HAITOOL – A Co-Designed Surveillance and Decision-support System to Support Antibiotic Stewardship Programs in Portugal

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BACKGROUND

Healthcare-associated infections (HAIs) are a **major cause of morbidity and mortality** (37,000 deaths/year in Europe) with an **important economic impact** (28.4 to 33.8 billion dollars/year in the USA)[1,2].

Antibiotics are important in HAIs control, however, **inappropriate prescription** leads to **antimicrobial resistance, increasing** even more **morbidity, mortality and costs**[3].

Strategies based on surveillance and monitoring systems well-matched with social, educational and cultural background are the best ones to prevent and control antibiotic resistant HAIs[4].

AIM

To co-design (with healthcare workers) and implement an information system adapted to Portuguese context, that impact on antibiotic resistant HAIs and antibiotic use, promotes antibiotic prescription based on guidelines, and improves antibiotic prescription.

METHODOLOGY

To co-design and develop the information system, the strategy represents in Fig. 1, is used:

- **Multidisciplinary research team:** Clinicians, Microbiologists, Pharmacists, Hospital Management, and Information System;
- **Healthcare workers** of the Portuguese participant hospitals
  - H. de São Francisco Xavier, CHLO
  - H. do Espirito Santo de Évora
  - H. Distrital da Figueira da Foz
- **Design Science Research Methodology**[5];
- **Surveillance and decision-support system** that extracts, processes and aggregates patient, microbiology and pharmacy data.

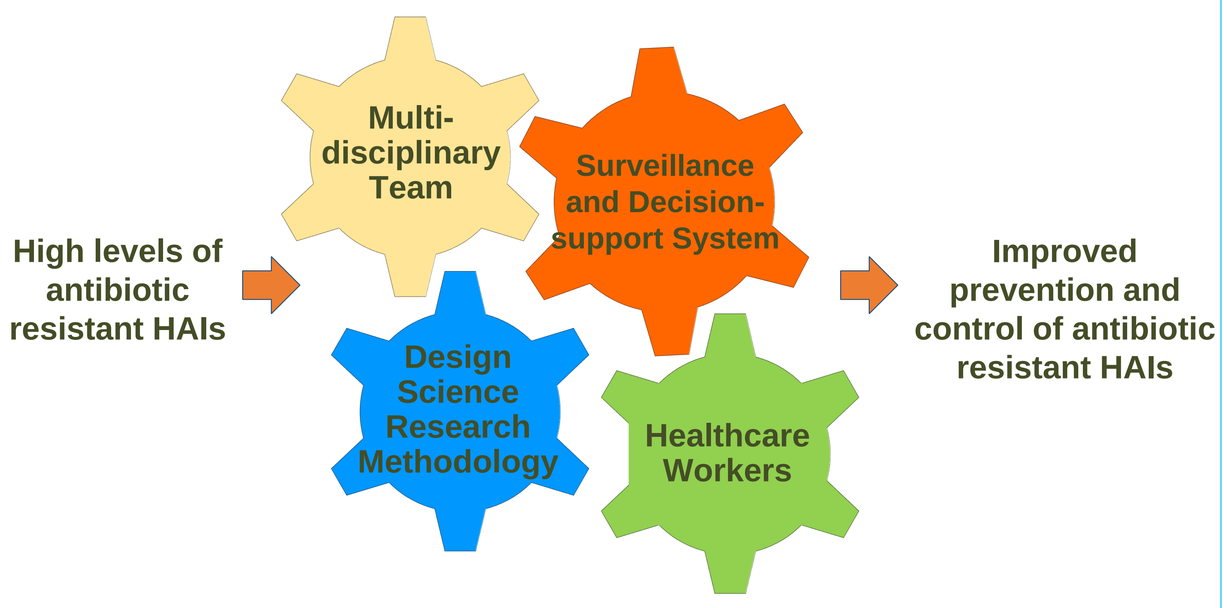

Fig. 1. Strategy schematics representation

RESULTS

We have co-designed and developed **HAITool, a surveillance and decision-support system adapted to Portuguese context.**

HAITool aggregates all clinical data in a single information system and includes integrated views of patient, microbiology and pharmacy data, displayed in innovative graphics:

- **Patient Timeline (Fig. 2) -** an integrated visualization of patient clinical evolution;

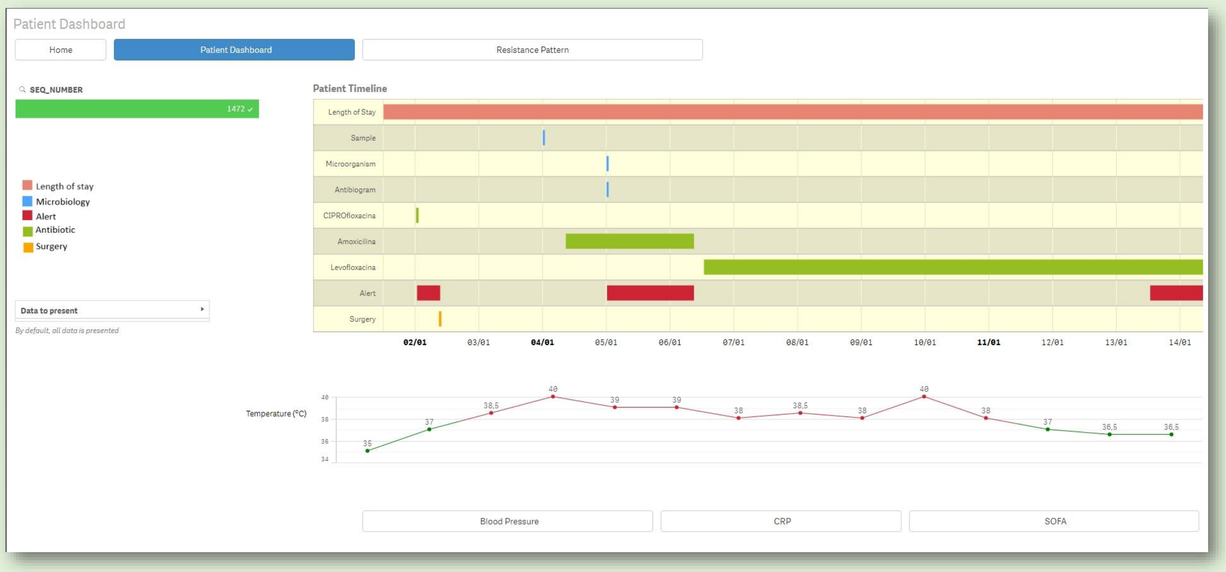

Fig. 2. Patient Timeline visualization

- **Antimicrobial consumption** - visualization of antibiotic consumption trends;
- **Antibiotic resistant infections** – visualization of antibiotic resistant infections distribution;
- **Antimicrobial susceptibility patterns (Fig. 3)** - local antimicrobial susceptibility patterns visualization;

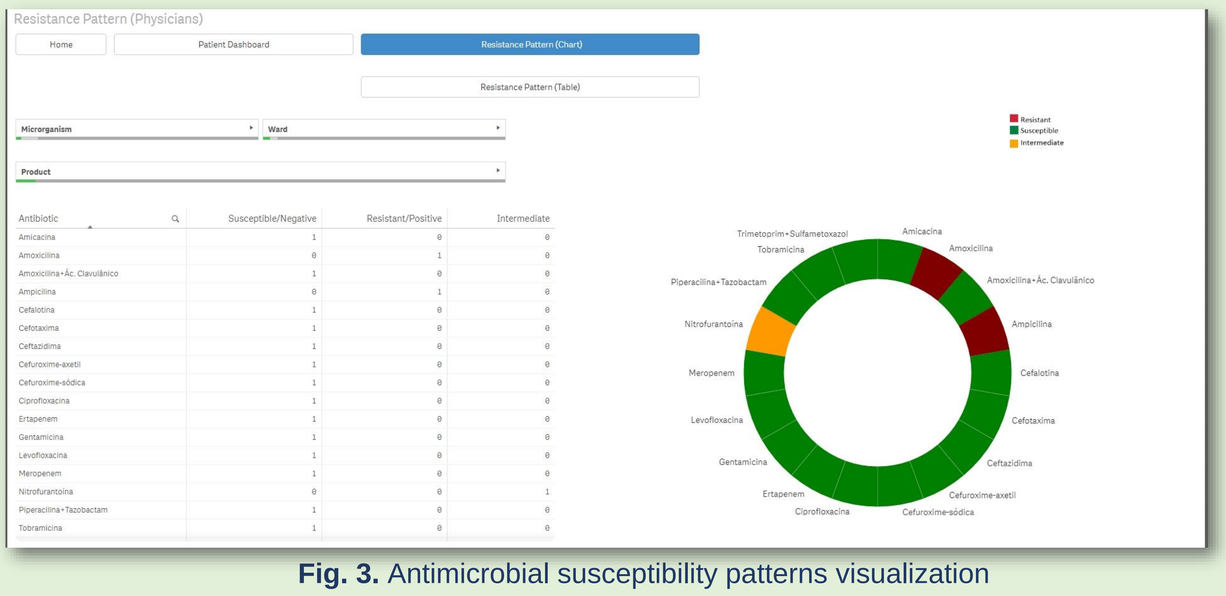

Fig. 3. Antimicrobial susceptibility patterns visualization

- **Alert and decision-support tool for antimicrobial prescription**
  - antimicrobial therapy duration (an algorithm matches antimicrobial prescriptions with Portuguese rules/guidelines);
  - antimicrobial therapy not according with microbiology lab results;
  - antimicrobial prescription without previous microbiological culture;
  - isolation of ESKAPE+C and multi-drug resistant microorganisms.

CONCLUSIONS

HAITool is a surveillance and decision-support system co-designed with healthcare workers and adapted to Portuguese context.

HAITool makes easier the management, prevention and control of antibiotic resistant HAIs and antibiotic use.

HAITool can be an important element of Antibiotic Stewardship Programs.

HAITool is an important step forward for reduction of antibiotic misuse and control and prevention of antibiotic resistant HAIs.

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