Welcome everyone. My name is Laura Guadalupe Carbajal Figueroa. I am pleased to present our research poster entitled “Prototype for Triage in a Medical Emergency Room in Hospitals.” Our research addresses a critical challenge in healthcare. In particular, the efficiency and quality of triage in hospital emergency departments in Mexico. This process classifies patients by the severity of their medical condition and prioritizes care for those in a critical state.

In Mexico, emergency services face a growing demand. Studies have shown that an increase in patients attending emergency services undergo triage. However, a considerable percentage are classified as "unqualified emergencies". The efficiency of triage can be affected by several factors, such as a lack of trained personnel, work overload, inadequate technological tools, and variability in the classification criteria. Inadequate triage can lead to negative consequences for patients, including delays in medical care, misclassification, and an increased risk of complications and mortality. This highlights the need to improve the triage process.

Based on these challenges, a portable prototype auxiliary device was specifically designed to support medical personnel in an emergency department. The primary objective of this prototype is to streamline the acquisition of multiple vital signs simultaneously, thereby making the evaluation and classification of patients during triage more efficient.

The device facilitates the quick and reliable acquisition of patient vital signs. It has three key sensors: a KY-039 heart rate detector, a KY-013 NTC thermistor for temperature, and a MAX 30102 pulse oximeter module.

The prototype uses an embedded system, which is based on the ATmega2560 microcontroller. It was selected for its extensive capabilities. It has a wireless data transmission via a Bluetooth communication module, sending data to a computer through serial COM ports. The collected information is stored in a structured database programmed in SQLite3. It has been divided into three parts: (1) "Persona" for personal data (like social security number, name, age, sex, medical history), (2) "Paciente" for patient number and emergency priority, and (3) "Signos_vitales" for the vital signs data collected by the device.

The data is available for real-time visualization through a graphical interface developed in Python. This interface allows medical personnel to monitor parameters like temperature, oxygenation, and pulse rate. It also provides functionalities to select patients by triage priority and to modify or delete records.

Based on the problem statement, a prototype was created and its performance evaluated. Mexican anthropometry was considered. The prototype was constructed from plastic (PVC) and acrylic for their malleability and durability, with Velcro straps for a secure fit.

Tests were conducted on ten subjects. The prototype measurements were compared with those of commercial devices. Convergence was observed in the oxygen sensor measurements (0.2127%). The differences in temperature and heart rate measurements were 2.25% and 17.7%, respectively.

These results demonstrate the prototype's potential for acquiring patient vital signs. The interface was intuitive for real-time monitoring and data management.

In conclusion, this project demonstrates the potential of embedded systems, wireless communication, and software development to address public health challenges. The prototype aims to help medical personnel identify a patient's clinical status within the first 5 minutes of arrival. It is intended to reduce long wait times for non-urgent cases and decrease emergency room saturation. It is a low-cost, portable, easy-to-handle, and comfortable device, making it suitable for implementation even in places with limited resources.

This research provides a solid foundation for future work, such as incorporating the measurement of other vital signs or specializing the device for specific patient groups. We gratefully acknowledge the support from Universidad Nacional Rosario Castellanos and Instituto Politécnico Nacional.

Thank you for your attention…