

# Health Informatics: A Challenge for Nurses in Public Health in Rural Mexico

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**Abstract.** Health informatics has significantly advanced global technology, yet challenges persist in public health and rural nursing in Mexico due to social inequalities, limited technology access, and suboptimal infrastructure, compounded by the absence of nurse informaticians as viable career options. Overcoming these barriers necessitates international collaboration, empowering Mexican nurses to contribute to universal health access and advocate for health equity. Interventions must extend beyond nursing curricula to existing workforces, ensuring they can address the needs of vulnerable populations in Mexico. Long-term international support is crucial to bridge these gaps and unleash the full potential of Mexican nurses in influencing global health.

**Keywords.** Nursing Informatics, Public Health, Rural Mexico

## 1. Introduction

Health informatics has played a pivotal role in advancing global technological developments. However, public health and community nursing in rural areas face distinct challenges [1]. Establishing trust between community members and their nurses is paramount for effective management of health issues [2]. Efforts to support care in rural areas have led to the implementation of various technological solutions. Notably, telehealth has emerged as an effective and widely accepted method for delivering quality services to vulnerable populations and remote areas [1], its usage surging exponentially during the global COVID-19 pandemic [3]. Similarly, eHealth strategies exhibit promise in promoting equitable access to primary healthcare in rural and refugee settings [4]. However, the seamless operation of these services a robust technological infrastructure and qualified human resources [2]. The integration of health informatics can serve as a catalyst for advancing nursing across all care contexts [5]. The efficacy of nursing informatics is evident in countries with widespread internet and technology access, where it has proven invaluable in healthcare delivery management [6]. In contrast, less developed countries grapple with suboptimal health information infrastructure and a constrained health system capacity, particularly evident

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in regions like rural Mexico. To address this, embracing advancements in information and new technologies becomes imperative in rural populations, aiming to expand information access and enhance public health outcomes [5].

## 2. The Real Challenge for Nurses in Mexico

In the vast expanse of Mexican territory, numerous indigenous territories and languages coexist, representing approximately 11 linguistic families spread across 68 original indigenous groups. Notably, in Oaxaca, as reported by the National Institute of Indigenous Languages (INALI), seven out of ten individuals in 275 municipalities identify as indigenous. This demographic diversity underscores the complexity of linguistic and cultural landscapes in the region. The digital divide is starkly evident in these vulnerable groups. While technology presents opportunities for enhancing care access, it simultaneously contributes to social exclusion, particularly impacting the most disadvantaged groups with limited access to information or digital knowledge. Internet access remains deficient and prohibitively expensive for many in rural areas [7], with over 20% of the Mexican population still lacking Internet access, while in developed countries, nine out of ten people are Internet users. In rural areas, only 62.3% of people have Internet access, compared to 83.8% in urban areas [8]. Although 93.9 million people in Mexico use a cellphone, there exists a gap in utilizing them for health purposes.

Among the primary barriers to technology adoption are, in addition to a direct Internet connection, those of a human and social nature, including psychological and social factors, as well as governance and economics. Over the past 20 years, there has been an increase in resources and technical capacity, an improvement in digital education, patient empowerment in their treatment, and growing public interest in this area. Specifically, the formation of interdisciplinary teams, academic and professional networks, and tele-nursing are considered successful initiatives [9].

Nevertheless, health interventions employed by nurses in developed countries are not equally accessible to individuals living in rural areas [10]. For example, when nurses utilize health informatics interventions to address non-communicable diseases in rural areas, individuals with lower levels of formal education are more likely to discontinue treatment compared to those with higher education [8, 10].

The significance of providing nurses with education on health informatics has long been acknowledged in México. The specialization in nursing informatics was introduced in North America 1988, where health information technology is commonly used for healthcare delivery and support. In fact, over four million nurses in the USA incorporate some form of health information technology into their daily practice [8]. However, there are still countries in which the digitalization of nursing care is in its infancy and obtaining nursing informatics specialization is not feasible. For example, less than 6% of private hospitals and 3% in public hospitals in Mexico have implemented digital health in their daily care [11]. These figures provide data to inform decision-making regarding public health policies related to the use of technologies in providing care to rural communities.

### **3. Ideal Technologies for those who needed them the most**

According to data from the National Institute of Statistics and Informatics (INEGI), a total of 9,103 people live in extreme poverty in México, a condition considered a serious public health problem [11]. These economic disparities hinder the utilization of health technologies. Additionally, factors contributing to health disparities include the lack of educational informatics programs for nurses, insufficient training for health professionals in using information and communication technologies, and inequitable distribution of global resources, including funding for research and development of new technologies [12].

Developing technologies that can be used by most people, regardless of their race, social status or location, is an integral element in reducing health and technological inequalities. For example, technologies that function using slower Internet or work both online and offline could be used when treating vulnerable groups, especially those living in rural areas. It is also essential to allocate resources to disseminate information about novel technologies through social networks and community leaders [13]. Recognizing the importance of global cooperation is key when implementing health technologies. The WHO emphasizes the significance of developed countries providing support for educational and government policies that promote access to education, facilitating the adoption of health informatics in nursing in less developed countries. Global health diplomacy has emerged as a strategy for addressing the use of global health technologies to assist those who need them the most. However, individual efforts are equally important in mitigating inequalities, and every nurse needs to recognize the importance of working together, regardless of country, region or background.

International cooperation is critical to addressing health challenges in today's increasingly globalized world. This is highlighted in the UN Sustainable Development Goals, with special emphasis on SDG 10 aiming to reduce the gap of inequality within and among the countries [14]. Nurses can make significant contributions to global health at the local, national, and international levels, adopting several strategies, including: a) contributing to primary health care, b) contributing to universal access to health, c) helping to address challenges associated with global nursing shortage and international nurse migration, d) promoting global health equity through leadership and in health policy, and e) participating in international exchanges and collaborations.

### **4. Conclusions**

The shortage of nurses competent in health informatics is a global issue. Educational programs focusing on utilizing technologies to support healthcare, such as eHealth and telehealth theory, along with their practical applications, should be integrated not only into nursing curricula, but also provided to practicing healthcare providers [15] across all categories of nursing [14]. Nurses who possess competencies in using health information records experience fewer healthcare-associated errors, provide safer care, generate reliable data, and practice more efficiently. Significant efforts to address informatics competencies in education have been made globally, exemplified by initiatives such as Technology Informatics Guiding Education Reform (TIGER), aiming to advance nursing education and workforce training in informatics [16]. However, these efforts are not fully utilized on a global scale, as careers in nursing

informatics are absent in many countries. International efforts are needed if we are to change this trajectory towards digitally savvy nursing workforce.

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