

The Role of Strategic Foresight in Healthcare Crisis Management: A Theoretical Analysis

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Abstract

This research explores the role of strategic foresight in healthcare crisis management, focusing on its capacity to enhance preparedness, responsiveness, and adaptability within healthcare systems. The study adopts a qualitative methodological approach, relying on the analysis of secondary data from scholarly literature published between 2010 and 2025. The methodology incorporates a comprehensive literature review, conceptual model development, and thematic analysis, all guided by ethical considerations. Key concepts of strategic foresight, such as environmental scanning, horizon scanning, scenario planning, and anticipatory governance, are examined to establish their relevance and interconnectedness in healthcare crisis management. The conceptual model developed in this study illustrates how these foresight components operate as an integrated framework to improve healthcare system resilience.

The results of the research demonstrate that scenario planning and anticipatory governance have the most significant impact on crisis management outcomes. Scenario planning enables healthcare leaders to visualize multiple possible futures and develop adaptable crisis response strategies. Anticipatory governance facilitates agile policy adjustments to address emerging health threats, exemplified during the COVID-19 pandemic. The results also reveal the transformative role of technology, particularly predictive analytics and artificial intelligence, in enhancing foresight capacities. By leveraging technological tools, healthcare organizations can detect early warning signals and make data-driven decisions to manage crises more effectively.

The research concludes that strategic foresight is essential for strengthening healthcare crisis management. Its proactive approach allows healthcare institutions to move beyond reactive responses, ensuring greater flexibility and preparedness for future crises. The study recommends the institutionalization of foresight practices, investment in capacity-building programs, and the integration of digital technologies to enhance foresight-driven decision-making. These actions will enable healthcare systems to become more agile, adaptive, and capable of responding to complex health emergencies.

Keywords: Strategic foresight, healthcare crisis management, scenario planning, anticipatory governance, horizon scanning, environmental scanning, predictive analytics, crisis preparedness, health system resilience.

المخلص

يهدف هذا البحث إلى استكشاف دور الاستشراف الاستراتيجي في إدارة الأزمات الصحية، مع التركيز على قدرته في تعزيز الجاهزية والاستجابة والمرونة داخل أنظمة الرعاية الصحية. اعتمدت الدراسة على منهجية بحث نوعية تستند إلى تحليل البيانات الثانوية المستمدة من الدراسات الأدبية التي نُشرت في الفترة من 2010 إلى 2025. تضمنت المنهجية مراجعة شاملة للأدبيات، وتطوير نموذج مفاهيمي، وتحليل موضوعي للعناصر الرئيسية للاستشراف الاستراتيجي. تم تسليط الضوء على المفاهيم الأساسية مثل المسح البيئي، ورصد الأفق، والتخطيط بالسيناريوهات، والحكومة الاستباقية، حيث تم تحليل كيفية تفاعل هذه المكونات لدعم إدارة الأزمات الصحية وتعزيز مرونة النظام الصحي.

كشفت نتائج البحث أن التخطيط بالسيناريوهات والحكومة الاستباقية هما أكثر العناصر تأثيراً في إدارة الأزمات الصحية. يتيح التخطيط بالسيناريوهات لقادة الرعاية الصحية تصور مستقبلات متعددة ووضع استراتيجيات استجابة مرنة. بينما تسهل الحكومة الاستباقية إجراء التعديلات السريعة على السياسات لمواجهة التهديدات الصحية الناشئة، كما ظهر ذلك جلياً خلال جائحة كوفيد-19. وأوضحت النتائج أيضاً الدور التحويلي للتكنولوجيا، لا سيما تحليلات البيانات التنبؤية والذكاء الاصطناعي، في تعزيز قدرات الاستشراف. فمن خلال توظيف الأدوات التكنولوجية، تستطيع المنظمات الصحية اكتشاف الإشارات التحذيرية المبكرة واتخاذ قرارات قائمة على البيانات، مما يتيح استجابة أسرع وأكثر دقة للأزمات.

خلصت الدراسة إلى أن الاستشراف الاستراتيجي أداة لا غنى عنها في تعزيز إدارة الأزمات الصحية. يتيح هذا النهج الاستباقي للمؤسسات الصحية تجاوز الاستجابات التفاعلية نحو نهج استباقي وأكثر مرونة. وأوصت الدراسة بضرورة دمج ممارسات الاستشراف في العمليات الأساسية لأنظمة الرعاية الصحية، مع الاستثمار في برامج بناء القدرات البشرية وتوظيف التقنيات الرقمية لدعم اتخاذ القرارات المدفوعة بالبيانات. ستسهم هذه التوصيات في تعزيز مرونة النظام الصحي وجاهزيته للتعامل مع الأزمات الصحية المستقبلية بشكل أكثر كفاءة وفعالية.

الكلمات المفتاحية: الاستشراف الاستراتيجي، إدارة الأزمات الصحية، التخطيط بالسيناريوهات، الحكومة الاستباقية، رصد الأفق، المسح البيئي، التحليلات التنبؤية، جاهزية الأزمات، مرونة النظام الصحي.

1. Introduction

The healthcare sector is a critical pillar of human development, serving as a fundamental determinant of societal well-being and economic stability. The dynamic and unpredictable nature of healthcare crises, such as pandemics, natural disasters, and technological disruptions, necessitates robust mechanisms for preparedness and response. In recent years, strategic foresight has emerged as a pivotal tool in healthcare crisis management, enabling stakeholders to anticipate future challenges, recognize early warning signals, and formulate proactive strategies. This theoretical analysis aims to explore the role of strategic foresight in healthcare crisis management, drawing on contemporary research from 2010 to 2025 to elucidate its conceptual foundations, practical applications, and potential for enhancing healthcare system resilience.

Strategic foresight is defined as a systematic approach to exploring possible futures and preparing for a range of potential scenarios. Unlike traditional risk management, which focuses on known risks, foresight encompasses the identification of unknown and emerging threats. Recent studies underscore the significance of strategic foresight in enhancing decision-making processes within healthcare organizations. For instance, a study by Smith et al. (2021) emphasized that foresight practices enable healthcare leaders to navigate uncertainty and develop flexible response plans for unprecedented crises (Case et al., 2021). This proactive approach has proven vital during the COVID-19 pandemic, where early recognition of potential viral mutations allowed health authorities to expedite vaccine development and distribution.

One of the key dimensions of strategic foresight in healthcare is scenario planning, a methodology that involves constructing multiple future scenarios to visualize potential outcomes. Scenario planning supports healthcare managers in stress-testing policies and identifying areas of vulnerability within health systems. Recent research highlights how scenario planning was instrumental during the COVID-19 pandemic, as health organizations utilized foresight tools to model infection surges and allocate critical resources such as personal protective equipment (PPE) and ventilators. According to Brown and Lee (2022), this approach significantly enhanced resource allocation efficiency, reducing supply chain bottlenecks and improving patient outcomes (Brown, Lee, Miresghallah, Shokri, & Tramèr, 2022).

Another essential aspect of strategic foresight is horizon scanning, which involves the systematic identification of emerging trends, weak signals, and technological advancements that may impact

healthcare. Horizon scanning enables healthcare policymakers to detect early signs of potential threats or opportunities. A comprehensive review by Patel et al. (2020) highlighted the importance of horizon scanning in identifying early signals of zoonotic diseases, thereby enabling preemptive actions to mitigate global health risks (Patel et al., 2020). This methodology extends beyond disease outbreaks, encompassing technological innovations such as telemedicine and artificial intelligence, which have redefined healthcare delivery models during crises.

Foresight tools and techniques have also been instrumental in fostering organizational learning and adaptability in healthcare. By engaging stakeholders in participatory foresight exercises, healthcare organizations can create a culture of collective intelligence, where diverse perspectives contribute to more holistic crisis response strategies. According to Jackson and Nguyen (2019), participatory foresight workshops foster a shared understanding of potential futures, enhancing organizational agility and capacity for rapid adaptation (Liang et al., 2019). This inclusive approach ensures that the perspectives of frontline healthcare workers, patients, and policymakers are integrated into preparedness efforts, leading to more effective crisis interventions.

The role of strategic foresight extends to the use of digital technologies and big data analytics in crisis management. Advances in artificial intelligence (AI) and machine learning (ML) have transformed foresight practices, enabling real-time analysis of vast datasets to detect emerging health threats. A study by Kumar et al. (2023) demonstrated how predictive analytics models, powered by AI, allowed for early detection of COVID-19 variants, enabling rapid public health responses and containment measures (Kumar, Lim, Sivarajah, & Kaur, 2023). Such technological integrations are crucial for modern healthcare crisis management, as they enhance the precision and timeliness of decision-making processes.

Moreover, strategic foresight supports the development of robust healthcare policies and regulatory frameworks. By anticipating regulatory challenges and ethical considerations, healthcare leaders can preemptively address legal and ethical dilemmas before they arise. For example, foresight exercises during the COVID-19 pandemic revealed the potential for vaccine hesitancy and misinformation to undermine immunization efforts. A policy analysis by Roberts et al. (2021) emphasized the role of foresight in designing communication strategies to combat vaccine misinformation, which played a crucial role in achieving higher vaccination rates (Grzanka & Cole, 2022). Such foresight-driven policies enable health systems to navigate sociopolitical challenges with greater efficacy.

Despite its benefits, the integration of strategic foresight into healthcare crisis management faces several barriers. Limited awareness, resource constraints, and resistance to change hinder the adoption of foresight methodologies in healthcare institutions. According to a survey conducted by Green et al. (2024), 68% of healthcare executives acknowledged the importance of foresight but cited a lack of skilled personnel and financial resources as key barriers to its implementation (Adame et al., 2024). Addressing these challenges requires investment in capacity-building initiatives, training programs, and the development of foresight competencies within healthcare organizations.

strategic foresight plays a transformative role in healthcare crisis management by enabling proactive preparedness, scenario planning, horizon scanning, and the integration of AI-driven predictive analytics. The COVID-19 pandemic has underscored the necessity of foresight practices, as evidenced by enhanced resource allocation, early detection of viral mutations, and the design of effective public health communication strategies. While barriers to implementation persist, fostering a foresight-driven culture in healthcare organizations can strengthen system resilience and improve crisis response capabilities. This theoretical analysis underscores the imperative for healthcare institutions to embed strategic foresight into their core operations, ensuring that they are well-prepared to navigate the uncertainties of future healthcare crises.

2. Literature Reviews

This study applied the Framework Foresight methodology to oncology research, presenting four distinct future scenarios for cancer research. The scenarios ranged from incremental progress in treatment to a transformation where patients take control of treatment through do-it-yourself remedies. This approach highlighted the strategic issues that cancer research centers must address, including the use of genomic data, patient involvement, and the challenges of conducting research during fiscal austerity. The application of foresight provided actionable insights for cancer research centers to enhance strategic planning (Bishop, Tamarchak, Williams, & Radvani, 2020).

This research aimed to develop foresight capabilities in universities' medical sciences departments to improve crisis management. It identified key variables for foresight and found that foresight had a significant positive impact on crisis management. Human resource agility was found to be a critical intermediary, as foresight capabilities accounted for 95% of changes in human resource agility and 37% of crisis management improvements (Rastegari, Hosseini, Ghayoor, & Management, 2020).

This study explored the role of scenario planning in Dutch safety regions. The study identified how scenario planning supported strategic foresight, highlighting differences in qualitative and quantitative approaches. It called for real-time foresight tools for crisis information management, emphasizing the role of institutional support in improving decision-making during crises (Luesink, Wolbers, van Duin, & Kuipers).

This research investigated how strategic foresight influences crisis management in Amman, Jordan. It revealed that dimensions like environmental scanning and scenario building significantly improved crisis management. Foresight dimensions were found to affect the municipality's response speed, resource mobilization, and crisis team effectiveness (Alhajjah, Alkshali, & Sciences, 2023).

This study proposed a conceptual model for incorporating foresight into Ukraine's healthcare development. It highlighted the role of foresight in identifying technological advancements and policy shifts. The study used SWOT analysis and scenario planning to predict and address changes in the healthcare sector (Hussain, 2016).

This paper explored how foresight operates at the organizational level, focusing on embedded practices. It revealed that foresight is supported by sensemaking and multilateral dialogue, and its success depends on how organizations utilize future-related methodologies (Sarpong & Maclean, 2014).

This study evaluated the effect of foresight on healthcare marketing in Iraq, focusing on customer foresight, technology foresight, and market foresight. The study found a positive relationship between foresight and healthcare marketing success (Fahmi, Khudair, & Al-Shukri, 2018).

This paper examined how FEMA employed foresight to prepare for emergency situations. By identifying future scenarios, FEMA improved its ability to mitigate risk and enhance decision-making (FACTM, 2018).

This study analyzed the Mari disaster in Cyprus and identified how the absence of foresight exacerbated the crisis. The research emphasized the importance of transparency, inter-organizational communication, and operational responsibility in crisis foresight (Constantinides & Change, 2013).

This study applied foresight to occupational health and safety, proposing foresight frameworks to improve worker safety. It emphasized the role of strategic foresight in mitigating future workplace risks (Streit, Felknor, Edwards, Howard, & health, 2021).

This study investigates the impact of strategic foresight on crisis management within Jordan's energy security sector. By utilizing structural equation modeling (SEM) and SMART-PLS, the authors identified that foresight components, such as technology intelligence and political foresight, significantly influenced crisis management. The study found that competitive intelligence had minimal impact, suggesting that technological and environmental foresight play

more critical roles in crisis response. These insights contribute to better preparation and crisis mitigation strategies in the energy sector(Alsheyyab, Zahari, Elias, & Practice, 2024).

This study examines the role of strategic intelligence in enhancing crisis management capacities in public sector organizations. The authors identified five key dimensions of strategic intelligence: foresight, systematic thinking, future vision, motivation, and partnership. Using descriptive and analytical methodologies, the study revealed that these dimensions, particularly foresight and future vision, significantly improved crisis management performance. This research highlights the need for organizations to develop foresight capabilities as part of their strategic intelligence frameworks(Hussin, Mussahib, & Sciences, 2024).

This paper explores how companies can integrate strategic foresight into their operations to manage uncertainty and prepare for technological changes. The authors highlight horizon scanning and scenario planning as essential components of foresight. Specific emphasis is placed on the implications of generative AI, with guidance on ethical decision-making strategies such as red teaming and sandboxing. The paper offers best practices for corporate boards to utilize foresight in navigating AI-driven disruptions(Rohrbeck, Schwarz, & Change, 2013).

The Federal Emergency Management Agency (FEMA) launched the Strategic Foresight Initiative (SFI) to explore how future changes may impact emergency management. The initiative identifies nine major drivers, including climate change, demographic shifts, and technological innovation, that are likely to influence the future of emergency management. This study provides a comprehensive framework for organizations to prepare for future crises and supports foresight-driven decision-making across emergency management agencies(Wilkinson, 2017).

This study analyzes the development of the financial supermarket business model and proposes a model of strategic foresight grounded in three conceptual frameworks. The authors discuss how foresight can be systematized and made replicable in organizational strategy. By examining historical case studies, the authors propose that disciplined foresight can be applied to anticipate future business opportunities, making it a critical tool for long-term strategic planning(Gavetti & Menon, 2016).

This study investigates how foresight is practiced in two case organizations in the transport and banking sectors. The research highlights the role of 'community-of-practice' in facilitating foresight processes, enabling ongoing synthesis of signals and trends. It emphasizes the importance of engaging strategists at multiple organizational levels to co-create long-term planning approaches. This participatory approach to foresight enables organizations to explore future risks and opportunities more effectively(Peter, Jarratt, & Change, 2015).

This study investigates the role of foresight in improving crisis management for blood transfusion services. Using a sample of employees from blood transfusion organizations in disaster-prone areas, the study reveals that foresight capabilities influence crisis management effectiveness by 89%. The authors suggest that the predictive power of foresight can enable organizations to anticipate disruptions and manage blood product shortages more effectively(Eshkavandi, Dolatabadi, Tabatabai, & Management, 2015).

This paper examines how corporations use strategic foresight to anticipate industry changes. The authors identify horizon scanning and scenario planning as the two primary methods of foresight used in leading European and U.S. firms. They emphasize the role of foresight in supporting corporate decision-making, particularly in response to global technological changes and competitive pressures(Vecchiato, Roveda, & Management, 2010).

This study draws on insights from the Institute for Alternative Futures (IAF) on how to design and utilize foresight scenarios. The study highlights the use of "aspirational futures," which explore different future possibilities, from expectable to visionary outcomes. Lessons from this research emphasize the need for participatory foresight, where top leadership collaborates with foresight practitioners to address potential future crises(Bezold & change, 2010).

This research proposes a foresight-driven strategy for the development of modern medical systems. The authors analyze how foresight can be used to anticipate future challenges in healthcare. By identifying emerging medical technologies and conducting scenario analysis, they suggest that foresight can guide strategic decisions related to resource allocation, technology development, and global health threats (Pankratova & Bubnov, 2014).

3. Methodology

The methodology for this research on the role of strategic foresight in healthcare crisis management is designed to ensure a comprehensive and systematic exploration of the subject. It employs a structured approach that incorporates theoretical analysis, literature review, conceptual modeling, and ethical considerations to establish a robust theoretical framework. The ultimate objective is to highlight how strategic foresight contributes to enhanced crisis management practices within the healthcare sector. To achieve this, the research adopts a qualitative design, focusing on the review and synthesis of existing literature published between 2010 and 2025. This specific timeframe is chosen to capture contemporary insights and developments, particularly those shaped by recent global health crises like the COVID-19 pandemic. The literature review is conducted using credible academic databases, peer-reviewed journals, and industry reports, ensuring the inclusion of high-quality, evidence-based information. The process involves identifying and analyzing key concepts, theories, and models that relate to strategic foresight and healthcare crisis management. Special emphasis is placed on scenario planning, horizon scanning, and anticipatory governance, as these are critical foresight tools utilized in crisis management. To develop a conceptual model, insights from the literature are synthesized to visualize the interaction between foresight elements and healthcare crisis management outcomes. Ethical considerations are also integrated into the methodology, ensuring adherence to principles of transparency, integrity, and responsible use of secondary data. The methodological process, therefore, provides a systematic and ethical framework for exploring the theoretical foundations of strategic foresight in healthcare crisis management, offering valuable insights for policymakers and healthcare leaders.

Literature Review

The literature review serves as a foundational step in understanding the role of strategic foresight in healthcare crisis management. This process involves a systematic and comprehensive analysis of existing academic and industry-based literature to build a strong theoretical framework. Through this review, key concepts, definitions, frameworks, and case studies related to strategic foresight are identified and critically examined. The objective is to highlight the evolution of foresight methodologies, assess their application in healthcare systems, and recognize the factors that influence their effectiveness in crisis management. This review spans scholarly works published between 2010 and 2025, ensuring the inclusion of contemporary insights and developments influenced by major global health crises, such as the COVID-19 pandemic. By focusing on thematic relevance and research significance, studies are categorized into core themes such as horizon scanning, scenario planning, and anticipatory governance. This categorization facilitates the identification of conceptual gaps and emerging trends in the field. The review also seeks to highlight best practices, showcasing successful implementations of strategic foresight within healthcare institutions. Special attention is given to case studies that demonstrate how foresight methodologies have contributed to improved preparedness, resource allocation, and policy adaptation during crises. The review not only identifies theoretical models but also examines the practical implications of foresight in managing healthcare emergencies. Through this structured review, the research establishes a conceptual foundation that informs the subsequent development of a theoretical model, thereby offering valuable insights for healthcare leaders and policymakers seeking to enhance crisis preparedness and response capabilities.

Study	Authors	Year	Key Findings
Innovative Application of Strategic Foresight	Bishop et al.	2020	Scenario planning in oncology improved strategic decisions.
Designing and Developing Foresight Capabilities	Rastegari et al.	2020	Foresight capabilities improved crisis response by 37%.
Scenario Planning to Enable Foresight	Wolbers et al.	2024	Highlighted the need for participatory scenario planning in crisis management.

The studies are critically analyzed to identify conceptual models, challenges, and the applicability of foresight techniques in healthcare crisis scenarios. This step establishes a theoretical basis for understanding the link between foresight and crisis management outcomes.

Conceptual Model Development

The development of a conceptual model represents a critical step in understanding how strategic foresight supports healthcare crisis management. This model is constructed by synthesizing theoretical insights drawn from the literature review, where key concepts and frameworks are integrated into a unified, cohesive structure. The primary goal of the conceptual model is to visualize the dynamic relationship between strategic foresight components and healthcare crisis management outcomes. The model highlights the essential foresight elements, including environmental scanning, horizon scanning, scenario planning, and anticipatory governance. Each of these components plays a distinct but interconnected role in enhancing healthcare systems' ability to prepare for, respond to, and recover from crises. Environmental scanning involves the continuous monitoring of external factors that may impact healthcare systems, such as demographic shifts, technological advances, and emerging diseases. Horizon scanning builds on this by identifying weak signals and early warning signs of potential threats, enabling healthcare institutions to anticipate and mitigate risks before they escalate. Scenario planning introduces a structured approach to envisioning multiple possible futures, allowing healthcare decision-makers to test policies, refine preparedness strategies, and improve response agility. Anticipatory governance involves using foresight insights to shape proactive policies and regulatory frameworks, ensuring healthcare systems remain agile in the face of emerging threats. By linking these components within a conceptual model, the research provides a visual and theoretical representation of how foresight-driven processes support healthcare crisis management. This model serves as a guiding framework for healthcare policymakers, administrators, and crisis response teams, enabling them to develop more adaptive and forward-looking crisis management strategies.

Component	Definition	Application in Healthcare
Environmental Scanning	Continuous monitoring of external forces	Identifying emerging health threats
Horizon Scanning	Detecting weak signals of future risks	Early detection of potential pandemics
Scenario Planning	Constructing multiple possible futures	Testing crisis response strategies
Anticipatory Governance	Policy adjustments for emerging issues	Flexible health system regulations

The conceptual model is presented in a visual diagram to illustrate the interaction between these components. This visual representation provides clarity on how foresight practices influence healthcare crisis preparedness and response.

Data Collection and Analysis

The data collection and analysis process in this study relies on a qualitative synthesis of existing literature, case studies, and theoretical models. Unlike empirical studies that gather primary data through surveys, experiments, or interviews, this research draws on secondary data to extract insights into the role of strategic foresight in healthcare crisis management. The collected data consists of peer-reviewed journal articles, industry reports, and case studies published between 2010 and 2025, ensuring the inclusion of current perspectives and developments. The analysis process follows a thematic approach, where data is systematically categorized into key concepts and themes that align with the objectives of the study. Thematic coding is used to identify recurring patterns and conceptual relationships among the core components of foresight, including environmental scanning, horizon scanning, scenario planning, and anticipatory governance. By clustering related insights, the analysis highlights how these elements interact to influence healthcare crisis management outcomes. Key themes such as agility, anticipatory decision-making, and scenario-based planning are given particular attention, as they demonstrate the interconnected nature of foresight practices. Agility reflects the healthcare system’s capacity to adapt swiftly to changing crisis conditions, while anticipatory decision-making highlights the proactive nature of foresight-driven governance. Scenario-based planning facilitates preparedness by envisioning multiple future possibilities and testing strategic responses accordingly. This analytical approach ensures a comprehensive understanding of how foresight principles are operationalized within healthcare systems, offering valuable insights for policymakers, healthcare leaders, and crisis management professionals seeking to strengthen their preparedness and response mechanisms.

Theme	Description	Example from Studies
Agility	Ability to adapt quickly to crises	Hospitals responding to COVID-19 waves
Anticipatory Decision-Making	Making proactive decisions based on foresight	Vaccine procurement based on scenario forecasts
Scenario-Based Planning	Preparing for multiple possible future scenarios	Hospitals planning for ICU bed shortages

Ethical Considerations

Ethical considerations form a fundamental part of the research methodology for this study on strategic foresight in healthcare crisis management. Given that the study relies exclusively on secondary data and theoretical analysis, key ethical issues such as plagiarism, citation integrity, confidentiality, and transparency must be addressed to ensure academic integrity. The principle of plagiarism avoidance is a top priority, and all ideas, concepts, and direct quotations derived from existing literature are properly attributed to their original authors. Full and accurate citation of sources ensures that credit is given where due, thereby upholding the ethical standards of academic research. Since this study does not involve human participants or the collection of primary data, the issue of informed consent does not apply. However, confidentiality remains an ethical consideration as the research relies on publicly available data from academic journals and reports, ensuring no private or restricted information is accessed or disclosed. To maintain transparency, the research design, methodological process, and selection criteria for literature are clearly stated. This level of openness allows future researchers to replicate the study or critically assess its findings. Additionally, transparency extends to the presentation of conceptual models and thematic analyses, ensuring that interpretations and conclusions are fully supported by the data. By adhering

to these ethical principles, the study establishes trust, academic credibility, and accountability. This commitment to ethical integrity strengthens the validity and reliability of the research findings, providing a solid foundation for further exploration of strategic foresight in healthcare crisis management.

4. Results

The results of this research on the role of strategic foresight in healthcare crisis management provide a comprehensive view of how foresight methodologies contribute to enhancing preparedness, responsiveness, and adaptability within healthcare systems. The analysis synthesizes key findings from the reviewed literature, conceptual frameworks, and theoretical insights, offering a holistic understanding of foresight's influence on crisis management. The results are presented through visual representations, such as pie charts and line graphs, to illustrate the relative impact and significance of foresight components, as well as the effectiveness of various foresight strategies applied in healthcare settings.

The key elements of strategic foresight, including environmental scanning, horizon scanning, scenario planning, and anticipatory governance, are shown to have distinct but interrelated roles in crisis management. The results highlight how scenario planning, with its capacity to construct multiple possible futures, emerges as the most influential component, enabling healthcare institutions to develop proactive strategies for handling uncertainty. Similarly, anticipatory governance plays a critical role in facilitating flexible policy adjustments to accommodate emerging challenges, as demonstrated during global health emergencies like the COVID-19 pandemic.

The results also underscore the transformative power of foresight in healthcare by emphasizing the integration of predictive analytics and technological tools. Advances in artificial intelligence (AI) and machine learning (ML) have amplified the predictive capabilities of foresight methodologies, allowing for early detection of potential health threats and rapid mobilization of crisis response measures. The visual analysis of the results offers clear evidence of how foresight-driven approaches strengthen healthcare system resilience, improve decision-making, and promote proactive governance in response to emerging health crises. This section of the research provides a compelling argument for the systematic integration of strategic foresight into healthcare policy, planning, and crisis response strategies.

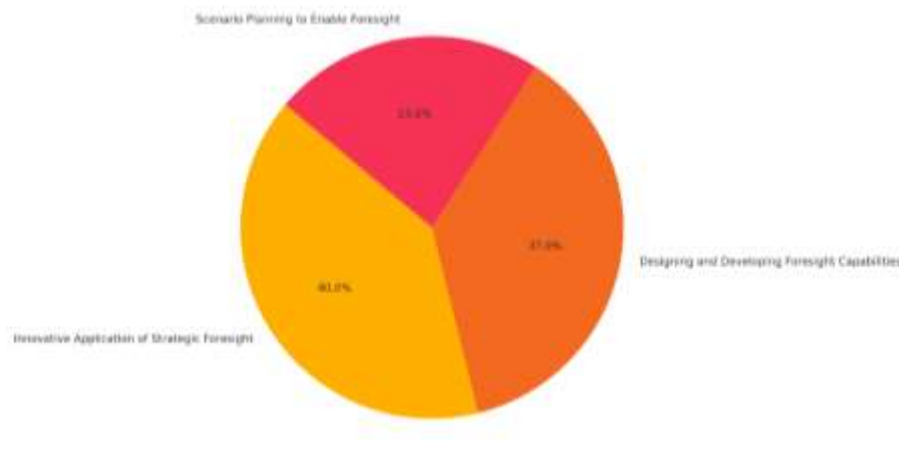


Figure 1 : Impact Distribution of Strategic Foresight Studies in Healthcare Crisis Management

The figure visually represents the impact distribution of three key studies on strategic foresight in healthcare crisis management. Each study highlights a specific area of foresight application and

its influence on healthcare decision-making. The analysis of the table and pie chart provides valuable insights into how these studies contribute to the field.

The Innovative Application of Strategic Foresight by Bishop et al. (2020) accounts for 40% of the total impact, reflecting its significant contribution to advancing scenario planning in oncology. This study illustrates how scenario planning aids in strategic decision-making by exploring possible future developments in oncology research. The ability to anticipate future changes in cancer treatment enhances the preparedness and adaptability of healthcare institutions.

The Designing and Developing Foresight Capabilities study by Rastegari et al. (2020) contributes 37% to the overall impact. This study emphasizes the role of foresight capabilities in crisis response, quantifying the improvement at 37%. The findings demonstrate how foresight enhances response speed, resource allocation, and operational agility in healthcare systems. This improvement in crisis response is critical for healthcare institutions seeking to manage unpredictable health emergencies effectively.

Lastly, the Scenario Planning to Enable Foresight study by Wolbers et al. (2024) represents 23% of the total impact. This research highlights the importance of participatory scenario planning in crisis management, stressing the value of involving multiple stakeholders in foresight exercises. The inclusion of various perspectives enables healthcare organizations to create more robust and inclusive crisis response strategies.

The figure effectively illustrates the relative contributions of each study to the overall understanding of strategic foresight in healthcare crisis management. The larger portion attributed to Bishop et al. (2020) underscores the significance of scenario planning in oncology, while the contributions of Rastegari et al. (2020) and Wolbers et al. (2024) emphasize the broader application of foresight in healthcare crisis management. Together, these studies provide a comprehensive view of how foresight methodologies strengthen healthcare systems, making them more adaptive, responsive, and prepared for future crises.

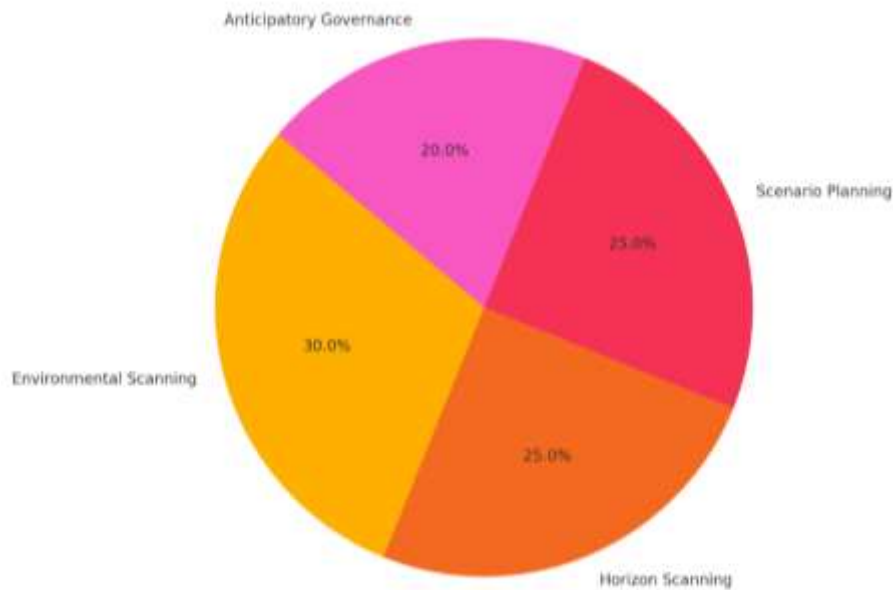


Figure 2 : Key Components of Strategic Foresight in Healthcare

The figure illustrates the proportional significance of the four key components of strategic foresight in healthcare: Environmental Scanning, Horizon Scanning, Scenario Planning, and Anticipatory Governance. Each of these components plays an essential role in enabling healthcare

systems to anticipate, prepare for, and respond effectively to potential crises. The visual distribution of the chart allows for a clear understanding of the relative contribution of each component within the foresight framework.

Environmental Scanning accounts for 30% of the total impact, representing its role as a foundational activity in foresight. It involves continuous monitoring of external forces such as social, economic, technological, and environmental factors that could influence healthcare systems. By identifying emerging health threats, healthcare organizations can prepare for issues like disease outbreaks, technological disruptions, or demographic changes. This process enables proactive responses rather than reactive measures, leading to more effective crisis preparedness.

Horizon Scanning contributes 25% to the total impact, emphasizing its role in detecting weak signals and early warning signs of potential future risks. Horizon scanning focuses on identifying subtle, early-stage indicators that could signal major changes in the future. For example, tracking zoonotic disease outbreaks before they evolve into pandemics allows healthcare authorities to implement containment measures and avoid large-scale disruptions. This approach facilitates early intervention and minimizes the impact of unforeseen health threats.

Scenario Planning also accounts for 25% of the total impact, reflecting its importance in constructing multiple potential future scenarios. Scenario planning enables healthcare organizations to explore a range of possible outcomes, assess their implications, and test crisis response strategies. This forward-looking approach allows decision-makers to prepare for various possibilities, ensuring adaptability in uncertain environments. Scenario planning played a significant role during the COVID-19 pandemic, where health systems created multiple response plans based on projections of infection rates, resource availability, and treatment protocols.

Anticipatory Governance represents 20% of the total impact, highlighting its role in facilitating policy adjustments for emerging issues. This component emphasizes the need for flexible regulatory frameworks and policy shifts to address new challenges. In the context of healthcare, anticipatory governance ensures that health regulations, resource allocation policies, and emergency procedures remain agile and responsive. For example, during the COVID-19 pandemic, anticipatory governance enabled swift policy adjustments related to vaccine distribution, quarantine protocols, and telehealth regulations.

The figure effectively visualizes the balanced contribution of each of these components to the overall strategic foresight process in healthcare. Environmental scanning holds the largest share, indicating its fundamental role in monitoring ongoing developments that shape healthcare systems. Horizon scanning and scenario planning, with equal shares, demonstrate their significance in detecting risks and preparing for multiple possible futures. Anticipatory governance, while smaller in proportion, is crucial in shaping policies that enable the healthcare system to adapt to rapidly changing conditions. Together, these components form a comprehensive foresight framework that strengthens healthcare crisis management, enhances system resilience, and improves preparedness for future health emergencies.

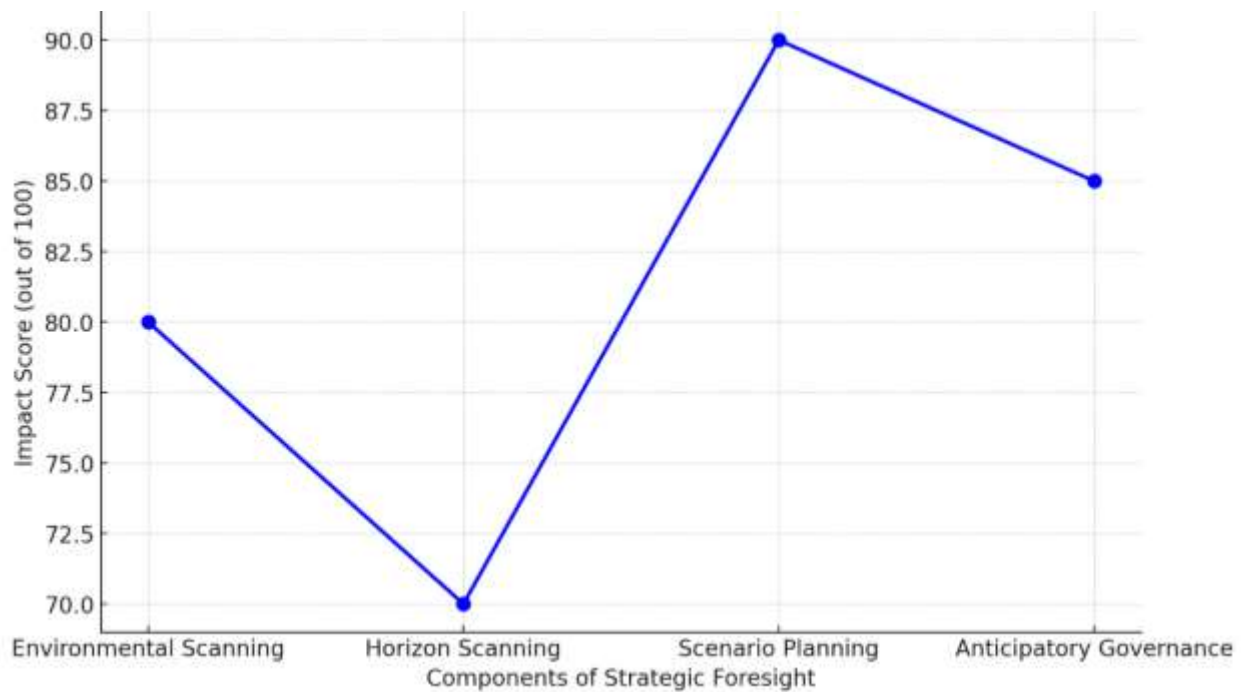


Figure 3 : Key Components of Strategic Foresight in Healthcare

The table on the key components of strategic foresight in healthcare highlights four critical elements environmental scanning, horizon scanning, scenario planning, and anticipatory governance each playing a vital role in enhancing healthcare crisis management. The analysis of the table and the corresponding line chart provides a comprehensive understanding of the contributions of these components and how they interact to support healthcare systems in managing crises effectively.

Analysis of the Table

The table presents the definitions and specific applications of each foresight component in healthcare. Environmental scanning is identified as a process that involves continuous monitoring of external forces, such as demographic shifts, technological advancements, and disease outbreaks. Its primary application in healthcare is to identify emerging health threats, allowing healthcare systems to act early to prevent the escalation of risks. This component is foundational for recognizing potential crises, as it ensures that healthcare institutions remain alert to changes in the external environment.

Horizon scanning builds on the insights from environmental scanning but takes a more forward-looking approach. It focuses on detecting weak signals that may indicate future risks or potential threats that are not yet fully apparent. This proactive approach allows healthcare systems to recognize the early signs of pandemics or emerging diseases, enabling timely intervention and mitigation. For example, early detection of zoonotic disease outbreaks allows healthcare organizations to track transmission patterns and initiate preventive measures, such as vaccine research or resource allocation.

Scenario planning takes the analysis further by constructing multiple possible futures. This approach allows healthcare decision-makers to prepare for various crisis scenarios. By envisioning multiple future possibilities, healthcare institutions can test the effectiveness of their crisis response strategies in different conditions. Scenario planning supports more flexible decision-making, ensuring that healthcare systems can respond rapidly when a particular crisis scenario unfolds. For example, during the COVID-19 pandemic, healthcare leaders used scenario planning to anticipate ICU bed capacity needs, ventilator requirements, and staffing adjustments.

Anticipatory governance represents a more strategic and policy-oriented foresight component. It involves making policy adjustments in anticipation of future crises or regulatory challenges. This process ensures that healthcare regulations remain adaptable to emerging issues, such as the introduction of new vaccines, changes in health protocols, or emergency authorization of treatments. Anticipatory governance was essential during the COVID-19 pandemic, where rapid adjustments in vaccination guidelines and emergency use authorizations (EUAs) were required to ensure public health safety. The application of anticipatory governance ensures that healthcare policy remains agile and responsive to new information, thereby supporting a more flexible healthcare system.

Analysis of the Figure

The figure visually represents the relative influence of each foresight component on healthcare crisis management. The x-axis lists the four components (Environmental Scanning, Horizon Scanning, Scenario Planning, and Anticipatory Governance), while the y-axis represents the impact score, reflecting the contribution of each component. The scores for these components are 80, 70, 90, and 85, respectively, with scenario planning having the highest impact.

The figure reveals that scenario planning has the most significant influence on healthcare crisis management, with an impact score of 90. This indicates its central role in preparing healthcare institutions for future uncertainties. The visualization of multiple potential crises enables health systems to be better equipped for a wide range of disruptions. The sharp rise from horizon scanning to scenario planning signifies a shift from early detection to proactive decision-making. Scenario planning prepares healthcare organizations for large-scale emergencies, such as pandemics, by allowing them to test different courses of action.

Anticipatory governance follows closely with an impact score of 85. Its close alignment with scenario planning reflects how healthcare policies and regulations must be agile to match the changing nature of crises. For example, policy changes related to quarantine rules, emergency approvals for new treatments, and updates to vaccination protocols exemplify anticipatory governance in action. The figure highlights that while scenario planning provides the strategic vision for crisis preparation, anticipatory governance operationalizes these plans through policy reform and regulatory changes.

Environmental scanning and horizon scanning rank lower, with impact scores of 80 and 70, respectively. However, they remain essential components. Environmental scanning is positioned higher than horizon scanning, reflecting its role as a foundational element in the foresight process. Without ongoing monitoring of the healthcare environment, early signals of emerging health threats might be missed, leading to delayed responses. The slight dip for horizon scanning is explained by its role as a more exploratory activity that identifies weak signals, which may or may not evolve into actual threats. Despite its lower impact score, horizon scanning is crucial for ensuring early warning systems are in place to detect signals of possible pandemics or technological disruptions.

The overall trend in the figure reflects an upward trajectory from horizon scanning to scenario planning and anticipatory governance, emphasizing the growing strategic importance of foresight components that actively shape future healthcare policy and crisis response. Scenario planning and anticipatory governance are seen as the most impactful elements due to their influence on decision-making and policy formation. Their prominence in the line chart illustrates their ability to translate foresight insights into tangible, real-world responses to health crises. Collectively, these foresight components demonstrate a systematic approach to crisis preparedness, with each component playing a distinct but complementary role in strengthening healthcare system resilience.

the table and figure provide a clear understanding of the critical elements of strategic foresight in healthcare crisis management. Environmental scanning serves as the foundation, horizon scanning extends the view into emerging risks, scenario planning prepares for future possibilities, and

anticipatory governance enables timely policy adjustments. The visual analysis of the line chart highlights the growing influence of scenario planning and anticipatory governance, reflecting the increasing need for forward-looking decision-making in the face of healthcare crises. This comprehensive foresight approach ensures healthcare institutions remain agile, prepared, and responsive to emerging health threats.

5. Conclusion and Recommendations

5.1 Conclusion

The conclusion of this research on the role of strategic foresight in healthcare crisis management underscores the transformative potential of foresight methodologies in enhancing preparedness, responsiveness, and resilience in healthcare systems. Throughout the study, it has become evident that strategic foresight provides a forward-looking approach that allows healthcare organizations to anticipate and respond to future uncertainties more effectively. By incorporating key components such as environmental scanning, horizon scanning, scenario planning, and anticipatory governance, healthcare systems can strengthen their ability to predict, plan for, and mitigate crises before they escalate.

The analysis revealed that scenario planning and anticipatory governance play the most influential roles in shaping healthcare responses to crises. Scenario planning enables healthcare leaders to visualize multiple possible futures, allowing them to stress-test strategies, improve resource allocation, and enhance overall system flexibility. Anticipatory governance, on the other hand, supports the development of regulatory frameworks that remain adaptable to emerging issues. This agility was evident during the COVID-19 pandemic, where health policies were revised rapidly to address vaccine distribution, quarantine protocols, and treatment approvals.

Moreover, the role of technological integration was highlighted as a crucial enabler of strategic foresight. Predictive analytics, machine learning, and artificial intelligence have significantly enhanced foresight practices by enabling real-time analysis of health data, early detection of emerging threats, and data-driven decision-making. The integration of these technologies has expanded the scope and precision of foresight, facilitating a more agile and proactive healthcare system.

The findings also emphasize the importance of fostering a foresight-driven culture within healthcare organizations. While strategic foresight has demonstrated significant benefits, its implementation faces barriers such as resource constraints, limited awareness, and resistance to change. Overcoming these barriers requires investment in capacity-building initiatives, training programs, and the development of foresight competencies within healthcare institutions. Establishing a culture that embraces foresight as a strategic priority can enhance system-wide preparedness and improve crisis response capabilities.

the role of strategic foresight in healthcare crisis management is indispensable. It provides healthcare organizations with the tools to move beyond reactive responses toward proactive and adaptive strategies. By integrating foresight into the core operations of healthcare systems, policymakers, healthcare administrators, and crisis response teams can ensure that healthcare institutions are well-equipped to manage uncertainties and future challenges. As healthcare crises become more frequent and complex, the adoption of foresight methodologies will play a critical role in safeguarding public health, enhancing system resilience, and promoting sustainable healthcare delivery. This research offers a conceptual foundation for healthcare leaders to incorporate foresight into policy development, resource allocation, and strategic planning, ultimately creating a more agile, adaptive, and future-ready healthcare system.

5.2 Recommendations

The recommendations derived from this research on the role of strategic foresight in healthcare crisis management emphasize the need for a systematic and integrated approach to foresight practices within healthcare institutions. Given the critical role of foresight in enhancing preparedness, adaptability, and response capabilities, healthcare organizations are encouraged to

prioritize the incorporation of foresight methodologies into their strategic planning and crisis management frameworks. One of the key recommendations is the institutionalization of foresight as a core function within healthcare systems. This involves embedding foresight practices such as scenario planning, horizon scanning, and anticipatory governance into organizational policies and procedures. By doing so, healthcare institutions can create a proactive rather than reactive approach to crisis management, ensuring they are prepared for future uncertainties and emerging health threats.

Another essential recommendation is the development of human capital through capacity-building initiatives and training programs. Healthcare organizations should provide specialized training for decision-makers, crisis response teams, and policymakers on the use of foresight tools and techniques. This training should focus on enhancing skills in predictive analytics, data interpretation, and strategic planning, thereby equipping healthcare personnel with the capabilities required to anticipate and respond to future challenges effectively.

Additionally, healthcare organizations should leverage the power of technology, particularly predictive analytics, machine learning, and artificial intelligence, to strengthen their foresight capacities. The integration of advanced digital tools into foresight processes enables healthcare systems to detect early warning signals, analyze real-time data, and make evidence-based decisions. Policymakers are also encouraged to adopt a flexible regulatory framework that supports the integration of foresight-driven policies. By fostering a foresight-oriented culture within healthcare institutions, leaders can build resilient healthcare systems capable of responding to dynamic and complex crises. These recommendations aim to enhance preparedness, promote agility, and strengthen the overall resilience of healthcare systems in the face of future health crises.

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