



*An intelligent network of Volatile Organic Compounds (VOC) sensors for
Surveillance & Infection Control in healthcare facilities*

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Phase 3 Project Abstract

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Prepared by



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PHASE 3 PROJECT ABSTRACT

Sens4Care is an innovative, ground-breaking “Surveillance & Infection Control System” targeting Multi-drug resistant organisms (MRDOs). Sens4Care (S4C) will be an active medical device, designed as a modular solution including:

1. **A novel sensors network able to detect Volatile Organic Compounds (VOC) of the target microorganisms** without the use of any intrusive or invasive sampling. The VOC sensors screening devices are based on Raman technology and, via machine learning algorithms, they are able to detect Clostridium difficile microorganism, Klebsiella pneumoniae and MRSA. The VOC sensors have also the potential to detect antibiotic resistances in Clostridium difficile (Toxins A and B, and Binary toxin (transferase)), Klebsiella pneumoniae (carbapenem & ESBL production), and additional Gram-negative pathogens and resistances.
2. **A modular ICT (client and server) platform for managing the related alerts system** (allowing the geo-localization, the time-stamping, and the characterisation of each alert) **and supporting the health practitioners** in the management of the sensors-enhanced screening protocols. The ICT platform includes a set of dashboards, data entry and advanced analytic functions, which effectively support the process of surveillance and infection control. The platform can be customized according to the clinical profile and role of the users within the hospital.
3. **A (local) server-based interoperability module** allowing S4C to store data in an easy-to-use format and integrate with the patient Electronic Health Record (EHR) including: the patient history (previous infections, hospitalizations, etc.); the Laboratory Information System; existing electronic hygiene control systems and other indication-relation control systems sending the screening outcomes and alerts on detections.

The proposed S4C solution is **highly innovative** and goes **beyond the state-of-the-art** by applying and validating a cutting-edge technology like Raman spectrometer in the field of VOC detection, not only in lab conditions but also in operational clinical environments. S4C ultimate ambition is to:

- improve the quality of care processes in hospitals;
- reduce both the costs and the operational impact resulting from infections caused by MDROs;
- improve the appropriateness of antimicrobial medicine usage;
- reduce the community and social care impact of MDROs acquired in hospitals.

Phase 3 primary goal is to test and validate the S4C prototype in all procurers’ designated sites by evaluating its diagnostic performance for Clostridium Difficile, Klebsiella and MRSA detected on patients and in the environment.

In Phase 3 we plan to:

- finalize the production of sufficient **prototypes** for testing the solution;
- appoint at least one of **contract research organisations** (CROs) to monitor all hospital sites;
- get an **ethics approval** in all sites;
- **install and test** all S4C prototypes until end of Phase 3, providing a full evaluation.