Preparedness for Outbreak/Pandemic: Strengthening Public Health Teams

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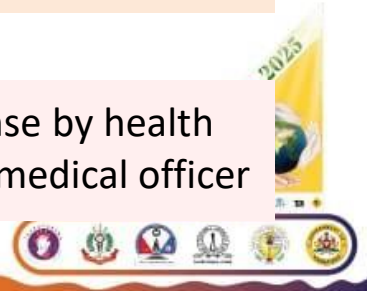
TERMINOLOGIES RELATED TO OUTBREAK

ENDEMIC DISEASE	Constant disease occurring in a population regularly at a usual baseline level, without need for additional external inputs (e.g. tuberculosis, malaria)	Local response by health worker and medical officer
CLUSTER	An unusually high incidence of a particular disease or disorder occurring in close proximity in terms of both time and geography (e.g. foodborne illness)	Local & district response by district surveillance officer and rapid response team
OUTBREAK	Occurrence of cases of disease in excess of what would normally be expected in a defined community, geographical area or season (e.g. measles, cholera, dengue)	Local, district and state response
EPIDEMIC	Rapid spread of infectious disease to a large number of people across geographical boundaries within a short period of time (e.g. 2015 swine flu epidemic)	State level response
PANDEMIC	Epidemic of infectious disease that has spread through human populations across a large region; for instance multiple continents, or even worldwide (e.g. swine flu 2009)	Local response by health worker and medical officer



CRITERIA FOR DECLARING OUTBREAK

- **Trigger levels** - thresholds for diseases that trigger pre-determined responses at various levels – not uniform

- **Trigger levels depend on**
  - Type of disease
  - Case fatality (Death / case ratio)
  - Number of evolving cases
  - Usual trend in the region (endemicity)

- **Examples of trigger levels for outbreaks**
  - Polio – 1 case
  - Cholera – a case of severe dehydration / death due to diarrhea in a patient of >5 years of age
  - Japanese Encephalitis – clustering of two or more cases from one locality or more than 4 cases in a PHC area within a week

PUBLIC HEALTH EMERGENCIES OF INTERNATIONAL CONCERN

Public Health Emergencies of International Concern (PHEICs) declared by the WHO during past 2 decades

- H1N1 influenza (2009)
- Ebola Virus Disease (2014-16, 2018-2020)
- Zika Virus Disease (2016)
- Poliomyelitis (2014)
- COVID-19 (2020)
- Monkey Pox (2022)

Other public health threats: SARS, Avian influenza (bird flu), MERS-CoV, and Nipah virus outbreaks

75% of future public health threats are likely to be zoonotic threats (which could be due to emerging, re-emerging and new pathogens) - WHO

WHY PREPAREDNESS MATTERS?

Quote: “Pandemics are inevitable, but catastrophic outcomes are not.” – WHO

Statistics:

COVID-19 caused over 6 million deaths globally

Economic loss > $10 trillion (World Bank estimate)

Reasons to prepare:

Global travel accelerates spread

Strains health systems rapidly

Preventable mortality and long-term consequences

LESSONS FROM PAST PANDEMICS

COVID-19

- Exposed supply chain weaknesses
- Showed power of rapid vaccine development

H1N1 (2009)

- Issues in vaccine prioritization
- Overwhelmed ICU capacities

SARS (2003)

- Poor inter-country coordination
- Success of aggressive contact tracing

Key Takeaway

- Preparedness determines outcomes

DISEASE OUTBREAK: FRAMEWORK FOR CONTROL AND MANAGEMENT

KEY PILLARS OF PUBLIC HEALTH PREPAREDNESS

- Surveillance & Early Warning
- Rapid Response & Investigation
- Communication & Community Engagement
- Healthcare System Readiness
- Workforce Development & Training
- Supply Chain & Logistics
- Policy, Planning & Legal Frameworks
- Research & Innovation

SURVEILLANCE

- Close observation → Keep watch continuously
- Health Surveillance → Disease trend → Outbreak
- Health Surveillance will help → Early detection / Prevention / Control
- Surveillance is the ongoing systematic collection, analysis and interpretation of data in order to plan, implement and evaluate public health intervention
- Indicator based
- Event Based

SURVEILLANCE & EARLY WARNING SYSTEMS

Integrated Disease Surveillance: Beyond syndromic surveillance to include genomic surveillance, wastewater surveillance, sentinel sites.

Real-time Data Analytics: Leveraging AI/ML for trend analysis, anomaly detection, predictive modelling.

Interoperability: Seamless data sharing across local, national, and international levels (e.g., IHR).

One Health Approach: Integrating human, animal, and environmental health surveillance.

Indicators: Specific metrics for monitoring disease activity and emerging threats.

HISTORY OF GENESIS OF IDSP

1988 – 1994

- Cholera outbreak in Delhi
- Plague outbreak in Surat

The Government of India realized the importance of Disease surveillance which not only had significant mortality and morbidity but also significant economic consequences.

National Surveillance Programme for Communicable Disease (NSPCD) was launched by the Centre in 1997-98.

- Initially in five pilot districts of the country (centrally sponsored scheme)
- Over the years extended to cover all 766 Districts in the country in all 28 states & 8 UTs in the country.
- Now the programme runs under NHM .

CORE CONDITIONS UNDER IDSP

Vaccine preventable diseases	Diphtheria, Pertussis, Measles, Rubella and Polio
Vector borne diseases	Dengue, Chikungunya, Malaria, and Japanese Encephalitis
Water borne diseases	Hepatitis A, Hepatitis E, Cholera, Diarrhoea, Dysentry and Typhoid
Respiratory diseases	Influenza, Mumps, Chicken pox,
Clinical syndromes causing death/hospitalisation	Meningococcal Meningitis
Zoonotic diseases	Scrub Typhus, Anthrax, Kyasanur Forest Disease, Crimean Congo Haemorrhagic Fever and Leptospirosis

***Surveillance of COVID-19 is currently being conducted by IDSP as a part of special surveillance.**

RAPID RESPONSE & OUTBREAK INVESTIGATION

Rapid Response Teams (RRTs)	Composition (epidemiologists, clinicians, lab personnel, communication specialists), training, deployment protocols.
Contact Tracing & Case Management	Modernizing techniques (digital tools, community involvement), isolation/quarantine protocols.
Laboratory Capacity	Diagnostics (rapid antigen, PCR, sequencing), biosafety levels, surge capacity for testing.
Incident Command System (ICS)	Standardized framework for managing complex health emergencies.

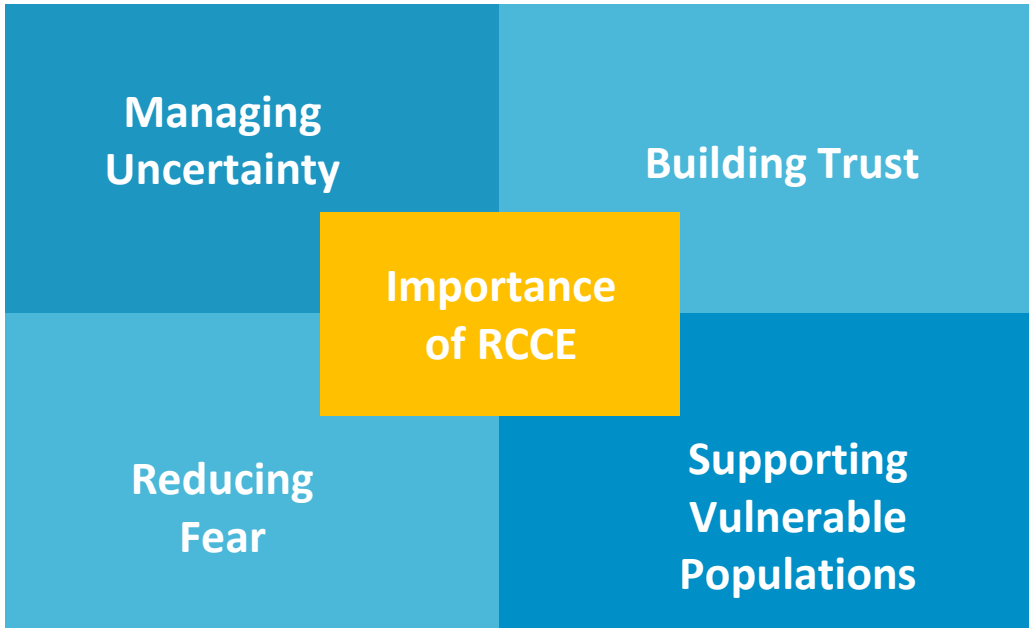
COMMUNICATION & COMMUNITY ENGAGEMENT

Risk Communication Strategy	Combating Misinformation /Disinformation	Community Engagement	Multi-channel Dissemination	Psychosocial Support
Clear, consistent, credible messaging (PRE-crisis, DURING-crisis, POST-crisis).	Strategies for identifying and addressing infodemics.	Involving local leaders, diverse populations, and trusted organizations. Cultural competency.	Social media, traditional media, community networks, direct outreach.	Addressing mental health impacts on the public and responders.

WHAT IS RCCE?

Risk communication involves sharing timely, accurate, and actionable information about health risks and how to protect oneself.

Community engagement means involving communities in the decision-making and response process.



Effective and timely risk communication during pandemics takes coordination between government agencies, non-governmental organizations (NGOs), community-based organizations (CBOs), and private companies.

ROLE OF COMMUNICATION ACROSS PANDEMIC PHASES

Pre-pandemic

Objective: Prepare the public and health systems for the possibility of a pandemic, ensuring awareness and readiness.

Key Activities:

- Public health campaigns
- Building trust through transparency:
- Stakeholder mapping

Pandemic

Objective: Communicate real-time updates during the pandemic to keep the public informed and safe.

Key Activities:

- Timely, accurate information
- Addressing misinformation
- Crisis communication

Post-pandemic

Objective: Focus on recovery and resilience, restoring trust in public health systems, and addressing the social and psychological impacts of the pandemic

Key Activities:

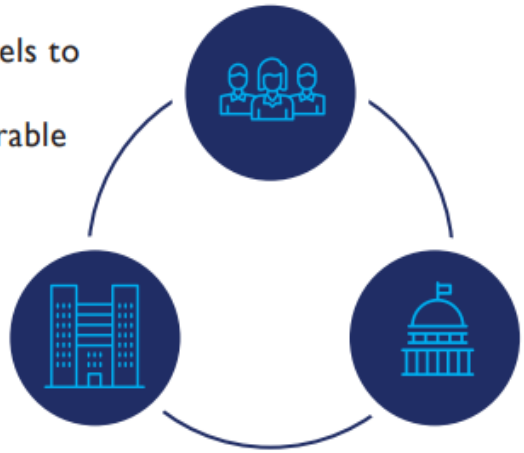
- Mental health support
- Rebuilding trust
- Equitable resource distribution

ROLE OF KEY STAKEHOLDERS

Broad roles for the key stakeholders during RCCE

NGOS AND CBOS

» Leverage existing networks and channels to amplify public health protocols
» Tailor communications to reach vulnerable populations



PRIVATE SECTOR ENTITIES

» Build communications to stimulate economic participation
» Update employees on new ways of working following public health guidelines
» Monitor communications efficacy and report back to the lead coordinator

GOVERNMENT AGENCIES

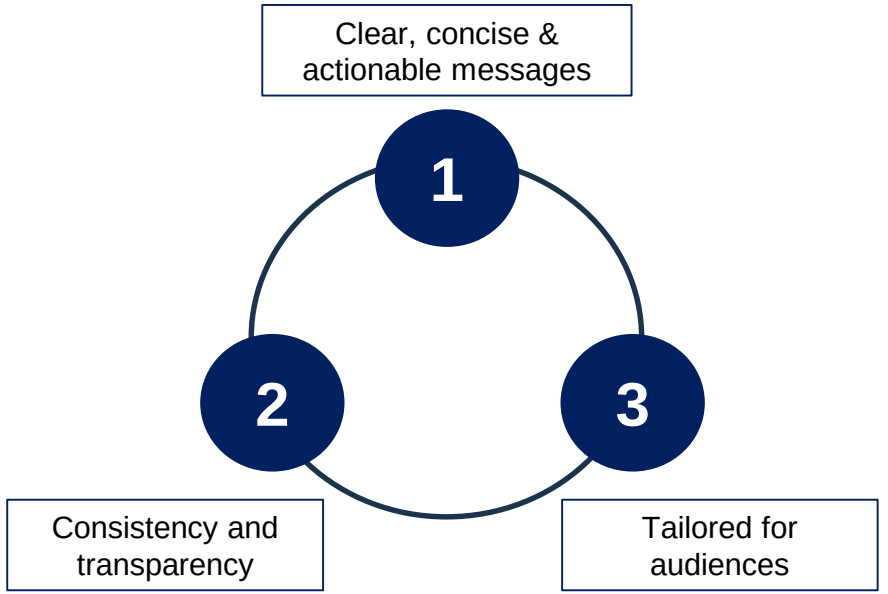
» Establish public health protocols, government policies, and temporary aid programs
» Foster a sense of trust and motivate action
» Monitor case numbers, infection rates, and other important statistics
» Continuously update policies as the situation changes

Source: ADB COVID-19 Risk Communications Promising Practices Playbook

STRATEGIES FOR EFFECTIVE COMMUNICATION

Key Imperatives For Creating Effective Covid-19 Risk Communications

- Behavior focussed
- Diverse channels and tactics
- Health literacy



Addressing the "Infodemic" is also a key aspect of RCCE. To combat this, regular fact checking from trusted sources coupled with rapid response is needed.

HEALTHCARE SYSTEM READINESS & SURGE CAPACITY

Hospital Preparedness: ICU beds, ventilators, PPE, oxygen supply, isolation units.

Alternate Care Sites: Planning for overflow capacity.

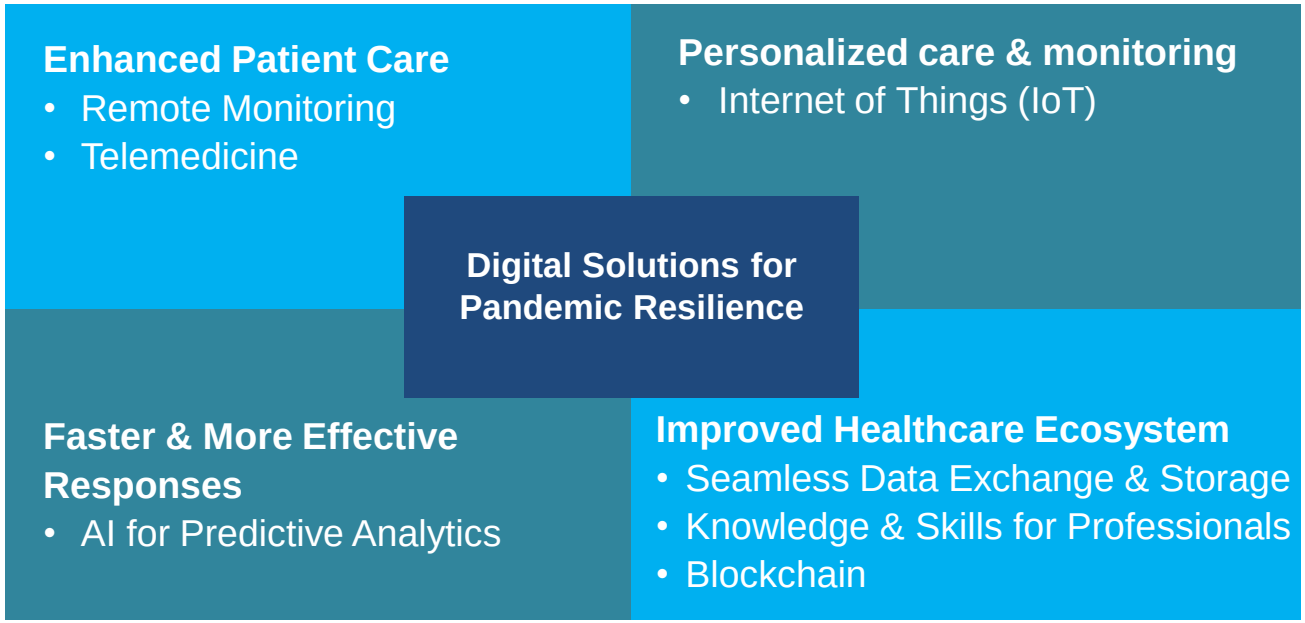
Healthcare Workforce Protection: Staffing, training, mental health support for frontline workers.

Vaccine and Therapeutic Distribution: Logistics, cold chain management, equity of access.

Integration with EMS and Primary Care

DIGITAL TRANSFORMATION FOR A FUTURE-READY HEALTHCARE SYSTEM

Global examples during COVID-19 highlighted that combined with telemedicine, primary health systems can adequately treat all patients with mild symptoms.



Digital health solutions must be a cornerstone of pandemic preparedness and response, prioritizing ethical, safe, secure, reliable, equitable, and sustainable benefits for all. These approaches lead to improved medical diagnosis, data-driven treatment decisions & personalized care.

WORKFORCE DEVELOPMENT & TRAINING

Competency-Based Training

Epidemiology, public health informatics, risk communication, emergency management.

Cross-Training

Ensuring personnel can fill multiple roles during a crisis.

Recruitment & Retention

Attracting and retaining skilled public health professionals.

Volunteer Management

Integrating and training community volunteers.

Leadership Development

Equipping leaders for complex decision-making under pressure.

SUPPLY CHAIN & LOGISTICS MANAGEMENT

Strategic National/Regional Stockpiles	PPE, diagnostics, therapeutics, vaccines, medical equipment.
Diversified Sourcing & Manufacturing	Reducing reliance on single points of failure.
Distribution Networks	Efficient and equitable delivery mechanisms.
Inventory Management Systems	Real-time tracking.
Cold Chain Logistics	Especially critical for vaccines.

POLICY, PLANNING & LEGAL FRAMEWORKS

National/Sub-national Pandemic Preparedness Plans: Regular review and updates, based on lessons learned.

Legal Authorities: Quarantine, isolation, emergency declarations, resource reallocation.

Ethical Considerations: Resource allocation, vaccine equity, data privacy.

Inter-agency Coordination: MOUs, defined roles and responsibilities across government levels and sectors.

International Health Regulations (IHR) Compliance: Fulfilling global commitments.

RESEARCH & INNOVATION

Vaccine & Therapeutic R&D: Accelerated pipelines, platforms for rapid development.

Diagnostic Technologies: Point-of-care, rapid, accurate testing.

Public Health Informatics: AI, Big Data, predictive modeling for public health applications.

Behavioral Science Research: Understanding human behavior during crises to inform interventions.

Funding Mechanisms: Dedicated and sustained funding for pandemic preparedness research.

KEY CHALLENGES & OPPORTUNITIES

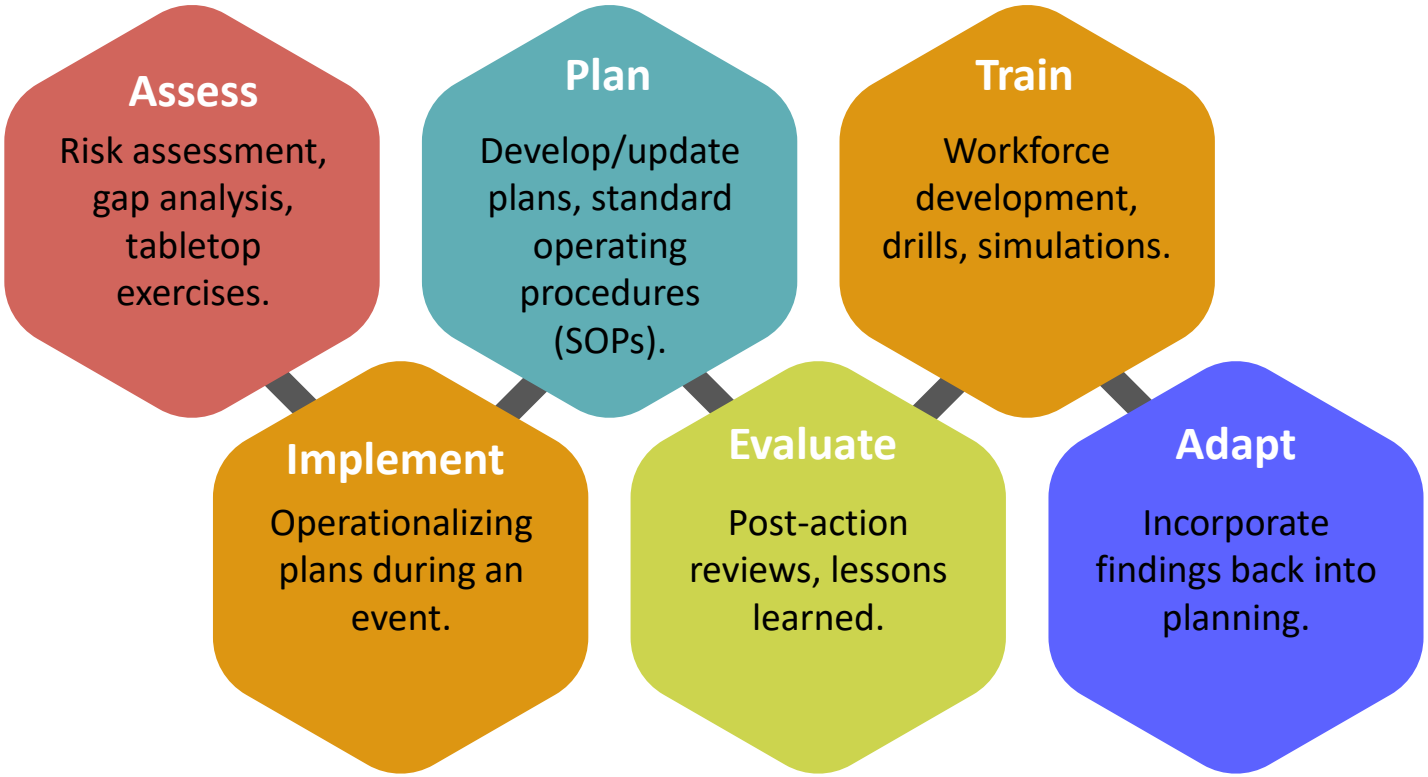
Challenges

- Sustained political will and funding.
- Addressing health inequities.
- Combating "pandemic fatigue."
- Rapidly evolving pathogens.
- Global coordination and equity.

Opportunities

- Leveraging technological advancements.
- Strengthening One Health approach.
- Enhanced global solidarity and partnerships.
- Building public trust and resilience.
- Learning from past events.

ROLE OF PUBLIC HEALTH TEAMS IN PRACTICE: A CYCLE OF PREPAREDNESS



CALL TO ACTION

For Public Health Professionals: Champion preparedness, continuously learn, collaborate.

For Policymakers: Prioritize and fund public health infrastructure.

For Communities: Engage, trust science, be part of the solution.

Shared Responsibility: Public health is everyone's business.

Final thought: "The time to repair the roof is when the sun is shining." - John F. Kennedy

“Attention is the rarest and purest form of generosity”

- Simone Weil

Thank You For Your Attention!