Objectives

- Integrate **AI algorithms** into hospital data processing through **Machine Learning* (ML)** to **improve procedures**;

- **Prevent cases of infection** among patients by identifying, already in the pre-admission phase, **characteristics** of the surgical patient that can expose him/her to the greatest risk of developing surgical site infections (Guerra R., 2024).

  *ML is **a branch of AI that allows computers to learn from data without being explicitly programmed**

Methodology

The main tool used for this project is **Machine Learning** and the **dataset** provided to the machine is:

1. the historical archive of corporate **hydroalcoholic gel consumption** from 2021 to 2023;
2. documented **antibiotic requests** from each inpatient stay from 2021 to 2023;
3. data on **Surgical Site Infections (SSI)** and their **protocols** from 2013 to 2024;
4. the random sample of **prosthetic patients** sent to the regional portal;
5. the **volumes of prosthetic** and **spinal surgeries** performed from 2021 to 2023 with follow up of any infection found;
6. report on monitored **microorganisms** from 2021 to 2023;
7. **protocol for antibiotic resistance surveillance** of some microorganisms isolated from the analytical laboratory.

Results

✓**Identifying cluster of patients characterized by a set of complex features leads to:**

- **a reduction in post-surgery complications;**

- greater **efficiency** and **effectiveness** in **healthcare assistance and treatment processes;**

- **rapid recovery** and reduction in **Length of Hospital Stay (LOS)**;

- **more suitable pathways and protocols** adopted, avoiding **unnecessary treatments and services**.

Results

✓**ML algorithms support hospital resources by:**

- offering a diagnostic tool that significantly speeds up **diagnosis times** related to the infection risk of treated/admitted patients;

- identifying the patient's association to a **specific cluster**, which can be associated with **customized services** and **procedures** that are less time-consuming and cost-effective;

- gathering significant **economic** and **sustainability benefits** for all parties involved.

Results

✓**The introduction of AI for pre-admission screening to identify surgical site infection risks can significantly reduce the incidence of these infections.**

Studies have shown that implementing AI and ML algorithms in pre-admission processes can lead to **a reduction in SSIs by approximately 30-50%** (De Simone B. et al., 2020).

THANK YOU

Machine Learning