

“First-person view” of pathogen transmission and hand hygiene – use of a new head-mounted video capture and coding tool

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At a glance

- Every 4.2 seconds a hand-to-surface exposure (HSE) takes place during the care and treatment of patients.
- With each contact, potentially harmful microorganisms can be transferred to the patient and his/her environment.
- Every 2 minutes the risk of infection arises if critical areas are touched.
- Nurses and other healthcare workers are often unaware of the frequency of patient-surface contacts.

Background

The hands of health care personnel are the most significant carrier of pathogens in the healthcare system, but detailed contact sequences have not yet been sufficiently researched. The authors have developed and applied a new method for systematic documentation of hand-to-surface exposures (HSE) in order to gain a better understanding of microbial transmission by hands in the real working day of an intensive care unit.

Significance for work in a patient-oriented environment

The frequency of hand-to-surface contacts underlines the central role of hands in the spread of potential pathogens. However, hand hygiene is inadequately performed despite potential colonisation and infection events. Awareness of this can help to develop more efficient prevention measures.

Methods

The 10 study participants wore a head-mounted camera for the observation period, the shooting angle of which was adjusted so that their hands remained in the field of view. The observational study was conducted in three intensive care units for trauma, cardiac and visceral surgery. All hand-to-surface contacts were coded in the respective video sequences with

commercial software with regard to their number, duration and type. In addition, it was recorded which hand (right/left) was involved, whether the hands were gloved, and which areas were touched. Based on the WHO “Five Moments for Hand Hygiene”, the authors identified hand-surface contact sequences of particular relevance for infection risks in patients.

Results

The 10 videos were 296.5 minutes long and included the working time of 8 nurses and 2 doctors. In total, an average of 14.2 hand-to-surface contacts per minute were recorded, which means one hand-surface contact every 4.2 seconds. Of the 4,222 hand-surface contacts, 291 colonization events - sequences of actions in which an area was first touched “outside the patient zone” and then an area “inside the patient zone” - (6.9%) and 217 infection events - sequences in which initially any area was touched followed by a touch of a “critical” point - (5.1%) were counted. Interestingly, 61% of colonisation and 2.3% of infection events occurred after contact with the hospital staff member’s own body (clothing, hair, skin). Hand hygiene was performed before 14 of the 291 colonization events and before 3 of the 217 infection events. This corresponds to a rate of only 5 % and 1 % respectively. On average, the hand disinfectants took 13 ± 9 s to rub in.