

Nudges emphasizing social norms increased hospital visitors' hand sanitizer use

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abstract

Hand hygiene has taken on new importance as a key behavior for limiting the spread of COVID-19. In the study reported here, we tested ways to increase hand sanitizer use by hospital visitors. We placed dispensers at entrances to hospital units and compared the effect of simply having the dispenser readily accessible (the control condition) with the effects of two nudges: combining the dispenser with an eye-catching sign emphasizing that hand sanitizer use is the norm ("Here we use HAND DISINFECTANT") or with the same sign except for the addition of an altruistic motive for the norm-emphasizing message ("Here we use HAND DISINFECTANT . . . to protect your relatives"). Both signs greatly improved compliance, although including the altruistic element did not significantly add to the impact of stating the norm. The results indicate that to improve hand hygiene, hospitals should go beyond locating hand sanitizer dispensers conveniently: they should make the dispensers more visible and stress that using hand sanitizer is the norm.

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In the mid-1800s, Ignaz Semmelweis issued simple advice for saving lives to physicians: wash your hands.¹ His admonition was reviled at the time, considered a personal insult by senior doctors who likely resented the implication that they were the cause of their patients' deaths.¹ Today, though, it is clear that hand hygiene is critical not only for health care workers but for anyone who wants to limit the spread of infectious diseases.

And yet compliance with hand-cleaning recommendations has long remained surprisingly low among health professionals and the public, as is demonstrated in part by the high numbers of health care–associated infections (HCAIs)—infections picked up in health care settings. HCAIs affect hundreds of millions of patients worldwide; in the United States alone, almost 100,000 people die of HCAIs every year.² Of course, HCAIs can be caused by many different factors related to systems and processes in health care and human behavior,³ but most cases could be prevented if health care workers and others who entered hospitals followed standard hand hygiene recommendations.

The importance of hand hygiene—whether that involves hand washing or using a hand sanitizer—extends far beyond HCAIs and hospitals. As multidrug-resistant organisms and diseases with no known cure (such as COVID-19) become more common, the need for prevention, and particularly hand hygiene, becomes ever more urgent in all kinds of settings. In light of the urgency of controlling infections in hospitals, we focus in this article on hospitals and report on an experiment that compared the effectiveness of nudges meant to increase visitors' use of hand sanitizer.

Most studies on infection control and hand hygiene compliance in hospitals have, sensibly, concentrated on medical professionals because of the critical need for them to avoid spreading infections.^{4,5} However—at least before hospitals began curtailing visitation in response to the COVID-19 pandemic—thousands of people entered hospitals to visit their ailing friends and relatives each day. Along with flowers,

chocolates, and other gifts, they brought the potential for transmitting pathogenic microorganisms. One observational study involving multiple hospitals reported in 2019 that visitors and patients accounted for 15.4% of all entries and exits from patient rooms in the acute care setting.⁶ Few studies, though, have examined hand hygiene in hospital visitors.⁷

Before undertaking our study, we understood that people can have plenty of reasons, both physical and mental, for not cleaning their hands. Among the barriers may be a lack of knowledge about the benefits of clean hands, overconfidence in the ability of one's immune system to fight off disease, inertia that overcomes good intentions (that is, the intention–behavior gap), or simply a lack of convenient access to soap and water or hand sanitizer. Indeed, a 2015 analysis of a large hospital in the United States showed that inconveniently located sinks and hand sanitizer dispensers contribute to low hand hygiene compliance in many hospitals and other health care institutions.⁴ Often these items are placed behind doors or otherwise out of immediate sight.

Unfortunately, interventions to increase hand hygiene compliance (such as education campaigns and reminders) often show modest results that do not last,^{8–10} so new methods are needed. In the behavioral sciences, behavior is framed as the interaction between individuals and their environments, which means that behavior can often be altered by making changes in the environment in which decision-making takes place.^{11,12} Changing the context of decisions with a simple nudge may sway people toward making more advantageous choices.¹³ With that knowledge in mind, we compared the effects of two nudges on visitors' use of hand sanitizer.

Methods

Specifically, we examined whether colored signs that emphasized hand sanitizer use as a social norm^{14,15} could improve hospital visitors' hand hygiene. The study was conducted in Oslo University Hospital, Scandinavia's largest

hospital. Patients come from all over Norway to receive treatment there and then stay for the first critical days after surgery before being sent home or to their local hospital for further recovery. Our study is a systematic replication of an informally published hand hygiene field study conducted at Gentofte Hospital in Denmark.¹⁶

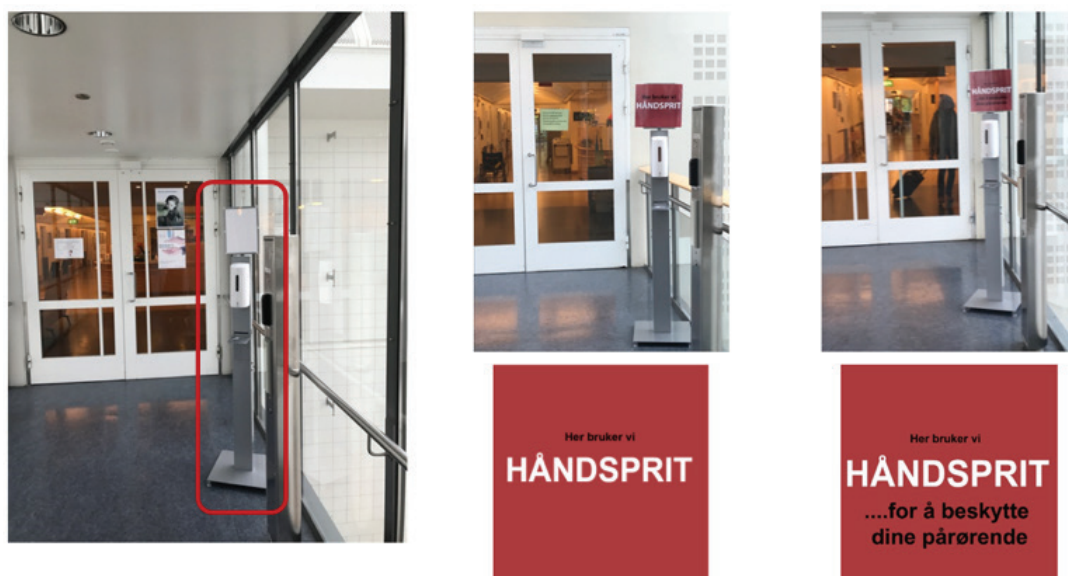
In the Gentofte Hospital study, the investigators used the status quo (often inaccessible dispensers) as the control condition and compared visitors' hand sanitizer use in that condition to (a) use when the dispensing device was placed at the entrance to a medical unit and (b) use when the new placement was combined with a red sign bearing a social-norm-emphasizing message that translates from Danish as "Here we use HAND DISINFECTANT . . . in order to protect your relative." The researchers recorded use or nonuse of the sanitizer in 90 encounters with the dispenser (30 observations in each condition). Three percent of visitors used hand sanitizer in the baseline condition, but 20% used it when the dispenser was placed more conveniently and 67% used it when the sign was displayed with the dispenser.¹⁶

As is shown in Figure 1, our design included

- a control condition, which involved accessible placement of a hand sanitizer dispenser at each hospital unit entrance;
- nudge 1, which involved adding a red sign with the message "Her bruker vi HÅNDSPRIT" (Here we use HAND DISINFECTANT) to a well-placed dispenser indicating that use of hand sanitizer is the norm at the hospital; and
- nudge 2, which was the same as nudge 1 but, as in the Danish study, the sign also offered an altruistic motive for using hand sanitizer: "Her bruker vi HÅNDSPRIT . . . for å beskytte dine pårørende" (Here we use HAND DISINFECTANT . . . to protect your relatives).

We chose to test the effect of adding signs to hand sanitizer dispensers because messages and social norms can both promote selected behaviors. We chose those particular messages—which we displayed on prominent signs measuring 29 × 29 centimeters—in part

Figure 1. The control condition & two nudges



Note. In the control condition (left), the hand sanitizer dispenser was placed in a convenient location. Nudge 1 (center) and nudge 2 (right) included that same convenient placement plus a red sign with Norwegian text that translates, respectively, as "Here we use HAND DISINFECTANT" and "Here we use HAND DISINFECTANT . . . to protect your relatives."

because the language “Here we use HAND DISINFECTANT” is forceful, simple, and in keeping with the egalitarian Scandinavian culture. We suspected that nudge 2 might be more effective than nudge 1 because it performed well in the Gentofte Hospital study and because some past evidence suggested that health and safety messages that highlight the consequences for others may be more effective than messages focusing only on the benefits for the recipient.¹⁴

Our study had a quasi-experimental design—“quasi” in that we could not randomly allocate participants to the conditions without letting them know the purpose of the study and thus potentially biasing their actions. We examined 300 episodes in which people made the choice to use or not use the disinfectant (100 choice episodes per condition). We included as participants every hospital visitor who entered a unit. We did not need informed consent or approval from a regional ethics committee because participants were observed in a public setting and no sensitive or publicly identifiable data were recorded. Trained observers unobtrusively recorded the number of visitors who used or did not use hand sanitizer. People wearing hospital uniforms were not included in the study; neither were patients. To avoid measuring the same visitors multiple times, we rotated the nudges used and the medical units observed over three weeks.

Before the study, Oslo University Hospital provided two freestanding automatic hand sanitizer dispensers that discharged a set amount of disinfectant when a hand was placed underneath them. Because the optimal placement of the devices would be as close to patients as possible (to reduce the risk of transmission of microorganisms), we determined that they should be located in front of the entrance to the care units. We tested different locations for the dispensers and ultimately decided to put them approximately two meters in front of the automatic doors that provide entrance to each treatment area, next to a pole that contained the mechanism for controlling the opening of the doors. The dispenser locations we chose also

allowed the observers to stay out of sight of the hospital visitors being monitored yet afforded a clear view of the hand sanitizer dispensers. The observers wore hospital attire to enable them to blend into the background and avoid attracting attention from people in the corridors. (A second observer was present for 25% of the observations; the interrater reliability score was 96%.)

Before the study, we also considered different colors for the sign. Because strong colors tend to grab attention and would stand out in an otherwise neutral environment, we tested green, blue, and red. No color led to more sanitizer use than another, so we opted for red—the color the Danish researchers used successfully. Also, the color red is often used to indicate danger or to raise awareness, as with stop signs.

Results

The study involved a binary outcome: whether hand sanitizer was or was not used. In the control condition, 7% of the visitors used hand sanitizer. Nudge 1 (reminding people that hand sanitizer use is the norm) resulted in 46% of the visitors using hand sanitizer, compared with 40% for nudge 2 (which stated the norm and also said, “to protect your relatives”). See Figure 2.

We found that presenting one of the nudges resulted in a significant increase in hand sanitizer use over merely making the dispensers more accessible ($p < .05$). We further found that nudge 2 was no more effective than nudge 1 ($p > .05$). (See note A for more detailed data and note B for an explanation of the statistics used in this article.)

Discussion & Policy Implications

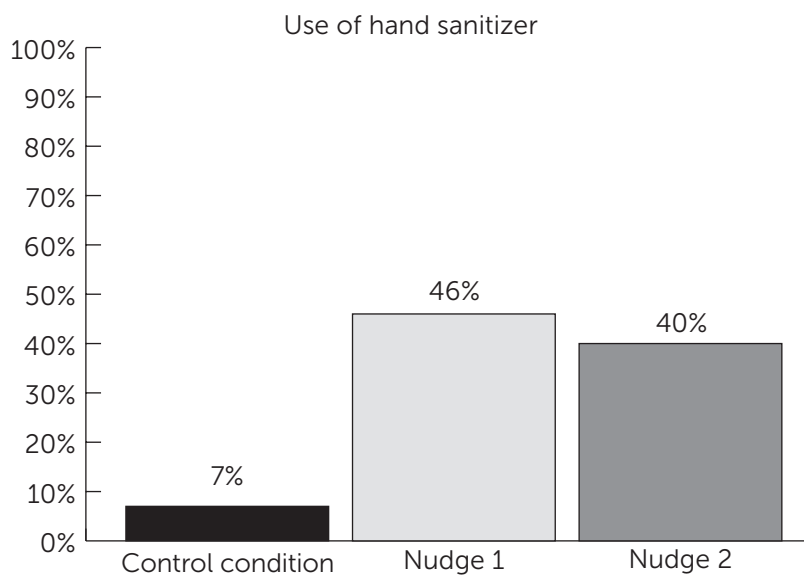
The COVID-19 pandemic has intensified the need for people to keep their hands clean. Practicing hand hygiene is one of the most straightforward, effective, and cost-effective behaviors for limiting the transmission of harmful germs and preventing illnesses.¹⁷ Therefore, it is more important than ever to transform intention into action.

In this study, we tested two nudges—eye-catching signs that said hand sanitizing was the norm—to increase the use of hand sanitizer by hospital visitors. Our results suggest that using cost-effective and simple nudges is an effective way to increase hospital visitors' use of hand sanitizer. The interventions resulted in a quantitatively meaningful and statistically significant increase in hand hygiene compliance. No statistically significant difference existed between the intervention that simply stated the norm and the intervention that stated the norm and also offered an altruistic rationale for compliance. In an intriguing finding that did not reach statistical significance, more women than men used the hand sanitizer in response to the altruistic nudge; it would be interesting to explore this pattern further.

One limitation of the study is that, at times, visitors arrived in small groups; we cannot rule out the possibility that there was some contagion effect in these instances. More important, we did not test the effect of attaching a simple red sign to the dispenser as a control condition (such as a sign that merely labeled the dispenser "Hand Sanitizer" rather than stating a norm); this limitation should be addressed in future replications. Replication studies are also essential, of course, to increase confidence in the findings as well as in their reliability and validity. It is also possible that the wording of the signs might need to differ in different cultures; in some places, for instance, it might be more effective to indicate that some specific authority recommends hand sanitizer use.

Some differences between our results and those of the Gentofte Hospital study warrant discussion. Recall that our control condition is similar to the Gentofte Hospital placement nudge and that our nudge 2 is similar to the Gentofte Hospital placement + sign nudge (which included the message that hand sanitization protects the visitors' relatives). In both the Danish and the Norwegian hospitals, as in many other hospitals around the world, the hand sanitizers were typically located inside patient rooms and out of immediate reach. In our control condition (convenient placement), 7%

Figure 2. The percentage of visitors who used hand sanitizer in the control condition & in response to different nudges



of the visitors used hand disinfectant, whereas 20% of the visitors used it in response to convenient placement in the Gentofte Hospital study. Further, in the Gentofte Hospital study, the placement + sign condition had a compliance rate of 67% compared with 46% for our nudge 1 (which had no mention of relatives) and 40% for our nudge 2.

The differences in the magnitude of the results between the two studies could be due to several factors, such as differences in competing stimuli in the surroundings, the number of observations, or cultural attitudes toward following rules. But the consistent bottom line of both studies is that it is possible to increase hand hygiene compliance among hospital visitors through thoughtful placement of dispensers and the use of readily visible signs. Indeed, the finding suggest that if hospitals want to increase hand sanitizer use, they should not only position dispensers conveniently but also increase the dispensers' visibility (such as with brightly colored signs) and stress that the use of the hand sanitizer is the norm.

The best health policies are based on scientific evidence, and policymakers can facilitate improved hand hygiene by promoting the instantiation of proven practices by architects,

contractors, and others who are involved in building hospitals and other institutions in which hand hygiene is of high importance. Our results are also particularly meaningful because they point to proposed interventions that are simple, low cost, and suitable for almost any physical location. What Semmelweis discovered more than 150 years ago still holds: simple interventions can be powerful, and the consequences of not using them can be dire.

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end notes

- A. The data were analyzed using chi-square tests. When hand sanitizer use was compared for all three conditions, the results were $\chi^2(2, N = 300) = 41.23, p < .05$. Comparison of the effects of nudge 1 and nudge 2 yielded $\chi^2(1, N = 200) = 0.74, p > .05$.
- B. Editors' note to nonscientists: For any given data set, the statistical test used—such as the chi-square (χ^2), the t test, or the F test—depends on the number of data points and the kinds of variables being considered, such as proportions or means. The p value of a statistical test is the probability of obtaining a result equal to or more extreme than would be observed merely by chance, assuming there are no true differences between the groups under study (this assumption is referred to as the *null hypothesis*). Researchers traditionally view $p < .05$ as the threshold of statistical significance, with lower values indicating a stronger basis for rejecting the null hypothesis.

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