disease outbreaks and other disasters have tremendously increased over time and recognized the importance of strengthening public health systems to prevent, detect and respond to these threats more effectively. Public health emergency management (PHEM) is a growing field of practice that combines specific knowledge, techniques, and organizing principles necessary to manage health emergencies and disasters effectively. The first step for developing preparedness is measuring the risk or risk assessment to identify the notable threats. Risk assessment helps to determine essential resource requirements to develop plans, procedures, and protocols to enable health systems to function better and prepare communities. Developing public health preparedness response using evidence-informed information is need of an hour as learnings from recent decades emergencies. India has taken the lead in developing the response capabilities learnings from the COVID-19 pandemic by developing an electronic COVID-19 vaccine intelligence network (CoWIN) platform, which is globally recognized. An open platform such as the Integrated Health Information Platform (IHIP), which can connect with eHospital Systems and the new National Health Management Information System, plays a crucial role in strengthening health systems. Unitized and unified real-time surveillance that is not based on traditional systems of data entry and upload, but one that allows interoperability and data sharing mechanisms, capitalizing on technological and digital advances, aligns with the National Digital Health Mission. In addition to the current systems and electronic health records for case-based surveillance

¹ Rajeev Sharma, Division of Global Health Protection, Centers for Disease Control and Prevention, Country Office-India

^{2*} Raju Thapa, Harjeet Kaur, Emergency Management, VHS-CDC, India

³ Surya Parkash, National Institute for Disaster Management, Ministry of Home Affairs, Government of India

linked through the best use of unique health identifiers, the vision suggests utilizing new situation-aware real-time signals from social media, mobile/sensor networks, and citizen-participatory surveillance systems for event-based epidemic intelligence. The vision also emphasizes risk communication with residents as the main stakeholders, the execution of prevention measures at all levels, and practical support collaboration of interdisciplinary teams for prompt and efficient public health responses. The chance that the COVID-19 pandemic has given us must not be wasted. Our public health surveillance tools, services, and infrastructure must be strengthened. We must tackle the root causes of illness and disease, refocus health systems on primary care and universal health coverage, and immediately improve the global infrastructure for health disaster preparation and reaction. This manuscript suggests how we can all work together to strengthen Public Health Emergency Preparedness and Response in India by the year 2047.

Keywords: *Public Health Emergency Management (PHEM); Vision 2047; Preparedness, Response; Resilience; India*

1. Introduction

Public health emergencies are primarily unpredictable. They can hit communities at any time, causing massive human suffering and loss of life. They can also have grave economic repercussions. If health systems are not well prepared to cope with emergencies, affected communities will be more severely impacted and more vulnerable to continuing health threats in the aftermath of a crisis.

Dealing effectively with the multiplying complex and multi-dimensional threats of the 21st century requires a strengthened and agile approach to preparing for and responding to public health emergencies and disasters (WHO 2022). Since the incursion of the COVID-19 pandemic, the Asia-Pacific region has been hit by multiple natural and biological disasters. In contrast, climate change has continued to warm the world, exacerbating the impacts. This has reshaped and expanded the Asia-Pacific riskscape. The risk of new public health emergencies and disasters continues to increase, driven by the escalating climate crisis, environmental degradation, and increasing geopolitical instability, disproportionately impacting the poor and most vulnerable. In an increasingly risky world, all these hazards need to be considered not just as individual threats but also in relation to the larger systems they are likely to disrupt.

The pandemic has revealed gaps in the global capacity to anticipate, avoid, identify, and quickly react to outbreaks, pandemics, and other health emergencies. COVID-19 reminded even the most privileged that infectious diseases still have the power to devastate health systems, communities, and economies. COVID-19 mainly affected the poor and vulnerable. The danger of new health crises is constantly rising due to the worsening climate crisis, environmental degradation, and rising geopolitical unrest, disproportionately affecting the most vulnerable and underprivileged. In 2022, 300 million people were impacted by humanitarian crises, increasing their vulnerability to the ensuing health crises (WHO 2022). The healthcare system needs to be the top priority of all countries, and focus should be made on the following points:

- **Better health outcomes:** One of the primary reasons to improve health systems is to achieve better health outcomes for individuals and populations. This includes reducing morbidity and mortality rates, improving life expectancy, and reducing the disease burden.
- **Increased access to healthcare:** Improving health systems can help increase access to healthcare services for everyone, regardless of income or social status. This includes improving the availability of healthcare facilities, equipment, and healthcare workers.
- **Improved quality of care:** Health system improvements can also help to improve the quality of care provided to patients. This includes ensuring that healthcare workers have the necessary skills and training, that healthcare facilities are well-equipped and maintained, and that patients are treated with respect and dignity.
- **Better management of health resources:** Improving health systems can also help to ensure that health resources are managed effectively and efficiently. This includes ensuring that medicines and medical supplies are available when needed, that healthcare facilities are adequately staffed, and that health services are delivered cost-effectively.
- **Preparedness for emergencies:** A well-functioning health system is essential for responding to emergencies like disease outbreaks or natural disasters. Improving health systems can help to ensure that healthcare facilities are prepared to respond to emergencies and that resources are available to respond quickly and effectively.

Overall, improving health systems is essential for achieving better health outcomes, increasing access to healthcare, improving the quality of care, managing health resources, and responding to emergencies.

Public health emergency preparedness, response, and resilience refer to the ability of public health systems to respond to and recover from emergencies, including natural disasters, infectious disease outbreaks, and acts of bioterrorism. It involves a coordinated effort among various government agencies, healthcare providers, emergency responders, and the general public to identify potential risks, develop plans, and take appropriate actions to minimize the impact of emergencies on public health.

Preparedness involves developing and maintaining systems, plans, and capacities to respond to emergencies. This includes conducting risk assessments, developing emergency response plans, establishing communication systems, stockpiling necessary medical supplies and equipment, and training personnel. The response involves implementing these plans and capacities during an actual emergency, such as providing medical care, distributing medications, and conducting disease surveillance.

Resilience involves the ability of communities and systems to recover from the effects of an emergency and adapt to new challenges. This may involve implementing changes to prevent future emergencies or improve their response, such as improving communication systems or increasing public health awareness.

Effective public health emergency preparedness, response, and resilience require ongoing collaboration and coordination among various stakeholders, including government agencies, healthcare providers, emergency responders, and the general public. It also requires a commitment to ongoing training, planning, and evaluation to identify areas for improvement and adapt to changing circumstances.

The Government of India is working towards India@2047- a vision plan for a 'future-ready India' that befits the 100th year of Indian Independence. The Prime minister of India emphasized that in the Amrit period of Independence (2022 - 2047), India is marching ahead rapidly to create a transparent system, efficient process and smooth governance to make development all-round and all-inclusive. The government is committed to strengthening good governance, that is, pro-people and pro-active

governance (DARPG, 2023). With Prime Minister Shri Narendra Modi's vision to make India a developed Nation by 2047, the government is deliberating on preparing the Action Plan and Vision Document of India@2047.

India has achieved significant success in preventing, managing, and eradicating main communicable diseases. Smallpox was eradicated worldwide, and Polio has been eliminated in India. In the past two decades, India has significantly decreased the frequency of HIV cases by more than half. The COVID-19 and Nipah viruses, among other recent epidemics, have been successfully confined or under control.

Without effective Public Health Emergency Management systems in existence, none of these efforts would have been feasible. In accordance with the National Digital Health Mission, it is the need of the hour to improve Public Health Emergency Preparedness, Response and Resilience in India with more modern digital health and technological advancements. Furthermore, making public health emergency management more people-centric is crucial, expanding on the 2017 National Health Policy's recommendations. Additionally, the PM - Ayushman Bharat Health infrastructure Mission (PM-ABHIM) established Health and Wellness Centers that offer a framework to improve community-based monitoring for both infectious and non-communicable illnesses.

More significant interaction between humans, animals, and the environment has allowed us to review emerging diseases, as evident during the covid-19 pandemic. Early identification of such an interface is crucial to break the transmission chain and building a robust monitoring system. This manuscript on Public Health Emergency Preparedness, Response and Resilience in India: vision 2047 is a move in towards holistically transforming the delivery of health care services across the public and private sectors in compliance with International Health Regulations (2005); Sustainable Development Goals (2015-2030) and other international agreement. Some of the critical priorities for vision@2047 are discussed in this manuscript.

2. Priority Action Points for Vision@2047

2.1 Public Health Surveillance

India has made significant progress in Public Health Surveillance (PHS). A National

Apical Advisory Committee (NAAC) was established by the Government of India (GoI) in 1995 due to the 1988 Cholera epidemic in Delhi and the 1994 plague breakout in Surat. The National Monitoring Initiative for Communicable Diseases was implemented in 1997. One of the first national disease surveillance systems, HIV Sentinel Surveillance (HSS), started in 1992 and was expanded nationwide a decade later. In 2004, the World Bank provided a ten-year grant to the Government of India for the "Integrated Disease Monitoring Project" (IDSP). This was later converted into a programme funded under the 12th plan (2012-17) within the National Health Mission (NITI Aayog 2020).

Surveillance is 'Information for Action'. Primary, secondary, and tertiary levels of healthcare are all impacted by public health surveillance, which is an essential public health function. The integrated solution envisioned in this paper includes a "One-Health" strategy combining health information from various sources, including human, plant, and animal monitoring, and improving current isolated systems. To march towards achieving India's vision by 2047, we need to prioritize the following points:

- A predictive, responsive, integrated, and tier-based system of disease and health monitoring that includes priority, emerging and re-emerging infectious and non-communicable illnesses and conditions are required for India.
- De-identified individual-level patient data obtained from hospitals, labs, and other sources must serve as the main foundation for surveillance.
- Public health surveillance may be controlled by an efficient managerial and technological framework with sufficient resources, but it must be careful to act in the interests of the general public.
- In order to manage situations that form a Public Health Emergency of International Importance, India will need to exercise regional and worldwide leadership.

For an effective public health surveillance system in India, it is crucial to envision integration, enhanced citizen-centric and community-based surveillance, strengthened laboratory capacity, expanded referral networks, and a unified Surveillance Information Platform to provide data for decision-making and action.

The IHIP is an open platform that can connect with eHospital Systems and the new National Health Management Information System. It can thus connect with public and

private hospitals, laboratories, and research centres under one platform to securely facilitate the exchange of health data.

Initiatives such as National Digital Health Mission (NDHM) aiming to make India Atmanirbhar or Self-reliant in providing universal health coverage to all the country's citizens will play a crucial role in strengthening the health sector.

2.2 Leveraging Science and Technology for Health

Our strategy should prioritize and promote the appropriate use of digital technologies as digital public goods adaptable to different countries and contexts to help address critical health system challenges to support equity in access to digital resources so that no one is left behind. We need to promote the protection of people, populations, health care professionals and systems against misinformation and the misuse of information, malicious cyber activities, fraud and exploitation, inappropriate use of health data, racism and human rights violations within the framework established by national and international treaties (WHO 2021). The appropriate use of digital health considers the following dimensions: health promotion and disease prevention, patient safety, ethics, interoperability, intellectual property, data security (confidentiality, integrity, and availability), privacy, cost-effectiveness, patient engagement, and affordability. It should be people-centred, trust-based, evidence-based, effective, efficient, sustainable, inclusive, equitable and contextualized. The growing global challenge of digital waste on health and the environment must also be appropriately managed (WHO 2021).

Advancement in Science and Technology brings interventions to make healthcare accessible and affordable, like low-cost vaccines for disease prevention, diagnostic kits for detection and medicines for treating diseases. For instance, The Ministry of Health and Family Welfare in India owns and runs CoWIN (Covid Vaccine Intelligence Network), an online government site for COVID-19 vaccination enrollment. It shows COVID-19 booking slots that are open in the vicinity, and that can be reserved on the website. Users can use laptops, smartphones, and mobile devices to access the app.

2.3 Leadership and Governance

Effective governance is essential to bring more significant equity, inclusivity and coherence to the architecture of Public Health Emergency Management, enabling our

country to work collectively around a shared plan galvanized by political will and with the resources to sustain positive changes (WHO 2022). In order to ensure sustained political commitment and end the cycle of panic and neglect that has characterized the response to prior global health emergencies, public health emergency preparedness and response must be elevated to the level of heads of state in coordination, collaboration, and corporation with the central government. Establishing a high-level body on public health emergencies comprising heads of state, critical stakeholders from central governments, ministries, and other international leaders will be crucial. With the following responsibilities, but not limited to, the high-level bodies/committees would (WHO, 2022):

- Address health emergencies as well as their broader context and social and economic impact;
- Encourage compliance with and adherence to global health agreements, norms, and policies;
- Address obstacles to equitable and effective Public Health Emergency Preparedness and Response, ensuring collective, whole-of-government and whole-of-society action aligned with global health emergency goals, priorities, and policies;
- Identify needs and gaps, quickly mobilize resources and ensure effective deployment and stewardship of these resources for Public Health Emergency Preparedness and Response.

2.4 Amendments to the International Health Regulations (2005)

The International Health Regulations (IHR) (2005) are an international legally enforceable structure specifying the rights and duties of its 196 States Parties and the WHO Secretariat in cross-border public health crises. The IHR is still a crucial legal instrument for responding to and preparing for public health crises. The COVID-19 pandemic has highlighted flaws in the IHR's interpretation, implementation, and conformance.

Further strengthening of IHR implementation compliance will require some targeted amendments. Improved accountability may be achieved by establishing a conference of State Parties and the responsible national authority for the IHR's

overall implementation; greater specificity with regard to notification, verification, and information sharing; capacity building and technical support for surveillance, laboratory capacity, and public health rapid response; and streamlining the procedure for enacting IHR amendments. The IHR's ongoing relevance and efficacy as a global health law tool depends on their ability to be quickly and effectively reinforced to meet changing global health requirements (WHO, 2022).

2.5 Strengthening Public Health Emergency Response Teams (PHERT)

The COVID-19 epidemic revealed shortcomings at the national level in the fundamental skills needed for efficient public health emergency preparedness and response. The basic global health security building blocks are national capabilities, so these deficits pose severe systemic risks. Building and bolstering professionalized multidisciplinary health emergency teams that are completely incorporated into national resilient health systems and other pertinent sectors under the One Health strategy will require significant expenditures in order to mitigate these risks.

The scale and nature of workforce requirements vary by country, but the most significant and pervasive gaps identified by COVID-19 are in the fields of epidemiology and surveillance, including laboratories; the health system workforce needed to scale up safe emergency clinical care quickly and maintain essential services during an emergency; the non-clinical aspects of protection, like working conditions and fair compensation; and community engagement (WHO 2022).

The development of globally available health emergency warning and response teams will be facilitated by wise investments in building up national capabilities, increasing regional and global preparation, detection, and response. Strengthened national warning and response teams, in conjunction with emergency coordination mechanisms to support training, certification, and deployment, can develop a national workforce for global health emergencies that is deployable internationally.

2.6 Strengthen Public Health Emergency Coordination

The operational success of the various components of the public health emergency system depends on how well they cooperate. COVID-19 showed that the nation's public health preparation and response management systems were frequently disjointed. The

pandemic brought to light regional and global issues such as inconsistent national approaches, a lack of efficient means of coordinating and communicating action among nations, and difficulties in effectively directing international assistance to the areas where it was most required.

Resolving this fragmentation will take further intervention in assuring greater consistency and standardization in emergency planning at national/sub-national levels. An improved workforce, infrastructure, and leadership must be resourced and empowered to strengthen operational readiness through risk and vulnerability assessment, prioritization of key functions across all core subsystems, development of context-specific preparedness, prevention, readiness, and response strategies and plans, mobilization of the required resources, and monitoring and evaluating results. The public health emergency management should be embedded in broader whole-of-government national disaster management systems.

In addition to connecting international and regional technical, financial, and operational support to national emergency management systems, a strengthened and redesigned network of public health emergency operations centres can enhance coordination between nations and international partners throughout the public health emergency management cycle (WHO, 2022).

2.7 Interconnected Core Subsystems

The operational readiness and capacities in five key areas determine the ability to successfully plan for, avoid, identify, and react to national, regional, and international public health emergencies. The core subsystems for health emergency preparedness, response and resilience are as follows:

- Collaborative surveillance and public health intelligence through enhanced multisectoral disease, threat, and vulnerability surveillance; expanded laboratory capacity for pathogen and genomic surveillance; and joint methods for risk assessment, event detection, and response monitoring.
- Community protection through two-way information exchange to educate, inform, and foster trust; community involvement in developing public health and social measures based on local contexts and customs; a multisectoral approach to social welfare and livelihood protection to support communities during health

emergencies; and procedures to ensure that people are protected from sexual exploitation, abuse, and harassment.

- Safe and adaptable clinical care; efficient illness prevention and control that safeguards patients, healthcare professionals, and communities; and robust health systems that can maintain.
- A seamless linkage between research and development and scalable manufacturing platforms and agreements for technology transfer, coordinated procurement and emergency supply chains, strengthened population-based services for immunization and other public health measures, and fast-track research and development are all ways to gain access to counter measures.
- Emergency coordination with a trained health emergency workforce that is interoperable, scalable, and ready to rapidly deploy; coherent national action plans for health security to drive preparedness and prevention; operational readiness through risk assessment and reduction and prioritization of critical functions; and rapid detection of and scalable response to threats using a standardized emergency response framework.



Figure : Interconnected Core Subsystems for Health Emergency Preparedness, Response and Resilience

(Source: WHO 2022)

The five core subsystems must be well integrated within nations and have strong ties to structures for support, coordination, and collaboration across all health emergency cycle phases of preparing, preventing, detecting, responding, and recovering, given these interdependencies and the diversity of actors involved.

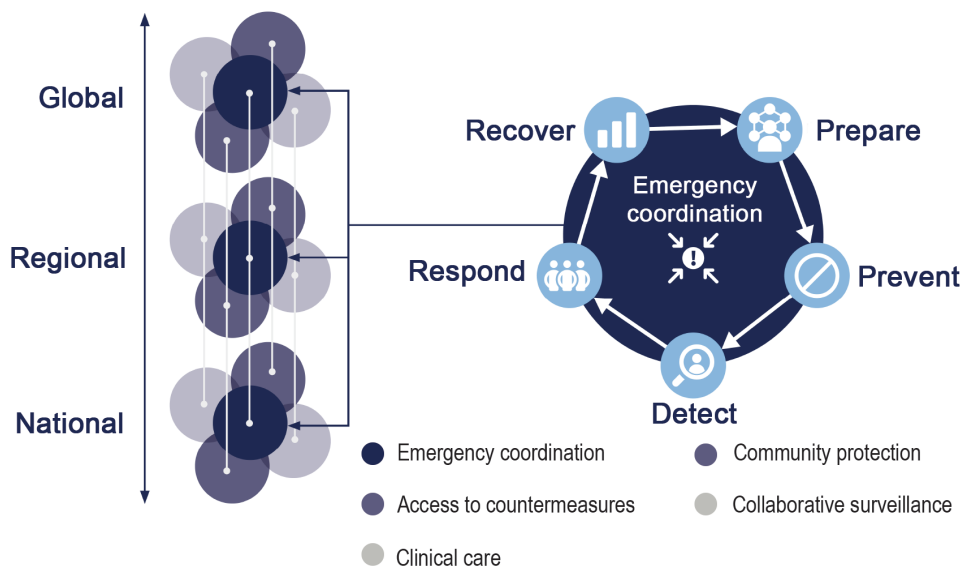


Figure : Interlinkages Between Five Core Subsystems for Health Emergency Preparedness, Response and Resilience Across

(Source: WHO 2022)

2.8 Expand Partnerships and Strengthen Networks for a Whole-of-Society Approach

COVID-19 has demonstrated that organizations and institutions at the national, regional, and global levels can work more closely together to improve resistance to health crises in critical areas. Before a health emergency occurs For, collaborative surveillance, clinical treatment, community protection, and access to remedies will necessitate the bolstering and, where necessary, the creation of whole-society, multidisciplinary, multi-partner networks.

COVID-19 has also drawn attention to how teamwork can help communities become more resilient to health emergencies. After every significant health disaster over the

past 20 years, the need to engage in cooperative arrangements that unite communities of practise and communities of circumstance to create reaction and resilience measures has been emphasized: COVID-19 makes these calls impossible to disregard.

2.9 Create/Strengthen an Independent Health Informatics Institute

Data collection, collation, analysis, and transmission for public health surveillance and associated activities are all crucial tasks for public health informatics. A specialized Independent Health Informatics Centre will need to be established to support and direct innovations and analytical activities, including the use of Internet of Things (IoT) surveillance activities. Recognizing the significance of Public Health Information for Action and allocating resources and suitable technology to handle it are imperative for both the centre and the states.

2.10 Prioritise Diseases/Conditions for Surveillance/ Disease Elimination

India can prioritize diseases and conditions under the five broad categories according to the Department of Disease Control, Ministry of Health, and Thailand classification using various criteria based on available information. The country should concentrate on the five main disease categories that were prioritized for health surveillance:

- a. Acute Communicable Disease,
- b. HIV and TB,
- c. Non-communicable disease,
- d. Injury,
- e. Occupational and environmental disease.

India could create its own list of diseases slated for elimination by 2030. India could adopt/design the prioritization criteria based on the context of each state or district, given its diversity.

2.11 Streamline Data Sharing, Analysis, Dissemination and use for Action

A unique health identifier (UHID) for each person is the most important prerequisite

for a uniform surveillance system. In addition to assisting in the existing Syndromic, Presumptive, and Laboratory record links, this may also be used to connect morbidity and mortality data. Additionally, it makes it possible to monitor NCDs better in order to comprehend health effects, estimate incidence and prevalence, and guide resource distribution. To guarantee that every person has a UHID, it is possible to use UID or a comparable system. This will give the patient and the healthcare practitioner full knowledge of the person's health and illness state. One-time passwords can be used to limit who has access to this data. One will need to be aware of the judiciary's rulings regarding the appropriate application of the UID for social and health security.

2.12 Encourage Innovations

India is renowned for its innovative approaches in health and other fields. For instance, Public Health Surveillance needs to identify steps where innovation can be explored within the public health surveillance loop, such as new techniques for data collection, new case definitions or new risk factors/groups, new point-of-care diagnostics and screening tools/devices, new analytical tools, new dissemination techniques, new stakeholders, and new evidence/research findings. In order to successfully build up and integrate these innovations into the Public Health system, it would be essential to find chances for their implementation within districts and states so that lessons could be learned from them.

2.13 Align with PM- Ayushman Bharat Health Infrastructure Mission (PM-ABHIM)

By preparing front-line healthcare workers to perform syndromic reporting for infectious diseases and screening for risk factors or disease markers for common NCD and communicable diseases using simple verbal screening tools or point of care diagnostics and devices, the Health and Wellness centres offer a unique opportunity to strengthen community-based surveillance at the primary health care level. For disease surveillance during hospitalization episodes, information obtained under the Pradhan Mantri Jan Arogya Yojana (PM-JAY) assurance scheme and the Government of India realizes the need for a sustainable, resilient public health infrastructure and programme. The PM- ABHIM focuses on strengthening national public health institutions, expanding the Integrated Health Information Portal, or IHIP, operationalizing several public health units, and establishing Public Health Emergency Operations Centers, or PHEOCs.

2.14 Strengthen Laboratory Infrastructure

To create a successful disease surveillance programme, various levels of healthcare require a strong and well-functioning laboratory system. States may have decentralized diagnosis centres to monitor diseases prone to epidemics. The IDSP-created district public health labs are being reinforced as part of the National Health Mission. These initiatives might be sped up and expanded. We need diagnostics that are quick, precise, cheap, and reliable.

2.15 Focus on Preventive Healthcare

Preventive healthcare should be focused on implementing effective measures to prevent diseases, rather than simply treating them after they occur. This can be achieved through a number of steps, such as promoting healthy lifestyle choices, early disease detection through screening programs and regular check-ups, promoting vaccination programs, developing and implementing health policies that promote health and prevent diseases, and increasing public awareness and education about the importance of preventive healthcare measures. By adopting these measures, the burden of preventable diseases and improving the overall health and wellbeing of its citizens can be reduced.

2.16 Emphasis on Mental Health

Mental health as an essential component of overall health and wellbeing should be prioritize and emphasised. This can be achieved through a number of steps, such as promoting mental health awareness, increasing access to mental healthcare, integrating mental health into primary healthcare, implementing mental health policies and regulations, and addressing social determinants of mental health. Public awareness campaigns can educate people about mental health issues, reduce stigma and discrimination, and encourage people to seek help. There is a need to invest in mental healthcare infrastructure to ensure everyone has access to quality mental health services. Integrating mental health services into primary healthcare can improve early detection and treatment of mental health issues, while developing and implementing policies and regulations can help reduce the risk of mental illness. Addressing social determinants of mental health, such as poverty and discrimination, can also improve mental health outcomes.

2.17 Public-Private Partnership

There is a need to strive towards establishing a robust public-private partnership in the health sector that improves the accessibility and quality of healthcare services for all its citizens. To achieve this vision, several key steps, such as encouraging private sector investment in healthcare infrastructure, creating a supportive regulatory environment, implementing innovative funding models, developing public-private partnerships for research and development, and promoting public-private partnerships in healthcare delivery needs to be taken. Providing incentives and tax benefits can encourage private sector investment in healthcare, while creating a supportive regulatory environment can ensure quality healthcare services. Innovative funding models can be implemented to attract private sector investment in healthcare, while collaborative research and development partnerships between the public and private sectors can lead to the development of new and innovative healthcare technologies. Additionally, public-private partnerships can be established to improve healthcare delivery in underserved areas and address healthcare workforce shortages. By establishing a strong and effective public-private partnership in the health sector, the accessibility and quality of healthcare services for all citizens, while also stimulating economic growth and development can be improved.

2.18 Health Education and Awareness

Health education and awareness should be prioritised as a key strategy to improve the overall health and wellbeing of its citizens. To achieve this vision, several key steps, such as promoting health education in schools, increasing public health awareness campaigns, leveraging digital technologies, collaborating with community organizations, and empowering healthcare professionals may be considered. Including health education in the school curriculum can teach children about healthy lifestyle choices, disease prevention, and the importance of physical activity and nutrition. Public health awareness campaigns can educate people about the importance of disease prevention, early detection, and treatment, while digital technologies can be used to promote health education and awareness and to facilitate access to healthcare services. Community organizations can be engaged in health education and awareness campaigns, and in the development of culturally sensitive healthcare programs. Healthcare professionals should also be trained in health education and communication skills to effectively

educate and empower patients to make informed healthcare decisions. By prioritizing health education and awareness, the health literacy of its citizens, encouraging healthy lifestyle choices, reduce the burden of preventable diseases, and building a healthier, more productive society can be improved.

2.19 Strengthen Community-Based Surveillance

In order to promote barriers to disease transmission, such as social/physical segregation, hand-washing, cough hygiene, use of toilets and safe drinking water, etc., as appropriate, primary health care centres would need to strengthen the capacity of front-line workers. These workers would be responsible for community-based surveillance for presumptive and active cases, active case-finding, contact tracing, and other related tasks. In order to screen for or confirm diseases that may be endemic or novel within local geographic contexts, primary care laboratories can be reinforced with point of care, community-based, or self-testing tools.

Block-level labs may be strengthened to improve the effectiveness of public health initiatives and lessen the burden on district and state-level laboratories. In block/district-level laboratories, it is possible to precisely diagnose the prevalent endemic illnesses in the area based on common symptoms (for example, Acute Febrile Illness). Block-level laboratories can support the right decisions regarding action and intervention in a timely manner by verifying the diagnostic early, during disease outbreaks, and after the outbreak.

2.20 Tiered Institutional PHEDM-CDC-PDP Capacity-Building Model

In the twenty-first century, Public Health Emergency and Disaster Management-Capacity Development Programme to Professional Development Programme (PHEDM-CDP-PDP) cannot be understood just in terms of local, national, or public management challenges; an integrated framework including all stakeholders is necessary. Public Health Emergency and Disaster management have a wide range of facets and levels. A tiered hierarchical restructuring becomes necessary while planning the public health emergency and disaster management system. A multi-tier approach creates a new system by bringing together the public sector, private sector and voluntary organization's

value systems and ensuring management activities and common services. This five-tier approach **will** pave the way for acquiring, strengthening, adapting, and sustaining the capacities of people, institutions, and societies to reduce vulnerabilities to public health emergencies and disaster risks, to avoid (prevent), or to prevent (mitigate and prepare for), the impacts of hazards. The five-tier approach is shaped as a triangle where the vertical axis represents increased capability.



Figure : Five-Tiered institutional PHEDM Capacity-Building Model

Conclusion

With the help of advanced technologies, policymakers must consider more complex and varied future scenarios. We need to make intelligent, evidence-based investments that deliver the best possible return in terms of lives saved, sustainable development, global economic stability and long-term growth which means recognizing that strengthening the public health emergency and disaster management must be part of the broader effort towards the 2030 Sustainable Development Goals and Sendai Framework for Disaster Risk Reduction.

References

1. WHO (2022). 10 proposals to build a safer world together – Strengthening the Global Architecture for Health Emergency Preparedness, Response and Resilience. World Health Organization 2022. Available on <https://www.who.int/publications/m/item/10-proposals-to-build-a-safer-world-together---strengthening-the-global-architecture-for-health-emergency-preparedness--response-and-resilience--white-paper-for-consultation--june-2022>

2. NITI Aayog (2020). Vision 2035: Public Health Surveillance in India A White Paper, published by NITI Aayog. ISBN 978-81-949510-6-3. Available on: https://www.indiascienceandtechnology.gov.in/sites/default/files/file-uploads/roadmaps/1609310715_PHS-13-dec-web.pdf
3. DARPG (2023). Vision India@2047 – DARPG, bringing citizens and government closer. Department of Administrative Reforms and Public Grievances, Ministry of Personnel, Public Grievances and Pensions, Government of India. Available on <https://darpg.gov.in/sites/default/files/final%20vision%20india2047..approved.pdf> (Accessed on January 2023)
4. WHO (2021). Global strategy on digital health 2020-2025 © World Health Organization 2021 ISBN 97892-4-002092-4 (electronic version). Available on <https://www.who.int/docs/default-source/documents/9789240020924.pdf>