

DISASTER COMMUNICATION STRATEGIES DURING PUBLIC HEALTH EMERGENCIES

Dr. Meera Iyer

Assistant Professor

Department of Public Health

Institute of Health Sciences and Policy Studies, Hyderabad, India

Abstract

Public health emergencies create conditions in which people must make rapid decisions while facts, risks, and service arrangements may change from hour to hour. Communication in these settings is therefore not a one-way release of official information; it is a coordinated process of listening, verifying, explaining uncertainty, supporting protective behaviour, and responding to community concerns. This paper presents a practical framework for disaster communication during outbreaks, environmental health incidents, mass-casualty events, and other public health emergencies. It synthesises established principles of emergency risk communication, crisis communication, community engagement, and infodemic management into a six-stage operational cycle: listen, verify, prioritise, communicate, engage, and adapt. The framework emphasises trusted leadership, rapid message clearance, multilingual and accessible communication, coordination with frontline workers and local institutions, ethical social listening, and transparent correction of misinformation. It also distinguishes between communication tasks before an event, during the initial alert, throughout sustained response, and during recovery. A communication strategy matrix and a set of readiness indicators are provided to help public health agencies translate broad principles into workplans, message products, feedback loops, and accountability mechanisms. The paper argues that trust is built not only through factual accuracy but also through empathy, consistency, acknowledgement of uncertainty, and evidence that public feedback changes decisions. The proposed model is conceptual and should be adapted to local languages, cultural practices, media environments, legal requirements, and access conditions. It is intended for public health departments, hospitals, emergency operations centres, humanitarian organisations, universities, and local governments seeking a durable and people-centred approach to emergency communication.

Keywords: Disaster Communication, Public Health Emergencies, Risk Communication, Community Engagement, Infodemic Management, Crisis Communication, Health Misinformation, Emergency Preparedness, Social Listening, Health Equity.

1. INTRODUCTION

Public health emergencies place communities in a difficult decision environment. A new infectious threat, chemical exposure, heat emergency, flood-related disease risk, hospital surge, or mass-casualty incident can generate fear, uncertainty, disruption, and a constant demand for reliable guidance. People need to know what has happened, what is not yet known, where they can obtain services, which actions are useful, and when guidance may change. At the same time, officials and response agencies must work with incomplete data, competing priorities, changing operational capacity, and unequal access to communication channels. In this context, disaster communication is a core response

function rather than an administrative afterthought.

Emergency risk communication is commonly understood as the real-time exchange of information, advice, and opinions between experts or officials and people facing a threat to health, survival, or social and economic wellbeing. Its practical purpose is to help people make informed decisions and take feasible protective action. This definition is important because it places dialogue, not simply message delivery, at the centre of public communication. A press conference, a text alert, a clinic poster, a radio interview, and a community meeting are most effective when they form part of a coordinated system that also receives questions, rumours, and reports of barriers to action.

The communication challenge becomes sharper when the public health situation is evolving. Early reports may be provisional, case definitions can change, laboratory capacity may be limited, and advice may need revision as evidence develops. Attempts to conceal uncertainty or delay communication until every detail is confirmed can create an information vacuum that is quickly filled by speculation, political narratives, commercial claims, or false cures. Conversely, communication that is timely but careless can damage trust, amplify stigma, or encourage harmful behaviour. The central task is to communicate what is known, what remains uncertain, what is being done to reduce uncertainty, and what people can do now.

The growth of digital communication has expanded both the speed and complexity of emergency response. Social media, messaging applications, community radio, online news, and search engines can help agencies reach diverse audiences quickly, but they also enable rumours and misleading claims to circulate across borders and languages. The resulting information environment, often described as an infodemic, can make trustworthy guidance harder to find and can weaken confidence in health institutions. Effective response therefore requires communication teams to monitor public questions, identify emerging narratives, correct dangerous claims, and make accurate information easy to locate and act upon.

Communication also has an equity dimension. A strategy based only on websites, official social-media accounts, or technical press briefings will exclude many people, including those with low literacy, limited connectivity, disability-related access needs, language barriers, insecure housing, or distrust of formal institutions. Public health agencies need to work with people and organisations that communities already recognise as credible: community health workers, clinicians, local leaders, teachers, disability advocates, faith networks, youth groups, civil-society organisations, and local media. Such partnerships do not replace official responsibility; they extend the reach, relevance, and accountability of official guidance.

This paper develops a structured communication framework for public health emergencies. It brings together crisis and emergency risk communication, risk communication and community engagement, infodemic management, and inclusive public communication. The paper has four goals: to clarify the core principles that should guide emergency communication; to organise them into an operational cycle; to provide a phase-based strategy matrix for responders; and to identify indicators that can be used to review readiness, reach, understanding, trust, and adaptation. The paper is conceptual rather than empirical, and the framework should be tailored to legal, cultural, epidemiological, and resource conditions in each setting.

2. LITERATURE REVIEW

The literature on crisis and emergency risk communication consistently warns that people process information differently during a crisis. Stress, uncertainty, loss of routine, and perceived threat can reduce attention, increase reliance on familiar messengers, and intensify the search for simple explanations. Crisis and Emergency Risk Communication (CERC) therefore stresses the importance of issuing information early, maintaining accuracy, demonstrating credibility, expressing empathy, offering practical action, and treating people with respect. These principles are not a formula for public relations; they are behavioural and ethical conditions for helping people understand and use health guidance.

World Health Organization guidance frames risk communication and community engagement as a capability that should be established before an emergency and integrated into response coordination. Preparedness involves assigning responsibilities, training spokespersons, mapping stakeholders, developing message templates, identifying accessible channels, and creating mechanisms for feedback. During response, communication must be connected to surveillance, clinical services, logistics, protection, and incident management so that public messages correspond to what people can actually do. Advice to seek testing, isolation, treatment, shelter, vaccination, or mental-health support is meaningful only when the relevant service is available, understandable, and reachable.

A second strand of literature focuses on community engagement. Community engagement treats people affected by a hazard as partners who have knowledge of local conditions, practical constraints, and trusted networks. Listening sessions, hotline records, community feedback mechanisms, rapid perception surveys, and engagement with local organisations can reveal why a recommendation is difficult to follow. For example, a message about hand hygiene may have little effect where water is unavailable; an instruction to isolate may be unrealistic in crowded housing; and online appointment systems may exclude people without digital access. Communication plans should therefore capture questions and barriers, share them with operational decision-makers, and visibly adapt services or messages where possible.

Infodemic management has become a major component of health emergency communication. An infodemic includes an overabundance of information, some accurate and some false or misleading, that can make it difficult for people to identify credible advice. A narrow approach that only publishes corrections after a rumour has spread is usually insufficient. Stronger practice combines social listening, pre-emptive explanations of common misconceptions, rapid correction of high-risk claims, promotion of reliable information sources, and engagement with trusted intermediaries who can explain guidance in local terms. Such work should be governed ethically, particularly when monitoring public online

conversations, because privacy, human rights, and the risk of stigmatising groups must be protected.

Trust is a recurring theme across the literature. It is influenced by the competence, honesty, consistency, fairness, and responsiveness of institutions. Trust is not created by repeating assurances; it develops when communication acknowledges uncertainty without becoming evasive, explains the reasons for difficult decisions, corrects errors openly, and provides opportunities for people to ask questions. The messenger matters as much as the message. Health professionals, community leaders, local journalists, and peer educators may be better positioned than a central authority to explain how general guidance applies to a particular neighbourhood or population group.

Finally, the literature emphasises accessibility and inclusion. Communication must be understandable to people with different literacy levels and should be available in relevant languages and formats. Plain language, visual materials, sign-language interpretation, captions, screen-reader compatible digital content, toll-free telephone services, and community-based outreach are practical tools rather than optional extras. An inclusive approach also avoids blame and stigma. It does not describe communities, regions, occupations, or demographic groups as inherently dangerous; instead, it focuses on exposure conditions, protective actions, support needs, and rights.

2.1 SUMMARY OF PREVIOUS STUDIES

Author(s)	Method / Technique	Major Contribution	Practical Gap / Need
WHO (2017)	Emergency risk communication guideline	Positions risk communication as a real-time exchange that supports informed protective decisions.	Calls for communication capacity before, during, and after emergencies.
Reynolds & Seeger (2005)	CERC integrative model	Connects crisis communication, risk perception, public health practice, and emergency response.	Requires operational adaptation for local public health systems.
Covello (2003)	Risk and crisis communication practice	Highlights empathy, trust, message clarity, and responsiveness under high concern.	Does not by itself address digital misinformation ecosystems.

Vaughan & Tinker (2009)	Pandemic communication and vulnerable populations	Shows that language, access, trust, and social conditions shape the usefulness of health advice.	Further work is needed on real-time feedback mechanisms.
Eysenbach (2020)	Infodemic management	Proposes listening, sense-making, evidence sharing, and resilience-building to address misinformation.	Needs integration with broader incident-management systems.
Tangcharoensathien et al. (2020)	WHO technical consultation	Identifies multi-sector actions for managing an infodemic during a public health crisis.	Implementation depends on local governance and data-protection safeguards.
IFRC (2022)	Community engagement and accountability guidance	Treats community members as partners and promotes systematic feedback and response mechanisms.	Operational roles and resources must be planned in advance.
WHO (2024)	RCCE competency framework	Defines behaviours and activities needed for high-performing, community-centred emergency programmes.	Requires workforce development and sustained institutional support.
CDC (2024)	CERC manual	Provides evidence-based communication principles, planning tools, and crisis communication practices.	Needs contextual translation across languages and media environments.

3. OBJECTIVES OF THE STUDY

The primary purpose of this paper is to develop a practical and people-centred framework for planning, delivering, monitoring, and improving disaster communication during public health emergencies. The framework aligns rapid risk communication with community engagement, service delivery, infodemic management, and ethical accountability so that communication supports feasible protective action.

3.1 PRIMARY OBJECTIVE

The primary objective of this study is to formulate a structured disaster communication model that enables public health agencies and response partners to provide timely, trustworthy, accessible, and actionable guidance while adapting to community feedback and changing evidence.

PRIMARY OBJECTIVE POINTS

- To identify the core principles that support trustworthy communication during public health emergencies.
- To develop a six-stage emergency communication cycle linking listening, evidence verification, message

prioritisation, dissemination, engagement, and adaptation.

- To integrate risk communication, community engagement, and infodemic management within incident-management practice.
- To provide practical strategies for communicating uncertainty, correcting harmful misinformation, and supporting protective behaviour.
- To strengthen accessible, multilingual, stigma-free, and equity-oriented communication for diverse populations.

3.2 SECONDARY OBJECTIVES

The secondary objectives address operational readiness, governance, inclusion, data use, frontline communication, partnerships, and post-event learning. They are intended to help organisations transform general communication principles into capacities that can be activated quickly during an emergency.

SECONDARY OBJECTIVE POINTS

- To map priority audiences, trusted messengers, service pathways, and communication barriers before an emergency occurs.

- To establish message-clearance procedures that are rapid enough for an evolving event while maintaining scientific and legal accuracy.
- To use hotlines, community feedback, media monitoring, and ethical social listening to identify urgent questions and rumours.
- To coordinate messages across public health agencies, hospitals, local government, civil society, and community-based organisations.
- To tailor communication products for different language groups, literacy levels, disability access needs, and media preferences.
- To equip frontline workers with brief, consistent, and empathetic talking points that connect public advice with available services.
- To define indicators for reach, comprehension, trust, feedback response, misinformation trends, and behavioural feasibility.
- To incorporate privacy, data protection, human rights, and non-stigmatising language into monitoring and response activities.
- To capture lessons from the response and update preparedness plans, message libraries, and training programmes.

4. RESEARCH METHODOLOGY

This study uses a structured narrative synthesis to develop a conceptual framework for disaster communication during public health emergencies. The analysis draws on international guidance for emergency risk communication, risk communication and community engagement, crisis and emergency risk communication, community engagement and accountability, and infodemic management, together with peer-reviewed literature on risk perception, trust, public health communication, and misinformation. The paper does not report data from human participants and does not present illustrative percentages as empirical findings.

The synthesis followed four analytic steps. First, communication guidance and scholarly sources were reviewed to identify recurring domains: governance, trust, transparency, uncertainty communication, community engagement, information access,

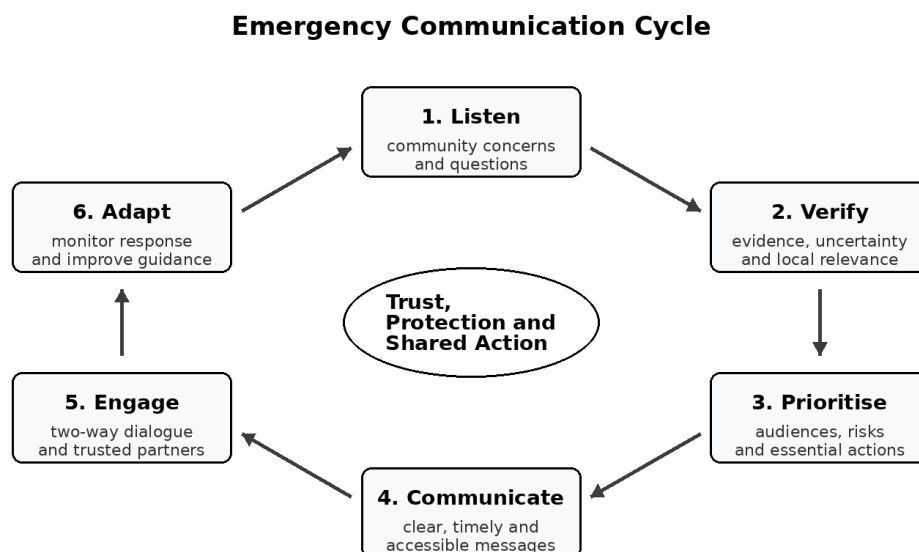
misinformation management, workforce capacity, and evaluation. Second, these domains were compared across the emergency timeline of preparedness, alert, active response, recovery, and learning. Third, the domains were organised into a practical cycle that response teams can use during rapidly changing circumstances. Fourth, the cycle was translated into a strategy matrix and a set of evaluation indicators that support operational planning.

The proposed cycle begins with listening because communication products should be informed by what people are asking, fearing, misunderstanding, and experiencing. It then moves to verification, in which evidence, uncertainty, local service information, and potential harms are checked. Prioritisation identifies who most needs information, what action is most urgent, and which communication channels are appropriate. Communication delivers clear and accessible guidance; engagement enables dialogue and partnership; and adaptation uses feedback and monitoring to revise messages, services, or outreach.

The framework is designed for adaptation rather than universal application. A public health department responding to an urban outbreak, a hospital managing a heat emergency, and a district responding to flood-related disease risks will have different audiences, services, languages, and infrastructure. The same is true across communication channels: a digital campaign may be effective in one setting but must be combined with radio, public address systems, printed materials, door-to-door outreach, or community meetings in another. For this reason, the framework treats local stakeholder mapping and communication access assessment as essential preparedness activities. Evaluation in this framework is formative as well as summative. Teams should not wait until the end of an event to learn whether communication is effective. They should review incoming questions, hotline themes, community feedback, media narratives, service uptake patterns, and observations from frontline workers while the response is underway. The purpose is not to judge the public for misunderstanding; it is to identify gaps in message design, service information,

reach, or feasibility and to adjust the response accordingly.

Figure 4.1: Emergency Communication Cycle



5. DATA ANALYSIS

The framework analyses disaster communication as a system of decisions, relationships, and feedback rather than as a single media product. A message can be factually correct but still fail if it reaches the wrong audience, uses unfamiliar language, does not address the main concern, lacks an available service pathway, or is delivered by a messenger people do not trust. For this reason, the analysis uses qualitative operational indicators that connect communication activity with public understanding, feasibility, and responsiveness.

At the preparedness stage, the central questions are whether the organisation knows its priority audiences, has clear roles, can approve messages quickly, and has accessible channels ready for use. During the initial alert, the focus shifts to speed, consistency, transparency about uncertainty, and the availability of practical protective guidance. During sustained response, teams need to monitor questions, rumours, service barriers, and fatigue; messages should be refined and channels adjusted. Recovery communication

should explain what has changed, where continuing support is available, and how lessons will inform future preparedness.

A strong feedback system separates signal from noise without dismissing genuine concern. Repeated questions on a hotline, rumours reported by health workers, concerns raised in community meetings, and search trends around a health topic may all indicate a communication need. These signals should be recorded, interpreted with local partners, assessed for potential harm, and linked to a clear action: clarify a message, update a frequently asked questions page, train frontline staff, adjust service information, or address a false claim with a credible explanation.

The matrix below translates the framework into phase-specific actions. It is deliberately non-numeric: it is a planning and review tool, not a claim of measured effectiveness. Agencies can add local targets, responsible units, deadlines, and evidence sources according to their emergency plan.

5.1 DISASTER COMMUNICATION STRATEGY MATRIX

Emergency Phase	Communication Objective	Core Practices	Priority Channels / Partners	Evidence Signals
Preparedness	Build communication readiness and	Map audiences and trusted messengers; prepare accessible	Community organisations, local media,	Updated contact lists, tested approval

	relationships.	templates; train spokespersons; establish a feedback protocol.	clinics, schools, faith groups, disability networks.	process, message library, channel-access map.
Initial alert	Explain the situation and immediate protective actions.	State what is known and unknown; describe who is affected; give simple actions; explain where services are available.	Official alerts, local radio, press briefings, SMS, websites, frontline staff.	Time to first verified message, clarity of action points, alignment across partners.
Active response	Support sustained behaviour and service use.	Provide regular updates; address practical barriers; coordinate with service delivery; adjust messages for changing guidance.	Hotlines, social media, community meetings, health-worker outreach, printed materials.	Recurring questions, service-access barriers, reach among priority groups.
Misinformation surge	Reduce the harm caused by false or misleading claims.	Monitor high-risk narratives; explain why a claim is unreliable; offer safer alternatives; engage trusted intermediaries.	Search-friendly web pages, short videos, radio interviews, peer networks, clinician scripts.	Rumour reports, engagement with reliable content, reduced repetition of high-risk claims.
Recovery and transition	Maintain trust and explain the next steps.	Communicate changes in risk, continuing services, recovery support, and lessons learned; acknowledge contributions and losses.	Public reports, community dialogue, health services, local media, social platforms.	Public questions about transition, uptake of follow-up services, feedback on response experience.

5.2 COMMUNICATION READINESS AND EVALUATION INDICATORS

The following indicators help teams assess whether communication capacity is present and whether it is functioning during an event.

Indicators should be interpreted alongside

local context. For example, a high number of calls may signal effective outreach, confusion, unmet service needs, or a combination of these factors; qualitative review is needed before drawing conclusions.

Evaluation Area	Key Review Question	Possible Evidence Sources
Timeliness	How quickly does the first verified public message reach priority audiences after a decision is made?	Time-stamped logs, press releases, SMS records, website updates.
Consistency	Do official messages, frontline scripts, hotlines, and partner materials give compatible guidance?	Message comparison, partner checks, mystery-client calls.
Comprehension	Can people accurately explain the recommended action and where to obtain support?	Rapid perception checks, short interviews, community feedback.
Accessibility	Are materials usable across languages, literacy levels, disability needs, and communication access conditions?	Accessibility review, translation checks, community testing.

Trust and empathy	Do audiences perceive the messenger as honest, respectful, and responsive to uncertainty and concern?	Feedback forms, qualitative listening sessions, media analysis.
Feedback response	Are recurring questions or barriers recorded, reviewed, and acted on within a defined period?	Issue trackers, meeting notes, action logs.
Misinformation risk	Which false claims are spreading, who is exposed, and what harm could result?	Ethical social listening, hotline reports, frontline observations.
Service linkage	Do messages lead people to correct and available services without creating avoidable demand or exclusion?	Referral data, service-provider feedback, field observations.
Learning	Are communication lessons documented and used to revise plans, templates, and training?	After-action reviews, updated plans, training records.

6. DISCUSSION

The proposed framework treats communication as part of public health operations. This distinction is important because community members judge guidance not only by its wording but also by whether the response behaves in a coherent and fair manner. A message advising people to seek care may undermine confidence if facilities are unprepared; a vaccination announcement may create frustration if eligibility rules are unclear; and an instruction to avoid travel may be unrealistic without information about support, employment protection, or essential services. Communication teams should therefore maintain direct links with service-delivery, logistics, surveillance, and protection teams.

The six-stage cycle is intentionally iterative. Listening is not an initial consultation that ends after the first message is issued. Community questions change as the emergency develops, as new restrictions are introduced, or as people encounter barriers in following advice. Verification is also continuous: facts, uncertainty, and service information must be re-checked before messages are updated. Adaptation demonstrates accountability. When people can see that their questions shape frequently asked questions, clinic hours, outreach locations, language choices, or spokesperson briefings, communication becomes more credible.

Misinformation management requires particular care. Public health agencies should prioritise claims according to their potential harm, spread, and relevance to current

decision-making. Not every inaccurate claim needs a public response, because repeating a low-impact rumour can unintentionally amplify it. For high-risk claims, a useful response combines a clear statement of what is known, a concise explanation of why the false claim is unreliable, a practical alternative action, and a link or direction to a trusted source. The tone should correct information without shaming people who encountered or believed a misleading claim.

Equity must be embedded from the start. Priority audiences may include people who are socially isolated, migrants, older adults, children and adolescents, people with disabilities, people living in remote areas, workers in high-exposure settings, and households with limited digital access. These categories should never be treated as passive recipients or sources of risk. Instead, planning should ask what information, support, format, messenger, and service pathway would make protective action possible. Accessible and inclusive communication is a measure of preparedness and public health quality.

The framework also has workforce implications. Emergency communication cannot rely solely on one spokesperson or a small media team. Public health agencies need trained spokespeople, communication officers, social-listening staff, translators, graphic and accessibility support, hotline managers, data analysts, community engagement practitioners, and liaison roles for partner organisations. Frontline workers require concise updates and referral information so that their interactions reinforce rather than contradict public

messages. Exercises, simulations, and after-action reviews can build this capacity before the pressure of a real emergency.

Several limitations should be recognised. The paper presents a conceptual synthesis rather than a controlled empirical test, so it does not estimate the size of effects for any individual communication practice. Communication outcomes are also shaped by political context, previous institutional trust, media freedom, technology access, and the severity of the event. Future research could test the framework in different settings, examine the relationship between feedback responsiveness and trust, compare channel mixes for specific audiences, and develop validated measures for communication readiness and community-centred response.

7. CONCLUSION

Disaster communication during a public health emergency is most effective when it is early, accurate, transparent, empathetic, accessible, and connected to real service pathways. It

8. REFERENCES

1. World Health Organization. (2017). *Communicating risk in public health emergencies: A WHO guideline for emergency risk communication (ERC) policy and practice*. Geneva: World Health Organization.
2. Reynolds, B., & Seeger, M. W. (2005). Crisis and emergency risk communication as an integrative model. *Journal of Health Communication*, 10(1), 43-55. <https://doi.org/10.1080/10810730590904571>
3. Covello, V. T. (2003). Best practices in public health risk and crisis communication. *Journal of Health Communication*, 8(S1), 5-8. <https://doi.org/10.1080/713851971>
4. Vaughan, E., & Tinker, T. (2009). Effective health risk communication about pandemic influenza for vulnerable populations. *American Journal of Public Health*, 99(S2), S324-S332. <https://doi.org/10.2105/AJPH.2009.162537>
5. Fischhoff, B. (2013). The sciences of science communication. *Proceedings of the National Academy of Sciences*, 110(S3), 14033-14039. <https://doi.org/10.1073/pnas.1213273110>
6. Eysenbach, G. (2020). How to fight an infodemic: The four pillars of infodemic management. *Journal of Medical Internet Research*, 22(6), e21820. <https://doi.org/10.2196/21820>
7. Tangcharoensathien, V., Calleja, N., Nguyen, T., Purnat, T., D'Agostino, M., Garcia-Saiso, S., et al. (2020). Framework for managing the COVID-19 infodemic: Methods and results of an online, crowdsourced WHO technical consultation. *Journal of Medical Internet Research*, 22(6), e19659. <https://doi.org/10.2196/19659>
8. World Health Organization. (2020). *Risk communication and community engagement (RCCE) action plan guidance: COVID-19 preparedness and response*. Geneva: World Health Organization.
9. World Health Organization. (2021). *Infodemic management: An overview of infodemic management during COVID-19, January 2020-May 2021*. Geneva: World Health Organization.
10. World Health Organization. (2022). *WHO policy brief: COVID-19 infodemic management*. Geneva: World Health Organization.
11. International Federation of Red Cross and Red Crescent Societies. (2022). *A Red Cross Red Crescent guide to community engagement and accountability*. Geneva: IFRC.

must also be two-way: communities need opportunities to raise questions, report barriers, and influence the response. The framework proposed in this paper organises these requirements into a practical cycle of listening, verifying, prioritising, communicating, engaging, and adapting.

The model supports public health agencies in moving beyond one-directional announcements toward a coordinated communication system that integrates emergency risk communication, community engagement, infodemic management, accessibility, and accountability. Its phase-based strategy matrix and evaluation indicators can be used to strengthen preparedness, guide early messaging, monitor sustained response, and capture lessons for recovery. The long-term goal is not simply to increase the volume of information. It is to help people understand risk, access support, make feasible protective decisions, and maintain trust in public health action during periods of uncertainty.

12. World Health Organization. (2023). *How to build an infodemic insights report in six steps*. Geneva: World Health Organization.
13. World Health Organization. (2024). *WHO competency framework: Risk communication and community engagement (RCCE)*. Geneva: World Health Organization.
14. Centers for Disease Control and Prevention. (2024). *Crisis and Emergency Risk Communication (CERC) Manual*. Atlanta, GA: CDC.
15. World Health Organization. (2025). *Social listening in infodemic management for public health emergencies: Guidance on ethical considerations*. Geneva: World Health Organization.
16. International Federation of Red Cross and Red Crescent Societies. (2023). *Community engagement and accountability strategy*. Geneva: IFRC.
17. World Health Organization. (2024). *Risk communication and community engagement readiness and response to health emergencies*. Geneva: World Health Organization.
18. Centers for Disease Control and Prevention. (2024). *CERC: Crisis communication plans*. Atlanta, GA: CDC.
19. World Health Organization. (2024). *Addressing dangerous health narratives in emergencies: An operational toolkit*. Copenhagen: WHO Regional Office for Europe.
20. World Health Organization. (2025). *Global guidance on monitoring public health and social measures policies during health emergencies*. Geneva: World Health Organization.