

## BRIEF REPORTS

## Do Physicians Clean Their Hands? Insights From a Covert Observational Study

Adam Kovacs-Litman, BSc<sup>1\*</sup>, Kimberly Wong, BSc<sup>1</sup>, Kaveh G. Shojania, MD<sup>1,2</sup>, Sandra Callery, RN, MHSc, CIC<sup>3</sup>, Mary Vearncombe, MD<sup>3</sup>, Jerome A. Leis, MD, MSc<sup>1,2,4\*</sup>

<sup>1</sup>Centre for Quality Improvement and Patient Safety, University of Toronto, Toronto, Ontario, Canada; <sup>2</sup>Department of Medicine, University of Toronto, Toronto, Ontario, Canada; <sup>3</sup>Department of Microbiology, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada; <sup>4</sup>Division of Infectious Diseases, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada.

Physicians are notorious for poor hand hygiene (HH) compliance. We wondered if lower performance by physicians compared with other health professionals might reflect differences in the Hawthorne effect. We introduced covert HH observers to see if performance differences between physicians and nurses decreased and to gain further insights into physician HH behaviors. Following training and validation with a hospital HH auditor, 2 students covertly measured HH during clinical rotations. Students rotated off clinical services every week to increase exposure to different providers and minimize risk of exposing the covert observation. We compared covertly measured HH compliance with data from overt observation by hospital auditors during the same time period. Covert observation produced much lower HH compliance than recorded by hospital auditors during the same time period: 50.0% (799/1597) versus

83.7% (2769/3309) ( $P < 0.0002$ ). The difference in physician compliance between hospital auditors and covert observers was 19.0% (73.2% vs 54.2%); for nurses this difference was much higher at 40.7% (85.8% vs 45.1%) ( $P < 0.0001$ ). Physician trainees showed markedly better compliance when attending staff cleaned their hands compared with encounters when attending did not (79.5% vs 18.9%;  $P < 0.0002$ ). Our study suggests that traditional HH audits not only overstate HH performance overall, but can lead to inaccurate inferences about performance by professional groupings due to relative differences in the Hawthorne effect. We suggest that future improvement efforts will rely on more accurate HH monitoring systems and strong attending physician leadership to set an example for trainees. *Journal of Hospital Medicine* 2016;11:862–864. © 2016 Society of Hospital Medicine

Hand hygiene (HH) is believed to be one of the single most important interventions to prevent healthcare-associated infection, yet physicians are notorious for their poor compliance.<sup>1–3</sup> At our 800-bed acute care academic hospital, we implemented a multifaceted HH program<sup>4</sup> in 2007, which was associated with improved HH compliance rates from 43% to 87%. Despite this improvement, HH compliance among physicians remained suboptimal, with rates below 60% in some patient areas. A targeted campaign focused on recruitment of physician champions, resulted in some improvement, but physician compliance has consistently remained below performance of nurses (70%–75% for physicians vs 85%–90% for nurses).

Our experience parallels the results seen in multinational surveys demonstrating consistently lower physician HH compliance.<sup>5</sup> Given the multiple improvement

efforts directed at physicians and the apparent ceiling observed in HH performance, we wanted to confirm whether physicians are truly recalcitrant to cleaning their hands, or whether lower compliance among physicians reflected a differential in the Hawthorne effect inherent to direct observation methods. Specifically, we wondered if nurses tend to recognize auditors more readily than physicians and therefore show higher apparent HH compliance when auditors are present. We also wanted to verify whether the behavior of attending physicians influenced compliance of their physician trainees. To test these hypotheses, we trained 2 clinical observers to covertly measure HH compliance of nurses and physicians on 3 different clinical services.

### METHODS

Between May 27, 2015 and July 31, 2015, 2 student observers joined clinical rotations on physician and nursing teams, respectively. Healthcare teams were unaware that the student observers were measuring HH compliance during their clinical rotation. Students rotated in the emergency department, general medical and surgical wards for no more than 1 week at a time to increase exposure to different providers and minimize risk of exposing the covert observation.

Prior to the study period, the students underwent training and validation with a hospital HH auditor at another clinical setting offsite to avoid any recognition

\*Address for correspondence and reprint requests: Jerome A. Leis, MD, Sunnybrook Health Sciences Centre, H463, 2075 Bayview Avenue, Toronto, Ontario, M4N 3M5 Canada; Telephone: 416-480-6100 x89352; Fax: 416-480-6769; E-mail: jerome.leis@sunnybrook.ca

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**TABLE 1.** Hand Hygiene Compliance Across Clinical Services and Professional Groupings as Measured by Covert Observers and Hospital Auditors During the Study Period

	Covert Observers, Compliance (95% CI)	Hospital Auditors, Compliance (95% CI)	Difference
Overall hand hygiene compliance	50.0% (47.6-52.5)	83.7% (82.4-84.9)	33.7%
Service			
Medicine	58.9% (55.3-62.5)	85.0% (82.7-87.3)	26.1%
Surgery	45.7% (41.6-49.8)	91.0% (87.5-93.7)	45.3%
Emergency	43.9% (38.9-49.9)	73.8% (68.9-78.2)	29.9%
Nurses	45.1% (41.5-48.7)	85.8% (83.3-87.9)	40.7%
Physicians			
Overall compliance	54.2% (50.9-57.1)	73.2% (67.3-78.4)	19.0%
Trainee compliance*	79.5% (73.6-84.3)		
Trainee compliance†	18.9% (13.3-26.1)		

NOTE: Abbreviations: CI, confidence interval. \*When attending physicians cleaned their hands. †When attending physicians did not clean their hands.

of these students by healthcare providers as observers of HH at the main hospital. Training with the auditors occurred until interobserver agreement between all HH opportunities reached 100% agreement for 2 consecutive observation days.

During their rotations, students covertly recorded HH compliance based on moments of hand hygiene<sup>4</sup> and also noted location, presence, and compliance of the attending physician, team size during patient encounter, and isolation requirements. Both students measured HH compliance of nurses and physicians around them. Although students spent the majority of their time with their assigned physician or nurse teams, they did not limit their observations to these individuals only, but recorded compliance of any nurse or physician on the ward as long as they were within sight during an HH opportunity. To limit clustering of observations of the same healthcare worker, up to a maximum of 2 observations per healthcare worker per day was recorded.

We compared covertly measured HH compliance with data from overt observation by hospital auditors during the same time period. Differences in proportion of HH compliance were compared with hospital audits during the same period with a  $\chi^2$  test. Difference between differences in overtly and covertly measured HH compliance for nurses and physicians was compared using Breslow day test.

The study was approved by the hospital's research ethics board. Although deception was used in this study,<sup>2,6</sup> all data were collected for quality improvement purposes, and the aggregate results were disclosed to hospital staff following the study.

## RESULTS

Covertly observed HH compliance was 50.0% (799/1597) compared with 83.7% (2769/3309) recorded

by hospital auditors during the same time period ( $P < 0.0002$ ) (Table 1). There was no significant difference in the compliance measured by each student (50.1%, 473/928 vs 48.7%, 326/669) ( $P = 0.3$ ), and their results were combined for the rest of the analysis. Compliance before contact with the patient or patient environment was 43.1% (344/798), 74.3% (26/35) before clean/aseptic procedures, 34.8% (8/23) after potential body fluid exposure, and 56.8% (483/851) after contact with the patient or patient environment. Healthcare providers examining patients with isolation precautions were found to have a HH compliance of 74.8% (101/135) compared to 47.0% (385/820) when isolation precautions were not required ( $P < 0.0002$ ).

Hospital auditor data showed that surgery and medicine had similarly high rates of compliance (91.0% and 85.0%, respectively), whereas the emergency department had a notably lower rate of 73.8%. Covert observation confirmed a lower rate in the emergency department (43.9%), but showed a higher compliance on general medicine than on surgery (58.9% vs 45.7%;  $P = 0.02$ ). The difference in physician compliance between hospital auditors and covert observers was 19.0% (73.2%, 175/239 vs. 54.2%, 469/865); for nurses this difference was much higher at 40.7% (85.8%, 754/879 vs. 45.1%, 330/732) ( $P < 0.0001$ ) (Table 1).

In terms of physician compliance, primary teams tended to have lower HH compliance of 50.4% (323/641) compared with consulting services at 57.0% (158/277) ( $P = 0.06$ ). Team rounds of  $\geq 3$  members were associated with higher compliance compared with encounters involving  $< 3$  members (62.1%, 282/454 vs. 42.0%, 128/308) ( $P < 0.0002$ ). Presence of attending physician did not affect trainee HH compliance (55.5%, 201/362 when attending present vs. 56.8%, 133/234 when attending absent;  $P = 0.79$ ). However, trainee HH compliance improved markedly when attending staff cleaned their hands and decreased markedly when they did not (79.5%, 174/219 vs. 18.9%, 27/143;  $P < 0.0002$ ).

## DISCUSSION

We introduced covert HH observers at our hospital to determine whether differences in Hawthorne effect accounted for measured disparity between physician HH compliance, and to gain further insights into the barriers and enablers of physician HH compliance. We discovered that performance differences between physicians and nurses decreased when neither group was aware that HH was being measured, suggesting that healthcare professions are differentially affected by the Hawthorne effect. This difference may be explained by the continuity of nurses on the ward that makes them more aware of visitors like HH auditors,<sup>7</sup> compared with physicians who rotate periodically on the ward.

Although hospital auditors play a central role in HH education through in-the-moment feedback, use of these data to benchmark performance can lead to inappropriate inferences about HH compliance. Prior studies using automated HH surveillance have suggested that the magnitude of the Hawthorne effect varies based on baseline HH rates,<sup>8</sup> whereas our study suggests a differential Hawthorne effect between professions and clinical services. If we relied only on auditor data, we would have continued to believe that only physicians in our organization had poor HH compliance, and we would not be aware of the global nature of the HH problem.

Our results are similar to that of Pan et al., who used covert medical students to measure HH and found compliance of 44.1% compared with 94.1% by unit auditors.<sup>2</sup> Because their study involved an active feedback intervention, the differential in Hawthorne effect between professions could not be reliably assessed. However, they observed a progressive increase in nurse HH compliance using covert observation methods, suggesting improvement in HH performance independent of observer bias.<sup>7</sup>

Covert observation in our study also provided important insights regarding barriers and enablers of HH compliance. Self-preservation behaviors were common among both nurses and physicians, as HH compliance was consistently higher after patient contact compared to before or when seeing patients who required additional precautions. This finding confirms that the perceived risk of transmission seems to be a powerful motivating factor for HH.<sup>9</sup> Larger groups of trainees were more likely to clean their hands, likely due to peer effects.<sup>10</sup> The strong impact of role modeling on HH was also noted as previously suggested in the literature,<sup>3,6</sup> but our study captures the magnitude of this effect. Whether or not the attending physician cleaned their hands during rounds either positively or negatively influenced HH compliance of the rest of the physician team (80% when compliant vs 20% when noncompliant).

Our study has several important limitations. The differential Hawthorne effect seen at our center may not reflect other institutions that have numerous HH auditors or high staff turnover resulting in lower ability to recognize auditors. We cannot exclude the

possibility of Hawthorne effect using covert methods that could have affected nurse and physician performance differently, but frequent rotation of the students helped maintain covertness of observations. Finally, due to the nature of the covert student observers, a longer observation time frame could not be sustained.

Our experience using covert HH auditors suggests that traditional HH audits not only overstate HH performance overall, but can lead to inaccurate inferences regarding HH performance due to relative differences in Hawthorne effect. The answer to the question regarding whether physicians clean their hands appears to be that they do just as often as nurses, but that all healthcare workers have tremendous room for improvement. We suggest that future improvement efforts will rely on more accurate HH monitoring systems and strong attending physician leadership to set an example for trainees.

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