

# Hand Hygiene Among Health Care Workers: Is Educating Patients and Families a Feasible Way to Increase Rates?

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## ABSTRACT

**Background:** The Centers for Disease Control and Prevention has recommended teaching patients to remind health care workers to disinfect their hands. However, cognitive impairment among patients may hamper such efforts.

**Methods:** The St. Louis University Mental Status (SLUMS) Examination was administered to randomly selected inpatients at the Omaha VA Medical Center in Omaha, Nebraska. We asked patients and their families about attitudes toward reminding health care workers to disinfect their hands: willingness, feeling comfortable, and feeling responsible.

**Results:** Of 143 patients, 94 completed SLUMS; 9 had normal mental status and appropriate attitudes. Overall, 16 encounters involved patients or family who were well-suited for giving reminders.

**Conclusion:** Programs to encourage hospitalized adults to remind staff to perform hand hygiene may encounter barriers related to cognitive impairment and attitudes.

## BACKGROUND

Despite the value of hand hygiene in infection prevention, study after study has demonstrated disappointing compliance.<sup>1</sup> This is a concern in many hospitals at a time when infection prevention is particularly important because of nosocomial infections, increasing resistance to antimicrobials, and a paucity of new antimicrobial agents. One approach to improving compliance with hand hygiene is to teach patients to remind health care workers

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to perform hand hygiene. The concept of patient reminders has gained support from the World Health Organization and the Centers for Disease Control and Prevention, whose hand hygiene guideline asks infection prevention programs to “encourage patients and their families to remind health care workers (HCWs) to decontaminate their hands.”<sup>2</sup>

Some literature<sup>3</sup> shows increased hand hygiene compliance by educating patients or their families to give reminders. However, recent trends raise questions about the viability of this approach. Trends toward shorter length of stay have left the remaining hospital population

weighted toward sicker patients who may be less able to provide hand hygiene reminders and more vulnerable to infection. We suspected that our patients might be so sick that cognitive impairment would be widespread, and a program to promote hand hygiene reminders would be futile. Therefore, we evaluated our patients for cognitive impairment.

Aside from cognitive impairment, others have identified additional barriers to hand hygiene reminders. The literature raises several issues including whether patients are willing to ask nurses, physicians, and other health care workers if they washed their hands or if they would wash their hands,<sup>4-5</sup> and if patients think it is their responsibility.<sup>6</sup> Therefore, we evaluated our patients for the presence of these attitudinal barriers. In addition, we asked families about their interest in providing hand hygiene reminders because even if patients could not give hand hygiene reminders, their families might do so.

## METHODS

In this cross-sectional study, we approached 120 adults hospitalized in medical-surgical units and 23 in intensive care beds at the

Figure. St. Louis University Mental Status Examination

## VAMC SLUMS Examination

Questions about this assessment tool? E-mail [aging@slu.edu](mailto:aging@slu.edu).

Name \_\_\_\_\_ Age \_\_\_\_\_  
 Is patient alert? \_\_\_\_\_ Level of education \_\_\_\_\_

/1  
/1  
/1  
/3  
/3  
/5  
/2  
/4  
/2  
/8

1. What day of the week is it?
2. What is the year?
3. What state are we in?
4. Please remember these five objects. I will ask you what they are later.  
 Apple Pen Tie House Car
5. You have \$100 and you go to the store and buy a dozen apples for \$3 and a tricycle for \$20.  
 How much did you spend?  
 How much do you have left?
6. Please name as many animals as you can in one minute.  
 1 0-4 animals 2 5-9 animals 3 10-14 animals 4 15+ animals
7. What were the five objects I asked you to remember? 1 point for each one correct.
8. I am going to give you a series of numbers and I would like you to give them to me backwards.  
 For example, if I say 42, you would say 24.  
 1 87 2 649 3 8537
9. This is a clock face. Please put in the hour markers and the time at ten minutes to eleven o'clock.  
 Hour markers okay  
 Time correct
10. Please place an X in the triangle.  
 Which of the above figures is largest?
11. I am going to tell you a story. Please listen carefully because afterwards, I'm going to ask you some questions about it.  
 Jill was a very successful stockbroker. She made a lot of money on the stock market. She then met Jack, a devastatingly handsome man. She married him and had three children. They lived in Chicago. She then stopped work and stayed at home to bring up her children. When they were teenagers, she went back to work. She and Jack lived happily ever after.  
 1 What was the female's name?  
 2 What work did she do?  
 3 When did she go back to work?  
 4 What state did she live in?

TOTAL SCORE \_\_\_\_\_

HIGH SCHOOL EDUCATION		LESS THAN HIGH SCHOOL EDUCATION	
27-30	Normal	25-30	Normal
21-26	MNCD*	20-24	MNCD*
1-20	Dementia	1-19	Dementia

\* Mild Neurocognitive Disorder

SH Tariq, N Tumosa, JT Chibnall, HM Perry III, and JE Morley. The Saint Louis University Mental Status (SLUMS) Examination for Detecting Mild Cognitive Impairment and Dementia is more sensitive than the Mini-Mental Status Examination (MMSE) - A pilot study. J Am Geriatr Psych (in press).

Source: [http://medschool.slu.edu/agingsuccessfully/pdfsurveys/slumsexam\\_05.pdf](http://medschool.slu.edu/agingsuccessfully/pdfsurveys/slumsexam_05.pdf)

formed all of the evaluations, which occasionally were observed by another author. We used SLUMS results to categorize patients. The SLUMS scoring range for those with at least a high school education is 1-20 for dementia, 21-26 for mild neurocognitive disorder (MNCD), and 27-30 for normal status. For those with less than a high school education, the scoring is 1-19 for dementia, 20-24 for mild neurocognitive disorder, and 25-30 for normal status.

To evaluate the attitudinal barriers to giving hand hygiene reminders, we asked patients the following questions, based on several studies:<sup>4-6</sup> “Would you be willing to ask your health care worker if he or she washed his or her hands?”; “Would you be comfortable asking your health care worker if he or she washed his or her hands?”; and “Do you think it is your responsibility to ask your health care worker if he or she washed his or her hands?” If family members were present, we asked them similar questions about their own attitudes toward giving reminders.

In addition, we made 2 observations regarding the hospital’s program for encouraging patients to remind staff to wash hands. This program was confined to 2 interventions: signs in patient rooms with a message that it’s okay to ask workers if they’ve cleaned their hands and similar

signs near the elevators. We noted if any such posters were evident in the patient rooms.

VA Medical Center in Omaha, Nebraska. Patients were selected randomly from a list of bed locations. We prepared a sequential list of bed locations ordered by nursing unit, then room number, then (for 2-bed rooms) bed number. Next, we used an Excel random number generator to prepare a sequence of random numbers and assigned the first bed location to the first random number, the second bed location to the second random number, etc. We then sorted the bed locations by their corresponding random numbers, which gave us a list of bed locations in random order. To avoid bias in patient selection, our first patient visit was to the first bed on our list of locations in random order, our second visit to the second bed location, and so on.

Evaluations included the St. Louis University Mental Status Exam (SLUMS)<sup>7</sup> (Figure) and were performed on weekdays from 8 AM to 10 AM and 2 PM to 4 PM for 4 weeks. One author per-

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other), factors related to risk of infection (intravenous device, urine collection device, endotracheal tube, chest tube, other device), and SLUMS score. The remainder of the sheet had a series of yes-no questions directed to the patient and to the family (if applicable) that evaluated the attitudinal barriers to giving hand hygiene reminders described above.

Approval was obtained from the Institutional Review Board to conduct this study with waiver of informed consent.

## RESULTS

Among the 143 patients enrolled, 84% of the patients were white and 96% non-Hispanic. Of the 23 intensive care unit (ICU) patients, 95.7% were men, mean age was 69.3, with a standard deviation (SD) of 8.1. Of the 120 patients outside the ICU, 95.8% were men, mean age was 66.2, and SD 13.3.

Only 94 (65.7%) patients were willing and able to complete the SLUMS test; 20 had normal mental status. Of those 20 patients, 9 indicated that they were willing to give reminders, were comfortable giving reminders, and felt it their responsibility to do so.

Of the 94 patients who completed the SLUMS test, 21.3% were classified normal, 35.1% MNCD, and 43.6% dementia. For the normal classification, the median SLUMS was 28, mean was 28.1, and SD 1.0. For MNCD, the median was 24, mean was 23.6, and SD 1.9. For dementia, the median was 15, mean 14.8, and SD 3.7. For all those who completed SLUMS, the median was 21, mean 20.7, and SD 6.1.

One hundred seven patients answered questions about their attitudes toward giving reminders; 66% said they were willing to give reminders, 30% said they weren't, and 4% said they didn't know. For the question about being comfortable giving reminders, 54% said "yes," 43% said "no," and 3% said they didn't know. For the question regarding their responsibility to give reminders, 39% said "yes," 58% said "no," and the rest gave other answers, such as "yes and no" and "don't know."

Family members were present for 28 (19.6%) patients. Of those families present, 25 answered questions about their attitudes toward giving reminders and 8 (32%) indicated they were inclined to do so. Taking into account both patients who were well-suited to give reminders and families who were inclined to give reminders, a total of 16 (11.2%) were expected to remind health care workers to perform hand hygiene.

Two of our incidental observations are noteworthy because they are consistent with the findings of our mental status evaluation and our questions about attitudes toward giving hand hygiene reminders. First, among the 143 patients, 21 failed to respond to an initial greeting and were unable to complete the SLUMS exam. Second, of 122 rooms with responsive patients, 105 had signs with the message, "Patients & Visitors: It's okay to ask health care providers if they have cleaned their hands." Signs

near elevators echo this message. Nonetheless, we were never reminded to practice hand hygiene by patients or their families.

## DISCUSSION

For a patient to remind staff to perform hand hygiene, a patient must have adequate cognitive capability and an attitude consistent with an inclination to give reminders. Such patients comprised only 6.3% of our population. Taking into account both patient and family suitability to provide reminders, reminders could be expected in only 11.2% of encounters.

Our results suggest that approximately 1 patient in 15 may remind staff to perform hand hygiene. Some authors speculate that such reminders, albeit infrequent, would have a meaningful impact.<sup>4</sup> However, the value of infrequent reminders remains a matter of speculation.

Among our patients who completed SLUMS, dementia was more prevalent than in the pilot study describing SLUMS<sup>7</sup> (44% vs 12%). MNCD was also more common in our patients (35% vs 26%), and our patients were less likely to be classified normal (21% vs 62%). This is plausible since the pilot study involved 702 individuals seen for routine clinic visits in the Geriatric Research Education and Clinical Center clinics in St. Louis, Missouri; our patients were in ICU or acute medical-surgical beds.

Additional support for the plausibility of our findings comes from the failure of a passive approach to promoting hand hygiene reminders in our hospital. Despite signs promoting reminders, no one reminded us to clean our hands when we entered the rooms. Concerns about inability of patients to provide hand hygiene reminders are complemented by concerns about social barriers. Indeed, a recent controlled trial<sup>8</sup> evaluating patient reminders found no clinically significant increase in hand hygiene. This intervention may have been stymied by patient attitudes—rather than cognitive impairment—inasmuch as it focused on lucid patients and excluded wards "inappropriate" for patient participation such as the ICU, where patient reminders would face barriers.

Some literature,<sup>9</sup> including a report from a rehabilitation unit, has indeed supported efforts to teach patients to remind staff to perform hand hygiene. However, studies of this sort are burdened by limitations: small sample sizes, less reliable data due to self-reporting, investigation with short follow up, and research limited to an affluent area. Additionally, these studies have not focused on the barrier of cognitive impairment.

Others have looked at hand hygiene reminders; however, we were unable to locate a study that, like ours, examined the entire set of factors necessary for a patient to give reminders: intact mental status, willingness to give reminders, comfort in doing so, and feeling responsible. Also, there was a paucity of reports

that—as in this paper—used systematic, random patient sampling at varied times during admission. Another special feature of this study was evaluation of the potential for family involvement, which assessed an additional issue affecting the success of a reminder program.

This study has some limitations. Our method of assessing mental status—the SLUMS examination—is not widely used; however, our patient population (veterans in the Midwest) resembles the population in which SLUMS was developed. Also, SLUMS Question 11 has face validity for assessing a patient's ability to participate in a reminder program. It is a story that is read to the patient, who is asked questions about it. A reminder program requires a patient to listen to instructions, comprehend them, and apply what has been learned. Although one could speculate that patients with mild neurocognitive disorder could give reminders, this doesn't seem likely considering the cognitive demands of a reminder program. There may be concern that SLUMS has not been validated as a measure of ability to participate in a hand hygiene reminders program. However, we saw that 34.3% of patients did not even complete SLUMS. Is it reasonable to expect patients like that to listen to an explanation of a reminders program, understand it, remember the instructions, and recall them when reminders are needed?

Furthermore, a growing body of literature has recognized the value of SLUMS. SLUMS was devised by researchers who recognized that the widely used Mini-Mental Status Examination (MMSE) had value in identifying dementia yet was unsuitable for identifying mild neurocognitive disorder. Their seminal paper<sup>7</sup> deriving and validating SLUMS studied 702 patients whom clinicians classified, using standard criteria, as dementia, mild neurocognitive disorder, or normal. SLUMS was indeed thought by the authors to be superior to MMSE in identifying mild neurocognitive disorder and comparable in identifying dementia. The authors presented receiver operating curves supporting these conclusions, and they presented detailed data on sensitivity and specificity for SLUMS and MMSE for the detection of both dementia and mild neurocognitive disorder for 2 groups of patients: those with high school education and those with less than high school education. This resulted in scoring recommendations that were modified somewhat for the current version of SLUMS:

“The scores for mild neurocognitive disorder and dementia for patients with less than high school education are 23.5 and 19.5, respectively. These cutoffs yield sensitivity/specificity values of 0.92/0.81 and 1.0 /0.98, respectively. The cutoff scores for mild neurocognitive disorder and dementia for patients with high school education or higher are 25.5 and 21.5, respectively. Sensitivity/specificity values for these cutoffs are 0.95/0.76 and 0.98/1.0, respectively.”

Additional scholarly work evaluated SLUMS scores over time<sup>10,11</sup> and in different cultures.<sup>12,13</sup> SLUMS also has been the object of study in an explicitly nonveteran population,<sup>14</sup> in comparison with other instruments,<sup>15</sup> and as a predictor of decline.<sup>16</sup>

Our results may have limited generalizability. Our study was confined to adults in medical-surgical units and an ICU. However, such patients are typical of many US hospitals. In addition, our work may not be generalizable to populations of non-English speaking or culturally diverse patients. We suspect that language and cultural barriers would further challenge a patient empowerment program.

## CONCLUSION

“Promote patient reminders” is an intervention that may be appropriate in some settings. The concept of tailoring hand hygiene improvement strategies to specific settings found support in a Joint Commission study.<sup>17</sup> This study of several hospitals sought to find the specific reasons for poor hand hygiene compliance in each setting. The authors encountered a variety of reasons for noncompliance. The study obtained substantial improvements in compliance, not by imposing a “one-size-fits-all” intervention, but rather by tailoring the intervention in each hospital to the specific reasons for noncompliance at each site. Interventions varied and included improving disinfectant dispenser placement, providing a space for workers to leave items they were carrying, and a commitment by leadership to glove use.

In a site with adult medical-surgical units resembling ours, however, the intervention of teaching patients to give hand hygiene reminders faces formidable barriers of cognitive impairment, exacerbated by patient and family attitudes.

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## REFERENCES

1. Erasmus V, Daha TJ, Brug H, et al. Systematic review of studies on compliance with hand hygiene guidelines in hospital care. *Infect Control Hosp Epidemiol.* 2010;31(3):283-294.
2. Boyce JM, Pittet D; and Healthcare Infection Control Practices Advisory Committee; HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. Guideline for hand hygiene in health-care settings. Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HIPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. *Am J Infect Control.* 2002;30(8):S1-46.
3. McGuckin M, Storr J, Longtin Y, Allegranzi B, Pittet D. Patient empowerment and multimodal hand hygiene promotion: a win-win strategy. *Am J Med Qual.* 2011;26(1):10-17.

4. Lent V, Eckstein EC, Cameron AS, Budavich R, Eckstein BC, Donskey CJ. Evaluation of patient participation in a patient empowerment initiative to improve hand hygiene practices in a Veterans Affairs medical center. *Am J Infect Control*. 2009;37(2):117-120.
5. Ottum A, Sethi AK, Jacobs EA, Zerbel S, Gaines ME, Safdar N. Do patients feel comfortable asking healthcare workers to wash their hands? *Infect Control Hosp Epidemiol*. 2012;33(12):1282-1284.
6. Pittet D, Panesar SS, Wilson K, et al. Involving the patient to ask about hospital hand hygiene: a National Patient Safety Agency feasibility study. *J Hosp Infect*. 2011;77(4):299-303.
7. Tariq SH, Tumosa N, Chibnall JT, Perry MH 3rd, Morley JE. Comparison of the Saint Louis University Mental Status Examination and the Mini-Mental State Examination for detecting dementia and mild neurocognitive disorder—a pilot study. *Am J Geriatr Psychiatry*. 2006;14(11):900-910.
8. Stewardson AJ, Farquet N, Gayet-Ageron A, et al. Patient and healthcare worker perception about patient participation in improving hand hygiene practices: impact of a patient participation intervention. *Antimicrob Resist Infect Control*. 2013;2:25-28.
9. McGuckin M, Taylor A, Martin V, Porten L, Salcido R. Evaluation of a patient education model for increasing hand hygiene compliance in an inpatient rehabilitation unit. *Am J Infect Control*. 2004;32(4):235-238.
10. Howland M, Tatsuoka C, Smyth KA, Sajatovic M. Detecting change over time: a comparison of the SLUMS examination and the MMSE in older adults at risk for cognitive decline. *CNS Neurosci Ther*. 2016;22(5):413-419. doi: 10.1111/cns.12515.
11. Cruz-Oliver DM, Malmstrom TK, Roegner M, Tumosa N, Grossberg GT. Cognitive deficit reversal as shown by changes in the Veterans Affairs Saint Louis University Mental Status (SLUMS) examination scores 7.5 years later. *J Am Med Dir Assoc*. 2014;15(9):687.e5-10. doi: 10.1016/j.jamda.2014.05.004.
12. Kaya D, Isik AT, Usarel C, Soysal P, Ellidokuz H, Grossberg GT. The Saint Louis University Mental Status Examination is better than the Mini-Mental State Examination to determine the cognitive impairment in Turkish elderly people. *J Am Med Dir Assoc*. 2016;17(4):370.e11-5. doi: 10.1016/j.jamda.2015.12.093.
13. Cao L, Hai S, Lin X, et al. Comparison of the Saint Louis University Mental Status Examination, the Mini-Mental State Examination, and the Montreal Cognitive Assessment in detection of cognitive impairment in Chinese elderly from the geriatric department. *J Am Med Dir Assoc*. 2012;13(7):626-629. doi:10.1016/j.jamda.2012.05.003.
14. Feliciano L, Horning SM, Klebe KJ, Anderson SL, Cornwell RE, Davis HP. Utility of the SLUMS as a cognitive screening tool among a nonveteran sample of older adults. *Am J Geriatr Psychiatry*. 2013;21(7):623-630. doi: 10.1016/j.jagp.2013.01.024.
15. Cummings-Vaughn LA, Chavakula NN, Malmstrom TK, Tumosa N, Morley JE, Cruz-Oliver DM. Veterans Affairs Saint Louis University Mental Status examination compared with the Montreal Cognitive Assessment and the Short Test of Mental Status. *J Am Geriatr Soc*. 2014;62(7):1341-1346. doi: 10.1111/jgs.12874.
16. Cruz-Oliver DM, Malmstrom TK, Allen CM, Tumosa N, Morley JE. The Veterans Affairs Saint Louis University Mental Status Exam (SLUMS exam) and the Mini-Mental Status Exam as predictors of mortality and institutionalization. *J Nutr Health Aging*. 2012;16(7):636-641.
17. Chassin MR, Mayer C, Nether K. Improving hand hygiene at eight hospitals in the United States by targeting specific causes of noncompliance. *Jt Comm J Qual Patient Saf*. 2015;41(1):4-12.

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