

# The Role of Health Information Management in Enhancing Health System Response During Crises: Opportunities, Challenges, and Technological Innovations

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## ABSTRACT

Crisis and disaster management in the health sector relies heavily on effective health information systems, especially during crises, epidemics, and disasters. The role of health information technicians and professionals is essential in managing data during such crises, ensuring timely and accurate decisions. This review explores the contributions of health information management to enhancing crisis response by improving patient data management, decision support, and integrating new technologies such as big data and mHealth applications. It also highlights challenges and gaps in health information management systems, including data quality, governance, and interoperability, and proposes strategies to improve the training and preparedness of health information professionals. The integration of digital health records and the effective use of artificial intelligence are presented as key opportunities to enhance the efficiency of health systems in crisis management and improve patient outcomes.

**KEYWORDS:** Crisis Management, Health Information Management, Disaster Response.

## 1. Introduction

Crisis and disaster management is a modern science that is becoming more complex day by day, especially in the health field. Health systems around the world are exposed to many crises and disasters that threaten their ability to provide health care services in critical times [1]. It has become impossible to practice health without using health information systems that organize and arrange data to help make quick and sound decisions, especially during crises and disasters that threaten the health sector [2]. Computerized information systems have also become one of the most important elements of management in technological and scientific development and health research that have produced remarkable successes [3,4]. Technology and

computerized information systems have become an essential means of work and management, especially in the field of health information systems management [5]. This is due to the connection between all technical health care activities and the availability of accurate information about the patient, personal information or information about the diagnosis of his disease or information about the results of medical tests and examinations or information about the treatment and its scheduled program and the extent of the patient's response to this treatment [5,6].

The contribution of information to all the work and activities of health systems depends on the quality of this information. It can be said that information is the basis of any decision taken by every official in his position, and the accuracy and correctness of the decision depends on it because it is the basic linking tool between the parts of the organization [7]. The process of making medical and administrative decisions during crises requires the availability of accurate information about the crisis, then the availability of sufficient knowledge and experience, and finally the availability of problem-solving skills in employing knowledge in selecting information and developing and implementing the appropriate decision [8,9]. Health information systems provide significant support in each of these aspects, which makes their use in general support for the medical decision and confirmation of its success [10]. In addition, health information systems contribute greatly to strategic health planning, setting priorities, clinical diagnosis, disease management, and many others. Therefore, there has been increasing interest in developing and updating health information systems due to their impact on managing crises, disasters, and pandemics, and thus ensuring the provision of health care services [7,8].

This review aims to explore the role of health information technicians and medical support in enhancing the health system response during crises, through health information systems and improving patient data management in emergency situations. In addition, the review aims to suggest strategies for appropriately training technicians to ensure their ability to deal with emergency challenges, with a focus on leveraging modern technology to improve health crisis response.

### Health Information Management

In health systems, health information professionals play an important role in collecting, processing, evaluating and managing data, as well as standardizing data in expanding the principles of assessment and assurance in the field of public health and developing mechanisms for querying and retrieving data that will support many end users, especially in the field of crisis and pandemic response and making decisions quickly, efficiently and effectively [11]. In addition, health information management professionals play an active role in developing and managing several public health databases. Using two main sources of data: data based on health records and data based on the community, which are collected through conducting interviews and periodic examinations [12].

Health information specialists, with the reliable databases they provide, contribute to examining the causes and risk factors that lead to health crises, and contribute to managing these crises by identifying the causes and thus developing plans and making appropriate decisions [13].

Sand J, 2022, indicates gaps in the tasks of health information specialists while confronting the Covid-19 pandemic, which were represented by uncertainty, weak communication between stakeholders, and the lack of rapid decision-making [14]. Massoudi, and Diana (2021) concluded the importance of addressing the ongoing gaps and challenges in health information systems at the local and global levels and developing the health information infrastructure before facing any other crises or pandemics that threaten public health, such as Covid-19 [15].

### Role of Health Information Professionals in Crisis Management

Health information professionals are an essential part of health information management, as they are required to provide services and manage health information with integrity and professional commitment. Health information management professionals work to ensure the accuracy and reliability of data that contribute to enhancing the ability of health systems to face crises and ensure the provision of health care and achieve the best health outcomes [16]. However, Health Information Professionals must respect professional standards and data confidentiality and not violate applicable laws. In addition, health information professionals play a pivotal role in monitoring and continuously developing health information systems and professional updates that enhance the ability to manage crises effectively and efficiently and enhance the quality of health care [17].

### Responsibilities of the Disaster Response Team in managing information

In responding to crises and emergencies, collecting, analyzing and presenting health information is one of the most important steps that contribute to dealing with crises, both internally and externally. The speed of information production and its reliability contributes to increasing the chances of making effective decisions in a timely manner. Moreover, this information will provide important guidance to the community affected by crises and disasters, which contributes to their management [18].

It should also be noted that the effective role played by communication specialists alongside information specialists is their responsibility, as they are responsible for collecting technical reports prepared by experts in various fields and converting them into simplified and concise information. They must also collect data provided by specialists in fields such as epidemiology, crises, mental health, hospital damage assessment, and logistics. This data is considered the raw material for reports used to determine needs and is shared with all stakeholders in the health sector and other stakeholders as needed [19].

Accordingly, the tasks that fall on the shoulders of health information systems specialists during crises and emergencies can be summarized as follows [19,20]:

- Collecting technical information related to disasters from various national health fields and the WHO Regional Disaster Response Team.
- Coordinate the timely and effective dissemination and distribution of information for internal use and for the attention of stakeholders from the national and international disaster response system.

- Promote and facilitate the production of resources (photos, maps, infographics, videos, press releases, etc.) documenting the impact of the emergency and the actions taken by the health sector and WHO.
- Prepare and distribute press releases, manage information requests from the media, and ensure coverage and dissemination of important messages.
- Monitor media coverage of the impact of the emergency, the progress of the health sector response to disasters, and provide recommendations to guide the required action for the population, etc.
- Support the development and implementation of an emergency communication plan that includes the preparation, production, and distribution of health information, education, and advocacy materials to be communicated to the affected population and the public.
- Advise health authorities in the planning, design, and development of effective information management and communication activities during crisis response and the protection of the health of the affected population.

### Summary of Health Information Management Challenges and Gaps

Key gaps and challenges to effective crisis response in relation to health information management include [20]:

- lack of standards for sharing information between providers and public health authorities
- issues with data collection and data quality, particularly in terms of completeness and timeliness
- governance, public policy and regulation.

The latter included lack of policies to facilitate efficient data sharing, contact tracing and data governance, and provider concerns about privacy regulations that led to incomplete data sharing. Governance and public policy barriers related to chronic underfunding of public health infrastructure, and lack of adequate investment in resources, specialized personnel and infrastructure were also identified [21]. There are many interconnected and intertwined legal, ethical, scientific, technical, technological, health equity and privacy dimensions that impact how health information is managed or mismanaged during crises [21,22].

### Opportunities for Health Information and Medical Support Technicians in Crisis Response

As part of the efforts to enhance health information systems technologies, it is necessary to employ modern technology and artificial intelligence that will provide stakeholders and society with accurate information that contributes to enhancing crisis and disaster management [23]. In addition, modern technology such as the mobile health application contributes 75% of the time required to report injuries by transferring mobile device messages to the emergency database and then to medical teams and other rescue teams [24].

In addition, big data contributes to discovering and tracking crises and pandemics such as Covid-19, determining the level of risk, reducing the spread of pandemics, or preventing health crises [25]. Health information systems specialists, using technology, can manage health information during crises through data servers

connected to the local and global health care system, thus quickly taking measures and decisions to confront crises and pandemics.

#### Data for risk assessment and scenario planning

The most important step in disaster preparedness is assessing the potential risks and vulnerabilities to the healthcare system and to society. This data helps healthcare managers identify the most likely and impactful risks, such as crises and epidemics, and their potential consequences for health and infrastructure [26]. Data can also help healthcare managers create realistic and flexible scenarios that simulate different disaster situations and test the system's readiness and resilience [25,26]. By using data to anticipate and prepare for different scenarios, healthcare managers can reduce uncertainty and improve decision-making in the face of a crisis.

During crises, healthcare managers need timely data that reflects the current state and response of the health system. Data can help healthcare managers monitor and track the evolution of crises, the status of health facilities and services, the needs and responses of patients and staff, and the impact and outcomes of interventions. Data can also help healthcare managers identify and address any gaps, challenges, or risks that may arise during the response. By using data to maintain situational awareness and monitor performance, healthcare managers can improve the quality and safety of the system [27].

#### Health Informatics Professional Interests in Big Data Monitoring

Health information management (HIM) professionals play a major role in how patient monitoring data is entered, used, and stored. This data is entered into electronic health records (EHRs). It helps enhance the work of medical teams in treating patients. Therefore, HIMs must be aware of advances in health information technology (HIT) and their impact on specialty areas, including pandemics and crises [28].

The COVID-19 pandemic has signaled advances in the integration of technology into health information systems, which has contributed to improving the delivery of clinical and public health services. Learning how to integrate advances in health information technology with traditional practices to improve quality and promote a culture of excellence in health care is the foundation of HIM work. HIMs can do this by understanding the impact of health information technology policy decisions on the quality of health care and knowing how to apply the best available technological resources in clinical practice [26,29]. It is also important to note that as these applications evolve in the coming years to support quality improvement, it will be essential to understand when and where these technologies can be used to improve overall operations and deliver superior health care.

Health information management is a promising field in crisis management and infectious diseases. Health information managers perform detailed analysis of information contained in health records to facilitate the delivery of health care, enhance patient safety, and support decision-making. They also play a role in ensuring the confidentiality of health information within the patient's medical record and represent advocates for patients' right to private, secure, and confidential information. Health information management specialists are an essential part of

quality programs and provide guidance on documentation, communication, e-health implementation, electronic health record architecture, and related policy issues [30].

### Benefits and Advantages of Digital Health Records

The adoption of digital health records brings many benefits to both patients and healthcare providers. By improving patient care, increasing healthcare efficiency, and enhancing accessibility and coordination, electronic health records play a vital role in modern healthcare systems. Explore several of these benefits below, in addition to those identified by the Office of the National Coordinator for Health Information Technology [31,32].

**Improved Patient Care:** One of the primary benefits of electronic health records is improved patient care. EHRs provide healthcare providers with comprehensive, up-to-date information about patients, helping them make more informed decisions.

**Increased Healthcare Efficiency:** Digital health records dramatically improve healthcare efficiency by streamlining administrative tasks and reducing the burden of paperwork. This automation allows healthcare professionals to focus more on patient care rather than administrative duties.

**Accessibility and Coordination:** Electronic health records improve accessibility and coordination of care by enabling healthcare providers to access patient information from anywhere, at any time. This is especially useful in emergency situations where timely access to medical records can be critical.

## 2. Conclusion:

Health information systems are indispensable in modern healthcare, especially in times of crisis and disaster. Efficient health information management plays a critical role in improving decision-making, enhancing crisis response, and ensuring the continuity of healthcare services. However, significant challenges remain, including issues of data sharing, quality, and governance, which require urgent attention. Training health information technicians in the use of modern technologies, along with developing robust data sharing and international coordination policies, can significantly improve the ability of health systems to respond effectively to emergencies. By harnessing the potential of big data, mobile health technologies, and digital health records, health information management can make a significant contribution to enhancing the resilience of health systems and improving outcomes during health crises.

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