ASEPHAI

Developing a pathway to integrate a personalised Far-UVC disinfection system, as a tertiary preventative measure against worsening of patients' health in ICUs

ABSTRACT

Current Infection Prevention & Control strategies rely on sterile barrier precautions, hand-hygiene, wound dressings, and antibiotics. While they reduce risk of Hospital Acquired Infections (HAI), they also burden health workers, contribute to antimicrobial resistance, without fully eliminating HAI, estimated to affect 4M patients (~25,000 EUR/person) in Europe, resulting in 37,000 deaths annually. Aseptuva's smart disinfection technology combines photonics with a digital control module and offers many advantages e.g. personalised treatment, hands-free functionality, and long-term sustained performance. Photonics-based solutions are promising alternatives to traditional Chlorhexidine-laden wound dressings that require frequent replacement and may trigger allergic reactions. In the future, miniaturization will enhance portability – an ideal for candidates for outpatient services and non-hospital settings.

Aseptuva will collaborate with the following partners: Hospital Universitario Costa del Sol, Spain, and INEGI, Portugal, to achieve the following objectives:

1. To assess the device's health economic value against the existing standard-of-care (SoC). The tasks include:
   - Evaluate IPC guidelines and identify end-user and patient challenges.
   - Analyse HAI data from hospitals for preliminary health-economic analysis.
   - Engage with Value Access Committees to develop a value proposition.
   - Build a go-to-market strategy together with procurement and reimbursement division.
   - Identify relevant patient groups for early adoption & maximum impact.
   - Pilot clinical study design in consultation with ethical review board and patient advocates.
2. To integrate Aseptuva's disinfection technology into current IPC protocols
   - Gain usability feedback from doctors and nurses on the design & handling of the device.
   - Identify, Assess, & Mitigate risks associated with the device, with feedback from Section 1.3.
   - Implement human-factor-based changes into the device's design, material, system.
   - Manufacture 2-3 demo-versions of the device, with upgrades as per Section 3.2.
3. To build a digital ecosystem for inputting relevant data into Aseptuva's Far-UVC module.
   - Build an information pipeline to input patient's demographic and medical history data into Aseptuva's digital module.
   - Institute a continuous feedback loop between microbiological test data and the digital module.
4. To develop a dynamic data-driven approach for delivering the minimum therapeutic dose.
   - Select an appropriate deep learning model validated with real data, for predicting Far-UVC dosage parameters.
   - Develop a graphical user interface integrating software and hardware controls for health workers.

Catheter care is integral to IPC strategies aimed at preventing hospital acquired infections (HAI), especially in critically ill patients who fall in the high-risk category. Aseptuva's automated technology targets germicidal Far-UVC at infection-prone areas around catheter-entry sites, which are currently disinfected manually every few days. In addition to effective disinfection, the treatment can be personalised for patients based on their demographic information and medical history data, such as skin-sensitivity or presence of any allergies. The Far-UVC dosage parameters can be fine-tuned to target specific pathogens, which are normally detected via routine microbiological analysis of swab tests or blood samples. This way, combining photonics technologies with a data-driven approach for personalised disinfection aims to elevate IPC strategies and reduce burden on health workers by eliminating the need for manual wound treatment.

KEYWORDS

- Infection prevention
- HAI
- Health economics
- PPI
- Far-UVC
- AMR

DURATION

18 months

PARTNERS

	Name and Surname of the Principal investigator	**Institution, Department, full Affiliations**	**City, Country**
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