

The association between shift patterns and the quality of hand antisepsis in a neonatal intensive care unit: an observational study

Judith Rittenschober-Böhm, M.D., PhD

Department of Pediatrics and Adolescent Medicine

Div. of Neonatology, Pediatric Intensive Care and Neuropediatrics

Comprehensive Center for Pediatrics, Medical University Vienna

Assessing hand hygiene compliance among healthcare workers in six Intensive Care Units

M. MUSU¹, A. LAI², N.M. MEREU², M. GALLETTA², M. CAMPAGNA², M. TIDORE³, M.F. PIAZZA⁴, L. SPADA²,
M.V. MASSIDDA¹, S. COLOMBO⁵, P. MURA¹, R.C. COPPOLA²

¹ Anesthesia and Intensive Care Department, Pain Therapy Service, University of Cagliari, Italy; ² Department of Medical Sciences and Public Health, University of Cagliari, Italy; ³ Hygiene, Health and Social Policies Department, Autonomous Region of Sardinia, Cagliari, Italy; ⁴ Department of Health Sciences, University of Genoa, Italy; ⁵ Department of Anesthesia and Intensive Care, IRCCS San Raffaele Scientific Institute, Milan, Italy

Keywords

Intensive care unit • Hand hygiene compliance • Hand washing technique • Healthcare workers

Summary

Introduction. Healthcare associated infections (HAIs) are a cause of high morbidity, disability and reduced quality of life, as well as mortality and rising costs for health systems. Preventing the HAI risk by planning and implementing effective preventive strategies is important to safeguard patient health.

Methods. The study aimed to evaluate the presence of procedures and protocols for infection control, to assess the adherence to the different aspects of hand hygiene (HH) and hand washing technique by healthcare workers in six ICUs. A perspective observational study was conducted in six ICUs. In each ICU, the adherence by health care workers to both hand hygiene practices and standard precautions was assessed, as well as the presence of procedures and written protocols.

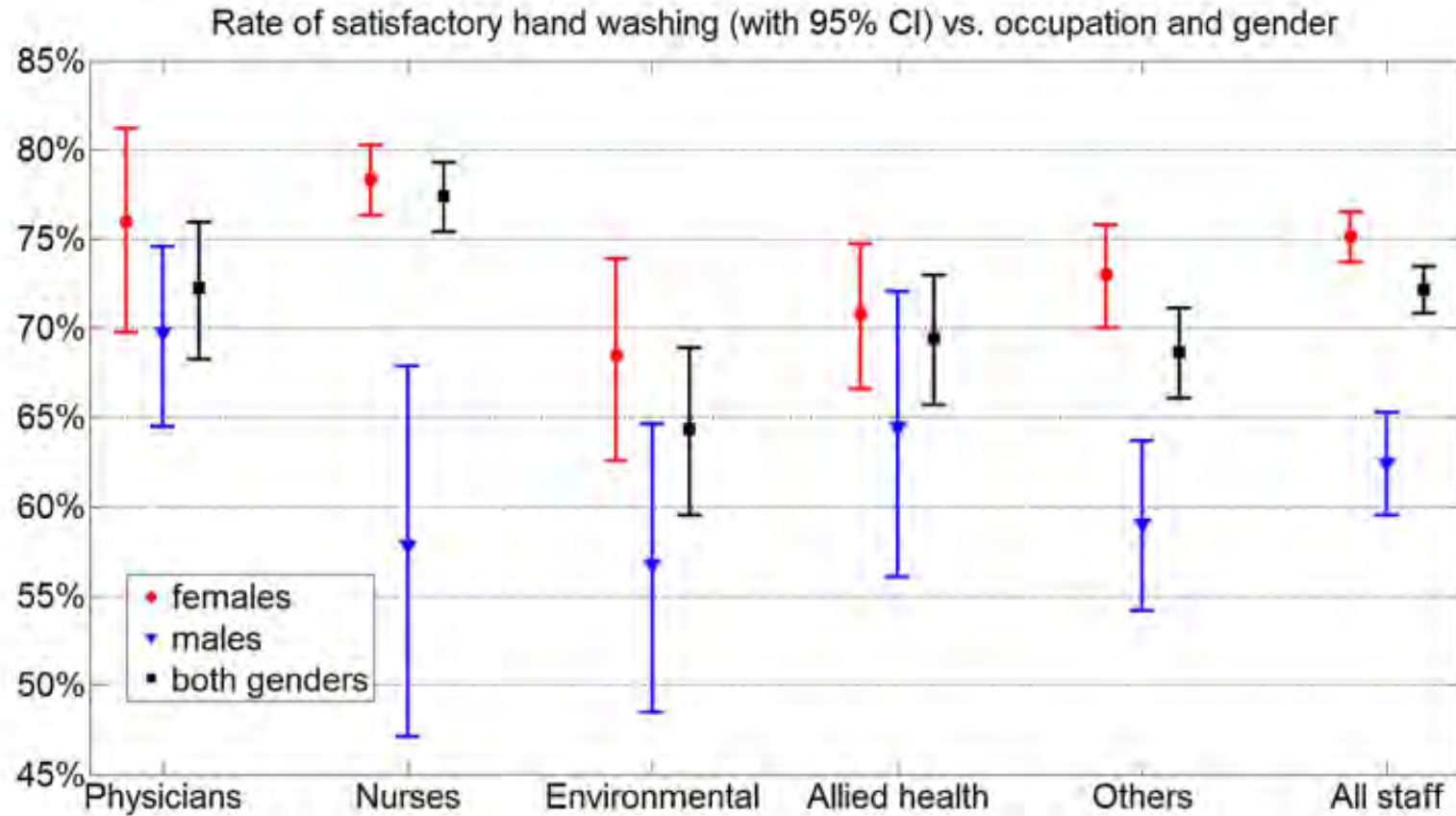
Results. The findings showed that in all the involved ICUs, 73 of 142 required protocols and procedures were available. Specifically, 59 of 79 were available for general measure of risk control,

12 of 15 for hand hygiene, and 24 of 48 for standard precautions and isolation measures. Also, the results showed highly variable levels of adherence to the best hygiene practices in all the ICUs involved in the study, with compliance rates ranging from 3% to 100%, and 73 of 142 required protocols were available at the study time.

Conclusions. Overall, the involved ICUs showed low levels of adherence to best hygiene practices. This suggests the need to implement immediate strategies for infection control in the ICUs. A multidisciplinary intervention could be effective in preventing and control the HAI risk. score was reached only by the third year students with regard to the proper HH. The level of knowledge about HAI was inadequate.

A periodically check of nursing students' knowledge would be advisable in order to fill any gaps, improve training, reduce HAI and increase prevention measures compliance.

Quality of Hand Hygiene



Szilágyi et al. *BMC Infectious Diseases* 2013, **13**:249
<http://www.biomedcentral.com/1471-2334/13/249>



The impact of an education program on hand hygiene compliance and nosocomial infection incidence in an urban Neonatal Intensive Care Unit: An intervention study with before and after comparison

Onno K. Helder^{a,*}, Johannes Brug^b, Caspar W.N. Looman^c, Johannes B. van Goudoever^a, René F. Kornelisse^a

Results: During 1201 observations hand hygiene compliance before patient contact increased from 65% to 88% ($p < 0.001$). Median (interquartile range) drying time increased from 4 s (4–10) to 10 s (7–14) ($p < 0.001$).

^a Department of Pediatrics, Division

^b EMGO Institute, VU University Me

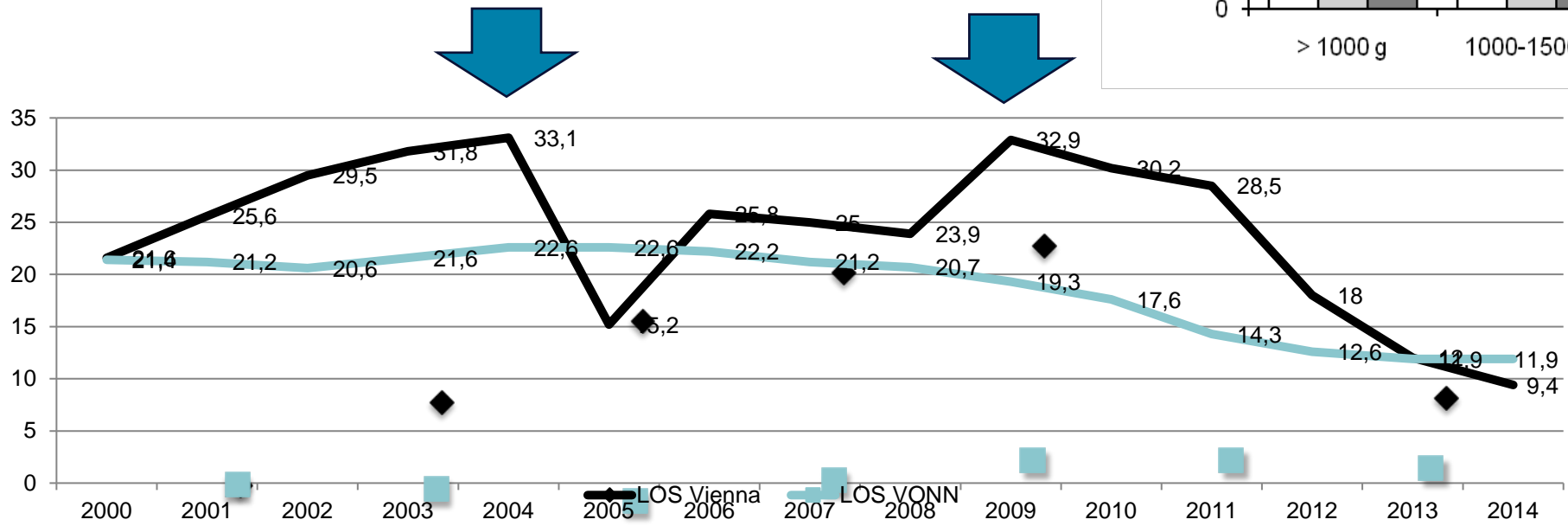
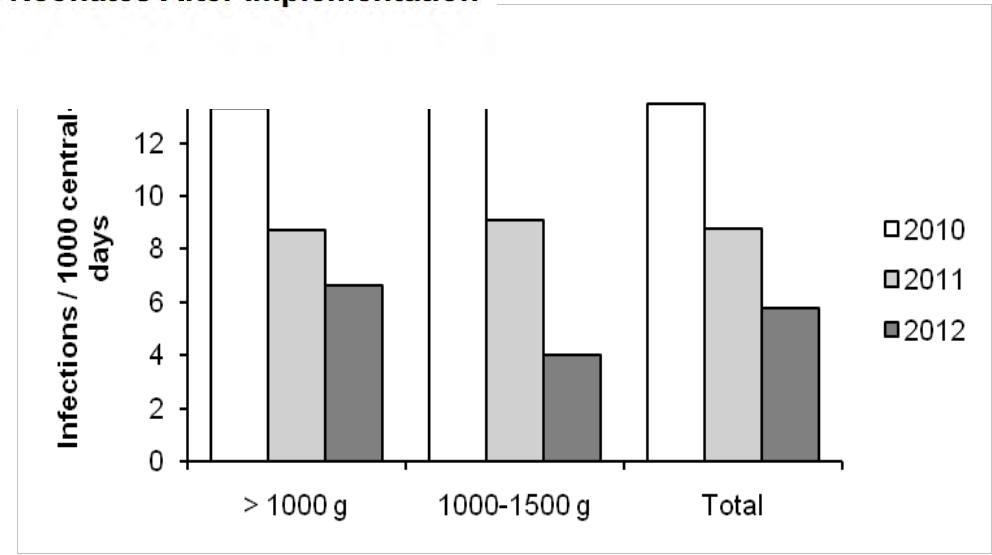
^c Department of Public Health, Erasi

The proportion of very low birth weight infants with one or more bloodstream infections and the infection rate per 1000 patient days (relative risk reduction) before and after the education program on hand hygiene intervention decreased from 44.5% to 36.1% (18.9%, $p = 0.03$) and from 17.3% to 13.5% (22.0%, $p = 0.03$), respectively.

At the baseline the nosocomial bloodstream infections per day at risk decreased by

Significant Reduction of Catheter-Associated Blood Stream Infections in Preterm Neonates After Implementation of a Care Bundle Focusing on Simulation Training of Central Line Insertion.

Steiner M¹, Langgartner M, Cardona F, Waldhör T, Schwindt J, Haiden N, Berger A.



Nosocomial Sepsis Rate NICU MUW vs. Vermont- Oxford Network

OPEN

Increased nurse workload is associated with bloodstream infections in very low birth weight infants

Erik Küng¹, Thomas Waldhör², Judith Rittenschober-Böhm¹, Angelika Berger¹ & Lukas Wisgrill¹

Neonatal sepsis is a major cause of morbidity and mortality in very low birth weight infants (VLBWI). Nurse workload considerably affects infection rates in intensive care units. However, data concerning the impact of staff workload on bloodstream infections (BSI) in VLBWI are scarce. The aim of the study was to examine the association between nurse workload and BSI in VLBWI. VLBWI admitted to our neonatal intensive care unit during 2016–2017 were retrospectively analysed. Association between nurse workload, determined by a standardized nursing score, and the BSI occurrence was investigated. A higher nurse workload was significantly associated with higher occurrence of BSI ($p = 0.0139$) in VLBWI. An assumed workload of 120% or higher, representing the need for additional nurses in our NICU setting, is associated with an elevated risk for BSI in this vulnerable population OR 2.32 (95% CI: 1.42–3.8, $p = 0.0005$). In conclusion, nurse understaffing is associated with a higher risk for BSI in VLBWI.

Received: 11 September 2018

Accepted: 29 March 2019

Published online: 19 April 2019



Contents lists available at ScienceDirect

International Journal of Nursing Studies

journal homepage: www.elsevier.com/ijns



The association between shift patterns and the quality of hand antisepsis in a neonatal intensive care unit: An observational study



Judith Rittenschober-Böhm^{a,*}, Katharina Bibl^a, Michael Schneider^a, Romana Klasinc^b, Péter Szerémy^c, Tamas Haidegger^{d,e}, Tamas Ferenci^f, Michaela Mayr^{a,b,c,d,e,f,g}, Angelika Berger^a, Ojan Assadian^{b,g}

^a Department of Pediatrics and Adolescent Medicine, Division of Neonatology, Pediatric Intensive Care and Neuropediatrics, Comprehensive Centre for Pediatrics, Medical University of Vienna, Währinger Gürtel 18-20, 1090 Vienna, Austria

^b Department for Hospital Epidemiology and Infection Control, Medical University of Vienna, Vienna, Austria

^c HandInScan Zrt, Debrecen, Hungary

^d Austrian Center for Medical Innovation and Technology, Wiener Neustadt, Austria

^e University Research, Innovation and Service Centre (EKIK), Óbuda University, Budapest, Hungary

^f John von Neumann Faculty of Informatics, Óbuda University, Budapest, Hungary

^g Institute for Skin Integrity and Infection Prevention, School of Human and Health Sciences, University of Huddersfield, United Kingdom

Aim of the study:

To investigate whether prolonged working hours and night shifts have an impact on hand hygiene quality.

Methods:

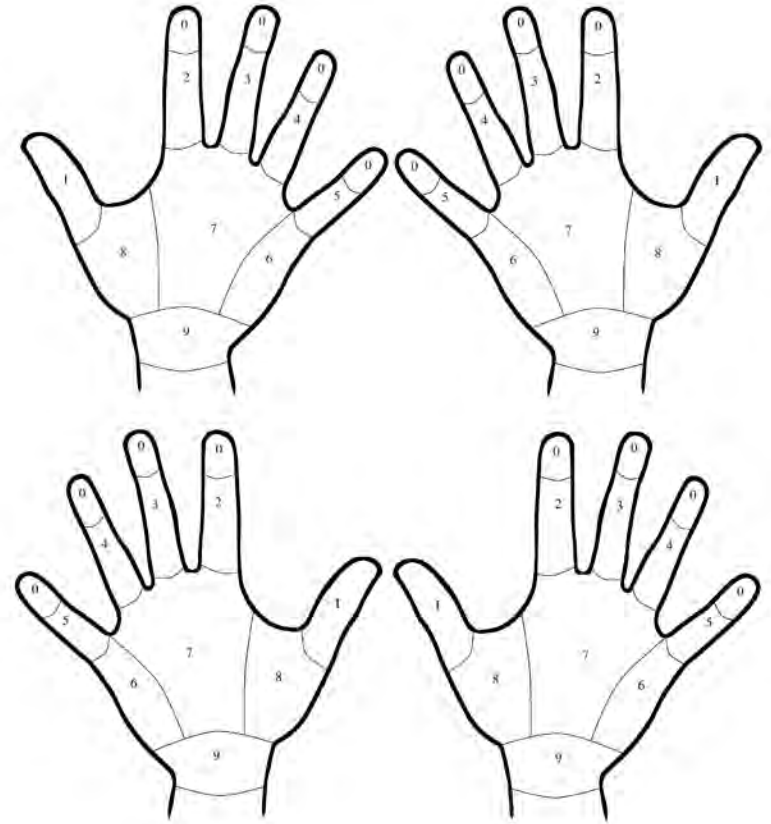
Semmelweis Scanner



passed



failed



Study Design

- Observational study, 2 level III NICUs at the General Hospital Vienna
- Hand scans before and after 12.5h day and night shifts (nurses)/ before and after 8h day shifts as well as before and after 25h day+night shifts (physicians)
- Two scans pre and post each shift
- Scans have to be separated by min. 24h (avoid bias from residual ultraviolet marker)
- No additional hand hygiene training for study
- The results of the measurements were blinded for all participants to prevent bias during subsequent scans.

Outcome Parameters

- Hand surface coverage with disinfectant before and after shifts
 - Hand scan „passed“: each hand surface $\geq 97\%$
 - Hand scan „failed“: any hand surface $\leq 97\%$

- Most frequently missed areas of hand coverage

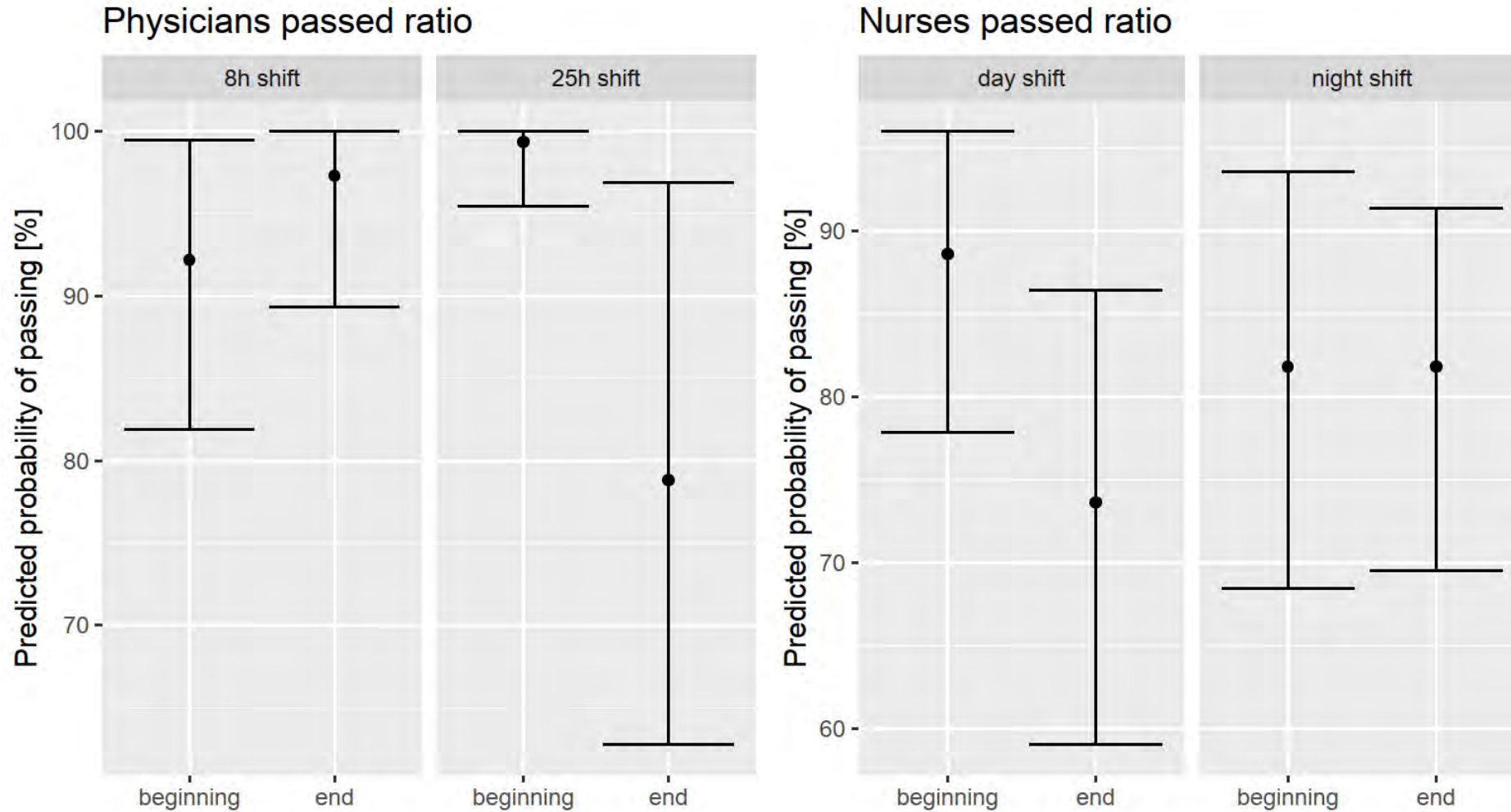
Results

Table 1

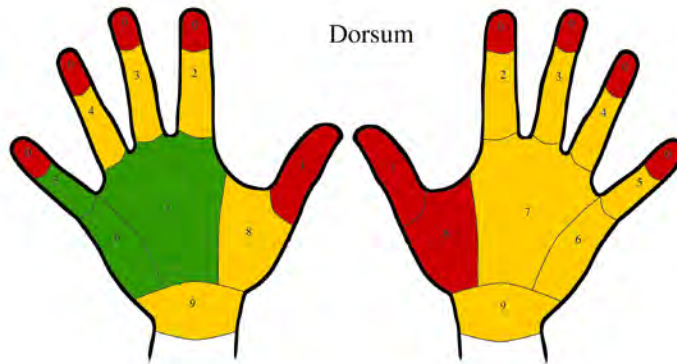
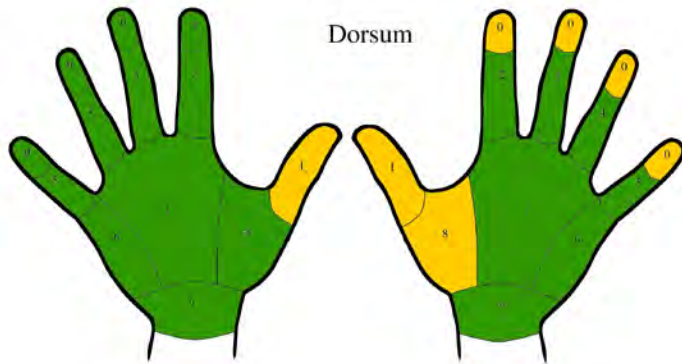
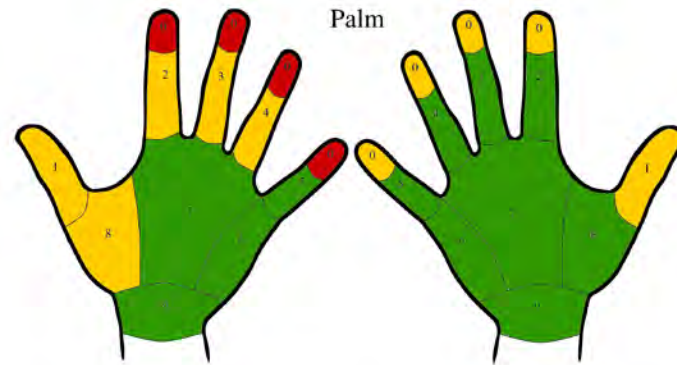
Demographic data and hand scans performed by physicians and nurses, grouped by occupation and shift type. Data on hand scans are given as total number, with percentage passed in parentheses.




	physicians	nurses
Participants, <i>n</i>	24	46
Male, <i>n</i> (%)	9 (37.5)	0 (0)
Dominant hand left, <i>n</i> (%)	1 (4.2)	1 (2.2)
Hand scans, <i>n</i> total (% passed)		
Scans for analysis	166 (87.3)	300 (73.3)
8 h day shift beginning	43 (86.1)	
8 h day shift end	42 (92.9)	
25 h day+night shift beginning	40 (97.5)	
25 h day+night shift end	41 (73.2)	
12.5 day shift beginning		81 (80.2)
12.5 day shift end		83 (66.3)
12.5 night shift beginning		62 (74.2)
12.5 night shift end		74 (73.0)

Predicted Probability of passing the hand scan



Most frequently missed areas of hand antisepsis



-  Most frequently missed > 10%
-  Frequently missed 5-10%
-  less frequently missed < 5%

physicians

nurses

Conclusion and Discussion

- Association between quality of hand hygiene antiseptics and extended working hours
- Remarkably reduced hand hygiene quality after 25h shifts of physicians and 12.5h day shifts of nurses
- Best hand hygiene quality at the beginning of day shifts and after 8h shifts
- Right dorsum most frequently missed part of hand antiseptics
- continuous hand hygiene training and feedback seems to be essential also for experienced staff



Limitations

- all participants are aware of the up-coming scan due to the need to use the UV dye labeled alcohol-based hand rub
- scans have to be separated by 24h to avoid bias by residual UV marker
- no data on workload
- did not consider individual shift patterns of participants (number of shifts/week)

Perspective

- Does continuous feedback on individual hand antiseptis performance has a positive effect on patient safety?
- Parents´ hand hygiene teaching study



Thank you for your attention!