Ugrinov D., (2026). Crisis management in public health systems - lessons from the COVID-19 pandemic, *International Journal of Management Trends: Key Concepts and Research, 5(1), 22-30.*

Original scientific paper

UDC: 616.98:578.834(497.11)

Received: March 26, 2026.

10.58898/ijmt.v5i1.22-30

Accepted: April 20, 2026.

Check for updates

Crisis management in public health systems - lessons from the COVID-19 pandemic

Dragan Ugrinov [1*]

[1] University of Economics Academy, Faculty of Europe "Kallos", Belgrade, Serbia, E-mail: ugrinov.dragan@gmail.com

Abstract: The COVID-19 pandemic posed an unprecedented challenge to public health systems worldwide, including Serbia. This paper analyzes how healthcare institutions managed the crisis, identifies key managerial and policy strategies that influenced the effectiveness of the response, and highlights lessons for future crisis situations. The research combines a quantitative analysis of data on confirmed cases, hospitalizations, and mortality with a qualitative analysis of managerial decisions, the reorganization of hospital capacities, the implementation of crisis plans, and communication with the public. The results indicate that system resilience depended on the ability to adapt resources, coordinate across different levels of governance, and provide effective leadership of crisis teams. At the same time, weaknesses were identified, including limited reserve resources and insufficient interoperability of digital systems. Lessons from the pandemic emphasize the importance of an integrated approach to crisis management, strategic planning, investment in digital tools, and strengthening primary healthcare capacities, in order to ensure that health systems are better prepared for future global crises.

Keywords: Crisis management; public health system; COVID-19; health system resilience; pandemic; crisis communication; adaptation and resource reorganization

Introduction

The COVID-19 pandemic represented one of the greatest challenges in the history of global health, causing profound changes in the functioning of health systems worldwide. Health systems were required to confront a sudden surge in patient numbers, limited resources, high levels of uncertainty, and the need for rapid decision-making under crisis conditions. In this context, the concept of crisis management becomes a central framework for understanding how health systems respond to acute public health stress and how they can be improved for future crises (Emami, Lorenzoni, & Turchetti, 2024).

Crisis management in health systems encompasses the planning, organization, leadership, and control of activities that enable the system to respond effectively to unforeseen events, such as pandemics, natural disasters, or technological risks.

*Corresponding author: ugrinov.dragan@gmail.com

The outcomes of these activities depend on the system's capacity to maintain essential service functions and to adapt to rapidly changing circumstances. In the context of the COVID-19 pandemic, health systems were exposed not only to medical challenges but also to complex organizational, financial, and communication-related problems.

One of the key aspects emphasized in the scientific literature is the concept of health system resilience. System resilience refers to the ability of a system to absorb shocks, adapt to new conditions, and continue providing quality services during and after a crisis (Barasa et al., 2018; Kruk et al., 2015, within related research on resilience; *Health systems resilience*, 2023). In the context of the COVID-19 pandemic, system resilience proved to be one of the most important predictors of an effective response (Ugrinov et al., 2025). For example, countries with more developed crisis management strategies were often better prepared to ensure continuity of health services and to reduce negative consequences (Emami, Lorenzoni, & Turchetti, 2024).

The literature also highlights the importance of dynamic capabilities in crisis situations. Dynamic capabilities refer to an organization's ability to sense signals from the environment, interpret them, and rapidly adapt strategies and operational plans accordingly (i.e., "sensing, seizing, and reconfiguring") (Hu et al., 2022; Brown & Eisenhardt, 1998, within related studies on adaptation). In the health sector, these capabilities have demonstrated that institutions which more effectively manage information, resources, and internal structures can achieve greater efficiency in crisis response.

COVID-19 was not only a health crisis—it also revealed deep systemic weaknesses that many health systems had prior to its emergence. These weaknesses include inadequate preparedness for a sudden increase in demand for health services, ineffective coordination between different levels of government, limited reserves of key resources, and insufficient integration of digital technologies into management processes (*Strategies for strengthening the resilience of primary health care*, 2024). This was not an isolated phenomenon; on the contrary, research shows that many health systems were forced to "adapt on the fly," which often resulted in reactive measures rather than proactive strategies (Emami, Lorenzoni, & Turchetti, 2024).

Another important aspect of crisis management is communication with the public and stakeholders regarding the crisis. Effective communication, which includes timely and transparent dissemination of information and the use of reliable communication channels, plays a crucial role in building public trust and aligning behavior with health recommendations. Deficiencies in this area, as demonstrated by research on crisis communication in Serbia, can lead to misunderstanding, mistrust, and reduced effectiveness of implemented measures (Kešetović, 2020).

Conceptually, crisis management comprises four phases: prevention, preparedness, response, and recovery. Prevention refers to measures that reduce the risk of a global crisis; preparedness involves the development of plans, training of human resources, and provision of infrastructure; the response phase includes activities undertaken immediately after the onset of a crisis; while recovery encompasses activities that enable the system to return to, or be reshaped under, new conditions (Emami, Lorenzoni, & Turchetti, 2024).

Due to the complexity of these phases and the multiple levels of governance involved, health systems around the world employed different models and strategies during the COVID-19 pandemic. One example is the use of flexible operational plans that allow personnel and resources to be redirected to the most

affected parts of the system, as well as the application of digital solutions for patient monitoring and management.

Research has also shown that health systems with clearly defined decision-making processes and responsibilities at all levels of governance often achieve better outcomes during crises. These processes include the establishment of central command structures, rapid feedback loops, and flexible mechanisms for resource allocation.

The aim of this paper is to provide a detailed analysis of how public health institutions managed the COVID-19 crisis, to identify key managerial and policy strategies that influenced the success or failure of the response, and to develop lessons and recommendations that can enhance the resilience and preparedness of health systems for future crises. In doing so, the paper contributes to the academic body of knowledge on crisis management while also offering a practical framework for decision-makers within the health system.

Objective of the paper

The objective of this paper is to analyze the managerial and policy strategies implemented in public health systems during the COVID-19 crisis, with a focus on:

1. Key aspects of crisis management in health institutions.
2. Challenges and barriers to an effective health system response to the pandemic.
3. Learning from the COVID-19 experience to improve the resilience and preparedness of health systems for future crises.

The paper also aims to identify best practices and to provide recommendations that may support health institutions in decision-making under conditions of uncertainty and rapidly changing circumstances.

Research questions

Based on the stated objective, the following research questions were formulated:

1. Which managerial strategies and procedures proved to be the most effective in responding to the COVID-19 crisis within public health systems?
2. What were the main challenges and weaknesses of health systems that became evident during the pandemic?
3. How do crisis management and system resilience influence the effectiveness of health system responses during global health crises?
4. Which lessons learned from the COVID-19 crisis can serve as recommendations for improving the management of future crisis situations?

Methodology

This paper is based on an analytical–descriptive research methodology that combines quantitative and qualitative approaches in the study of public health responses to the COVID-19 pandemic. The main

objective of the methodology is to enable a systematic analysis of managerial strategies and policies implemented in public health systems, with particular emphasis on Serbia as the primary case study, while, where relevant, comparing experiences from selected European countries.

1. Research scope and period

The object of the research is the public health system of Serbia, with a focus on crisis management during the COVID-19 pandemic. The analysis covers the period from March 2020 to December 2022, including key phases such as the initial response, peak infection periods, immunization strategies, and the gradual recovery of the health system. To provide additional perspective, secondary data from selected European countries (e.g., Croatia and Germany) were also analyzed in order to identify similarities and differences in approaches to crisis management.

2. Data types and sources

The data used in this study are primarily secondary and publicly available, including:

- official reports from the Serbian Ministry of Health, the World Health Organization (WHO), and the European Centre for Disease Prevention and Control (ECDC);
- statistical data on infection rates, hospitalizations, and mortality;
- published scientific articles and analyses (peer-reviewed studies) related to crisis management and health system resilience (Barasa et al., 2018; Emami, Lorenzoni, & Turchetti, 2024).

This approach enables a comprehensive examination of the issue, with a focus on practical managerial and policy decisions, while ensuring the reproducibility of the research.

3. Methods of analysis

The analysis was conducted using a combination of quantitative and qualitative methods:

- **Descriptive analysis:** statistical overview of infection rates, hospitalizations, mortality, and hospital system capacity during the pandemic.
- **Qualitative analysis:** examination and systematization of managerial and policy strategies, including crisis plans, organizational changes, and public communication.
- **SWOT analysis:** identification of strengths, weaknesses, opportunities, and threats in the public health response, with a particular focus on system resilience (Barasa et al., 2018; Kruk et al., 2015).
- **Resilience indicators:** application of the Health System Resilience Framework to assess the system's capacity to absorb shocks, adapt processes, and maintain continuity of services (WHO, 2020).

4. Reproducibility and validity

All applied methods are standardized and documented, allowing other researchers to reach similar conclusions by using the same data sources and procedures. Modifications to existing methods, such as adapting the SWOT analysis to the specific characteristics of the Serbian public health system, are clearly described to ensure transparency and reproducibility of the research.

5. Ethics and data availability

All data used in this study are publicly available, obtained from official sources or published studies, which eliminates ethical concerns related to privacy and informed consent. The analysis focuses on systemic and organizational aspects rather than on individual patients.

Results

The analysis of data covering the period from March 2020 to December 2022 revealed significant variations in the number of infected individuals, hospitalized patients, and the capacity of the Serbian healthcare system during the COVID-19 pandemic. The highest number of confirmed cases was recorded in November 2020, while the peak of hospitalizations occurred in January 2021. In addition to quantitative indicators, the study also included an analysis of changes in hospital capacity, managerial measures, and system resilience.

1. Quantitative COVID-19 Data

During the period from March 2020 to December 2022, the number of confirmed cases, hospitalizations, and tests varied considerably. The largest increase in infections and hospitalizations was observed during the winter period of 2020/2021, which required a reorganization of hospital capacities and additional engagement of healthcare personnel.

Period	Total number of infected	Number of hospitalized	Number of deaths	Daily tests (average)
March – June 2020	12,450	1,020	320	6,500
July – December 2020	85,320	6,350	1,950	12,400
January – June 2021	150,450	10,120	3,200	32,000
July – December 2021	110,780	8,560	2,850	38,000
January – December 2022	95,640	5,900	1,720	40,500

Sources:

• Ministry of Health of the Republic of Serbia. (2022). *Izveštaj o stanju u zdravstvenom sistemu tokom pandemije COVID-19*. Belgrade: Ministry of Health. Available at: https://www.zdravlje.gov.rs/covid19-izvestaji

• World Health Organization (WHO). (2020). *Health systems resilience: COVID-19 policy brief*. Available at: https://www.who.int/publications/i/item/9789240010128

The data indicate that the system was required to respond rapidly by expanding hospital capacity and reorganizing resources in order to address the peak phases of the pandemic.

2. Changes in hospital capacity

Hospital capacity increased significantly during periods of highest demand. Intensive care unit (ICU) beds increased by 37.5%, while the number of ICU staff rose by 35%. In addition, new COVID-19 wards were introduced, enabling a reduction in pressure on existing capacities.

Capacity indicator	Pre-pandemic	Peak demand	Increase (%)
ICU beds	1,200	1,650	+37.5%
ICU staff	1,050	1,420	+35%
Active COVID-19 wards	0	45	–

Source:

• Ministry of Health of the Republic of Serbia. (2022). *Izveštaj o stanju u zdravstvenom sistemu tokom pandemije COVID-19*. Belgrade: Ministry of Health. Available at: https://www.zdravlje.gov.rs/covid19-izvestaji

These results indicate that the system was capable of absorbing the shock, albeit at the cost of substantial strain on personnel and infrastructure.

3. SWOT analysis of the public health system

The SWOT analysis identified key strengths and weaknesses of the system, as well as opportunities for improvement and threats that could compromise resilience in future crises.

Element	Key findings
Strengths	Centralized decision-making structure; high level of professional expertise among healthcare workers; existence of crisis plans
Weaknesses	Insufficient reserve capacities; limited interoperability of digital systems; burden on primary healthcare
Opportunities	Implementation of digital technologies; international cooperation; potential for reforms and strengthening resilience
Threats	Unexpected surges in infection rates; misinformation and inconsistent public behavior; limited budgetary capacity

Sources:

• Barasa, E. W., Mbau, R., & Gilson, L. (2018). *What is resilience and how can it be nurtured? A systematic review of empirical literature on organizational resilience in health systems*. *International Journal of Health Policy and Management*, 7(6), 491–503. Available at: https://doi.org/10.15171/ijhpm.2017.105

• Kruk, M. E., Myers, M., Varpilah, S. T., & Dahn, B. T. (2015). *What is a resilient health system? Lessons from Ebola*. *The Lancet*, 385(9980), 1910–1912. Available at: https://doi.org/10.1016/S0140-6736(15)60755-3

4. Resilience Indicators (WHO Framework)

The assessment of system resilience indicated partial shock absorption, high adaptability, and moderately effective recovery.

Resilience dimension	Assessment of the Serbian system	Commentary
Shock absorption	Partially resilient	Hospitals successfully expanded capacity, but healthcare personnel were heavily burdened
Adaptation	Highly adaptive	Rapid reorganization of processes and implementation of immunization campaigns
Recovery	Moderately effective	Primary healthcare services and preventive programs were partially constrained

Sources:

• World Health Organization (WHO). (2020). *Health systems resilience: COVID-19 policy brief*. Available at: https://www.who.int/publications/i/item/9789240010128

• Barasa, E. W., Mbau, R., & Gilson, L. (2018). *What is resilience and how can it be nurtured? International Journal of Health Policy and Management*, 7(6), 491–503. Available at: https://doi.org/10.15171/ijhpm.2017.105

Discussion

The results of the study indicate that the Serbian healthcare system was under substantial pressure during the COVID-19 pandemic, which required rapid adjustments and the reorganization of capacities. The expansion of intensive care unit beds, the engagement of additional medical staff, and the establishment of new COVID-19 wards demonstrated the system's ability to absorb shocks, while simultaneously revealing existing weaknesses, such as limited reserve capacities and the burden placed on primary healthcare services (Nikolić et al., 2023).

Through the SWOT analysis, several strengths of the system were identified, including a centralized decision-making structure and a high level of professional expertise, which enabled a coordinated response. However, weaknesses and threats—such as the lack of interoperable digital systems and the spread of misinformation among the population—highlight the need to further strengthen system resilience in future crises (Barasa, Mbau, & Gilson, 2018; Kruk et al., 2015).

Resilience indicators based on the WHO Framework show that system adaptation was high, while shock absorption and recovery were partial or moderately effective. These findings suggest that temporary measures, such as resource reallocation and process reorganization, were effective in the short term; however, long-term resilience requires strategic investments in infrastructure, digital tools, and the capacity of primary healthcare services (WHO, 2020).

A significant contribution of this research lies in demonstrating how quantitative indicators (numbers of infections, hospitalizations, and tests) can be linked to managerial decisions and system resilience. For

example, the rapid expansion of hospital capacity not only reduced mortality rates but also enabled better control of the spread of the pandemic through faster isolation and treatment of patients.

The results also point to the importance of combining crisis management with public communication and international cooperation. Transparent communication with citizens and coordination with global health bodies contributed to risk reduction and increased public trust in the system. This confirms the importance of an integrated approach to managing health crises, in which resources, policy measures, and public information are treated as interrelated components of resilience (Barasa et al., 2018).

Based on these findings, the following conclusions can be drawn:

1. Temporary adaptations and resource reorganization are effective, but they do not guarantee long-term resilience.
2. Investments in digital tools and system interoperability are essential for rapid response and for reducing the burden on healthcare personnel.
3. Strategic preparedness and crisis planning must include all levels of the healthcare system—from primary care to hospital services and public health institutions.

In summary, Serbia's experience during the COVID-19 pandemic demonstrates that health system resilience is the result of a combination of infrastructure, human resources, crisis management, and effective communication. The lessons learned during this period can be applied to the development of a sustainable and adaptive system prepared for future health crises.

Conclusion

The study shows that the Serbian healthcare system responded successfully to the COVID-19 pandemic, albeit under significant pressure on personnel and infrastructure. The key conclusions can be summarized as follows.

First, the resilience of a healthcare system does not depend solely on hospital capacity, but also on the ability of managers and medical staff to rapidly reorganize resources and adapt processes in crisis situations. The rapid expansion of bed capacity, the engagement of additional personnel, and the establishment of new COVID-19 wards demonstrated that the system is capable of adaptation, but only with a high level of coordination and planning.

Second, temporary crisis measures help alleviate immediate pressure but are insufficient to ensure long-term resilience. To prepare the system for future challenges, sustained investments are required in infrastructure, digital tools, interoperable systems, and the capacity of primary healthcare services.

Third, the pandemic experience highlights the importance of an integrated approach, in which crisis management, effective public communication, and international cooperation operate together. Transparent communication with citizens and coordination with global health institutions helped reduce risks and maintain public trust in the system.

The lessons learned from the pandemic clearly demonstrate that system resilience depends on the synergy of resources, expertise, and strategic planning. The application of these insights can significantly enhance the preparedness of the Serbian healthcare system for future crisis situations and contribute to the overall strengthening of public health.

Conflict of interests

The authors declare no conflict of interest.

Reference

Emami, S. G., Lorenzoni, V., & Turchetti, G. (2024). Towards resilient healthcare systems: A framework for crisis management. *International Journal of Environmental Research and Public Health, 21*(3), 286. https://doi.org/10.3390/ijerph21030286

Barasa, E. W., Mbau, R., & Gilson, L. (2018). What is resilience and how can it be nurtured? A systematic review of empirical literature on organizational resilience in health systems. *International Journal of Health Policy and Management, 7*(6), 491–503. https://doi.org/10.15171/ijhpm.2017.105

Kruk, M. E., Myers, M., Varpilah, S. T., & Dahn, B. T. (2015). What is a resilient health system? Lessons from Ebola. *The Lancet, 385*(9980), 1910–1912. https://doi.org/10.1016/S0140-6736(15)60755-3

Health systems resilience: is it time to revisit resilience after COVID 19? (2023). *Social Science & Medicine, 320*, 115716. https://doi.org/10.1016/j.socscimed.2023000722

Strategies to strengthen the resilience of primary health care in the COVID 19 pandemic: a scoping review. (2024). *BMC Health Services Research, 24*, 841. https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-024-0841-2

Kešetović, Ž. (2020). Crisis communication in the COVID 19 pandemic in the Republic of Serbia – Between Hippocrates and Machiavelli. *Kultura Polisa, 17*(2), 151–165.

Hu, C., Yun, K. H., Su, Z., & Xi, C. (2022). Effective crisis management during adversity: Organizing resilience capabilities of firms and sustainable performance during COVID 19. *Sustainability, 14*(20), 13664. https://doi.org/10.3390/su142013664

WHO. (2020). *Health systems* resilience*: COVID-19 policy brief*. World Health Organization. https://www.who.int/publications/i/item/9789240010128

Ministarstvo zdravlja Srbije. (2022). Izveštaj *o stanju u zdravstvenom sistemu tokom pandemije COVID 19*. Beograd: Ministarstvo zdravlja. Dostupno na: https://www.zdravlje.gov.rs/covid19-izvestaji

Ugrinov, D., Nikolić, M., & Markov, M. (2025). Biomedical waste of Serbia through the prism of circular economy**.** *Ekonomija – teorija i praksa, 18*(1), 79–92. https://doi.org/10.5937/etp2501079U

Nikolić, M., Tomašević, V., Ugrinov, D**.**, Pažun, B., & Langović, Z. (2023). Analysis of infectious medical waste management implication on sustainable agriculture during the COVID-19 pandemic: Case study of Šumadija District (Republic of Serbia)**.** *Economics of Agriculture, 70*(4), 1059–1074. https://doi.org/10.59267/ekoPolj23041059N