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Derivation and Spread of Social Risks in Global Public Health Crises

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Abstract: The emergence and spread of risks during PHEIC have introduced new challenges for national and social governance. This study develops a "Content-Media-Driving Forces" framework and applies case analysis through theoretical review, categorizing risks stemming from PHEIC into two main types: tangible risks and public opinion risks. Tangible risks encompass structural and procedural dimensions, whereas public opinion risks arise from prevailing societal judgments and the moralization of critique. Throughout the risk evolution process, these two categories interact dynamically, creating a complex network that amplifies risk derivation and dissemination in a multi-directional manner. Effective social risk management necessitates stringent regulation of epidemic control measures, with a particular emphasis on mitigating procedural social risks, addressing public concerns promptly, and curbing the spread of public discourse that could intensify interactions between public opinion risks and broader social risks.

Keywords: risk deconstruction; public health emergencies; international concern; derived risk categories; mechanisms of diffusion

1. Introduction

1.1. Research Background and Significance

Public Health Emergencies of International Concern (PHEIC) represent global crises that not only pose significant threats to public health but also trigger extensive social, economic, and political disruptions. Historical cases such as the COVID-19 pandemic, the Ebola outbreak, and the H1N1 influenza have demonstrated that, beyond the immediate health risks, these emergencies often lead to social unrest, economic downturns, and widespread public anxiety [1].

One of the most pressing challenges during PHEIC is the emergence and escalation of social risks — a complex set of uncertainties that arise from misinformation, institutional trust erosion, and governance failures. These risks can exacerbate public fear, disrupt social stability, and hinder effective crisis response. Understanding the derivation and spread of social risks in public health crises is therefore essential for developing effective mitigation strategies and ensuring societal resilience.

1.2. Definition of Social Risks in PHEIC

Social risks in the context of PHEIC refer to the uncertainties, conflicts, and disruptions that emerge within society as a result of a public health crisis. These risks are not limited to the direct impact of the disease but extend to governance challenges, misinformation, public opinion shifts, and economic instability. Key characteristics of social risks include:

1) Uncertainty and volatility: Rapidly evolving situations create fear and unpredictable social responses.
2) Trust erosion: Public skepticism toward government agencies, health institutions, and the media.
3) Misinformation and public perception shifts: The rapid spread of false or misleading information exacerbates panic and social divisions.
4) Systemic impact: Social risks extend beyond the health sector, affecting economies, politics, and cultural stability.

Given their far-reaching consequences, analyzing the mechanisms of social risk derivation and spread is crucial for both academic research and policy formulation.

2. Characteristics and Deconstruction of Social Risks in PHEIC

2.1. Case Selection and Overview

2.1.1. Criteria for Case Selection

To ensure a comprehensive and rigorous analysis, this study adopts a multiple-case comparative research approach to mitigate the risk of overgeneralization often associated with single-case studies. By employing cross-validation across various cases, this approach enables configurational analysis, which helps extract key paths and mechanisms of social risk derivation and diffusion under Public Health Emergencies of International Concern (PHEIC). A "Social Risk Case Database for PHEIC" was compiled, incorporating over 120 documented cases of social risks emerging during public health emergencies. The selection of cases for this study adheres to four key principles [2].

First, authenticity and availability were prioritized. Most cases were sourced from government reports, academic literature, and public databases. Cross-verification was conducted using digital platforms such as Weibo, WeChat, TikTok, and public opinion monitoring systems to ensure reliability. Cases with inconsistent or unverifiable event descriptions were excluded. Second, typicality and representativeness guided case selection, ensuring that the chosen cases had significant social impacts across diverse regions, ensuring global relevance and comparability. Preference was given to cases that affected large populations and exhibited common social risk patterns, while those with localized or minor impacts were excluded due to limited research value [3].

The third principle was a focus on secondary social risks triggered by public health emergencies, rather than direct health risks [4,5]. Cases that primarily involved disease transmission, medical responses, or epidemiological factors were excluded. Instead, the study specifically examines social risks related to governance challenges, misinformation diffusion, institutional trust erosion, and economic instability. By adhering to these principles, the study aims to provide a detailed analysis of the social risks associated with PHEICs.

2.1.2. Overview of Selected Cases and Social Risk Dynamics

Based on the above criteria, three representative public health emergencies were chosen for in-depth analysis:

- COVID-19 Pandemic (2019–present)

Misinformation and infodemic: The rapid spread of misinformation via digital platforms led to widespread public confusion and panic.

Institutional trust erosion: Public skepticism toward government policies and healthcare institutions increased due to inconsistent messaging.

Economic disruptions and social unrest: Lockdowns, job losses, and business closures triggered protests and deepened societal inequalities.

Public opinion polarization: Divisions over pandemic control measures, such as vaccines and mask mandates, escalated.

- Ebola Outbreak (2014–2016)

Mistrust in healthcare systems: Resistance to health interventions arose due to historical distrust in government and international aid organizations.

Stigmatization and social exclusion: Ebola survivors and affected communities faced discrimination and isolation.

Governance and crisis management failures: Delayed responses and inadequate infrastructure intensified public fear and unrest.

- SARS Epidemic (2002–2003)

Public panic and economic Consequences: Widespread fear led to economic slowdowns, affecting key industries such as tourism and retail.

Media influence on Public Perception: Sensationalized media coverage amplified anxiety and misinformation.

Trust in Public Health Systems: Initial delays in information disclosure led to heightened public skepticism.

2.1.3. Comparative Analysis of Social Risks

While the nature and severity of these crises varied, they all exhibited common social risk patterns, including:

1) Public distrust in institutions and crisis management efforts.
2) Misinformation-driven public reactions and behavioral shifts.
3) Economic and social disruptions beyond the immediate health crisis.

By systematically analyzing these cases, this study aims to map the pathways of social risk derivation and diffusion, contributing to a more effective risk mitigation framework in future public health emergencies.

2.2. Key Characteristics of Social Risks in PHEIC

Social risks in Public Health Emergencies of International Concern (PHEIC) are marked by uncertainty and rapid escalation [6]. This uncertainty arises from unpredictable factors such as the transmission dynamics of the disease, government responses, and public behavior. As a result, the social impact of such emergencies is often difficult to anticipate. In many cases, the crisis unfolds suddenly, and its scale can escalate quickly, with outbreaks spreading beyond initial expectations [7]. This rapid expansion and the unpredictability of the situation heighten societal anxiety and fear, amplifying the overall social risk beyond just health concerns, permeating various aspects of society.

PHEICs have multidimensional impacts, affecting not only public health but also the economy, politics, and public perception. Economically, a health crisis can trigger recessions, business closures, and widespread unemployment. Politically, the effectiveness and fairness of government responses directly influence the stability of governments and the legitimacy of their actions. Public perception also shifts dramatically, with people often questioning the credibility of authorities and the effectiveness of the health systems in place. The diverse range of effects complicates the risk management process, as different social groups experience these risks in varying ways, creating a complex web of interconnected risks [8].

Information asymmetry is a critical issue in PHEICs, leading to a crisis of public trust. In the early stages of an outbreak, the delay or lack of transparent communication often

leaves the public in the dark, contributing to widespread confusion, panic, and speculation. When official messages are inconsistent or change frequently, trust in government and health institutions erodes. This information gap also fosters the spread of misinformation, which further exacerbates public fear and distrust. As a result, the lack of clear, accurate, and consistent information significantly amplifies social risks, undermining the effectiveness of public health responses and intensifying the crisis [9].

2.3. A Tri-Dimensional Model for Social Risk Deconstruction

To better understand the dynamics of social risk during Public Health Emergencies of International Concern (PHEIC), a tri-dimensional model is proposed, consisting of structural risks, process risks, and perceptual risks. These three dimensions provide a comprehensive framework for deconstructing and analyzing how social risks emerge, evolve, and spread during such crises [10].

Structural risks are deeply rooted in institutional vulnerabilities and governance challenges. During a PHEIC, existing weaknesses in public health infrastructure, healthcare systems, and governmental institutions can exacerbate the crisis. These vulnerabilities may include insufficient healthcare resources, poorly coordinated responses, and the lack of a clear crisis management framework. As these institutional gaps become apparent, they undermine public trust in authorities, worsening the overall social risk and complicating efforts to manage the emergency effectively [11].

Process risks arise from policy missteps, coordination failures, and poor crisis management. These risks are closely linked to the decision-making process at the governmental and institutional levels. When public health policies are inadequate, inconsistent, or delayed, they can hinder effective response efforts. Additionally, failures in coordination between different governmental agencies, health organizations, and international bodies often result in fragmented or conflicting responses that further confuse and alienate the public [12]. These process risks significantly contribute to the escalation of the crisis and intensify social instability.

Perceptual risks refer to shifts in public opinion, the spread of misinformation, and increasing social anxiety. In times of crisis, the public's perception of the situation can dramatically shift, especially when information is scarce, misleading, or contradictory. The spread of misinformation via social media platforms can amplify confusion, mistrust, and fear, leading to panic and social unrest. As anxiety grows, individuals and communities may engage in harmful behaviors, further exacerbating the crisis. These perceptual risks are often the most difficult to manage, as they are rooted in social attitudes and collective emotions rather than objective reality.

3. Development and Evolution of Social Risks in PHEIC

3.1. The Emergence and Classification of Social Risks

The emergence and classification of social risks during Public Health Emergencies of International Concern (PHEIC) can be categorized into two broad types: tangible risks and perceptual risks. These risks evolve as the crisis unfolds, influenced by various factors, including governance decisions, public reactions, and media narratives.

Tangible risks refer to concrete, measurable risks that have direct and observable impacts on society. These include both process-related risks and structural risks. Process-related risks arise from the failures in the crisis management process, such as ineffective or delayed responses, poor resource allocation, and insufficient preparedness. For example, a government's inability to quickly mobilize healthcare resources, or the misallocation of critical supplies like ventilators and protective equipment, can significantly increase the severity of the crisis. Structural risks, on the other hand, are associated with weaknesses in the social, economic, and political frameworks that contribute to the crisis's spread. These risks include policy inconsistencies, such as conflicting messages from health authorities, as well as economic disruptions caused by lockdowns, business closures, and

rising unemployment rates. Both tangible risks can destabilize societal functions, leading to long-term consequences in terms of health, economy, and social stability.

Perceptual risks involve subjective and emotional aspects of the crisis, where public opinion and societal perceptions play a central role in shaping the trajectory of the emergency. A key component of perceptual risks is institutional trust erosion, which occurs when the public becomes skeptical of the government's response and the credibility of experts. This erosion of trust can be triggered by perceived inefficiencies or contradictions in official statements, leading to a general sense of distrust towards institutions meant to manage the crisis. Additionally, public opinion polarization and moral criticism become increasingly prominent during PHEICs. As the crisis progresses, debates over public health measures (such as lockdowns, mask mandates, or vaccination policies) often split society into opposing factions, resulting in deepened social divisions. Furthermore, the rise of a blame culture and ethical disputes, where individuals or groups assign fault to specific parties (such as the government, healthcare workers, or the general public), can fuel social tension and hinder collaborative efforts to mitigate the crisis [13].

3.2. Mechanisms of Social Risk Derivation and Spread

Information dissemination and amplification play a central role in the derivation and spread of social risks during PHEICs. The rapid flow of information through channels like social media and mass media can significantly amplify both accurate and inaccurate information. Social media platforms, with their viral nature, enable rumors and misinformation to spread quickly, contributing to widespread confusion and fear. Traditional mass media can similarly magnify the crisis by sensationalizing certain aspects, leading to public panic and uncertainty. The manner in which information is presented, whether it is overly optimistic or exaggerated, has a profound influence on public perception and, consequently, on the evolution of social risks. Misinformation and a lack of clear, reliable sources further exacerbate the risk environment, influencing how the public reacts and how quickly certain risks spiral out of control.

Table 1 below summarizes the primary mechanisms that contribute to the derivation and spread of social risks in a PHEIC:

Table 1. Mechanisms of Social Risk Derivation and Spread.

Mechanism	Description	Impact on Social Risk
Information Dissemination and Amplification	Rapid spread of information through social media, mass media, and rumors.	Amplifies public confusion, misinformation, and panic.
Public Perception Shifts and Behavioral Changes	Changes in how the public perceives the crisis, leading to behavior changes.	Causes panic buying, protests, compliance/non-compliance with health measures.
Risk Spillover Effects	Economic, political, and cultural sectors affected by public health crises.	Economic instability, political unrest, and deepened cultural/social divides.

Shifts in public perception during a public health crisis are profound and often lead to mass behavioral changes. As the crisis progresses, the initial sense of uncertainty may evolve into fear or anger, depending on the perceived severity of the situation. Public perception is shaped not only by the government and media but also by personal experiences and community dynamics. These shifts often trigger changes in behavior, such as panic buying, adherence to or defiance of public health measures, and widespread protests or calls for action. These behaviors reflect the broader societal anxieties and contribute to the overall escalation of social risks. Understanding the drivers behind these perception shifts can help mitigate negative behaviors and address the root causes of mass panic.

Finally, risk spillover effects occur across various sectors, including the economic, political, and cultural domains. Economic risks, such as job losses, business closures, and market instability, create additional social challenges, often leading to political unrest or dissatisfaction with government policies [14]. Politically, the mishandling of the crisis can lead to protests, erode trust in leadership, and deepen political divides. Culturally, public health emergencies can highlight or exacerbate existing social inequalities, leading to cultural and social tensions. These spillover effects demonstrate how a crisis in one sector can ripple through and amplify risks across other sectors, creating a complex web of interconnected social risks that require coordinated and multi-faceted responses.

4. Mitigation Strategies for Social Risks in Public Health Emergencies

4.1. Key Aspects of Risk Reduction

Effective risk reduction during Public Health Emergencies of International Concern (PHEIC) requires a comprehensive approach that addresses both the immediate crisis and its long-term social impacts. One of the most crucial aspects is transparent communication and trust-building. Governments, institutions, and health organizations must prioritize clear, accurate, and consistent messaging to prevent misinformation and minimize public confusion. Transparency in sharing data and decision-making processes fosters trust, which is essential in ensuring public cooperation with health measures. When the public feels informed and confident in the actions taken by authorities, it reduces the likelihood of panic, resistance, and social unrest [15].

Another critical aspect of risk reduction is strengthening institutional resilience and governance efficiency. The ability of governments and institutions to adapt quickly and effectively to emerging health crises is paramount. This requires not only having robust infrastructure and emergency response systems in place but also ensuring that these systems can operate efficiently under pressure. Strengthening the capacity of healthcare systems, creating contingency plans, and ensuring that decision-makers have access to accurate and timely information can help mitigate both tangible and perceptual risks.

Finally, public engagement and psychological support mechanisms are essential to managing the social risks associated with PHEICs. Engaging with the public through various channels, listening to their concerns, and providing emotional and psychological support can help alleviate the anxiety and stress that often accompany such crises. Establishing mental health support services, providing regular updates, and creating community-focused initiatives can promote resilience and reduce social tension. Ensuring that the public feels heard and supported can significantly reduce the social unrest and public disillusionment that often follows a health emergency.

4.2. Practical Approaches for Risk Mitigation

To effectively mitigate social risks during Public Health Emergencies of International Concern (PHEIC), several practical approaches must be implemented. One key approach is media management and misinformation control. During a crisis, misinformation can spread rapidly, particularly through social media platforms, exacerbating panic and mistrust. Governments and health organizations must actively engage in media management, providing accurate, consistent, and timely information to prevent the spread of rumors and misleading reports. This can be achieved by partnering with trusted media outlets, leveraging digital platforms for official communication, and utilizing fact-checking services to debunk false narratives. Proactively managing public discourse through credible sources helps reduce uncertainty and fosters trust in public health interventions.

Another important strategy is cross-sector collaboration between government, the private sector, and civil society. Addressing the multifaceted risks associated with a PHEIC requires coordinated efforts across different sectors. Governments play a crucial role in policy-making and crisis management, while the private sector can contribute resources, technological innovations, and logistical support. Civil society organizations are

essential in reaching vulnerable populations and ensuring that communication and relief efforts are equitable. By fostering collaboration among these sectors, resources and expertise can be optimized, allowing for a more comprehensive and efficient response to social risks and public health challenges.

Lastly, adaptive policy frameworks for dynamic crisis response are vital in mitigating risks during unpredictable public health emergencies. Traditional, rigid policy frameworks often fail to address the rapidly evolving nature of a crisis. Therefore, adaptive policies — those that can be modified in real-time based on new information, emerging risks, and changing circumstances — are essential. Governments must develop flexible crisis response strategies, incorporating continuous monitoring and feedback loops to assess the effectiveness of interventions. By adopting a dynamic approach to policymaking, authorities can better respond to new challenges and reduce the potential for further escalation of social risks.

5. Conclusion

This study has examined the derivation, spread, and mitigation of social risks during Public Health Emergencies of International Concern (PHEIC), with a focus on understanding the dynamics of social risk emergence and effective response strategies. Key findings from the analysis highlight that social risks during a PHEIC are multifaceted, involving tangible risks such as economic disruptions and healthcare system failures, as well as perceptual risks like the erosion of public trust and the spread of misinformation. The mechanisms through which these risks evolve — through media amplification, shifts in public perception, and sectoral spillover — underscore the complexity of managing social risks in crises.

The study also reveals the importance of implementing practical approaches to mitigate social risks. Effective media management, cross-sector collaboration, and adaptive policy frameworks are essential strategies for minimizing the impact of social risks. These approaches not only address immediate concerns but also help to build resilience against future public health emergencies. Transparent communication and trust-building are particularly critical, as they lay the foundation for effective crisis management and social cohesion during emergencies.

However, there are limitations to this research. The analysis primarily relies on case studies from recent global health crises, which, while insightful, may not fully capture the range of social risks present in all types of public health emergencies. Additionally, while this study provides a framework for understanding social risk dynamics, further research is needed to refine the proposed models and strategies, particularly in light of emerging global health threats such as zoonotic diseases and antimicrobial resistance.

In terms of future directions, research should focus on developing more granular models of social risk diffusion and exploring the role of emerging technologies, such as artificial intelligence and digital health platforms, in managing public health crises. Additionally, cross-disciplinary studies that integrate public health, political science, and sociology would provide a more holistic view of how social risks evolve and interact with societal systems. Exploring the effectiveness of early-warning systems and the role of global cooperation in managing these risks is another promising area for further investigation.

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