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FROM: Shauna-Lee Konrad (X55145)

SUBJECT: Physician Compliance with Hand Hygiene

DATABASES: PubMed, Cinahl

SEARCH STRATEGY: (Internship and Residency[mh] OR physicians[mh] OR Faculty, Medical[mh] OR physician*[ti] OR doctor*[ti]) AND (hand disinfection[mh] OR "hand hygiene"[ti] OR (hand*[ti] AND wash*[ti]) OR ((cross infection[mh] OR hygiene[mh] OR infection control[mh] OR guideline adherence[mh]) AND hand*[tiab]))

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1. Griffing, G. T. (2012). **Why don't doctors wash their hands?** *Journal of the American Medical Directors Association*, 13(7), 662. AN/PMID: 22703699; S1525-8610(12)00162-4 [pii]
2. Haessler, S., Bhagavan, A., Kleppel, R., Hinchey, K., & Visintainer, P. (2012). **Getting doctors to clean their hands: lead the followers.** *BMJ Quality & Safety*, 21(6), 499-502. AN/PMID: 22357778; bmjqs-2011-000396 [pii]
Abstract:BACKGROUND: Despite ample evidence that hand hygiene (HH) can reduce nosocomial infections, physician compliance remains low. The authors hypothesised that attending physician role modelling and peer pressure among internal medicine teams would impact HH adherence. METHODS: Nine teams were covertly observed. Team member entry and

exit order, and adherence to HH were recorded secretly. The mean HH percentage across encounters was estimated by compliance of the first person entering and exiting an encounter, and by the attending physician's HH compliance. RESULTS: 718 HH opportunities prior to contact and 744 opportunities after contact were observed. If the first person entering a patient encounter performed HH, the mean compliance of other team members was 64%, but was only 45% if the first person failed to perform HH ($p=0.002$). When the attending physician performed HH upon entering the patient encounter, the mean HH compliance was 66%, but only 42% if the attending physician did not perform HH ($p<0.001$). Similar results were seen on exiting the room. The effects of the first person were not driven solely by the attending physician's HH behaviour because the attending physician was first or second to enter 57% of the encounters and exit 44% of the encounters. CONCLUSIONS: If the first person entering a patient room performs HH, then others were more likely to perform HH too, implying that peer pressure impacts team member HH compliance. The attending physician's behaviour also influenced team members regardless of whether the attending physician was the first to enter or exit an encounter, implying that role modelling impacts the HH behaviour of learners. These findings should be used when designing HH improvement programmes targeting physicians.

3. White, C. M., Statile, A. M., Conway, P. H., Schoettker, P. J., Solan, L. G., Unaka, N. I., et al. (2012). **Utilizing improvement science methods to improve physician compliance with proper hand hygiene.** *Pediatrics*, 129(4), e1042-50. AN/PMID: 22392176; peds.2011-1864 [pii]
Abstract:OBJECTIVE: In 2009, The Joint Commission challenged hospitals to reduce the risk of health care-associated infections through hand hygiene compliance. At our hospital, physicians had lower compliance rates than other health care workers, just 68% on general pediatric units. We used improvement methods and reliability science to increase compliance with proper hand hygiene to >95% by inpatient general pediatric teams. METHODS: Strategies to improve hand hygiene were tested through multiple plan-do-study-act cycles, first by 1 general inpatient medical team and then spread to 4 additional teams. At the start of each rotation, residents completed an educational module and posttest about proper hand hygiene. Team compliance data were displayed daily in the resident conference room. Real-time identification and mitigation of failures by a hand-washing champion encouraged shared accountability. Organizational support ensured access to adequate hand hygiene supplies. The main outcome measure was percent compliance with acceptable hand hygiene, defined as use of an alcohol-based product or hand-washing with soap and turning off the faucet without using fingers or palm. Compliance was defined as acceptable hand hygiene before and after contact with the patient or care environment. Covert bedside observers recorded at least 8 observations of physicians' compliance per day. RESULTS: Physician

compliance with proper hand hygiene improved to >95% within 6 months and was sustained for 11 months. **CONCLUSIONS:** Instituting a hand-washing champion for immediate identification and mitigation of failures was key in sustaining results. Improving physician compliance with proper hand hygiene is achievable and a first step in decreasing health care-associated infections.

4. **A look at The Joint Commission: engaging physicians in hand hygiene challenges.** (2011). *Bulletin of the American College of Surgeons*, 96(4), 48-49. AN/PMID: 22315894

5. Jang, J. H., Wu, S., Kirzner, D., Moore, C., Tong, A., McCreight, L., et al. (2010). **Physicians and hand hygiene practice: a focus group study.** *The Journal of Hospital Infection*, 76(1), 87-89. AN/PMID: 20638748; S0195-6701(10)00228-8 [pii]

6. Nevo, I., Fitzpatrick, M., Thomas, R. E., Gluck, P. A., Lenchus, J. D., Arheart, K. L., et al. (2010). **The efficacy of visual cues to improve hand hygiene compliance.** *Simulation in Healthcare : Journal of the Society for Simulation in Healthcare*, 5(6), 325-331. AN/PMID: 21330817; 01266021-201012000-00003 [pii]

Abstract:BACKGROUND: Guidelines governing healthcare workers' (HCW) hand hygiene (HH) behavior are well established. Despite known hazards of healthcare-associated infection to both HCW and patients, hand hygiene compliance (HHC) rates remain dismally low. To evaluate a potential solution to this ongoing challenge, we used a simulated patient encounter in an actual hospital room to test the efficacy of individual HH triggers. METHODS: One hundred fifty HCW (75 physicians and 75 nurses) participated in this study and were randomly assigned to one of five equal-size groups. Each participant performed a focused physical examination on a standardized patient and was expected to maintain HH before and after the examination. Using two rooms on a medical-surgical unit in a tertiary care teaching hospital, various cues were employed, and the impact on pre- and postexamination HHC was recorded. In the control group, the hand sanitizer dispenser was in its usual location (Baseline). In one group, the dispenser was relocated to direct line of sight (Line-of-Sight) on entering the room; in another, flashing lights were affixed to the dispenser in its usual location (Baseline & Flicker); and in a third group, the dispenser was relocated to the line of sight, and flashing lights were attached (Line-of-Sight & Flicker). In the last group, a large warning sign (Warning Sign) was affixed to the door, informing the healthcare provider that the room was under electronic surveillance, and failure to perform HHC would trigger an alarm. Data were analyzed using a generalized linear model to perform a repeated measures logistic regression; $P < 0.05$ was considered statistically significant. RESULTS: In the control group (Baseline), pre- and postexamination HHC rates were 36.7% and 33.3%, respectively. All

interventions improved HHC preintervention compared with baseline (Line-of-Sight=53.3%, Baseline & Flicker=60%, Line-of-Sight & Flicker=66%, Warning Sign=93.3%), but only the Line-of-Sight & Flicker and the Warning Sign produced statistically significant increased pre-examination HHC ($P = 0.022$ and $P < 0.001$, respectively). Only the Warning Sign produced statistically significant increased HHC postexamination ($P < 0.001$).

CONCLUSIONS: Visual cues can improve HHC, but their efficacy varies. A warning sign informing of a surveillance system with subsequent reporting of noncompliance resulted in the most significant improvement in HHC. Using a standardized patient in an actual hospital room was a helpful tool in assessing the impact of various interventions designed to improve HHC and patient safety.

7. Rodriguez, L. A., Kachala, S. S., & Adusumilli, P. S. (2010). **Doctor, did you wash your hands?** *The National Medical Journal of India*, 23(2), 111-112. AN/PMID: 20925215
8. Cantrell, D., Shamriz, O., Cohen, M. J., Stern, Z., Block, C., & Brezis, M. (2009). **Hand hygiene compliance by physicians: marked heterogeneity due to local culture?** *American Journal of Infection Control*, 37(4), 301-305. AN/PMID: 18834749; S0196-6553(08)00558-0 [pii] Abstract:BACKGROUND: Physician compliance with hand hygiene guidelines often has been reported as insufficient. METHODS: The study was conducted in 2 hospitals (Hadassah Ein Kerem [EK] and Mt Scopus [MS]) in Jerusalem, Israel. Covert observations were conducted during morning rounds by trained observers. The data were recorded as the percentage of times that hand hygiene was applied out of the total contacts with patients. After the observational step, an intervention-providing an alcohol gel and encouraging its use-was instituted in several wards. RESULTS: Physicians' compliance with hand hygiene averaged 77% at MS and 33% at EK ($P < .001$), and was characterized by a marked additional heterogeneity among wards. Rates of adherence ranged from as low as 4% in a gynecology ward to as high as 96% in a neonatal unit. Availability of a handwashing basin in the room and seniority status of the physician were associated with higher compliance rates but explained only a small part of the variation. Compliance improved significantly in 2 wards exposed to the intervention. CONCLUSION: The remarkable heterogeneity in physicians' hand hygiene compliance among sites within the same institution is consistent with an important role of the local ward culture.
9. Chatzizacharias, N. A., & Chapple, K. (2009). **Doctors' compliance with hand hygiene guidelines in the surgical ward.** *Infection Control and Hospital Epidemiology : The Official Journal of the Society of Hospital Epidemiologists of America*, 30(3), 308-309. AN/PMID: 19215200; 10.1086/595978 [pii]

10. Saint, S., Bartoloni, A., Virgili, G., Mannelli, F., Fumagalli, S., di Martino, P., et al. (2009). **Marked variability in adherence to hand hygiene: a 5-unit observational study in Tuscany.** *American Journal of Infection Control*, 37(4), 306-310. AN/PMID: 19135761; S0196-6553(08)00756-6 [pii]
Abstract:BACKGROUND: International authorities recommend that the hand hygiene of health care workers be improved to prevent health care-associated infection. In 2005, Tuscany, a region in central Italy, initiated a campaign to improve hand hygiene that focused on raising awareness and educating health care workers. We assessed hand hygiene rates approximately 3 years after the campaign was initiated in 5 units of 2 hospitals in Florence, Italy, the capital of Tuscany. We also were curious whether variability would exist in the hand hygiene rates despite the close proximity of the units. METHODS: We conducted a 3-month observational study in 2008 to assess hand hygiene adherence of doctors and nurses. Four of the units (ophthalmology, cardiology, geriatrics, and infectious diseases) were within one hospital, and the fifth unit (an emergency department) was in another hospital located less than 1 km away. External observers were used to assess the hand hygiene adherence of doctors and nurses before patient contact. RESULTS: A total of 665 doctor-patient observations and 1147 nurse-patient observations were made. Doctors used some type of hand hygiene before touching the patient in 28% of their patient interactions (soap and water in 16% and alcohol-based handrub in 12%). Nurses used some type of hand hygiene in 34% of their interactions (soap and water in 27% and alcohol-based handrub in 7%). Hand hygiene adherence varied substantially across the units, from a low of 6% to a high of 66% for doctors and from 19% to 56% for nurses. The correlation between nurse adherence and doctor adherence was 0.90. CONCLUSION: The overall rates of hand hygiene adherence observed were similar to those found when Tuscany initiated a hand hygiene campaign 3 years earlier. Focusing on overall rates may be misleading, however, because substantial variability existed between units. Furthermore, these rates come only from the "first moment" (before touching the patient) and can only be compared with rates from studies using the same approach.
11. Tai, J. W., Mok, E. S., Ching, P. T., Seto, W. H., & Pittet, D. (2009). **Nurses and physicians' perceptions of the importance and impact of healthcare-associated infections and hand hygiene: a multi-center exploratory study in Hong Kong.** *Infection*, 37(4), 320-333. AN/PMID: 19636497
Abstract:BACKGROUND: Hand hygiene promotion for patient safety is a challenge worldwide, and local data are critical to tailor strategies to the setting. METHODS: This is a cross-sectional study of nurses and physicians providing direct patient care in four hospitals in Hong Kong using an anonymous questionnaire survey. Cognitive factors related to hand hygiene and the perception of effective interventions promoting hand hygiene were assessed. RESULTS: The overall response rate was 59.3%. Among respondents, 70% of the nurses and 49% of the physicians perceived that over 15% of patients would suffer from healthcare-associated infections. A total of 79% of the nurses and 68% of the physicians believed that more than 5% of patients would die as a result of healthcare-associated infection. A total of 60% of the nurses and 46% of the physicians acknowledged that over 75% of healthcare-associated infections could be prevented by optimal hand hygiene practices, although 36% of the nurses and 23% of the physicians claimed that six to ten hand cleansing times per hour would be necessary. Bivariate analysis showed significant differences between professionals in self-reported performance. A multivariate regression model revealed that perceived behavioral control and subjective norms were the most important factors associated with the nurses and physicians' self-reported hand hygiene performance. However when gender was taken into account among professionals, subjective norms was the only consistent one. CONCLUSION: These results could be used as a tool to create goal-specific strategies for motivating hand hygiene amongst nurses and physicians in Hong Kong, with appropriate promotional interventions delivered to the different professional groups and specialties.
12. Johnson, P. D. (2008). **Why ICU doctors do not wash their hands.** *Critical Care and Resuscitation : Journal of the Australasian Academy of Critical Care Medicine*, 10(4), 274-275. AN/PMID: 19049474
13. Julian, K. G., Subramanian, K., Brumbach, A., & Whitener, C. J. (2008). **Attitudes of healthcare workers and patients toward individualized hand hygiene reminders.** *Infection Control and Hospital Epidemiology : The Official Journal of the Society of Hospital Epidemiologists of America*, 29(8), 781-782. AN/PMID: 18690788
14. Sladek, R. M., Bond, M. J., & Phillips, P. A. (2008). **Why don't doctors wash their hands? A correlational study of thinking styles and hand hygiene.** *American Journal of Infection Control*, 36(6), 399-406. AN/PMID: 18675145; S0196-6553(08)00065-5 [pii]
Abstract:BACKGROUND: The World Health Organization has identified cognitive determinants of hand hygiene as an outstanding research question. This study investigated whether doctors' preferences for a rational thinking style or an experiential thinking style are associated with hand hygiene compliance. METHODS: This was an observational study of hand hygiene practices of 32 doctors in 2 teaching hospitals in South Australia. Compliance rates were correlated with self-reported thinking styles. The doctors were observed by a trained observer during a ward round or outpatient clinic and were unaware that hand hygiene was under observation. The main outcome measures were hand hygiene compliance (hand hygiene compliance tool) and thinking style (Rational-Experiential Inventory). RESULTS: An overall mean compliance rate of 7.6% (standard

deviation +/- 7.2%) was found. Compliance was significantly positively correlated with experiential/automatic thinking ($r = .46$; $P = .004$) and the observational setting of ward rounds (vs clinics) ($r = -.47$; $P = .003$). No significant relationship was found between compliance and a rational/deliberate thinking style ($r = -.01$; $P = .472$). **CONCLUSIONS:** Hand hygiene is more experiential than rational. Findings suggest that certain promotional strategies appealing to the experiential thinking mode may improve compliance, and that traditional approaches based on logic and reasoning alone probably will not work.

15. Stoner, M. J., Cohen, D. M., Fernandez, S., & Bonsu, B. K. (2007).

Physician handwashing: what do parents want? *The Journal of Hospital Infection*, 65(2), 112-116. AN/PMID: 17174446; S0195-6701(06)00474-9 [pii]

Abstract: Transmission of micro-organisms from the hands of healthcare workers to patients is a major cause of healthcare-acquired infections. In 2002, the US Centers for Disease Control and Prevention (CDC) published guidelines for healthcare workers that included the recommendation for alcohol-based hand rub for hand hygiene during patient visits. In this prospective study we surveyed parental and healthcare workers' preferences for the hand hygiene practices of emergency physicians. The study comprised 99 parents of ill or injured children presenting to our emergency department and 100 healthcare providers (64 nurses, 29 physicians and seven nurse practitioners) within the department. There was a clear and similar preference by parents and healthcare workers for hand hygiene using soap and water over alcohol cleansing rubs.

Furthermore, both groups preferred hand hygiene before and after the examination and wanted to observe the physician perform this procedure.

In conclusion, families and healthcare worker preferences for hand hygiene are not in keeping with recommendations published by the CDC.

Educational interventions are needed to disseminate the CDC's guidelines and to promote compliance with evidence-based recommendations for hand hygiene.

16. Wharton, E. M., & Platt, A. J. (2006). **Can we improve doctors' hand hygiene on ward rounds?** *The Journal of Hospital Infection*, 64(4), 400-401. AN/PMID: 16996646; S0195-6701(06)00373-2 [pii]

17. Gandjour, A., & Lauterbach, K. W. (2005). **How much does it cost to change the behavior of health professionals? A mathematical model and an application to academic detailing.** *Medical Decision Making : An International Journal of the Society for Medical Decision Making*, 25(3), 341-347. AN/PMID: 15951461; 25/3/341 [pii]

Abstract: Several strategies have shown to be effective at enhancing the implementation of research findings in daily practice. These implementation strategies improve the delivery of preventive or therapeutic

care by successfully educating health professionals. On the other hand, little is known about the costs of these implementation strategies. The goal of this article is to present a mathematical model that predicts implementation costs by using published data. As an important feature, the model portrays the relationship between the degree of treatment underuse and implementation costs. Two application examples of outreach programs for the prevention of stroke and coronary disease analyze the relevance of implementation costs with respect to the cost-effectiveness ratio and total costs. They demonstrate that implementation costs may have little impact on the cost-effectiveness ratio but may nevertheless be relevant to a 3rd-party payer who needs to stay within the budget and ensure that care is provided to a large underserved population. The model and its consideration of implementation costs may contribute to a more efficient use of health care resources.

18. **Simple methods improve hand-washing compliance.** (2004). *Hospital Peer Review*, 29(4), 50, 55. AN/PMID: 15069887

19. Filardo, T. (2004). **Hand hygiene.** *Annals of Internal Medicine*, 141(8), 648. AN/PMID: 15492349; 141/8/648 [pii]

20. Pittet, D., Simon, A., Hugonnet, S., Pessoa-Silva, C. L., Sauvan, V., & Perneger, T. V. (2004). **Hand hygiene among physicians: performance, beliefs, and perceptions.** *Annals of Internal Medicine*, 141(1), 1-8.

AN/PMID: 15238364; 141/1/1 [pii]

Abstract: BACKGROUND: Physician adherence to hand hygiene remains low in most hospitals. OBJECTIVES: To identify risk factors for nonadherence and assess beliefs and perceptions associated with hand hygiene among physicians. DESIGN: Cross-sectional survey of physician practices, beliefs, and attitudes toward hand hygiene. SETTING: Large university hospital. PARTICIPANTS: 163 physicians. MEASUREMENTS: Individual observation of physician hand hygiene practices during routine patient care with documentation of relevant risk factors; self-report questionnaire to measure beliefs and perceptions. Logistic regression identified variables independently associated with adherence. RESULTS: Adherence averaged 57% and varied markedly across medical specialties. In multivariate analysis, adherence was associated with the awareness of being observed, the belief of being a role model for other colleagues, a positive attitude toward hand hygiene after patient contact, and easy access to hand-rub solution. Conversely, high workload, activities associated with a high risk for cross-transmission, and certain technical medical specialties (surgery, anesthesiology, emergency medicine, and intensive care medicine) were risk factors for nonadherence. LIMITATIONS: Direct observation of physicians may have influenced both adherence to hand hygiene and responses to the self-report questionnaire. Generalizability of study results requires additional testing in other health

care settings and physician populations. **CONCLUSION:** Physician adherence to hand hygiene is associated with work and system constraints, as well as knowledge and cognitive factors. At the individual level, strengthening a positive attitude toward hand hygiene and reinforcing the conviction that each individual can influence the group behavior may improve adherence among physicians. Physicians who work in technical specialties should also be targeted for improvement.

21. Weinstein, R. A. (2004). **Hand hygiene--of reason and ritual.** *Annals of Internal Medicine*, 141(1), 65-66. AN/PMID: 15238372; 141/1/65 [pii]

22. Aizman, A., Stein, J. D., & Stenson, S. M. (2003). **A survey of patterns of physician hygiene in ophthalmology clinic patient encounters.** *Eye & Contact Lens*, 29(4), 221-222. AN/PMID: 14555896

Abstract:**PURPOSE:** This study examined physician hygiene patterns in the eye clinic of a major medical center to assess compliance with recommended practice patterns to avoid nosocomial infection during patient encounters. **METHODS:** One hundred ophthalmology resident-patient encounters were observed anonymously by the authors. Examining physicians were evaluated in handwashing between patients, cleaning and disinfecting of tonometer tips after each use, and recapping of diagnostic drop bottles after each use. **RESULTS:** Physicians washed their hands 74% of the time between patient encounters. The surfaces of tonometer tips were disinfected with an alcohol pad 100% of the time. Diagnostic drop bottles were recapped 57% of the time after each use. **CONCLUSIONS:** There is ample clinical evidence in the ophthalmic literature that practitioners' hands and tonometer tips can be vectors for transmission of nosocomial infection and that vigorous handwashing and disinfection of instruments can decrease the rates of transmission. Sometimes, however, physicians neglect to follow these simple and effective steps. We suggest posting visual educational materials in examination rooms as a reminder to ophthalmology residents and clinic personnel to adhere to these precautions, benefiting doctors and patients.

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24. Salemi, C., Canola, M. T., & Eck, E. K. (2002). **Hand washing and physicians: how to get them together.** *Infection Control and Hospital Epidemiology : The Official Journal of the Society of Hospital Epidemiologists of America*, 23(1), 32-35. AN/PMID: 11868890; ICHE4234 [pii]

Abstract:**OBJECTIVE:** To determine the motivating and behavioral factors responsible for improving compliance with hand washing among physicians. **DESIGN:** Five unobtrusive, observational studies recording hand washing after direct patient contact, with study results reported to physicians.

SETTING: A 450-bed hospital in a health maintenance organization with an 18-bed medical-surgical intensive care unit (ICU) and a 12-bed cardiac care unit. **METHODS:** An infectious disease physician met individually with participants to report study results and obtain a commitment to hand washing guidelines. Follow-up interviews were conducted to evaluate behavioral factors and educational programs. Hand washing study results were presented to all staff physicians by live and videotaped inservice presentations and electronic mail (e-mail) newsletters. The importance of influencing factors and the educational effectiveness of the hand washing program were evaluated. **RESULTS:** Five observational hand washing studies were conducted in the ICU between April 1999 and September 2000. Rates of physician compliance with hand washing were 19%, 85%, 76%, 74%, and 68%, respectively. There were 71 initial encounters and 55 follow-up interviews with the same physicians. Physician interviews revealed that 73% remembered the initial encounter, 70% remembered the hand washing inservice presentations, and 18% remembered the e-mail newsletters. Personal commitment and meeting with an infectious disease physician had the most influence on hand washing behavior. **Direct inservice presentations (either live or videotaped) had more influence than did e-mail information.** Rates of ventilator-associated pneumonia did not significantly change before and during the study periods. A decrease in the rate of central-line-related bloodstream infections from 3.2 to 1.4 per 1,000 central-line days was found, but could not be solely attributed to improved physician compliance with hand washing. **CONCLUSIONS:** Physician compliance with hand washing can improve. Personal encounters, direct meetings with an infectious disease physician, and videotaped presentations had the greatest impact on physician compliance with hand washing at our medical center, compared with newsletters sent via e-mail. Local data on compliance with hand washing and physician involvement are factors to be considered for physician hand washing compliance programs in other medical centers.

25. Heseltine, P. (2001). **Why don't doctors and nurses wash their hands?** *Infection Control and Hospital Epidemiology : The Official Journal of the Society of Hospital Epidemiologists of America*, 22(4), 199-200. AN/PMID: 11379708; ICHE6789 [pii]

26. Lipsett, P. A., & Swoboda, S. M. (2001). **Handwashing compliance depends on professional status.** *Surgical Infections*, 2(3), 241-245. AN/PMID: 12593714
Abstract:**BACKGROUND:** Nosocomial infections can be transmitted from microorganisms on the hands of health care workers to patients. Handwashing (HW) has a proven benefit in preventing transmission of infection, yet compliance with handwashing, especially in intensive care units, ranges between 28% and 74%. **METHODS:** To determine if HW behavior varies as a function of health care professional status and patient

interaction, we conducted an observational study of a surgical intermediate care unit in a large university teaching hospital. HW compliance was observed among all health care workers (HCW): physicians (MD; N = 46), nurses (RN; N = 295), and nursing support personnel (NSP; N = 93). Over an 8-week period, unidentified, trained observers documented all HCW interactions in 1-h random blocks. HW opportunities were classified into low and high risk of pathogen acquisition and transmission. RESULTS: A total of 493 HW opportunities were observed, of which 434 involved MD, RN, and NSP. Two hundred and sixty-one low-risk (MD 35, RN 171, NSP 55) and 173 (MD 11, RN 124, NSP 38) high-risk interactions were observed. Overall HW rates were low (44%). Significant differences existed among HCW, with MDs being the least likely to wash (15% versus RN 50%, NSP 37%, $p < 0.01$). In adjusting for high-risk situations, MDs (odds ratio [OR] 5.58, 95% CI 2.49-12.54; NSP, OR 1.73, 95% CI 1.13-2.64; RN, OR 0.98, 95% CI 0.77-1.23) were significantly less likely to perform HW when compared to RNs. Nursing groups were significantly less likely to wash in low-risk versus high-risk situations (MD 9.2% versus 17.1%; RN 69.4% versus 39.6%; NSP 85% versus 23.3%), suggesting individual discrimination of the importance of HW. Although nurses were less likely to wash in high-risk situations compared to NSP, the overall number of opportunities was greater, suggesting that improvement in HW to the level of NSP could have a major impact on infection transmission. CONCLUSION: Significant opportunities exist for quality improvement, novel educational strategies, and assessment of reasons why MDs and, to a lesser extent, RNs fail to follow simple HW practices.

27. van de Mortel, T., Bourke, R., McLoughlin, J., Nonu, M., & Reis, M. (2001). **Gender influences handwashing rates in the critical care unit.** *American Journal of Infection Control*, 29(6), 395-399. AN/PMID: 11743487; S0196-6553(01)96896-8 [pii]
Abstract:BACKGROUND: Nurses tend to wash their hands more often than physicians, and among nonhealth care workers, women tend to wash their hands more often than men. This study examined the influence of gender on the handwashing rates of health care workers (HCWs). The null hypotheses were that there would be no intergender difference in (a) handwashing rates in HCWs across professions and (b) within professional groups. METHODS: Handwashing by nurses, physicians, wardspersons, x-ray technicians, and physiotherapists after patient contact in a critical care unit (CCU) was determined through covert observation. The gender and profession of the subjects were recorded, but their identity was not. RESULTS: Female CCU staff washed their hands significantly more often than did their male counterparts after patient contact ($P = .0001$). When the results were examined for the influence of profession on handwashing, significant intergender differences remained for physicians ($P = .0468$) and wardspersons ($P = .0001$). There was also a nonsignificant trend ($P = .07$) toward higher rates of handwashing among female x-ray technicians.

There were no statistically significant intergender differences in handwashing rates among nurses ($P = .7588$) and physiotherapists. CONCLUSIONS: It appears that gender may influence handwashing rates in HCWs in the CCU, although this difference appears to be modified in particular professional groups. Further research should examine factors that modify handwashing rates within professional groups and in settings other than the CCU.

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29. Richardson, C. (2000). **Be a real advocate--tell those doctors to wash their hands.** *Nursing Standard (Royal College of Nursing (Great Britain) : 1987)*, 15(12), 30. AN/PMID: 11971584
30. Pritchard, R. C., & Raper, R. F. (1996). **Doctors and handwashing: instilling Semmelweis' message.** *The Medical Journal of Australia*, 164(7), 389-390. AN/PMID: 8609844