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# The Role of Information Technology in the Health Sector

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## Abstract

Health informatics, a product of the overwhelming increase in technology, is currently considered a highly useful tool for promoting health, preventing disease, and treating the latter when prevention is not possible. It allows for the collection, storage, analysis, and processing of health information, transforming it into essential knowledge for decision-making. The objective of this paper is to briefly but concisely describe relevant aspects of health informatics. To this end, a literature review of global scientific literature was conducted, and the data found were categorized into the following chapters: evolution of the concept of health informatics, role of health informatics, and conclusions. It is concluded that this discipline contributes to improving the quality of life of individuals, modifies healthcare paradigms, and remains in constant evolution and development.

**Kew Words:** informatics, health, computing, information, data

## Introduction

Informatics has entered the healthcare sector as a tool employed at multiple levels, enabling the automatic processing of information by computers based on scientific knowledge. However, health informatics transcends this limit; that is, it is more than the simple automatic management of health information. It transforms the healthcare system and its operational methods, leading to overall improvement by enhancing the information-intensive nature of healthcare, which is necessary specifically for early diagnosis and timely treatment, and more generally for the development and implementation of socio-health policies [1, 2].

The multidisciplinary nature of health informatics is based on the involvement of not only computer science, but also epidemiology, statistics, basic and clinical medical sciences, and the cognitive component, in the effective use of biomedical data and scientific knowledge for solving individual health problems and for making health decisions at the population level. Informatics encompasses not only purely clinical aspects, that is, medical practice, but also the social and environmental aspects in which individuals and society are immersed [1, 3, 4].

Because health informatics is gaining increasing importance in the healthcare field over time, it is crucial to understand it. Therefore, the objective of this paper is to present, concisely yet rigorously, the characteristic and defining data of this field of knowledge through a narrative review of current information available in the global scientific literature.

### Evolution of the Concept of Health Informatics

After several decades and analysis by academics, a set of definitions of "health informatics" has emerged, contributing to the theoretical enrichment of the concept and the establishment of its true value and scope of application in the global healthcare sector. This is summarized in Table 1 below:

| Definition | Author |
|---|---|
| Science of the analysis, documentation, management, control and synthesis of information processes in the health system, especially in the classical environment and medical practice. | Recihertz [5] |
| The study of the nature and principles of information and its application in all aspects of health care. | Shires [6]. |
| The word “impact” is added to the previous concept after the word application. | Protti [7]. |
| The science of medical information that uses systematic analytical tools to develop procedures (algorithms) for management, process control, decision making, and scientific analysis of medical knowledge. | Shortliffe [8]. |

| | |
|---|---|
| The rational study of how we think about patients, and how treatments are defined, selected, and evolved. | Coiera [9]. |
| The science concerned with the systematic processing of data, information, and knowledge in medicine and the health sciences. Its domains cover aspects of computational and informational processes and structures applicable to any clinical or administrative discipline within the health sector, which may or may not be tele-based (remote), and can be practiced by health professionals, academic researchers and educators, scientists, and technologists (properly trained) in operational, commercial, and academic domains. | Roberts (2001) []. |

**Table 1:** Concepts of health informatics. Evolution

**Source:** designed by the author.

After outlining the conceptual evolution of health informatics, it is important to highlight its main differences from medical informatics, as commonly presented in the scientific literature. Medical informatics focuses primarily on diagnosis, treatment, and direct clinical care (the use of technology in individual medical practice), while health informatics focuses mainly on population health, epidemiology, and healthcare administration (the use of technology throughout the entire healthcare ecosystem; it is a transdisciplinary science [1, 11]).

Similarly, medical informatics is limited to reducing medical errors and improving the quality of personalized care, while health informatics aims to optimize workflow and improve healthcare services at a macro level. We do not believe that such differences exist between the two disciplines; it is simply a matter of different scopes (individual and collective). Therefore, the term "health informatics" seems, in our view, to be more appropriate because it is more comprehensive and inclusive [1, 12].

### The Role of Informatics in Health

Health informatics, with its automatic and rational processing of information by computer systems, has revolutionized the healthcare sector, modifying the relationship between patients and healthcare institutions. This has led to a clear shift in the traditional healthcare model, with a particular emphasis on implementing new scientific evidence, given the power of the tools that informatics as a science possesses [1, 13].

The applications of informatics in health are numerous and varied. It can encompass the processing of information from molecular and individual aspects to populations, thanks to the wide range of sophisticated tools available for research, statistics, epidemiology, teaching, healthcare service delivery, and healthcare management or administration [1, 14, 15].

Informatics allows for the storage, analysis, and interpretation of clinical and population health data for the development of proactive knowledge in disease risk prevention and the early implementation of individual and population-based therapeutic measures. Information facilitates the prediction of the success or failure of a given health intervention (translational bioinformatics), as well as the development of recommendations for its improvement, if necessary [1, 16, 17].

Current clinical and population-based decision support systems rely on informatics and artificial intelligence because these are the key elements that enable the integration of scientific knowledge, the disease life cycle, and its epidemiological behavior. These elements are essential for rational decision-making at both the individual and collective levels, and, of course, for the training of healthcare personnel, to deliver healthcare to everyone, in all geographic areas, to promote health, and to prevent disease outbreaks [1, 18].

In summary, health informatics offers improvements in patient care by optimizing the management of health information. This involves changes in healthcare organization, beginning with the necessary training of personnel at all levels of the health system. It also entails improvements in medical records by facilitating the structured uploading of information essential for interpretation. Furthermore, health informatics improves communication among the social actors involved in healthcare [19, 20].

The participation of health informatics is fundamental in the allocation and management of resources for health programs, as the information it generates reveals the areas in the health-disease process that require priority attention. Reviewing clinical activity through health informatics contributes to the revalidation and certification processes for healthcare personnel. Individuals and the communities to which they belong can use these tools to stay informed about the status of their health problems [20, 21].

## Conclusions

Health informatics, a key element in healthcare decision-making, arose from the need to inform and manage data in the healthcare sector. Its theoretical meaning has evolved and been supplemented over time as its use has expanded. Undoubtedly, informatics facilitates the collection, analysis, and interpretation of health data, which are generally voluminous and difficult to manage without these tools. Informatics allows for the conversion of data into valuable knowledge for implementing measures aimed at resolving health problems that affect individuals and communities. With informatics, traditional healthcare paradigms have been modified, and its potential in the sector is limitless. Furthermore, this discipline improves the quality of life of the individuals who make up society.

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