



EVIDENCE: HAND HYGIENE COMPLIANCE MEASUREMENT SYSTEM



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FLASHLIGHT ON LITERATURE

Light-guided nudging and data-driven performance feedback improve hand hygiene compliance among nurses and doctors

Authors: Anne-Mette Iversen, Marie Stangerup, Michelle From-Hansen, Rosa Hansen, Louise P. Sode, Krassimir Kostadinov, Marco B. Hansen, Henrik Calum, Svend Ellermann-Eriksen, Jenny D. Knudsen.

Publication: American Journal of Infection Control. 2021 Jun;49(6):733-739.

This study investigated the effect of light-guided nudging and data-driven performance feedback (multimodal strategy) on healthcare workers' hand hygiene compliance.

WHAT IS THE BACKGROUND

- Adequate hand hygiene of healthcare workers can prevent an estimated 15%-30% of hospital-acquired infections but compliance remains suboptimal.
- Evidence-based practices to increase hand hygiene compliance among healthcare workers are warranted.

WHAT IS THE STUDY DESIGN?

- A prospective, observational, quality improvement study between Feb 2019 and Dec 2020 in a surgical department (29 beds).
- Light-guided nudging: sani nudge sensors, located on dispensers, displayed a nudge (green smiley) as a reward when a sanitization was performed.
- Weekly performance data on group level were sent to the infection control nurses and ward managers, shown at staff meetings and put up on bulletin boards. Individual data was sent directly to the healthcare workers via email.

RESULTS

- The doctors significantly increased their hand hygiene compliance in patient rooms (16% vs 42%, $P<.0001$) and working rooms (24% vs 78%, $P=.0006$) when using the multimodal strategy.
- The nurses also increased their hand hygiene compliance significantly from baseline in both patient rooms (27% vs 43%, $P=.0005$) and working rooms (39% vs 64%, $P<.0001$).
- The nurses, receiving individual performance feedback, improved even further (patient rooms: 43% vs 55%, $P<.0001$ and working rooms: 64% vs 80%, $P<.0001$).

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

- Hand hygiene compliance of doctors and nurses can be significantly improved with light-guided nudging and data-driven performance feedback in combination (multimodal strategy) using an automated hand hygiene system.
- Provides the hospitals with an effective tool to improve hand hygiene compliance with limited efforts.

FLASHLIGHT ON LITERATURE

Effectiveness of an electronic hand hygiene monitoring system to increase compliance and reduce healthcare-associated infections

Authors: Annie Rosenfeldt Knudsen, Susanne Kolle, Marco Bo Hansen, Jens Kjølseth Møller.

Publication: Journal of Hospital Infection. 2021 May 28;S0195-6701(21)00214-0. doi:10.1016/j.jhin.2021.05.011.

This study tested the effect of the sani nudge solution on the hand hygiene compliance of healthcare workers and hospital-acquired bloodstream infections.

WHAT IS THE BACKGROUND

- Hand hygiene compliance (HHC) among healthcare workers is a key measure in infection prevention and control but remains suboptimal, also during the COVID-19 pandemic.
- Only a few studies have investigated the effect of an electronic hand hygiene system on hospital-acquired bloodstream infections (HA-BSI) even though they are common and have serious consequences.

WHAT IS THE STUDY DESIGN?

- An investigator-initiated quality improvement project designed as a prospective interventional trial in a Danish inpatient nephrology department with 800-900 admissions per year.
- Alcohol based hand rubs were measured with the sani nudge system
- The healthcare workers received group and individual feedback based on actionable insights from the electronic hand hygiene system.

RESULTS

- HHC in relation to patient contact more than doubled during the study period for the doctors (16% vs 37%, $p < 0.0001$) and the nurses (22% vs 56%, $p < 0.0001$).
- The incidence of the HA-BSI was significantly reduced from 19.1 cases per 10,000 patient days to 0 cases ($p = 0.003$) during the intervention period with improved HHC.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

- The sani nudge solution is successful in improving the HHC of the doctors and nurses.
- Reduction in HA-BSI is significant and similar impact could potentially be seen with other types of healthcare-associated infections (HCAIs).
- Highlights the value of investment in electronic hand hygiene systems that can improve HHC and reduce HCAIs, and is therefore relevant to other hospitals.

FLASHLIGHT ON LITERATURE

Clinical experiences with a new system for automated hand hygiene monitoring: A prospective observational study

Authors: Anne-Mette Iversen, Christiane P. Kavalaris, Rosa Hansen, Marco B. Hansen, Krassimir Kostadinov, Jette Holt, Jenny D. Knudsen, Jens K. Møller, Svend Ellermann-Eriksen.

Publication: American Journal of Infection Control. 2020;48(5):527-533.

This first clinical study to evaluate the sani nudge system. The authors aimed at assessing the hand hygiene compliance of healthcare workers in different rooms and settings.

WHAT IS THE BACKGROUND

- Direct observation of hand hygiene by a trained observer is the most used method but captures only a small fraction of the total hand hygiene events while also being time-consuming and subject to bias.
- Electronic hand hygiene systems can overcome the limitations associated with direct observations.

WHAT IS THE STUDY DESIGN?

- A prospective, observational study conducted at two Danish university hospitals employing the sani nudge system on alcohol-gel dispensers, healthcare worker badges and patient beds, measuring hand hygiene opportunities and events (sanitizations).

RESULTS

- The lowest hand hygiene compliance was found in patient rooms (hospital A: 45%; hospital B: 29%) and the highest in staff toilets (hospital A: 72%; hospital B: 91%) and sluice rooms (hospital A: 84%; hospital B: 66%).
- Healthcare workers more often sanitized hands after rather than before patient contact (hospital A: mean HHC of 56% vs 46%; hospital B: mean HHC of 37% vs 32%).
- The hand hygiene levels did not vary between patient rooms with single, twin, or multiple beds.
- Hand hygiene levels were consistent over time on an individual level, meaning that high-performance healthcare workers consistently performed well, whereas low-performance healthcare workers consistently performed poorly.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

- The sani nudge system proved to be a useful alternative to direct observation, supplying detailed information about hand hygiene compliance on individual, group, and ward levels.
- Gives the hospitals an essential tool in understanding the areas where and when poor compliance behavior mostly occurs.
- Information from the system can be used to tailor training and feedback to achieve high impact.

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FLASHLIGHT ON LITERATURE

Hand hygiene compliance of healthcare workers before and during the COVID-19 pandemic: A long-term follow-up study

Authors: Marie Stangerup, Marco B. Hansen, Rosa Hansen, Louise P. Sode, Bjørn Hesselbo, Krassimir Kostadinov, Bente S. Olesen, Henrik Calum.

Publication: American Journal of Infection Control. 2021;S0196-6553(21)00430-2.

This study investigated the change in hand hygiene compliance of healthcare workers once data-driven feedback stopped and how the COVID-19 pandemic influenced hand hygiene behavior.

WHAT IS THE BACKGROUND

- To ensure high standards of patient and healthcare worker safety, it is important to know when the effect of an intervention wears off so healthcare organizations can initiate new approaches on time.
- Monitoring and feedback are key elements of the World Health Organization's multimodal strategy to improve hand hygiene compliance. Yet, current practices are manual, time-consuming, and associated with bias, making it difficult to assess when healthcare organizations should reinforce current practices or launch new initiatives.

WHAT IS THE STUDY DESIGN?

- A prospective, observational, extension trial in an in-patient surgical department between Jan 2019 and Dec 2020.
- Doctors (n=19) and nurses (n=53) were included, and their hand hygiene compliance was measured using the sani nudge system.
- Changes in hand hygiene compliance were compared during three phases: (1) Intervention (bi-weekly data presentation meetings), (2) Pre-pandemic follow-up and (3) Follow-up during COVID-19.

RESULTS

- Comparison analyses revealed that the hand hygiene compliance was significantly lower in the pre-pandemic follow-up period (46% vs 58%, $P<.0001$) and in the follow-up period during COVID-19 (34% vs 58%, $P<.0001$) compared with the intervention period (phase 1).

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

- Despite the COVID-19 pandemic, the hand hygiene compliance of the healthcare workers significantly decreased over time once the data presentation meetings from management stopped.
- Healthcare workers fall back into old hand hygiene routines once improvement initiatives are stopped.
- Healthcare organizations should continuously measure hand hygiene to initiate timely interventions that prevent compliance from dropping and compromising patient safety.

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FLASHLIGHT ON LITERATURE

Assessing the clinical accuracy of a hand hygiene system: Learnings from a validation study

Authors: Marco Bo Hansen, Nina Wismath, Evelyn Fritz, Alexandra Heiningner.

Publication: American Journal of Infection Control. 2021;49(7):963-965.

This study assessed the accuracy of the sani nudge system using a clinically relevant validation method.

WHAT IS THE BACKGROUND

- Healthcare organizations face increasing pressure from accreditation bodies to measure and document hand hygiene compliance as part of quality assurance, but it is a manual and time-consuming process.
- Automation of the measurements using the sani nudge system can reduce some of the increased workloads that infection prevention teams experience because of the coronavirus pandemic.

WHAT IS THE STUDY DESIGN?

- A validation study in an internal medicine department at the University Hospital Mannheim, Germany.
- To assess the accuracy of an electronic hand hygiene system (sani nudge), two nurses performed clinical standard tasks while being observed by two infection preventionists.
- Data from the direct observations were compared with data obtained from the sani nudge system using an independent-event approach.

RESULTS

- **True positive events:** All hand sanitizations (n=26) and all patient contacts (n=18) were accurately attributed by the system. The infection preventionists observed 10 missed hand events, and the same 10 (100%) events were properly detected by the system.
- **True-negative events:** The nurses walked into the patient room 4 times to give a message to the patient without touching the patient or surroundings which was correctly measured by the system.
- No false-positive or false-negative events were identified.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

- In this validation study, the accuracy rate was 100% between the events obtained with the direct observations and the sani nudge system.
- A high accuracy rate is also expected in large-scale settings with more healthcare workers included.
- Highlights the value of the sani nudge system as an accurate and reliable system to measure hand hygiene opportunities and events in relation to patient contact.



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ECOLAB'S APPROACH AIMS TO...

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REDUCE THE BURDEN OF HCAs

* Guest et al. Modelling the costs and consequences of reducing healthcare-associated infections by improving hand hygiene in an average hospital in England. BMJ Open 2019; 9:e029971. oi:10.1136/bmjopen-2019-029971

ABOUT ECOLAB HEALTHCARE

Ecolab Healthcare is driven to help health systems and hospitals realise clinical, operational and financial value through repeatable and measurable workflows. Our standardised processes and digital dashboards provide actionable insights and opportunities for corrective actions that help reduce the costs and inefficiencies of infections, while improving margins and keeping patients and staff safe.

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