The Challenger: Superbugs

Multi-Drug Resistant Organisms (MDROs) are an international health issue due to the morbidity, mortality and healthcare costs arising from their proliferation in healthcare environments, leading to an estimate of around 2,699,911 yearly new cases of healthcare-associated infections in the European Union/European Economic Area alone. Early detection is considered one of the foundations for the fight against the MDRO menace, and medical technology has focused on reducing both the “time” and “sampling” factors on the identification of microorganisms in patients, whilst increasing interoperability with electronic notification systems. However, a much older war afflicts the incidence of infectious diseases in a healthcare context: hygiene. A technology that detects the environmental presence of a high-risk microorganism, in real-time, can reduce costs and the subsequent prevalence of infections by allowing for more accurate targeted cleaning procedures and identifying contaminated patient zone surfaces. An added ability to target both patients and healthcare professionals, and the contribution to environmental and hand hygiene, could be a major game-changer for healthcare institutions that adopt such a technology.

Reducing time of detection of specific microorganisms and allowing physicians to be aware of their presence in healthcare environments, including patient and physician-level detection in real-time, is the commitment of the Anti-SUPERBUGS project. To achieve this, companies will be presented with the ASB’s guidelines and requirements to design and manufacture the most suitable technology.

Tools for defining the Challenge’s requirements

Consortium level:
• “Wouldn’t It Be Good If...” focus groups
• Dissemination activities
• State of the Art analysis

Regional level:
• Questionnaires directed at healthcare staff (medical staff, nurses, researchers, laboratory aids) and informatics experts
• Literature review and European and regional data regarding most prominent microorganisms
• Individual interviews with healthcare practitioners
• Meetings with directors from Medical Institutes, Hospitals and Central Laboratories

The challenges found by the Consortium:

What microorganisms should ASB focus on?
• Initial microorganism selection too broad
• Review of our produced needs by the European Commission
• R: Prioritize the minimum MDRO requirements of the technology

How can the ASB’s needs be viable for companies?
• Hierarchy of the regionally important microorganisms
• Grade system based on requirements fulfilled by companies: - Mandatory requirements: passing grade - R: Extra requirements: passing + extra grade
• R: Competitive procurement setting for best technological solution

What type of technology can be expected of the ASB?
• Detection based on volatile organic compounds (VOC)
• Information and Communication Technology interoperable with Hospital Information Systems

Microbiological and technological objectives

General:
• Improve quality of hospital care process by:
  - Detecting Hospital-Acquired Infection (HAI) microorganisms
  - Inform about the spreading of infections within healthcare facilities
  - ICT prototype development
  - Reduce costs of collateral healthcare effects
  - Promote Research & Development activities in advanced ICT
  - User and patient friendly
  - Ecologically sustainable

Technological details:
• Real-time detection in hospital environments, patients, healthcare professionals and fomites
• Non-invasive sampling
• VOC-based detection
• Detection interoperable with the Healthcare Information Systems
• Detection linked with geolocation in healthcare facility
• Automatic/unassisted detection

Targeted microorganisms:
• C. difficile
• Klebsiella pneumoniae (+ Extended-Spectrum Beta-lactamase & Carbapenemase production)
• Acinetobacter baumannii (+ Multi-drug resistance)
• Staphylococcus aureus (Methicillin resistance)

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