

# ULRR

## Anti-microbial coating innovations to prevent healthcare-associated infection

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## Commentary

### Antimicrobial coating innovations to prevent healthcare-associated infection



Worldwide, millions of patients are affected annually by healthcare-associated infection (HCAI), impacting up to 80,000 patients in European hospitals on any given day.<sup>1</sup> This represents not only a public health risk, but also an economic burden.

Through its Cooperation in Science and Technology programme (COST), the European Commission has recently funded a four-year initiative to establish a network of stakeholders involved in development, regulation, and use of novel antimicrobial coatings for prevention of HCAI. The network (its acronym is AMiCI) currently comprises participants of more than 60 universities, knowledge institutes, and companies across 29 European countries and, to date, represents the most comprehensive grouping to target use of these emergent technologies in healthcare settings. By accessing the network's website (<http://www.amici-consortium.eu>), there is an ongoing opportunity for those interested to engage with the programme.

Antimicrobial coatings hold promise based, in essence, on the application of materials and chemicals with persistent bactericidal or bacteriostatic properties on to surfaces in healthcare environments.<sup>2,3</sup> However, an excellent systematic review of the topic was published recently in this journal in which the authors reported a scarcity of studies assessing non-copper antimicrobial surfaces in the clinical environment, and a complete lack of published data regarding the successful implementation of materials other than copper on clinically significant outcomes (including HCAI).<sup>4</sup>

The focus of considerable commercial investment and academic research energies, such antimicrobial coating-based approaches are widely believed to have potential to reduce microbial numbers on surfaces in clinical settings.<sup>5</sup> This belief is despite limited definitive evidence for their efficacy in clinical settings; rather, it is based largely on positive findings from studies involving, for example, silver or gold ions, titanium or organosilane, under laboratory conditions.<sup>6</sup> However, there are reports of successful delay and/or prevention of recontamination following conventional cleaning and disinfection by problematic micro-organisms, including methicillin-resistant *Staphylococcus aureus* and vancomycin-resistant enterococci.<sup>7–10</sup>

The European Commission funding of this network reflects the potential for antimicrobial innovations to positively impact

on the four million patients reported by the European Centre for Disease Prevention and Control to be affected by HCAI annually. More specifically, the network participants will address knowledge gaps that persist due to lack of:

- systematic, international co-ordinated research on the effects (both positive and negative) of antimicrobial coatings in healthcare or other sectors;
- know-how regarding the availability and use of different mechanisms of action of (nano)-coatings and the desired use in different applications, procedures, and products;
- information relating to the possible adverse effects of such materials, e.g. the potential induction of new resistance mechanisms in bacteria or emission of toxic agents into the environment;
- standard performance assessments for antimicrobial coatings, applicable in laboratory settings and, thereby, complicating direct comparison of different coatings from different producers;
- standard performance assessments to determine functionality of coatings in normal and extreme test conditions, field tests, or benchmark methods to assess the efficacy in field conditions; and
- communication or publication of best practices by hospitals, other clinical facilities, regulators or product suppliers.

The project recognizes, and aims to address, the disparate perspectives of inventors and entrepreneurs; academic researchers; manufacturers; distributors; commercial, clinical, biocide, and consumer affairs regulators; medicines agencies; clinical microbiologists; attending physicians; healthcare facility managers and procurement officers; environmental monitoring specialists and environmental protection agencies; hygiene companies; and, of course, patients and their carers. The AMiCI consortium is addressing this challenging diversity of viewpoints through a series of consultation events and targeted transfer of personnel between industry and academic groups, strategically chosen to deal with the most pressing topics arising from those consultations, and the development of coatings capable of demonstrably reducing HCAI.

#### Conflict of interest statement

None declared.

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