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BUILDING PUBLIC HEALTH RESILIENCE: LESSONS FROM COVID-19 FOR FUTURE HEALTH CRISES IN ZAMBOANGA CITY

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Abstract
This study examined the resilience of Zamboanga City's public health system during the COVID-19 pandemic to derive lessons for future crises aligned with SDG 3 (Good Health and Well-Being) and SDG 16 (Peace, Justice, and Strong Institutions). Guided by Futures Thinking, it assessed pandemic preparedness, crisis administration, and response and recovery through a mixed-methods design combining surveys, key informant interviews, and document review for triangulation. Quantitative results showed that preparedness (M = 2.86), crisis administration (M = 2.94), and response and recovery (M = 2.93) were rated "Effective," with acceptable reliability (α = 0.66–0.86). Qualitative findings emphasized governance accountability, risk anticipation, coordination, and community empowerment. Futures tools— Triangle, Wheel, and Backcasting—projected a shift from reactive response toward anticipatory, data-driven, and inclusive governance by 2040. If appropriate actions are sustained to design the preferred future, Zamboanga City can transition toward a resilient health sector consistent with AmBisyon Natin 2040.

Keywords: Futures Thinking, COVID-19 Lessons, Pandemic Preparedness, Crisis Administration, Response and Recovery

1 Introduction

The COVID-19 pandemic was a defining moment for public health governance, exposing systemic vulnerabilities that tested the ability of local institutions to protect communities and sustain essential services. Evidence suggests that governance capacity, coordination, and foresight are among the most important factors for effective pandemic management (World Health Organization, 2022). Existing research recognizes the critical role played by local governments in implementing response measures, allocating resources, and communicating risks to the public (Department of Health, 2021). In the Philippines, the pandemic revealed both the potential and the fragility of decentralized health governance, especially in cities such as Zamboanga, where limited resources, overlapping mandates, and fragmented coordination challenged policy coherence. Data from several studies suggest that while local governments acted as the first line of defense, their responses were often reactive and constrained by the absence of integrated monitoring systems and networked governance arrangements (Kapucu & Hu, 2020).

Despite these extensive national assessments, few empirical studies have focused on how local public health systems, particularly in Mindanao, managed crisis administration and post-pandemic recovery. Previous research on pandemic response has not sufficiently examined the relational dimensions of governance—how agencies, hospitals, and social institutions interacted under uncertainty, nor has it systematically applied futures-oriented or evaluation frameworks to assess institutional effectiveness. This study therefore addressed a critical gap by integrating the Monitoring and Evaluation (M&E) Framework for COVID-19 Responses, Network Governance, and the Futures Thinking Framework to analyze the city's crisis

governance performance and its transition toward resilient, inclusive public health systems. The M&E framework provided a structured lens for evaluating how health, economic, and social interventions were implemented and what lessons could inform preparedness for future emergencies. The Network Governance Framework (Provan & Kenis, 2008; Kapucu & Hu, 2020) illuminated how collaboration, coordination, and shared accountability among diverse actors—such as the Department of Health (DOH), Department of Social Welfare and Development (DSWD), City Health Office (CHO), Government Hospitals, and Barangay Governments—shaped the effectiveness of Zamboanga's COVID-19 management. Meanwhile, the Futures Thinking Framework (Inayatullah, 2018) allowed the study to map the present, anticipate emerging issues and weak signals, and identify strategies for transforming the future toward a desired state. Together, these frameworks enabled a comprehensive assessment of both policy performance and institutional relationships within crisis governance.

The purpose of this study was to examine the resilience of Zamboanga City's public health system during the COVID-19 pandemic and to derive lessons for future health crises. It investigated the following research question: How effective were the city's pandemic preparedness, crisis administration, and response and recovery mechanisms, and how could these insights inform the design of a foresight-based, evidence-driven public health governance model? The study employed a convergent mixed-methods design (Creswell & Plano Clark, 2018), integrating surveys, key informant interviews, and document review for triangulation. Quantitative data were analyzed through descriptive statistics, with mean ratings and Cronbach's alpha coefficients ($\alpha = 0.66–0.86$) confirming reliability, while qualitative data were examined thematically using Inayatullah's (2008) Futures Triangle, Futures Wheel, and Backcasting tools. The scope encompassed local health and administrative agencies, including the Department of Health (DOH), Department of Social Welfare and Development (DSWD), City Health Office (CHO), Government Hospitals, National Economic and Development Authority (NEDA) and Barangay Governments. Limitations stemmed from the time gap between the pandemic and data collection—three years after the outbreak—when several administrators had been reassigned or replaced, and some interviewees, though deeply involved, were not principal decision-makers at the pandemic's height.

Findings showed that preparedness (M = 2.86), crisis administration (M = 2.94), and response and recovery (M = 2.93) were all rated "Effective," supported by acceptable internal reliability. Governance accountability, risk anticipation, coordination, and community empowerment emerged as major themes. Futures analysis indicated that Zamboanga's health governance had entered a phase of transitional resilience, evolving from reactive response toward anticipatory, data-driven collaboration. The study provides new insights into how local governments can integrate evaluation and network governance within futures methodologies to strengthen institutional readiness for future crises. The policy-ready roadmap derived from the findings recommends institutionalizing foresight planning, establishing permanent inter-agency crisis councils, integrating digital monitoring systems, and promoting transparency and participatory decision-making. Ultimately, the study concludes that if immediateand appropriate actions are taken to design the city's desired future, Zamboanga City can transition toward a resilient, inclusive, and foresight-driven health sector consistent with A*mBisyon Natin 2040 a*nd the aspirations of SDGs 3 and 16.

2 iterature overview

he COVID-19 pandemic profoundly disrupted local public health systems, testing emergency preparedness, governance structures, and institutional adaptability across countries. Evidence suggests that the pandemic not only exposed preexisting systemic weaknesses but also created an unprecedented opportunity to reimagine public health governance through resilience and

foresight (Mustafa et al., 2021; WHO, 2020). Global experiences underscored the central role of leadership, community participation, and coordinated crisis management in mitigating pandemic impacts, all of which are critical to achieving Sustainable Development Goals (SDGs) 3 and 16, which advocate for good health, well-being, and strong institutions (United Nations, 2015).

nternational evidence revealed that nations with fragile health systems, such as Spain and Italy, struggled with underfunding, weak coordination, and inadequate preparedness, leading to significant strain on healthcare delivery (The Lancet Public Health, 2020; Mascio et al., 2020). In South Asia, limited resources and socioeconomic disparities hampered pandemic response, prompting scholars like Sarkar et al. (2020) to advocate for cost-effective, multi-tiered public health frameworks. These global experiences resonate with the Philippine context, where structural gaps in governance and devolution exposed the challenges of sustaining essential health services during prolonged crises (Lumintao, 2021). In Region IX, for instance, human resource shortages and fragmented coordination mechanisms limited pandemic response capacity, despite legal mandates such as Republic Act 11332 requiring surveillance units at all levels (Regional Development Council IX, 2020).

he literature on emergency preparedness highlights the importance of comprehensive, multi-sectoral approaches that integrate preventive planning with adaptive learning. Studies from the Organization for Economic Cooperation and Development (OECD, 2022) and Jefferies et al. (2020) emphasized the need for resilient leadership and community participation to ensure sustained response capacity. New Zealand's rapid containment through decisive non-pharmaceutical interventions (Robert, 2020) and the use of mathematical modeling for disease forecasting (Xiang et al., 2021) demonstrate the utility of evidence-based planning. Locally, researchers in Zamboanga City have explored such predictive methods: Ogarte and Misil (2024) used the Susceptible-Infected-Removed (SIR) model to analyze transmission dynamics, while Patayon and Subong (2022) applied time-series modeling to evaluate the pandemic's economic effects. These studies provided valuable insights into early warning mechanisms but rarely examined their implications for long-term institutional resilience.

risis management literature, meanwhile, stresses adaptive governance as a defining element of resilience. Adaptive systems bridge social and biophysical domains, enhancing flexibility, legitimacy, and learning (Juhola, 2023). In Indonesia, governance innovations such as digital information systems and economic adaptation strategies (Hizbaron et al., 2021) exemplify how local governments can embed resilience into routine governance. Philippine scholars like Ona et al. (2021) and Felices (2021) identified similar mechanisms through resilience governance and inter-LGU coordination, emphasizing knowledge management, shared legitimacy, and interdependence. Community engagement emerged as another recurring theme. From the World Health Organization's (WHO) Community Engagement Package (Omeleke et al., 2021) to the grassroots "Maginhawa" community pantries (Abesamis et al., 2022), the literature underscores civic participation as essential to inclusive recovery and trust-building—an institutional trait central to SDG 16's vision of strong, participatory governance.

he response and recovery literature builds on these insights, showing how crisis periods catalyze institutional transformation. Fauci and Folkers (2023) and the OECD (2022) emphasize that early, transparent, and coordinated actions are vital for effective pandemic response. Mustafa et al. (2021) and Haldane et al. (2021) further argue that recovery efforts must strengthen health system financing, governance, and workforce capacity—key dimensions of Universal Health Coverage (UHC). These works converge on a single proposition: public health resilience cannot be achieved through biomedical measures alone; it

requires institutional foresight, community inclusion, and sustained investment in governance reform.

t the national level, A*mBisyon Natin 2040 (*NEDA, 2016) anchors these aspirations in a shared vision of a "matatag, maginhawa, at panatag na buhay." It frames health security, equity, and trust as central pillars of sustainable development. The vision's alignment with SDGs 3 and 16 positions it as both the normative compass and strategic endpoint for reforming public health governance. When situated within Futures Thinking—as articulated by Inayatullah (2008)—A*mBisyon Natin 2040 e*nables policymakers to analyze the "push of the present," the "weight of the past," and the "pull of the future," thereby linking crisis experiences with long-term policy transformation.

ecent Philippine and comparative studies suggest that foresight-based governance offers a viable path for institutionalizing resilience. For instance, Mafei et al. (2020) and Mascio et al. (2020) note that anticipatory governance enhances agility and collaboration across bureaucracies, while WHO's (2022) Western Pacific Regional Office (WPRO) framework promotes multi-scenario planning and stakeholder inclusion. Locally, Cruz and Vazquez (2024) argue that the future of Philippine health governance lies in digital transformation, decentralized decision-making, and community-centered care—all consistent with A*mBisyon Natin 2040'*s call for high-trust, people-centered institutions.

3 esearch Methodology

he study utilized a convergent mixed-methods design to comprehensively examine Zamboanga City's public health system in terms of pandemic preparedness, crisis administration, and response and recovery during the COVID-19 pandemic. Quantitative and qualitative data were collected concurrently and triangulated to ensure validity and depth of analysis. The research was theoretically anchored on the Monitoring and Evaluation (M&E) Framework for COVID-19 Responses, Network Governance, and Futures Thinking Theories, providing a structured basis for assessing institutional performance, inter-organizational collaboration, and futures design thinking in planning for future crises.

his study examined the public health system and crisis response in Zamboanga City during the COVID-19 pandemic. The research scope covered several key institutions, including the City Health Office (CHO), the City Disaster Risk Reduction and Management Office (CDRRMO), and various national line agencies such as the National Economic and Development Authority (NEDA), the Department of Health (DOH), and the Department of Social Welfare and Development (DSWD), in addition to selected government hospitals like the Zamboanga City Medical Center and the Mindanao Central Sanitarium. The study utilized a purposive sampling approach to select participants for both its quantitative and qualitative components. T he q uantitative s ample i ncluded 7 0 b arangay o fficials w ho w ere d irectly involved in the crisis response. For the qualitative aspect, Key Informant Interviews (KIIs) were conducted with health administrators, frontline workers, and institutional administrators chosen for their direct and in-depth involvement in pandemic operations. Data collection concurrently employed structured survey questionnaires to assess three core dimensions—pandemic preparedness, crisis administration, and response and recovery—and the KIIs, which provided rich, detailed exploration of leadership, coordination, and governance experiences.

or quantitative data analysis, the methods included frequency and weighted mean to determine effectiveness levels, standard deviation to measure data dispersion, and Cronbach's alpha reliability testing to confirm internal consistency. Qualitative responses were analyzed thematically and organized using Inayatullah's (2008) Futures Triangle, Futures Wheel, and

Backcasting tools, which enabled foresight-based interpretation of governance lessons and future pathways.

4 iscussion

he survey gauges the perception of those engaged in the response and implementation of COVID-19 local guidelines and protocols.

able 1
evel of Effectiveness of the Emergency Preparedness Measures of the Local Public Health Sector during the COVID-19 Pandemic

ub scales	*ean (SD)*	*escription*
isk Anticipation Capacities	.82 (0.63)	*ffective*
ritical Sector Preparedness	.79 (0.61)	*ffective*
andemic Management Protocols	.93 (0.63)	*ffective*
verall	.86 (0.53)	*ffective*

egend: Very Effective (3.50 – 4.0); Effective (2.50 – 3.49); Less Effective (1.50 – 2.49); Not Effective (1.0 –
.49)

able 1: Level of Effectiveness off the Emergency Preparedness Measures of the Local Public Health Sector during the COVID-19 Pandemic," indicates that overall, the emergency preparedness measures in Zamboanga City's local public health sector were perceived as "Effective," with an overall mean score of 2.862.86 (SD 0.53).

Delving into the subscales, the following observations can be made:

1. **Risk Anticipation Capacities:** This subscale received a mean score of 2.822.82 (SD 0.630.63), also rated as "Effective." The study's Key Informant Interview (KII) questionnaire specifically probes this area, asking about ideal systems for anticipating and mitigating public health risks, potential worst-case scenarios if capacities are not developed, main challenges or barriers, and strategies for improvement. The literature review underscores the importance of future planning to prioritize essential services and understanding hazards and threats for effective pandemic preparedness. The "Effective" rating suggests that stakeholders perceived existing capacities for anticipating risks as generally adequate, though the standard deviation indicates some variation in these perceptions.
2. **Critical Sector Preparedness:** With a mean score of 2.792.79 (SD 0.610.61), this aspect was also deemed "Effective." This aligns with the KII questionnaire's focus on what critical sectors (e.g., healthcare, transportation, food supply) should ideally look like for pandemic preparedness, the impact if they are unprepared, current barriers, and actions for improvement. The literature review highlights that critical sectors like pharmaceutical industries and healthcare providers play a crucial role in improving resilience. The "Effective" rating implies a generally positive assessment of how well these vital sectors were prepared, though, like risk anticipation, there is some variability in responses.

3. **Pandemic Management Protocols:** This subscale scored the highest among the three, with a mean of 2.932.93 (SD 0.630.63), and is described as "Effective." The KII questionnaire explores ideal pandemic management protocols, the consequences of

improper implementation, barriers (related to policy, leadership, or resource allocation), and steps for improvement. The literature review also discusses the importance of setting up risk management protocols. This relatively higher mean suggests that the protocols in place for managing the pandemic were perceived as comparatively more effective by the respondents.

The overall mean of 2.862.86 (SD 0.530.53) suggests a general consensus among the respondents—likely comprising healthcare administrators, frontline healthcare workers, policymakers, and barangay leaders—that Zamboanga City's emergency preparedness measures during the COVID-19 pandemic were largely effective. The standard deviations across all subscales (ranging from 0.530.53 to 0.630.63) indicate a moderate degree of variability in the responses. While the average perception is positive ("Effective"), these SD values suggest that not all respondents shared the exact same level of agreement, and there were differing experiences or viewpoints regarding the effectiveness of these measures.

Table 2
Level of Effectiveness of the Crisis Management Measures of the Local Public Health Sector during the COVID-19 Pandemic

Sub scales	***Mean (SD)***	***Description***
Crisis Communication	2.99 (0.51)	*Effective*
Governance Arrangements	2.84 (0.61)	*Effective*
Whole-of-Society Response	2.98 (0.53)	*Effective*
Overall	2.94 (0.51)	*Effective*

Legend: Very Effective (3.50 – 4.0); Effective (2.50 – 3.49); Less Effective (1.50 – 2.49); Not Effective (1.0 –
1.49)

Table 2 presents the assessment of the crisis management measures implemented by the local public health sector during the COVID-19 pandemic. The overall mean score of 2.94 (SD = 0.51) indicates that the city's crisis management was rated "Effective", suggesting that most governance and coordination efforts were successfully executed though with room for improvement.

Among the subscales, Crisis Communication (M = 2.99, SD = 0.51) obtained the highest mean, reflecting the city's progress in establishing responsive communication channels through digital and community-based information platforms. This effectiveness was particularly evident in maintaining real-time updates and fostering public compliance. Whole-of-Society Response (M = 2.98, SD = 0.53) also registered high effectiveness, indicating strong collaboration between government, civil society, and the private sector. However, Governance Arrangements (M = 2.84, SD = 0.61) scored lowest among the subdimensions, signaling persisting gaps in policy integration, resource alignment, and bureaucratic coordination.

Table 3
Level of Effectiveness of the Response and Recovery Measures of the Local Public Health Sector during the COVID-19 Pandemic

Sub scales	***Mean (SD)***	***Description***
Lockdown and Restrictions	3.01 (0.65)	*Effective*
Economic and Financial Support	2.81 (0.66)	*Effective*
Health Measures	3.01 (0.61)	*Effective*
Social Policy	2.91 (0.58)	*Effective*
Overall	2.93 (0.54)	*Effective*

Legend: Very Effective (3.50 – 4.0); Effective (2.50 – 3.49); Less Effective (1.50 – 2.49); Not Effective (1.0 –
1.49)

Table 3 summarizes the effectiveness ratings for the response and recovery phase of the COVID-19 crisis. The composite mean of 2.93 (SD = 0.54) denotes that the city's overall response and recovery strategies were also "Effective."

The subscales Lockdown and Restrictions (M = 3.01, SD = 0.65) and Health Measures (M = 3.01, SD = 0.61) both achieved the highest ratings, suggesting that containment protocols, surveillance, and public health guidelines were implemented efficiently and adhered to by the public. These results indicate adaptive enforcement, balancing restriction with the maintenance of essential services. Social Policy (M = 2.91, SD = 0.58) likewise reflected effective delivery of welfare and psychosocial support initiatives.

However, Economic and Financial Support (M = 2.81, SD = 0.66) scored lowest, revealing partial gaps in providing timely and equitable aid, especially to informal and marginalized sectors. This result aligns with qualitative findings showing that administrative bottlenecks, overlapping aid programs, and limited fiscal flexibility constrained relief distribution.

Table 4
Scale Reliability of the Survey Questionnaire

Variables	*Cronbach's Alpha (α)*	*Reliability Level*
Pandemic Preparedness		
Risk Anticipation Capacities	0.71	Good & Acceptable
Critical Sector Preparedness	0.80	Good & Acceptable
Pandemic Management Protocols	0.86	Good
Crisis Management		
Crisis Communication	0.66	Acceptable
Governance Arrangements	0.85	Good
Whole-of-Society Response	0.79	Good & Acceptable
Response and Recovery		
Lockdown and Restrictions	0.81	Good
Economic and Financial Support	0.76	Good & Acceptable
Health Measures	0.81	Good
Social Policy	0.80	Good & Acceptable

Legend: Excellent (0.91 – 1.0); Good (0.81 – 0.9); Good & Acceptable (0.71 – 0.8); Acceptable (0.61 – 0.70)

Table 4 shows the reliability statistics for all constructs measured in the study. Cronbach's alpha values ranged from 0.66 to 0.86, indicating acceptable to good reliability across all subscales. This confirms the internal consistency of the items used to assess pandemic preparedness, crisis management, and response and recovery measures.

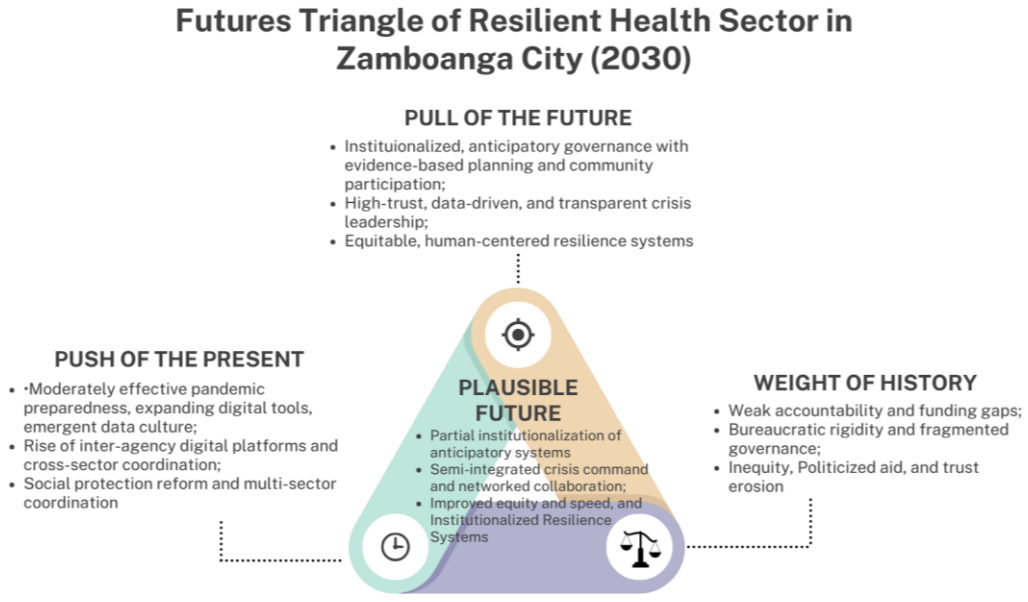
The highest reliability score was recorded for Pandemic Management Protocols (α = 0.86) under the preparedness domain, followed closely by Governance Arrangements (α = 0.85) and Lockdown and Restrictions (α = 0.81), classified as "Good." These results suggest that the items used to measure these constructs were strongly interrelated and consistently reflected participants' perceptions. Meanwhile, Crisis Communication (α = 0.66) achieved an "Acceptable" level, implying that while the scale captured essential elements of communication effectiveness, future refinements could improve measurement precision.

The quantitative results established that Zamboanga City's public health sector performed effectively across crisis preparedness, administration, and recovery dimensions, reflecting a moderate yet functional level of institutional resilience. However, the numerical trends also revealed underlying disparities—particularly in governance coordination and economic support—that quantitative indicators alone could not fully explain. To deepen this understanding, qualitative analysis was employed to interpret how historical legacies, present drivers, and envisioned futures interact in shaping public health governance. Using Inayatullah's Futures Triangle, the study explored these relationships by examining the weights of the past, pushes of the present, and pulls of the desired future—uncovering how systemic challenges and emerging capacities collectively influence Zamboanga City's transition toward anticipatory and inclusive crisis administration.

The Futures Triangle

The Futures Triangle analysis integrates the quantitative assessment of effectiveness with the qualitative insights on systemic governance gaps and institutional aspirations. It provides a dynamic understanding of how the pushes of the present, weights of the past, and pulls of the future interact to shape the plausible futures of Zamboanga City's health crisis governance toward 2030 as medium term plan.

Figure 1
Futures Triangle of Public Health Sector Resilience in Zamboanga City (2030)



The futures triangle illustrates the interplay of forces shaping the transition of Zamboanga City's public health sector toward resilience by 2030. The push of the present reflects ongoing progress—moderately effective preparedness, emerging digital tools, and growing inter-agency collaboration—that signals early institutional momentum. Yet, the weight of history continues to drag progress through weak accountability, fragmented bureaucracies, and politicized aid systems that erode trust and efficiency. Counterbalancing these is the pull of the future, defined by a vision of anticipatory, transparent, and equitable governance that anchors resilience on foresight, evidence, and citizen participation.

The resulting plausible future depicts a transitional phase where partial institutionalization of anticipatory systems and semi-integrated crisis structures begin to emerge. This state marks a pivotal midpoint—where progress depends on whether present digital and governance reforms overcome historical inertia to realize a fully institutionalized, people-centered public health ecosystem by 2040.

Futures Wheels of the Preferred Futures

The transition from the plausible futures (central nodes) toward the desirable futures (second-order consequences) reflects the evolutionary pathway of Zamboanga City's public health governance across three interrelated domains — pandemic preparedness, crisis administration, and response and recovery. Each domain exhibits distinct institutional dynamics but converges toward a unified vision of a resilient, anticipatory, and inclusive public health system by 2040.

Figure 2
Futures Wheels of the Preferred Futures in Public Health Sector Pandemic Preparedness, Crisis Administration, and Response and Recovery in Zamboanga City (2040)

Transition Toward Preferred Future on Pandemic Preparedness in Public Health Sector in Zamboanga City (2040)

Transition Toward Preferred Future on Crisis Administration in Public Health Sector in Zamboanga City (2040)

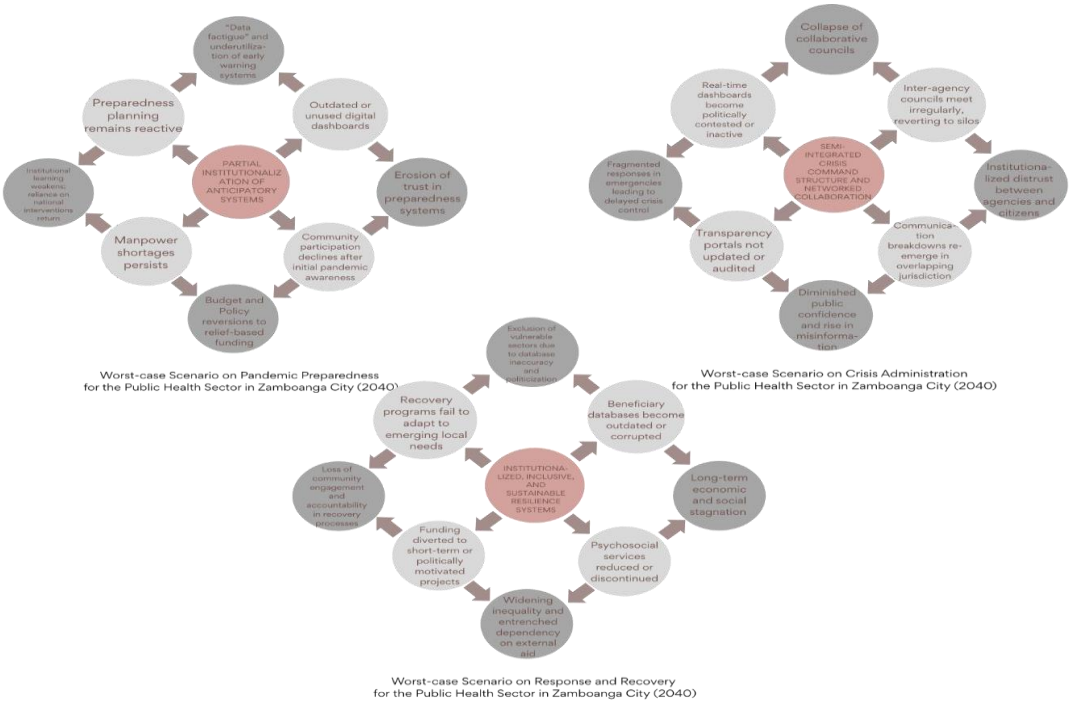
Transition Toward Preferred Future on Response and Recovery in Public Health Sector in Zamboanga City (2040)

The three futures wheels collectively illustrate the city's systemic transformation toward a resilient and anticipatory public health sector by 2040. Pandemic preparedness evolves from reactive responses to data-driven foresight through institutionalized surveillance, transparent funding, and community participation. Crisis administration transitions from fragmented coordination to adaptive, trust-based governance sustained by inter-agency collaboration and crisis councils. Response and recovery, in turn, shift from relief-centered interventions to inclusive, sustainable resilience systems anchored in digital integration, psychosocial well-being, and livelihood security. Together, these interconnected futures reveal a governance ecosystem where preparedness, administration, and recovery reinforce one another, advancing from short-term compliance to long-term institutional learning and citizen empowerment. The resulting trajectory represents Zamboanga City's envisioned Resilient Public Health System (2040)—a proactive, data-informed, and people-centered framework capable of adapting to future crises with coherence, transparency, and equity.

Futures Wheels and the Worst-Case Scenario

While the plausible futures outline attainable progress by 2040, the futures wheel for the worst-case scenario explores the reverse trajectory—what could occur if these gains are not institutionalized or sustained. Using the same plausible futures as central anchors, this analysis identifies the immediate and long-term consequences of stagnation, policy fatigue, or leadership discontinuity. The results underscore the fragility of transitional systems and highlight the urgency of sustained governance innovation.

Figure 3
Futures Wheels of the Worst-Case Scenario of Pandemic Preparedness, Crisis Administration, and for the Public Health Sector in Zamboanga City (2040)



The worst-case scenarios across pandemic preparedness, crisis administration, and response and recovery reveal how institutional inertia and weak governance can undo years of reform. In pandemic preparedness, foresight systems stagnate into "data fatigue," with underutilized dashboards, waning participation, and chronic manpower and funding gaps leading to the return of reactive planning. Crisis administration similarly regresses into fragmented silos as transparency falters, inter-agency councils become inactive, and politicized dashboards erode public confidence. Meanwhile, response and recovery mechanisms deteriorate under outdated databases, politicized funding, and the neglect of psychosocial and livelihood programs, fostering inequality and dependency.

Collectively, these outcomes show a reversal of resilience—a governance environment where lost institutional learning, weakened accountability, and public distrust reinforce one another. Rather than a proactive health ecosystem, the city risks entrenching a cycle of fragmentation and exclusion, emphasizing the urgency of sustaining foresight, leadership continuity, and community participation to avert this collapse.

Backcasting

Table 5
Backcasting Timeframe for the Resilient Public Health Sector in Zamboanga City (2025–2040)

Timeframe	Pandemic Preparedness	Crisis Administration	Response & Recovery
2040 (Preferred Future)	**Fully institutionalized anticipatory systems:** integrating foresight into LGU plans, sustained funding, and citizen co- production of data.	**Adaptive, transparent, and trusted crisis governance:** institutionalized through digital platforms and permanent crisis councils.	**Inclusive and sustainable resilience systems:** harmonizing social protection, livelihood, and psychosocial programs.
2030 (Mid-Term Plausible Future)	**Partial institutionalization of anticipatory systems:** Early warning dashboards active in all LGUs; foresight tools in planning workshops.	**Semi-integrated crisis command structure:** Shared digital dashboards functional; multi-sector coordination in place.	**Institutionalized resilience mechanisms:** Beneficiary databases and livelihood programs scaled citywide.
2025 (Present State)	**Reactive preparedness:** Fragmented planning; weak data sharing; limited funding.	**Fragmented crisis management:** Ad hoc coordination; limited transparency.	**Relief-centric recovery:** Short-term aid, weak integration across programs.

Pandemic Preparedness: From Compliance to Anticipation

Between 2025 and 2030, Zamboanga City transitions from reactive preparedness toward partial institutionalization by building digital foresight tools and piloting localized risk

anticipation mechanisms. However, sustainability challenges remain due to limited human resources and fiscal constraints. By 2040, preparedness matures into fully institutionalized anticipatory governance, where foresight and data analytics are routine LGU functions, and community-driven monitoring ensures transparency and inclusiveness.

Crisis Administration: From Fragmented Response to Adaptive Governance

In the present (2025), crisis governance remains fragmented and reactive, heavily reliant on personal leadership styles. By 2030, partial integration occurs through digital command dashboards and crisis councils, signaling an early shift toward coordination. By 2040, the system evolves into adaptive and transparent crisis administration, characterized by inter-agency synergy, real-time data use, and institutionalized trust — ensuring that emergency response is swift, coherent, and participatory.

Response and Recovery: From Relief to Sustainable Resilience

At present, recovery operations focus on relief and distribution, with weak data integration and minimal long-term rehabilitation. By 2030, the system transitions to partial institutionalization of resilience mechanisms, as digital beneficiary systems and livelihood programs begin to stabilize. By 2040, recovery transforms into human-centered resilience systems — harmonizing social protection, livelihood, and psychosocial programs into sustainable, equitable frameworks that foster community empowerment and long-term wellbeing.

Roadmap Towards Resilient Public Health Resilience

Insights drawn from the Backcasting analysis provided a structured pathway for translating envisioned futures into actionable strategies. By working backward from the desired state of a resilient, anticipatory, and inclusive public health system, the analysis identified key milestones, enablers, and interventions necessary to bridge current gaps. These backcasted steps informed the formulation of a policy-ready roadmap, outlining the concrete ways forward for institutionalizing foresight, strengthening governance networks, and embedding resilience within Zamboanga City's local health administration.

Figure 4

Resilient Public Health Sector in Zamboanga City Roadmap (2025-2040)

The roadmap illustrates Zamboanga City's strategic transformation from fragmented and reactive public health governance toward a resilient, anticipatory, and inclusive system by 2040. Rather than depicting a linear series of interventions, the figure visualizes three interlinked transitions—preparedness, crisis administration, and recovery—each contributing to the city's systemic resilience.

Between 2025 and 2030, the roadmap highlights the initiation of institutional change, where short-term, compliance-based practices give way to digital foresight systems, inter-agency coordination, and participatory monitoring. This phase represents the city's emergence from a reactive posture to one of structured experimentation, testing mechanisms such as crisis dashboards, foresight workshops, and social protection databases. The mid-term stage (2030) marks institutional consolidation, where new governance infrastructures—such as the Local Crisis Governance Code, Zamboanga Foresight Network, and Social Protection Integration Platform—become operational. These mid-level reforms signify the embedding of foresight, transparency, and evidence-based decision-making within bureaucratic processes.

By 2040, the roadmap converges toward a mature resilience framework, where anticipatory governance, adaptive crisis leadership, and inclusive recovery systems are institutionalized as enduring public values. This vision reflects the culmination of continuous learning and stakeholder collaboration, positioning public health not merely as a service function but as a governance paradigm built on trust, accountability, and citizen participation.

5 Conclusions

The main goal of the current study was to determine the effectiveness of crisis preparedness, management, and recovery measures of Zamboanga City's public health sector during the COVID-19 pandemic, and to envision future scenarios and policy pathways toward a resilient and foresight-driven health system.

This study has shown that the city's public health sector demonstrated moderate to high effectiveness across all dimensions—preparedness (M = 2.86), crisis administration (M = 2.94), and response and recovery (M = 2.93)—supported by acceptable internal reliability (α = 0.66–0.86). The findings confirmed that crisis communication and whole-of-society collaboration were the system's greatest strengths, while governance arrangements and economic support mechanisms remained its weakest points. The qualitative analysis deepened these findings through Inayatullah's Futures Triangle, Futures Wheel, and Backcasting, revealing that the city is in a phase of transitional resilience, shaped by enduring bureaucratic constraints ("weights of the past"), emerging coordination and digital reforms ("pushes of the present"), and a collective aspiration for anticipatory, transparent, and inclusive governance ("pulls of the future").

The results of this study indicate that local public health resilience depends not only on emergency response capacity but also on the institutionalization of foresight, data integration, and networked governance. These findings suggest that in general, strengthening governance accountability, risk anticipation, and participatory crisis coordination can accelerate Zamboanga City's transition toward *AmBisyon Natin 2040*'s envisioned high-trust, people-centered society.

The study contributes to our understanding of how futures thinking can be operationalized in local health governance. By combining Monitoring and Evaluation (M&E) Framework for COVID-19 Responses, Network Governance, and Futures Thinking frameworks, it provides an evidence-based model for developing policy-ready roadmaps that link present actions to preferred futures. This integration adds to the emerging field of futures-oriented public administration in the Philippines, demonstrating how foresight tools can transform crisis experiences into strategic learning for sustainable development.

A major limitation of this study is its reliance on data gathered three years after the pandemic's peak, when administrative leadership had shifted and institutional memory may have weakened. Being limited to Zamboanga City, the findings may not fully represent the diversity of health governance contexts across regions.

Considerably more work will need to be done to determine how foresight planning and network governance frameworks perform across varying local government capacities. Future studies could assess the long-term effects of institutionalizing crisis councils, digital health intelligence systems, and foresight training programs on overall governance resilience.

These findings suggest several courses of action for policy and practice. Greater efforts are needed to institutionalize foresight units within local governments, establish permanent inter-agency crisis management councils, and strengthen financing mechanisms for preparedness and recovery programs. Continued efforts are also needed to make crisis communication more participatory and data-driven. If such actions are pursued with urgency and coherence, Zamboanga City can realize its envisioned resilient, inclusive, and future-ready health sector, aligned with the goals of SDG 3 (Good Health and Well-Being) and SDG 16 (Peace, Justice, and Strong Institutions).

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