
ICU Volume 12 - Issue 4 - Winter 2012/2013 - Cover Story: The Global ICU

Challenges and Changes in Mexico After the Influenza AH1N1 Outbreak

From Standard ICU to Tele Presence with Robotics and Tele-Ultrasound

From March to December 2009, the Influenza AH1N1 outbreak was observed in several cities of Mexico, showing deep flaws in the healthcare system and a general lack of knowledge on how to act and react in case of an epidemic. Because of that, thousands of people got infected and high mortality was observed in intensive care units (ICUs). Since then, the fragile healthcare system, particularly that of intensive care, has been recuperated through a number of programmes and initiatives, which are discussed in this article.

Health System Improvement

Mexico comprises of 32 states and has a total population of 103 million people, two thirds of whom have access to social security. Since the AH1N1 pandemic three years ago, an increase of medical coverage became available. Mexican health authorities have focused on improvement through enhancing a programme called Seguro Popular, which has been functioning since 2003, ensuring medical attention to Mexican citizens, particularly the vulnerable population. Nearly half of the country's population is now enrolled (Vence 2012) reaching almost universal healthcare coverage—many of whom prior to this had no insurance to cover medical expenses.

The programme has increased the number of high care general hospitals and primary care clinics in remote cities and fully equipped general hospitals in small cities, preparing them for taking care of critical patients. It has increased the number of ICU beds; improved several monitoring systems; and in some places introduced diagnostics equipment like portable ultrasound for acute areas. A significant amount of mechanical ventilators have been added to ICUs and some high care hospitals, and high frequency oscillatory ventilators have been included as rescue therapy for acute respiratory distress syndrome. Regional high care hospitals have been created and improved in every state, among them high care hospitals for obstetrical patients and other vulnerable members of the population (pediatrics and neonatology).

An Enhanced ICU System

Since the revelation of flaws in the healthcare system, made evident by the AH1N1 pandemic, the Mexican health system has been preparing the population, providing them with information about how to prevent influenza as well as primary care measures for avoiding transmission of the virus and mortality. In addition, it has supplied statistics, symposiums for gaining knowledge, and improved equipment and supplies. Important campaigns for promoting sanitary measures (such as hand washing, and vaccination for influenza) have been established on every level. The Mexican Critical Care Society has been training intensivists in critical care ultrasound through World Interactive Network Focused on Critical Ultrasound (WINFOCUS) programmes.

With regard to biological threats, it is crucially important to improve efficient medical attention for critically ill patients, protect health workers from highly virulent viruses or bacteria, or both, and decrease mortality by carefully monitoring vulnerable patient populations during outbreaks. These strategies were continued after the outbreak and adapted to the newly established approach of intra hospital epidemiologic vigilance. Since the outbreak of influenza AH1N1, healthcare professionals in Mexico have worked every day to promote the country's specialty as well as to increase the standard of safety and care to international levels. For that reason, the Ministry of Health, together with a multidisciplinary team, is working to map out directives on the minimal equipment and supplies needed for ICUs to guarantee medical attention for severely ill patients under extreme circumstances. A Mexican national norm for ICUs was written via the collaboration of Mexican authorities with the three major critical care societies: the Mexican College of Critical Care Medicine, the Mexican Association of Pediatrics in Intensive Care and the Mexican Association of Pediatrics. The main objective of the Mexican norm for ICUs is to improve ICU system quality all over Mexico.

The programme has played a major role in intra hospital infection and disease control as well as increasing the level of security for patients during hospitalisation. The Mexican Academy of Surgery and other Mexican medical associations, including the Mexican College of Critical Care Medicine, released campaigns promoting sanitary measures and vaccination for influenza. Specific clinical guidelines for the 10 major diseases are distributed to ICUs in both public and private hospitals so as to standardise admission and treatment in ICUs (www.salud.gob.mx).

Robotics in the ICU

Innovative strategies for attending to patients during the pandemic were observed and adopted, including the use of telepresence with robots at suburban hospitals. This came about after the increase of hospitals, clinics and ICU beds created a lack of intensivists for full 24-hour coverage, seven days per week in several units, particularly those located in small cities away from the high care hospitals. Telepresence allows the distance and time for diagnosis to be shortened considerably, further allowing the start of specialised medical attention for a critically ill patient. It also supports the nursing team and other medical fellows. Its use has resolved one of the major problems in the ICU—the lack of intensivists.

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Critically ill patients in towns and cities that are geographically distant from high care hospitals can thus receive specialised medical assistance and attention, meaning that the quality and safety of care during hospitalisation in the ICU is increased.

Originally, this novel programme assisted three suburban hospitals in the State of Mexico, acute care facilities, including emergency rooms, ICUs, and isolated areas for influenza. The programme showed that it is feasible to provide assistance from highly specialised physicians to distant communities during an outbreak of influenza. In addition, it has aided in the acquisition of medical reports, nurse's reports and laboratory results, as well as supervision of ventilator settings and provision of advice regarding guidelines, all of which may result in increased quality and safety of medical care in the ICU.

The Institute of Health of the State of Mexico is leading and coordinating the telepresence experience in Mexico by using robots in acute care facilities. From August 2009 to December 2011, more than 850 interventions took place using the RP-7i® robot. Generally, optimal Internet broadband connection was available, thus providing good video images and clear audio sounds. Malfunctions were mainly due to Internet network failure at the suburban hospitals. Medical staff, patients and their relatives easily accepted the programme and were highly confident about the expertise offered. The success of the programme has led to its broad employment, with four new robots added to the programme covering all regions of the state.

Echocardiography and Ultrasound in ICU

In recent years, the availability of portable and relatively inexpensive ultrasound units has made the technology a viable option for imaging in rural and underdeveloped clinics. Today, the use of Internet protocol transmission has proved its feasibility through the use of broadband with image compression technology. After the images are transmitted, either as asynchronous or synchronous sonograms, a remotely located expert can interpret them.

According to WHO, diagnostic imaging is a requirement for the accurate treatment of at least a quarter of all patients worldwide. Despite that, some areas, though they have access to second-level hospitals, including emergency room services, ICU radiology, CT scanning and ultrasonography, among other facilities, do not often have sufficient access to them for performing a directed, protocolised diagnosis in acute care areas. This can be achieved via the extended Focused Assessment with Sonography for Trauma (FAST) protocol and pulmonary ultrasound.

Tele-Ultrasound

New practice opportunities are emerging for intensivists: echocardiography, telepresence with robots in remote ICUs, and the combination of both strategies. We could say that technology and telecommunications applied in the ICU have created a new paradigm for critical care practice, extending the coverage of specialised critical care to middlelevel hospitals in standard cities. The resulting new era of telemedicine and e-health services has taken advantage of technological advances and has successfully broken geographical and socioeconomic barriers.

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