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Increasing patient safety through a new phase 3 simulated-use test for chemical surface disinfectants

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INTRODUCTION & AIM

Insufficient disinfection of frequently touched surfaces in healthcare facilities is an important risk factor in the spreading of nosocomial pathogens. For a disinfectant to be registered as a biocidal product, it must pass several phase 1 and 2 efficacy tests, which are very standardized but do not reflect the reality during the actual use of the product.
To be able to test disinfectants under real life conditions in the lab, the first phase 3 step 1 test was developed in this study.

MATERIAL & METHODS

The test principal of the simulated-use test is based on the EN 16615. The practical relevance of this test method was improved by implementing a new contamination as well as a new wiping procedure:

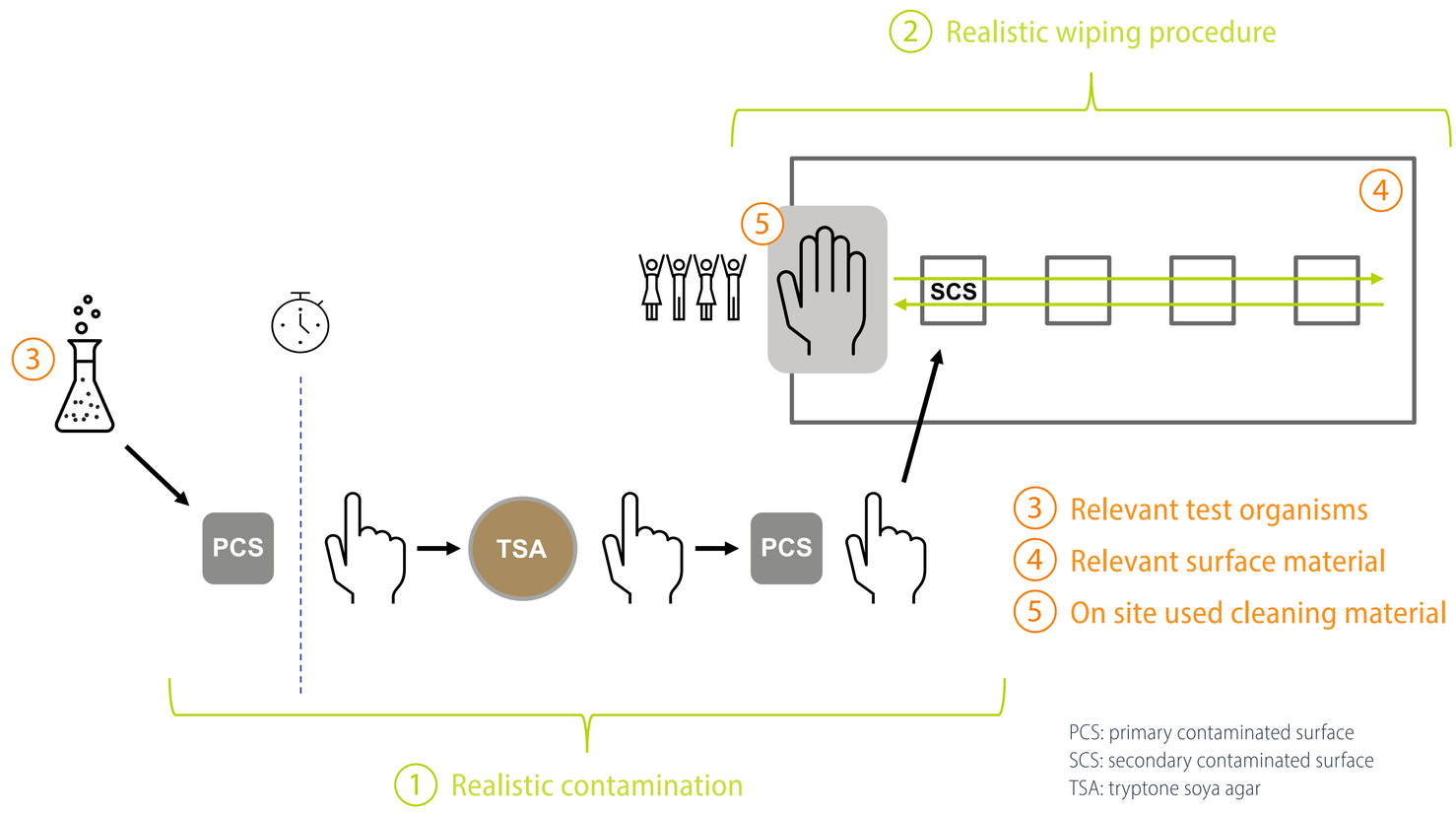
1. In the simulated-use test the test surfaces are contaminated via the newly developed **touch transfer** method (Knobloch et al., 2017) and are then
2. **wiped by four test persons** in a **non-standardized** way so that the individual variance of the wiping technique is represented.

In addition to that, the simulation of a hospital environment was achieved by using the following material from our project partner UKE in the simulated-use tests:

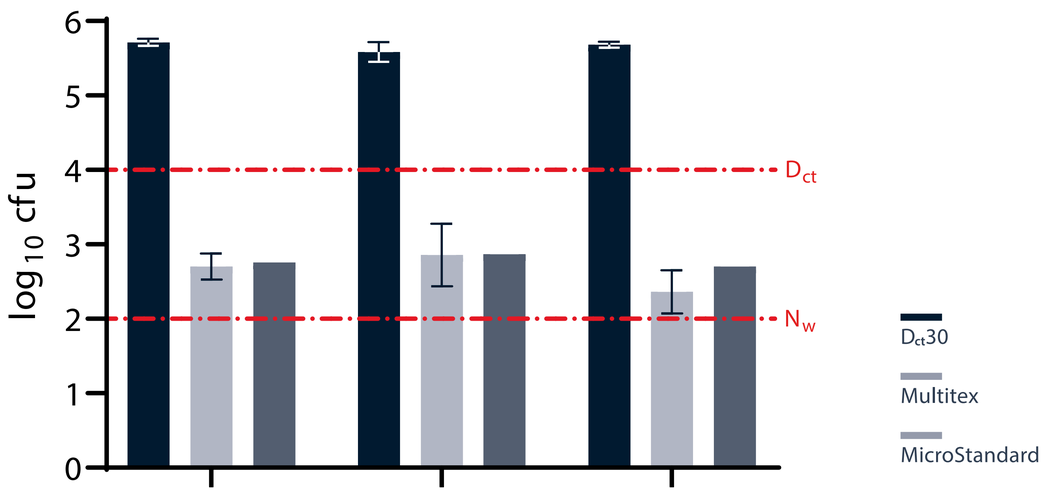
3. **clinical isolates** from the immediate patient environment as test organisms, possibly tested as a mixed contamination: *Staphylococcus aureus* MRSA, *Enterococcus faecium* VRE and *Acinetobacter baumannii*
4. common and **relevant surface materials** as test surfaces: ABS*, melamine** and stainless steel
5. **wiping materials and disinfectants used by the cleaning staff:** Multitex® Safe & Clean Wipes DR, MicroStandard microfiber cloth and disinfectants A (Quaternary ammonium compound QAC + amine (concentrate)) and B (Alcohol + amine (RTU))

* acrylonitrile butadiene styrene copolymer
** solid plastic panels coated with melamine resin

RESULTS



PCS: primary contaminated surface
SCS: secondary contaminated surface
TSA: tryptone soya agar



Validation of different surface materials and wipes: Shown is the recovery of *S. aureus* after drying controls ($D_{ct}30$) and water controls on ABS, melamine and stainless-steel test surfaces. The water controls were carried out using Multitex and Microstandard wipes.

The recovery of *S. aureus* after the drying (D_{ct}) and water (N_w) controls was sufficiently high ($D_{ct} > 4$ log, $N_w > 2$ log). All surface and wiping materials were therefore successfully validated and could be used in a simulated-use test.

CONCLUSIONS

Depending on the type of healthcare facility in which a disinfectant is meant to be used in, the materials present in that environment must be validated and then used in the simulated-use test. Once a simulated-use test is established, it is the best laboratory test to ensure patient safety by accurately measuring the efficacy of a disinfectant through the direct simulation of its practical use.