The First SMART Ward in a Public Hospital in Romania – A Model of Digital Innovation Implemented in Buhuși, Bacău County

Romania marks an important milestone in the digitalization of the public healthcare system with the inauguration of the first SMART ward in a public hospital, implemented within the Internal Medicine Department of the "Prof. Dr. Eduard Apetrei" Hospital in Buhuși, Bacău County. This initiative represents a concrete example of the responsible and efficient use of artificial intelligence–based technologies for the benefit of patients and medical staff.

The implementation was carried out in the context of current concerns regarding the modernization of public healthcare services and alignment with European trends in digital health.

• SMART technology for patient safety and comfort

Within the ward, the Smart Nurse Call Solution has been implemented; a state-of-the-art intelligent system that optimizes patient monitoring and increases the efficiency of medical staff activities. The solution integrates advanced technologies such as FMCW and MIMO radars, beamforming, and micro-Doppler analysis, enabling continuous, non-invasive, and safe monitoring.

Contactless monitoring of heart rate and respiratory rate provides real-time data on patients' health status. In addition, the auxiliary care radar delivers essential information regarding time spent in

bed, patient mobility, and sleep quality, contributing to personalized treatment and optimization of the recovery process.

• Prevention, confidentiality, and rapid intervention

A key element of the SMART solution is the automatic detection of falls and lack of movement, achieved through millimeter-wave radars and artificial intelligence algorithms. The system generates immediate alerts to medical staff, reducing clinical risks and response times in critical situations.

At the same time, the ward uses thermal radars and GDPR-compliant cameras that allow patient monitoring without capturing facial details or intrusive images, ensuring the protection of patients' privacy and dignity. Communication is supported through bidirectional intercom systems, intelligent alarms, and an emergency button accessible to patients.

• Artificial intelligence – from diagnosis to patient relations

The innovation component is further enhanced by the introduction of a rapid AI-based diagnostic system, using an ingestible video capsule equipped with micro-cameras that transmit images for up to 12 hours. AI-assisted analysis provides diagnostic suggestions, supporting medical decision-making and reducing the time required for investigations.

In terms of patient and visitor interaction, the hospital has integrated an AI assistant at the reception desk, capable of providing information, responding to requests, and guiding access flows, thus contributing to a modern, efficient medical environment oriented toward the needs of its beneficiaries.

• An example of good practice in healthcare digitalisation

Through this initiative, the city of Buhuși, Bacău County, becomes a national benchmark in the field of healthcare digitalization and an an internationally recognized example of good practice.

This pilot project demonstrates that artificial intelligence–based solutions can be successfully implemented in public hospitals, with a real impact on the quality of medical services and patient safety.