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Designing Financial Systems for Pandemic Preparedness: An Integrated Framework for Adaptive and Accountable Global Health Financing

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	Abstract
Kaleem Ullah Khan Global Health Finance Professional, Independent Researcher Michigan, United States Email: kaleem002@hotmail.com	Pandemic preparedness requires financial systems capable of operating effectively in environments characterized by uncertainty, urgency, and evolving risk. While significant global investments have been made, existing financing architectures remain fragmented, rigid, and heavily compliance-driven, limiting their ability to support timely and adaptive responses. Building on emerging discussions around risk-tolerant financing and capability-oriented due diligence, this paper argues for a systems-level approach to financial design in global health. The paper proposes an integrated conceptual framework that connects adaptive funding mechanisms, embedded capacity strengthening, and risk-informed governance within a unified financial system. By shifting from isolated financial instruments to coherent system design, this approach enables more effective allocation of resources, strengthens institutional capability, and enhances global pandemic preparedness.
Keywords:	Pandemic Preparedness; Global Health Financing; Financial Systems; Risk Management; Governance; Capacity Building



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Introduction

The increasing frequency, scale, and complexity of global health emergencies have exposed persistent weaknesses in pandemic preparedness systems. Recent crises, including COVID-19, have demonstrated that while scientific capability and global coordination are critical, the effectiveness of response efforts is equally dependent on how financial resources are mobilized, structured, and deployed (World Health Organization [WHO], 2021). Despite significant global investments, substantial gaps remain in translating financial commitments into timely, coordinated, and impactful action (World Bank, 2022).

Existing discussions on pandemic preparedness have largely focused on funding volumes and resource mobilization. However, growing evidence suggests that the design of financial systems, how funds flow, adapt, and interact with delivery mechanisms, is a critical determinant of overall system effectiveness. During recent health emergencies, delays in disbursement, rigid budget structures, and fragmented funding streams have limited the ability of institutions to respond rapidly and flexibly to evolving needs (OECD, 2020). These challenges highlight that financial systems are not merely administrative enablers but core components of preparedness architecture.

Current global health financing models are typically structured around risk minimization and accountability, relying on predefined budgets, strict compliance requirements, and sequential approval processes. While these features are essential for ensuring transparency and safeguarding public funds, they may not be well-suited to the high-uncertainty environments that characterize pandemic preparedness. In such contexts, decision-making must often occur with incomplete information, and programme pathways may evolve rapidly in response to emerging evidence. Rigid financial systems can therefore create bottlenecks, constrain innovation, and reduce the overall effectiveness of interventions.

Recent scholarships have begun to recognize the need for more adaptive financing approaches. Concepts such as risk-tolerant financing emphasize the importance of enabling investment in uncertain but high-impact areas, particularly in early-stage research and development. Similarly, evolving perspectives on financial due diligence highlight the need to move beyond compliance-based assessments toward approaches that support partner capability and long-term system strengthening. While these developments represent important progress, they are often addressed in isolation, focusing on specific instruments or processes rather than the broader architecture of financial systems.

This paper argues that achieving meaningful improvements in pandemic preparedness requires a shift from incremental adjustments to individual financing mechanisms toward a more comprehensive approach to financial system design. Specifically, it proposes that financial systems should be conceptualized as integrated architectures that connect funding mechanisms, governance structures, and operational delivery within a coherent framework.

The contribution of this paper is twofold. First, it synthesizes existing insights on global health financing, risk management, and governance to identify key limitations in current system design. Second, it proposes an integrated conceptual framework that incorporates adaptive financing, risk-informed governance, and embedded capacity strengthening as core components of financial systems for pandemic preparedness. By shifting the focus from fragmented financial instruments to system-level design, the paper aims to provide a foundation for more effective, flexible, and resilient financing models in global health.

Literature Review

Global health financing has been widely studied in relation to resource mobilization, governance, and accountability (WHO, 2021; World Bank, 2022). Existing literature highlights the importance of financial systems in enabling effective responses to health emergencies yet also identifies significant structural limitations.

Moon et al. (2015) emphasized the need for systemic reforms following the Ebola outbreak, noting that delays in funding and coordination hindered response effectiveness. Similarly, the Global Preparedness Monitoring Board (2021) identified fragmented financing systems and insufficient flexibility as key barriers to preparedness.

Research has also demonstrated that traditional donor funding models prioritize compliance and risk minimization, often resulting in rigid financial structures that limit adaptability (OECD, 2020; Abbas, 2023). Yamey et al. (2020) argue that pandemic preparedness requires sustained investment in uncertain and high-risk areas, particularly in research and development, which may not align with conventional financing approaches.

While recent discussions have explored concepts such as risk-tolerant financing and adaptive governance, there remains limited focus on how these elements can be integrated into a coherent financial system. This paper addresses this gap by proposing a conceptual framework for system-level financial design.

Conceptual Approach

This paper adopts a conceptual and policy-oriented approach, synthesizing insights from existing literature and practice-based perspectives in global health financing.

Rather than presenting empirical analysis, the paper develops a structured framework to conceptualize financial systems as integrated architectures that connect funding mechanisms, governance structures, and operational delivery.

The approach is grounded in the recognition that pandemic preparedness operates in environments of high uncertainty, where financial systems must support both flexibility and accountability. The objective is to provide a model that can inform policy discussions and guide the design of more adaptive financial systems.

Limitations of Current Financial System Design

Current financial systems in global health are often characterized by fragmentation and rigidity. Funding is frequently distributed across multiple streams, each with its own conditions, reporting requirements, and timelines.

These systems typically rely on:

Fixed budgets and predefined outputs

Sequential approval processes

Limited flexibility in resource reallocation

Compliance-driven oversight

While these mechanisms are effective in ensuring financial control, they may introduce inefficiencies in crisis contexts. During the COVID-19 pandemic, delays in mobilizing and reallocating funds were widely reported as a constraint on timely response (OECD, 2020).

Additionally, fragmented systems may limit coordination across programmes, reducing the overall effectiveness of financial investments in preparedness.

Core Principles for Financial System Design

Adaptive Financing Structures - Financial systems should enable flexible allocation and reallocation of resources in response to evolving needs. This includes mechanisms such as rolling forecasts and scenario-based planning.



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Integrated Risk Management - Risk should be managed systematically rather than avoided. Financial systems should incorporate risk-based decision frameworks that align financial risk with programmatic impact.

Embedded Capacity Strengthening - Capacity building should be integrated into financial system design, ensuring that partner organizations are supported in developing sustainable financial and governance systems (Abbas, 2024; Khan, 2026).

Early and Continuous Financial Engagement - Financial expertise should be embedded throughout programme design and implementation, enabling proactive risk management and informed decision-making.

Accountability Through System Design - Accountability should be achieved through transparent governance frameworks, reporting systems, and audit mechanisms, rather than restrictive controls that limit flexibility.

An Integrated Financial Systems Framework

This paper proposes a three-component framework:

Adaptive Funding Mechanisms - Flexible financial structures that support rapid allocation, reallocation, and scaling of resources.

Governance and Risk Oversight - Structured governance systems that define roles, decision thresholds, and risk management processes.

Capacity and System Strengthening - Integration of capacity building as a core component of financial system design, supported by dedicated resources and long-term investment. This framework represents a shift from fragmented financial instruments to a coherent system that enables both flexibility and accountability.

Policy Implications

Adopting a system-level approach to financial design has several implications for global health institutions and donors:

Funding models may need to incorporate greater flexibility and staged financing approaches

Donor frameworks should align risk management with operational realities

Capacity building should be formally integrated and resourced within funding structures

Financial systems should support real-time monitoring and adaptive decision-making

These changes are essential to ensure that financial systems can effectively support pandemic preparedness efforts.

Conclusion

Pandemic preparedness requires financial systems that are capable of operating in complex and uncertain environments. Traditional financing architectures, while effective for accountability, may not fully support the adaptability required in crisis contexts.

This paper argues that the next phase of global health financing should focus on system design, integrating adaptive funding, governance, and capacity strengthening into a unified framework.

By moving from fragmented and rigid models toward integrated and adaptive financial systems, global health institutions can better enable innovation, strengthen partnerships, and improve preparedness for future health emergencies.

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