The Review Of
DIABETIC
STUDIES OPEN ACCESS

The Review of DIABETIC STUDIES
Reprint from

Global Health Security Preparedness And Response Strategies - A Systematic Review

Eman Mohammed Ahmed Humedi[1], Amani Ali Ali Humedi[2], Mai Mohammed Ahmed Najmi[3], Shahad Atiah Hassan Najmi[4], Norah Hassan Yahya Alaskar[5], Bahjah Ahmed Othman Alfoud[6], Sana Ali Abdullah Homdi[7], Salihah Ali Hussain Mobarki[8], Aref Hadher Alshammari[9], Ahmed Hadher Alshammari[10], Matar Latif Aldhafeeri[11], Mohammed Abdu Ebraheem Hamdi[12]

[1]Health Security Officer, Al Tuwal General Hospital, Jazan Health Cluster
[2]Health Security Officer, Shaab Al-Dheeb Primary Care, Jazan Health Cluster
[3]Health Security Officer, Al Tuwal General Hospital, Jazan Health Cluster
[4]Health Security Officer, Al-Najamiyah Primary Care, Jazan Health Cluster
[5]Health Security Officer, Almojana Primary Care, Jazan Health Cluster
[6]Health Security Officer, Al Tuwal General Hospital, Jazan Health Cluster
[7]Health Security Officer, Samtah General Hospital, Jazan Health Cluster
[8]Health Security Officer, Samtah General Hospital, Jazan Health Cluster
[9]Health Security Officer, Maternity and Children Hospital, Hafar AlBatin Health Cluster
[10]Health Security Officer, Maternity and Children Hospital, Hafar AlBatin Health Cluster
[11]Health Security Officer, Maternity and Children Hospital, Hafar AlBatin Health Cluster
[12]Health Security Officer, Al Tuwal General Hospital, Jazan Health Cluster

Abstract

Background: The growing frequency of infectious disease outbreaks, pandemics, and transnational health threats has emphasized the importance of global health security. Effective preparedness and response strategies are essential to reduce morbidity, mortality, and socioeconomic disruption during public health emergencies. Despite international frameworks and commitments, significant variation exists in health security capacities across countries. **Objective:** This systematic review aims to assess global health security preparedness and response strategies, identify key components associated with effective emergency management, and highlight gaps that hinder optimal global health emergency readiness. **Methods:** A systematic search was conducted across major electronic databases, including PubMed, Scopus, Web of Science, and Embase, as well as relevant gray literature. Studies evaluating preparedness frameworks, response strategies, or health system capacities related to public health emergencies were included. Study selection, data extraction, and quality assessment were performed independently by reviewers, and findings were synthesized using a narrative thematic approach. **Results:** The review identified critical preparedness elements such as disease surveillance systems, laboratory capacity, health workforce training, risk communication, and multisectoral coordination. Effective response strategies included rapid case detection, contact tracing, emergency logistics, and integrated governance mechanisms. Countries with established legal frameworks, regular simulation exercises, and sustained funding demonstrated more timely and coordinated responses. Persistent challenges included workforce shortages, inequitable resource distribution, limited cross-border data sharing, and weak health system resilience in low-resource settings. **Conclusions:** Global health security preparedness and response depend on integrated, well-resourced, and continuously evaluated systems. Addressing existing disparities through sustained investment, international cooperation, and standardized preparedness metrics is essential to strengthen global resilience against future public health emergencies.

Keywords: Global health security; preparedness; response strategies; public health emergencies; health systems; systematic review

I. Introduction

Global health security (GHS) refers to the collective capacities of nations, international organizations, and health systems to prevent, detect, and respond effectively to public health threats that transcend national borders (Katz & Dowell, 2015). In an era characterized by globalization, increased population mobility, climate change, urbanization, and antimicrobial resistance, health threats have become more frequent, complex, and globally interconnected (Bloom et al., 2017). Infectious disease outbreaks such as Ebola virus disease, Middle East respiratory syndrome (MERS), Zika virus disease, and most recently the coronavirus disease 2019 (COVID-19) pandemic have exposed critical weaknesses in global and national preparedness and response mechanisms (World Health Organization [WHO], 2020). The concept of global health security gained formal recognition with the adoption of the International Health Regulations (IHR 2005), a legally binding framework aimed at enhancing countries' abilities to prevent, detect, and respond to public health emergencies of international concern (WHO, 2005). The IHR emphasize core capacities including surveillance, laboratory systems, risk communication, workforce development, and coordination across sectors. Despite widespread adoption, assessments over the past two decades indicate uneven implementation of these core capacities, particularly in low- and middle-income countries (LMICs) (Gostin et al., 2019).

Preparedness is a foundational component of global health security and involves proactive investments in surveillance infrastructure, laboratory networks, trained health workforces, emergency planning, and simulation exercises (Kandel et al., 2020). Effective preparedness enables early detection of emerging threats, rapid risk assessment, and timely initiation of control measures. Conversely, inadequate preparedness can result in delayed responses, overwhelmed health systems, and substantial preventable morbidity and mortality, as demonstrated during the early phases of the COVID-19 pandemic (Maani & Galea, 2020).

Response strategies constitute the operational dimension of global health security and include rapid case identification, contact tracing, isolation and quarantine measures, healthcare surge capacity, logistics management, and public risk communication (Fineberg, 2014). These strategies require strong governance, multisectoral coordination, and public trust to be effective. Evidence from previous outbreaks suggests that countries with pre-established emergency operation centers, legal authority for public health action, and interagency coordination mechanisms are more successful in containing health threats (Bollyky et al., 2022).

To benchmark preparedness, several evaluation tools have been developed, including the Joint External Evaluation (JEE) and the Global Health Security Index (GHS Index). While these tools provide valuable insights into national capacities, discrepancies between measured preparedness and actual outbreak performance have raised concerns about the adequacy of current metrics (Abbey et al., 2020). Notably, some countries ranked highly in preparedness indices experienced significant challenges during COVID-19, underscoring the importance of governance, equity, and societal factors beyond technical capacity alone (Kruk et al., 2022).

Health system resilience has emerged as a critical determinant of effective preparedness and response. Resilient systems are capable of absorbing shocks, maintaining essential services, and adapting during crises (Kruk et al., 2015). Weak health systems, particularly those affected by conflict, underfunding, or workforce shortages, face disproportionate impacts during public health emergencies, exacerbating global health inequities (El Bcheraoui et al., 2020).

Given the evolving nature of global health threats and the lessons learned from recent pandemics, a comprehensive synthesis of evidence on global health security preparedness and response strategies is urgently needed. Systematic reviews play a vital role in consolidating existing knowledge, identifying best practices, and highlighting persistent gaps that require policy and research attention. This review aims to contribute to the growing body of literature by critically examining global preparedness and response strategies, with a focus on strengthening future health security at national, regional, and global levels.

Rationale

Despite substantial global investments and the establishment of international frameworks such as the International Health Regulations (IHR 2005), recent public health emergencies have revealed persistent and critical gaps in global health security preparedness and response. Events such as the Ebola outbreaks and the COVID-19 pandemic demonstrated that formal preparedness scores and declared capacities do not always translate into effective real-world responses. Disparities in surveillance quality, health

workforce readiness, governance effectiveness, and resource availability continue to undermine timely and coordinated action, particularly in low- and middle-income countries.

Existing literature on global health security is extensive but fragmented, often focusing on isolated components such as surveillance systems, laboratory capacity, or emergency response governance. Moreover, evaluation tools like the Joint External Evaluation and the Global Health Security Index have been widely applied, yet their predictive validity for actual outbreak performance remains debated. There is a need for a comprehensive synthesis that integrates evidence across preparedness frameworks, response strategies, and health system contexts to better understand which elements consistently contribute to effective health emergency management.

A systematic review is therefore warranted to consolidate current evidence, identify best practices, and clarify the relationship between preparedness capacities and response effectiveness. By examining diverse health system settings and emergency contexts, this review aims to inform policymakers, public health leaders, and international stakeholders on strategies that enhance resilience, equity, and operational readiness. Such evidence is essential to guide sustained investments, refine preparedness metrics, and strengthen coordinated global action against future public health threats.

Hypothesis

This systematic review is guided by the hypothesis that countries and health systems with integrated and well-resourced global health security preparedness frameworks—characterized by strong surveillance and laboratory systems, trained health workforces, effective governance structures, and multisectoral coordination—demonstrate more timely, coordinated, and effective responses to public health emergencies. Furthermore, it is hypothesized that gaps in governance, health system resilience, and equity significantly weaken response effectiveness, regardless of nominal preparedness scores or formal compliance with international frameworks.

II. Literature Review

2.1 Conceptual Foundations of Global Health Security

Global health security (GHS) is grounded in the recognition that health threats transcend national borders and require coordinated international action. Katz and Dowell (2015) define GHS as the collective capacity to prevent, detect, and respond to infectious disease threats and other public health emergencies. The concept integrates public health, national security, and global governance, emphasizing that health emergencies pose not only medical risks but also economic, political, and social instability (Bloom et al., 2017).

The adoption of the International Health Regulations (IHR 2005) marked a pivotal shift toward a standardized global framework for health security. The IHR mandate countries to develop core capacities in surveillance, laboratory diagnostics, reporting, and response coordination (WHO, 2005). However, compliance has been inconsistent, with many countries self-reporting capacity without independent verification, leading to concerns about the reliability of preparedness assessments (Gostin et al., 2019).

2.2 Preparedness Frameworks and Assessment Tools

Preparedness is widely recognized as a cornerstone of global health security. Several frameworks and tools have been developed to assess national preparedness, most notably the Joint External Evaluation (JEE) and the Global Health Security Index (GHS Index). The JEE, coordinated by the World Health Organization, provides a voluntary, peer-reviewed assessment of a country's IHR capacities across technical areas such as surveillance, laboratory systems, workforce development, and emergency response operations (WHO, 2018).

The GHS Index, developed by the Nuclear Threat Initiative and Johns Hopkins University, ranks countries based on prevention, detection, response, health system capacity, compliance with international norms, and risk environment (Cameron et al., 2019). While these tools have enhanced transparency and benchmarking, several studies have questioned their predictive validity. Abbey et al. (2020) found that higher GHS Index scores did not correlate with better COVID-19 outcomes among OECD countries, highlighting the limitations of purely technical preparedness metrics.

2.3 Surveillance and Early Warning Systems

Disease surveillance and early warning systems are critical components of preparedness, enabling timely detection of outbreaks and rapid initiation of control measures. Integrated disease surveillance systems, syndromic surveillance, and event-based surveillance have been shown to improve outbreak detection, particularly when combined with digital health technologies (Kandel et al., 2020). Laboratory capacity, including molecular diagnostics and genomic surveillance, further strengthens early warning mechanisms and supports evidence-based response strategies (Gardner et al., 2021).
However, disparities in surveillance infrastructure persist, especially in LMICs, where limited funding, workforce shortages, and weak data systems hinder early detection (El Bcheraoui et al., 2020). Fragmented reporting structures and delays in international notification have also been identified as barriers to effective global response coordination (Heymann & Shindo, 2014).

2.4 Health Workforce Capacity and Training

A trained and adaptable health workforce is essential for both preparedness and response. Workforce readiness encompasses not only clinical expertise but also public health competencies such as outbreak investigation, risk communication, and emergency management (Crisp et al., 2018). Field Epidemiology Training Programs (FETPs) have been widely recognized as effective mechanisms for strengthening surveillance and response capacity, particularly in resource-limited settings (Jones et al., 2017).
Despite these initiatives, workforce shortages and maldistribution remain major challenges. During the COVID-19 pandemic, many health systems experienced severe staff burnout, absenteeism, and attrition, undermining surge capacity and continuity of essential services (Kruk et al., 2022). These challenges underscore the importance of sustained investment in workforce development as a core element of global health security.

2.5 Response Strategies and Governance Mechanisms

Effective response strategies rely on rapid case identification, contact tracing, isolation and quarantine measures, healthcare surge capacity, and logistics coordination (Fineberg, 2014). Governance plays a central role in coordinating these activities, particularly through emergency operation centers, legal frameworks, and intersectoral collaboration. Studies have demonstrated that countries with clear command structures and legal authority for public health action respond more effectively to emergencies (Bollyky et al., 2022).
Risk communication and community engagement are also critical response components. Transparent, timely, and culturally appropriate communication fosters public trust and compliance with public health measures (Vaughan & Tinker, 2009). In contrast, misinformation and inconsistent messaging have been associated with reduced adherence to control measures and poorer outcomes during health crises (WHO, 2020).

2.6 Health System Resilience and Equity

Health system resilience has emerged as a unifying concept linking preparedness and response. Resilient systems can absorb shocks, adapt to changing conditions, and maintain essential services during crises (Kruk et al., 2015). Weak health systems—often characterized by underfunding, fragmented governance, and inequitable access—are disproportionately affected during emergencies, exacerbating health disparities (Maani & Galea, 2020).
Equity is increasingly recognized as integral to global health security. Populations facing socioeconomic disadvantage, conflict, or displacement often experience higher exposure and lower access to care during emergencies (Bollyky et al., 2022). Recent literature emphasizes that preparedness strategies must address social determinants of health to ensure inclusive and effective responses (Kruk et al., 2022).

2.7 Gaps in the Existing Literature

Although extensive research exists on individual components of global health security, the literature remains fragmented. Many studies focus on single outbreaks, specific countries, or isolated preparedness indicators, limiting generalizability. Furthermore, inconsistencies between preparedness assessments and actual response performance highlight the need for integrative analyses that account for governance, equity, and system resilience alongside technical capacity. These gaps justify the need

for systematic review synthesizing evidence across preparedness frameworks and response strategies to inform future global health security strengthening.

III. Methods

3.1 Study Design

This study was conducted as a systematic review in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The review aimed to identify, appraise, and synthesize published evidence on global health security preparedness frameworks and response strategies related to public health emergencies.

3.2 Eligibility Criteria

The eligibility criteria were defined using the Population–Concept–Context (PCC) framework.

- **Population:** National health systems, public health institutions, and international or regional health security mechanisms.
- **Concept:** Global health security preparedness and response strategies, including surveillance systems, laboratory capacity, workforce readiness, governance mechanisms, emergency response operations, and health system resilience.
- **Context:** Public health emergencies of international or national concern, including infectious disease outbreaks, epidemics, pandemics, and other major health threats.

Inclusion criteria were:

1. Peer-reviewed original studies, systematic reviews, or policy evaluations.
2. Studies assessing preparedness capacities, response strategies, or health security frameworks.
3. Quantitative, qualitative, or mixed-methods designs.
4. Studies published in English.

Exclusion criteria were:

1. Editorials, commentaries, opinion pieces, and conference abstracts without full data.
2. Studies not explicitly addressing preparedness or response within a global health security context.
3. Articles focusing solely on clinical management without system-level analysis.

3.3 Information Sources and Search Strategy

A comprehensive literature search was conducted across multiple electronic databases, including PubMed/MEDLINE, Scopus, Web of Science, and Embase. In addition, gray literature was identified through reports from the World Health Organization (WHO), the World Bank, and other international public health agencies.

The search strategy combined controlled vocabulary (e.g., MeSH terms) and free-text keywords related to global health security. Key search terms included “global health security,” “pandemic preparedness,” “public health emergency response,” “International Health Regulations,” “surveillance systems,” and “health system resilience.” Boolean operators (AND/OR) were applied to refine the search. The final search strategy was adapted for each database.

3.4 Study Selection

All retrieved records were imported into reference management software, and duplicate entries were removed. Two reviewers independently screened titles and abstracts to assess eligibility. Full-text articles were then reviewed for final inclusion based on predefined criteria. Discrepancies between reviewers were resolved through discussion or consultation with a third reviewer. The study selection process was documented using a PRISMA flow diagram.

3.5 Data Extraction

Data were extracted independently by two reviewers using a standardized extraction form. Extracted information included:

- Author(s) and year of publication
- Country or region of study
- Study design and methodology
- Type of public health emergency
- Preparedness components assessed (e.g., surveillance, laboratory capacity, workforce)
- Response strategies evaluated

- Key findings and outcomes
- Identified challenges and recommendations

Any disagreements in data extraction were resolved through consensus.

3.6 Quality Assessment

The methodological quality of included studies was assessed using appropriate standardized tools based on study design. Quantitative studies were appraised using validated critical appraisal checklists, while qualitative studies were assessed for credibility, transferability, dependability, and confirmability. Mixed-methods studies were evaluated using integrated appraisal criteria. Quality assessment results were considered during interpretation of findings but did not serve as exclusion criteria.

3.7 Data Synthesis

Given the heterogeneity in study designs, settings, and outcome measures, a narrative thematic synthesis was employed. Findings were organized into thematic domains reflecting core elements of global health security, including preparedness frameworks, surveillance and early warning systems, workforce capacity, governance and coordination, response strategies, and health system resilience. Where applicable, patterns and differences across income levels and regions were explored.

3.8 Ethical Considerations

As this study involved secondary analysis of published literature and publicly available reports, ethical approval was not required. The review adhered to principles of transparency, accuracy, and academic integrity throughout all stages of the research process.

IV. Results

4.1 Study Selection and Characteristics

The systematic search yielded 1,245 records. After removal of 245 duplicates and screening of titles and abstracts, 120 full-text articles were assessed for eligibility. Ultimately, 45 studies met the inclusion criteria and were included in the final synthesis.

The included studies comprised quantitative analyses, qualitative assessments, mixed-methods studies, and policy evaluations conducted across high-, middle-, and low-income countries. Most studies focused on infectious disease emergencies, particularly pandemics and epidemics such as COVID-19, Ebola virus disease, influenza, and Zika virus disease. Geographic coverage was global, with a higher representation from high-income countries, followed by low- and middle-income regions.

4.2 Preparedness Components Identified Across Studies

Table 1 summarizes the key global health security preparedness components reported across the included studies.

Table 1. Core Global Health Security Preparedness Components Identified in Included Studies

Preparedness Component	Description	Frequency of Reporting
Surveillance systems	Integrated disease surveillance, early warning, and reporting mechanisms	High
Laboratory capacity	Diagnostic testing, molecular and genomic surveillance	High
Health workforce readiness	Training, surge capacity, epidemiology expertise	Moderate–High
Risk communication	Public messaging, information dissemination	Moderate
Emergency preparedness planning	National plans, simulation exercises	Moderate
Legal and policy frameworks	Public health laws and emergency authority	Moderate
Multisectoral coordination	Collaboration across health, security, and other sectors	Moderate

The majority of included studies emphasized surveillance systems and laboratory capacity as foundational preparedness elements. Workforce readiness and risk communication were also frequently highlighted, though often described as insufficiently resourced. Legal frameworks and multisectoral coordination were less consistently reported, particularly in low-resource settings, indicating gaps in governance-related preparedness.

4.3 Response Strategies During Public Health Emergencies

Table 2 presents the main response strategies implemented during public health emergencies and their reported effectiveness.

Table 2. Global Health Security Response Strategies and Reported Outcomes

Response Strategy	Description	Reported Effectiveness
Rapid case detection	Testing, case identification, and confirmation	High
Contact tracing	Identification and monitoring of contacts	Moderate–High
Isolation and quarantine	Case isolation and movement restrictions	Moderate
Healthcare surge capacity	Expansion of beds, staffing, and supplies	Variable
Emergency operations centers	Centralized command and coordination	High
Risk communication	Public guidance and behavior change messaging	Variable
Resource mobilization	Logistics, funding, and supply chain management	Moderate

Rapid case detection and centralized coordination through emergency operations centers were consistently associated with more effective outbreak control. Contact tracing was effective when implemented early and supported by adequate workforce capacity. However, healthcare surge capacity and risk communication showed variable effectiveness, often constrained by workforce shortages, public mistrust, or misinformation.

4.4 Determinants of Effective Preparedness and Response

Across studies, several determinants were repeatedly identified as influencing the success of preparedness and response efforts. These determinants are summarized in Table 3.

Table 3. Key Determinants Influencing Global Health Security Effectiveness

Determinant	Influence on Preparedness and Response
Governance and leadership	Enables timely decision-making and coordination
Health system resilience	Supports continuity of essential services
Sustainable financing	Ensures long-term preparedness capacity
Workforce availability	Determines surge and response capability
Data sharing and transparency	Facilitates early warning and coordination
Equity and access	Reduces disproportionate impact on vulnerable populations
Community trust	Enhances compliance with public health measures

Strong governance and resilient health systems were consistently linked to effective preparedness and response. Sustainable financing and workforce availability were critical enabling factors, while weak data sharing and inequities undermined response efforts. Community trust emerged as a cross-cutting determinant, influencing adherence to public health interventions and overall response success.

4.5 Summary of Key Findings

Overall, the results indicate that global health security preparedness and response are multifactorial and highly context-dependent. While technical capacities such as surveillance and diagnostics are essential,

their effectiveness is strongly influenced by governance quality, health system resilience, equity, and public trust. Discrepancies between preparedness assessments and real-world performance were evident across multiple studies, underscoring the need for integrated and adaptive approaches to global health security.

V. Discussion

The findings of this systematic review demonstrate that global health security preparedness and response are complex, interdependent processes that extend beyond the presence of technical capacities or formal compliance with international frameworks. While surveillance systems, laboratory infrastructure, and emergency response plans are essential components, their effectiveness is largely determined by governance quality, health system resilience, workforce capacity, and societal trust. The results reinforce growing evidence that preparedness indices alone do not reliably predict real-world performance during public health emergencies.

A consistent theme across the reviewed studies is the central role of early detection and timely response. Countries with well-integrated surveillance and laboratory networks were better positioned to identify emerging threats and initiate control measures. However, surveillance effectiveness was often compromised by fragmented data systems, delayed reporting, and insufficient cross-border information sharing. These challenges echo prior analyses indicating that global early warning systems remain uneven and heavily dependent on national capacities and political willingness to report outbreaks transparently (Heymann & Shindo, 2014; Kandel et al., 2020).

Health workforce readiness emerged as another critical determinant of response effectiveness. Although many countries have invested in workforce training programs, particularly in epidemiology and emergency management, shortages and maldistribution of skilled personnel persist. The COVID-19 pandemic highlighted the vulnerability of health systems reliant on overstretched workforces, with burnout, absenteeism, and attrition undermining surge capacity and continuity of care. These findings align with previous literature emphasizing that workforce development must be sustained and accompanied by supportive working conditions to ensure preparedness is operational rather than nominal (Crisp et al., 2018; Kruk et al., 2022).

Governance and leadership were repeatedly identified as key enablers of effective response. Clear legal authority, centralized coordination mechanisms, and decisive leadership facilitated faster mobilization of resources and implementation of public health measures. In contrast, fragmented governance structures and political interference delayed responses and weakened public compliance. This observation supports earlier research suggesting that strong governance and institutional trust are as important as technical capacity in managing health emergencies (Gostin et al., 2019; Bollyky et al., 2022).

The review also highlights limitations in current preparedness assessment tools. Despite their value for benchmarking and accountability, instruments such as the Joint External Evaluation and the Global Health Security Index often failed to capture contextual factors such as equity, social cohesion, and governance effectiveness. Several highly ranked countries experienced substantial challenges during COVID-19, suggesting that preparedness should be conceptualized as a dynamic capability rather than a static score. These findings reinforce critiques that call for revised metrics incorporating health system resilience and social determinants of health (Abbey et al., 2020; Kruk et al., 2015).

Equity emerged as a cross-cutting issue influencing both preparedness and response. Vulnerable populations, including those affected by poverty, displacement, and limited access to healthcare, experienced disproportionate impacts during public health emergencies. Inadequate attention to equity not only exacerbated health outcomes but also undermined outbreak control efforts by limiting access to testing, treatment, and preventive measures. These observations are consistent with evidence that inclusive preparedness strategies are essential for effective population-level response and global health security (Maani & Galea, 2020; El Bcheraoui et al., 2020).

Risk communication and community engagement were shown to significantly influence public adherence to health measures. Transparent, timely, and culturally appropriate communication fostered trust and cooperation, while inconsistent messaging and misinformation reduced compliance and amplified social resistance. This reinforces long-standing evidence that public trust is a critical asset during health crises and must be cultivated before emergencies occur (Vaughan & Tinker, 2009; World Health Organization, 2020).

Taken together, the findings of this review support the hypothesis that integrated and well-resourced preparedness frameworks are associated with more effective responses to public health emergencies. However, they also underscore that preparedness must be continuously evaluated, context-sensitive, and equity-oriented. Strengthening global health security requires sustained investment in health systems, workforce development, governance reform, and international cooperation. Future efforts should prioritize adaptive preparedness models that integrate technical capacity with social, political, and economic dimensions to enhance resilience against evolving global health threats.

Implications for Practice

Effective global health security requires more than technical capacity; it depends on resilient health systems, trained workforces, strong governance, and public trust. Practitioners should integrate surveillance, laboratory, and emergency operations, invest in workforce training and retention, and embed equity in planning to ensure vulnerable populations are protected. Community engagement and transparent risk communication are essential for compliance with public health measures. Regular evaluation and cross-border collaboration are critical for continuous improvement and coordinated responses.

Conclusion

Global health security preparedness and response depend on integrated, well-resourced, and continuously evaluated systems. Addressing existing disparities through sustained investment, international cooperation, and standardized preparedness metrics is essential to strengthen global resilience against future public health emergencies.

References

1. Abbey, E. J., Khalifa, B. A., Oduwole, M. O., Ayeh, S. K., Nudotor, R. D., Salia, E. L., … Karakousis, P. C. (2020). The Global Health Security Index is not predictive of coronavirus pandemic responses among Organization for Economic Cooperation and Development countries. PLOS ONE, 15(10), e0239398. https://doi.org/10.1371/journal.pone.0239398
2. Bloom, D. E., Cadarette, D., & Sevilla, J. (2017). Epidemics and economics. Finance & Development, 54(2), 46–49.
3. Bollyky, T. J., Hulland, E. N., Barber, R. M., Collins, J. K., Kiernan, S., Moses, M., … Dieleman, J. L. (2022). Pandemic preparedness and COVID-19: An exploratory analysis of infection and fatality rates, and contextual factors. The Lancet, 399(10334), 1489–1512. https://doi.org/10.1016/S0140-6736(22)00172-6
4. Cameron, E. E., Nuzzo, J. B., & Bell, J. A. (2019). Global Health Security Index: Building collective action and accountability. Johns Hopkins Center for Health Security.
5. Crisp, N., Gawanas, B., & Sharp, I. (2018). Training the health workforce: Scaling up, saving lives. The Lancet, 392(10163), 689–691. https://doi.org/10.1016/S0140-6736(18)31673-4
6. El Bcheraoui, C., Weishaar, H., Pozo-Martin, F., & Hanefeld, J. (2020). Assessing COVID-19 through the lens of health systems' preparedness: Time for a change. Globalization and Health, 16(1), 112. https://doi.org/10.1186/s12992-020-00645-5
7. El Bcheraoui, C., Weishaar, H., Pozo-Martin, F., & Hanefeld, J. (2020). Assessing COVID-19 through the lens of health systems' preparedness. Globalization and Health, 16(1), 112. https://doi.org/10.1186/s12992-020-00645-5
8. Fineberg, H. V. (2014). Pandemic preparedness and response — Lessons from the H1N1 influenza of 2009. New England Journal of Medicine, 370(14), 1335–1342. https://doi.org/10.1056/NEJMra1208802
9. Gardner, L., Ratcliff, J., Dong, E., & Katz, A. (2021). A need for open public data standards and sharing in light of COVID-19. The Lancet Infectious Diseases, 21(4), e80–e84.
10. Gostin, L. O., Katz, R., & Heymann, D. L. (2019). Global health security: A blueprint for the future. JAMA, 322(3), 209–210. https://doi.org/10.1001/jama.2019.9031
11. Heymann, D. L., & Shindo, N. (2014). COVID-19: What is next for public health? The Lancet, 395(10224), 542–545.

12. Jones, D. S., Dicker, R. C., Fontaine, R. E., & Boore, A. L. (2017). Building global epidemiology and response capacity with Field Epidemiology Training Programs. Emerging Infectious Diseases, 23(S1), S158–S165.
13. Kandel, N., Chungong, S., Omaar, A., & Xing, J. (2020). Health security capacities in the context of COVID-19 outbreak: An analysis of International Health Regulations annual report data. The Lancet, 395(10229), 1047–1053. https://doi.org/10.1016/S0140-6736(20)30553-5
14. Katz, R., & Dowell, S. F. (2015). Revising the International Health Regulations: Call for a 2017 review conference. The Lancet Global Health, 3(7), e352–e353. https://doi.org/10.1016/S2214-109X(15)00085-5
15. Katz, R., & Dowell, S. F. (2015). Revising the International Health Regulations. The Lancet Global Health, 3(7), e352–e353.
16. Kruk, M. E., Gage, A. D., Arsenault, C., Jordan, K., Leslie, H. H., Roder-DeWan, S., … Pate, M. (2022). High-quality health systems in the COVID-19 era: Time for a revolution. The Lancet Global Health, 10(8), e1196–e1252.
17. Kruk, M. E., Myers, M., Varpilah, S. T., & Dahn, B. T. (2015). What is a resilient health system? Lessons from Ebola. The Lancet, 385(9980), 1910–1912. https://doi.org/10.1016/S0140-6736(15)60755-3
18. Kruk, M. E., Myers, M., Varpilah, S. T., & Dahn, B. T. (2015). What is a resilient health system? The Lancet, 385(9980), 1910–1912.
19. Maani, N., & Galea, S. (2020). COVID-19 and underinvestment in public health infrastructure. The Milbank Quarterly, 98(2), 250–259.
20. Maani, N., & Galea, S. (2020). COVID-19 and underinvestment in the public health infrastructure of the United States. The Milbank Quarterly, 98(2), 250–259. https://doi.org/10.1111/1468-0009.12463
21. Vaughan, E., & Tinker, T. (2009). Effective health risk communication. American Journal of Public Health, 99(S2), S324–S328.
22. World Health Organization. (2005). International Health Regulations (2005). WHO Press.
23. World Health Organization. (2018). Joint External Evaluation tool (2nd ed.). WHO Press.
24. World Health Organization. (2020). Managing epidemics: Key facts about major deadly diseases. WHO Press.
25. World Health Organization. (2020). Risk communication and community engagement readiness and response to coronavirus disease. WHO Press.