have the ability to cause wound infections. Why not perform assays that specifically measure pathogenic organisms (eg, cultures or PCR assays)? This approach would probably provide a more clinically relevant measure of whether viruses or bacteria are being retained on robotic instruments after cleaning.

Finally, and most importantly, there is a practical question: How do the findings of higher residual protein on robotic surgical instruments impact actual clinical outcomes? An extensive body of observational data suggests that minimally invasive surgeries may have lower rates of infectious complications than open surgeries.[4,5] Recently, 2 prospective randomized trials found no higher rates of infectious complications with robotic cystectomy and prostatectomy than with open operations. While the precise impact of robotic surgery on postoperative complications remains a topic of debate and active research, there is certainly no evidence for exponentially greater infectious rates with robotic surgical instruments.

In addition, the proven incidence of infection due to surgical devices is very low.[6] Surgical wound infections are vastly more likely to be due to contamination from the patient's skin flora. Thus, benefits due to smaller incision could easily outweigh any theoretical increase in risk due to retained biomaterial on instruments.

The results of Saito et al underscore one of the ways that robotic surgical instruments differs from traditional open surgical instruments: The former tend to have a larger amount of residual protein left after cleaning, which makes sense given their design and size. While novel approaches for cleaning surgical instruments should adapt to new types of instruments, this should not dissuade innovators. Ultimately, new technologies and techniques are judged by their clinical outcomes. Specifically, the evaluation of novel techniques should include careful assessment of infectious risks in concert with careful basic scientific research. At the end of the day, this is what matters for patients, surgeons, and other stakeholders.

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REFERENCES

1. Saito Y, Yasuhara H, Murakoshi S, et al. Challenging residual contamination of instruments for robotic surgery in Japan. *Infect Control Hosp Epidemiol* 2016. doi: 10.1017/ice.2016.249.
2. Hatiboglu G, Teber D, Hohenfellner M. Robot-assisted prostatectomy: the new standard of care. *Langenbecks Arch Surg* 2012;3:343–352.
3. Wehrl M, Albers G, Bühler K, et al. Round robin tests conducted by the working group DaVinci to establish a method for testing the cleaning of MIS robotic instruments. *Central Service* 2014;22: 165–179.
4. Tollefson MK, Frank I, Gettman MT. Robotic-assisted radical prostatectomy decreases the incidence and morbidity of surgical site infections. *Urology* 2011;4:827–831.
5. Trinh QD, et al. Perioperative outcomes of robot-assisted radical prostatectomy compared with open radical prostatectomy: results from the nationwide inpatient sample. *Eur Urol* 2012;4:679–685.
6. Chan-Myers H, McAlister D, Antonoplos P. Natural bioburden levels detected on rigid lumened medical devices before and after cleaning. *Am J Infect Control* 1997;6:471–476.

More Doctor–Patient Contact Is Not the Only Explanation For Lower Hand-Hygiene Compliance in Australian Emergency Departments

To the Editor—Previous reports have demonstrated low hand-hygiene (HH) compliance in emergency departments (EDs).[1,2] Barriers to compliance in this setting include crowding, higher patient acuity, nonstandardized workflow, higher staff turnover, lower penetration of HH promotion activities, and high representation of doctors in ED audits, a group with known suboptimal HH compliance.[1,3,4] We sought to use a nationwide dataset to describe HH performance in Australian EDs and to test the hypothesis that lower HH compliance in EDs is explained by a higher proportion of observed HH activity by doctors in this setting.

We used data collected for the Australian National Hand Hygiene Initiative (NHHI), which is described elsewhere.[5] Briefly, the NHHI was launched in 2008 as a standardized national approach to HH culture change adapted from the WHO Multimodal Hand Hygiene Improvement Strategy.[6] At the institutional level, the core components of the NHHI are alcohol-based hand rub at the point of care, healthcare-worker education about HH and infection control, and HH auditing with performance feedback using the WHO "5

Moments" methodology. The NHHI uses a train-the-trainer model for HH auditors. National and jurisdictional representatives train "gold standard auditors" (GSAs) during a 2-day workshop; GSAs can then train "general auditors" in their own organization with a 1-day workshop. Each year, auditors must collect at least 100 moments and must complete an "auditor validation" online learning module and quiz to maintain auditing competency. Since 2011, the interim national benchmark for HH compliance has been 70%, and aggregate institution-level compliance has been reported publically online.[7] In 2013, implementation of the NHHI became a requirement for hospital accreditation.[8] The program focuses on inpatient wards, with no explicit national requirement to include emergency departments.

We compared HH compliance in EDs, high-risk wards, and other acute-care inpatient wards. According to the NHHI definition, high-risk wards include critical care, renal, hematology/oncology, and transplant wards. We included hospitals that submitted HH compliance audit data during National Audit Period 1 2016 (November 2015–March 2016) and belonged to an Australian Institute of Health and Welfare hospital peer group indicating the presence of a 24-hour ED (ie, principal referral hospitals, public group A hospitals, public group B hospitals, and private group A hospitals).[9] Hand-hygiene compliance was computed as the proportion of moments during which an HH action (hand rubbing or washing) is performed, expressed as a percentage. We performed a χ^2 test to assess the independence of ward type and others categorical variables, including HH action and healthcare-worker profession, at the HH moment level. We used multivariate mixed-effects logistic regression to evaluate the relationship between ward type and HH compliance after adjusting for profession and HH indication. We accounted for hospital-level clustering by including hospitals as a random effect.

Overall, 152 hospitals were included in this analysis: 132 public (87%) and 20 private (13%). These hospitals submitted 369,162 HH moments. Overall, 108 of these hospitals (71%) submitted HH moments from their EDs, for a total of 20,872 HH moments. Hand-hygiene compliance was lower in EDs than in acute-care and high-risk wards: 20,872 of 27,686 (75%) in EDs, 185,057 of 222,819 (83%) in acute-care wards, and 100,402 of 118,657 (85%) in high-risk wards ($P < .001$). Doctors represented a higher proportion of observed moments in EDs than acute-care and high-risk wards: 6,467 of 27,686 (23%) in EDs, 33,742 of 222,819 (15%) in acute-care wards, and 16,544 of 118,657 (14%) in high-risk wards ($P < .001$). In addition, doctors had significantly lower HH compliance in EDs than acute-care and high-risk wards: 4,057 of 6,467 (63%) in EDs, 24,336 of 33,742 (72%) in acute-care wards, and 12,447 of 16,544 (75%) in high-risk wards ($P < .001$, Figure 1). After adjusting for profession and HH indication, hand-hygiene compliance remained significantly lower in EDs than in acute-care inpatient wards (adjusted odds ratio, 0.59; 95% CI, 0.57–0.60), which suggests that other factors may be involved.

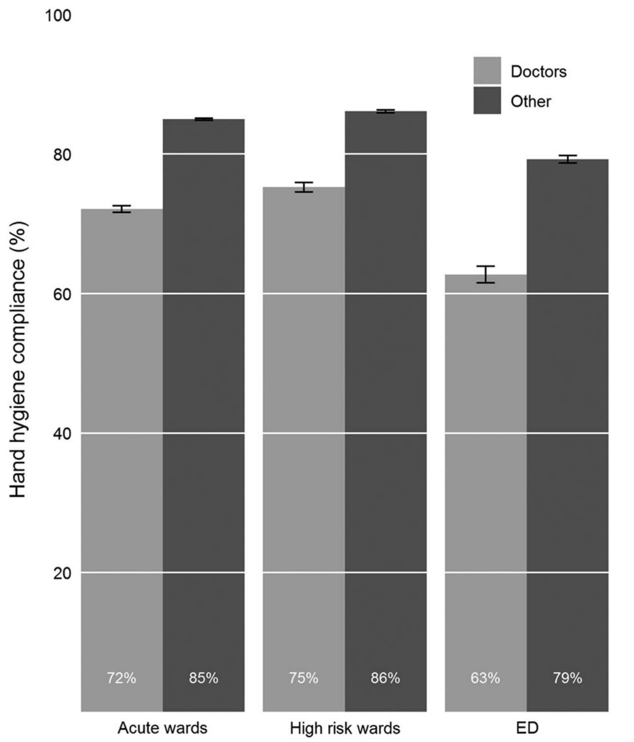

FIGURE 1. Aggregate hand-hygiene compliance, stratified by ward type and profession.
NOTE. High-risk wards include critical care, renal, hematology/oncology, and transplant wards. Abbreviations: ED, emergency department.

Doctors account for a significantly greater proportion of observed HH opportunities, and have lower HH compliance, in EDs than in inpatient wards. Lower HH compliance in EDs is therefore not explained solely by healthcare-worker profession or by HH indication. Overall, we believe that this finding relates to a combination of 2 interrelated factors. First, coordinated strategies to improve HH have targeted inpatient wards rather than EDs. Second, EDs represent a unique setting with distinct environment, staff, and patient factors compared with inpatient wards. Interventions as simple as ensuring availability of ABHR at the point of care are more complex in the ED setting. In summary, there is a need for greater focus on identifying modifiable barriers to appropriate HH in Australian EDs and on implementing targeted initiatives to improve HH behavior.

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references

1. Muller MP, Carter E, Siddiqui N, Larson E. Hand hygiene compliance in an emergency department: the effect of crowding. *Acad Emerg Med* 2015;22:1218–1221.
2. Wiles LL, Roberts C, Schmidt K. Keep it clean: a visual approach to reinforce hand hygiene compliance in the emergency department. *J Emerg Nurs* 2015;41:119–124.
3. Carter EJ, Wyer P, Giglio J, et al. Environmental factors and their association with emergency department hand hygiene compliance: an observational study. *BMJ Qual Saf* 2015.
4. Scheithauer S, Kamerseder V, Petersen P, et al. Improving hand hygiene compliance in the emergency department: getting to the point. *BMC Infect Dis* 2013;13:367.
5. Grayson ML, Russo P, Ryan K, Havers S, Heard K. Hand hygiene australia manual. Hand Hygiene Australia website. http://www.hha.org.au/userfiles/file/manual/hhamanual_2010-11-23.pdf Published 2013. Accessed April 7, 2016.
6. World Health Organization. *WHO Guidelines on Hand Hygiene in Healthcare*. Geneva: World Health Organization Press; 2009.
7. Australian Institute of Health and Welfare. MyHospitals website. http://www.myhospitals.gov.au/. Published 2016. Accessed August 18, 2016.
8. Australian Commission on Safety and Quality in Health Care. National Safety and Quality Health Service Standards (September 2012). Sydney: ACSQHC; 2012.
9. Australian hospital peer groups. Australian Institute of Health and Welfare website. http://www.aihw.gov.au/publication-detail/?id=60129553446. Published 2015. Accessed 27 June, 2016.

Seasonal Variation in Bare-Below-the-Elbow Compliance

To the Editor—The increasing risk of pathogen transmission within the hospital setting continues to be a challenge for hospital infection prevention programs striving to reduce hospital-acquired infections. While healthcare providers' hands and medical devices are widely accepted sources of pathogen transmission, recent studies indicate that healthcare attire could potentially contribute to transmission as well.[1] In the United Kingdom, the practice of bare below the elbows (BBE) has been adopted to decrease the potential risk of cross transmission between healthcare attire and patients.[2] Furthermore, experts from the Society for Healthcare Epidemiology of America suggest BBE in the inpatient setting as an infection prevention adjunct based on biological plausibility.[3]

At Virginia Commonwealth University Health System (VCUHS), BBE is recommended in the inpatient setting to facilitate hand hygiene and to limit cross transmission of pathogens via contaminated apparel. BBE requires all healthcare providers to wear short sleeves and to avoid wristwatches, bracelets, neckties, or white coats at the bedside. Although BBE has been an infection prevention recommendation since January 2009 at VCUHS, compliance assessment began in May 2014. We explored the correlation between BBE compliance and average monthly climate temperature.

This study was performed at an 865-bed, urban, academic medical center with 8 intensive care units and 25 non–intensive care units. In May 2014, trained hand-hygiene observers began measuring BBE compliance among healthcare providers. Healthcare providers were considered compliant with BBE if they wore short sleeves or rolled up their sleeves and avoided wearing wristwatches, bracelets, neckties, and white coats during patient encounters in the inpatient setting. Compliance was recorded as presence or absence of BBE at the bedside, but specific reasons for noncompliance were not documented. We compared monthly BBE compliance to the average local monthly climate temperatures from May 2014 through September 2015. Temperatures were obtained from an online weather source (www.accuweather.com). The relationship between BBE compliance and local climate temperatures was assessed using a correlation analysis software (SAS version 9.4, SAS Institute, Cary, NC).

Over the 16-month study period, 46,832 patient encounters were observed in the inpatient setting. The overall compliance