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It's Not All About Me: Motivating Hand Hygiene Among Health Care Professionals by Focusing on Patients

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Abstract

Diseases often spread in hospitals because health care professionals fail to wash their hands. Research suggests that to increase health and safety behaviors, it is important to highlight the personal consequences for the actor. However, because people (and health care professionals in particular) tend to be overconfident about personal immunity, the most effective messages about hand hygiene may be those that highlight its consequences for other people. In two field experiments in a hospital, we compared the effectiveness of signs about hand hygiene that emphasized personal safety ("Hand hygiene prevents you from catching diseases") or patient safety ("Hand hygiene prevents patients from catching diseases"). We assessed hand hygiene by measuring the amount of soap and hand-sanitizing gel used from dispensers (Experiment 1) and conducting covert, independent observations of health care professionals' hand-hygiene behaviors (Experiment 2). Results showed that changing a single word in messages motivated meaningful changes in behavior: The hand hygiene of health care professionals increased significantly when they were reminded of the implications for patients but not when they were reminded of the implications for themselves.

Keywords

social influences, motivation, health, cooperation

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In 1847, Ignaz Semmelweis required health care professionals at the Vienna General Hospital to wash their hands, and death rates due to childbed fever decreased from 18.3% to 1.3%. Since then, extensive research has demonstrated that hand hygiene plays a critical role in preventing the spread of infections and diseases (Backman, Zoutman, & Marck, 2008). Nevertheless, it is common for health care professionals to wash their hands less than half as often as recommended, and many interventions for improving hand hygiene among health care professionals have proven ineffective (Gawande, 2004; Whitby et al., 2007). How can psychological science guide the development of messages to address this pressing problem?

Messages about health and safety are thought to be effective when they highlight personal risks for the actor. Researchers have speculated that health care professionals "are probably driven to wash their hands by their need to protect themselves more than [by their need to protect] their patients" (Korniewicz & El-Masri, 2010, p. 88). According to this line of logic, messages aimed at health care professionals should emphasize how hand hygiene protects them personally. Such messages are believed to activate basic motivations related to survival and self-protection (Rothman & Salovey, 1997). As Williams and Noyes (2007) summarized, safety behavior "is dependent on individuals believing that the risk is likely to affect *them*, that it will have serious consequences for *them*" (p. 21, emphasis in original).

However, research on overconfidence has shown that individuals consistently overestimate their immunity (Dunning, Heath, & Suls, 2004). This illusion of invulnerability is common among health care professionals. As two physicians explained, "I'm a doctor, I'm protected," and "We doctors wear magic white coats. We destroy disease. . . . How could it ever attack us?" (Klitzman, 2006, p. 547).

Overconfidence is likely to be fueled by both motivational and cognitive processes. First, to maintain a sense of security while working in hazardous environments, health care professionals may need to convince themselves that they are protected. According to research on motivated reasoning (Kunda, 1990) and confirmation biases (Nickerson, 1998), health care professionals may search for information that seems to verify their personal safety and may discount information that

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suggests they are at risk. Indeed, research has shown that people tend to respond defensively to information that poses a threat to their personal health or safety: People are likely to scrutinize such messages for flaws rather than accept the information they contain (Liberman & Chaiken, 1992).

Second, although health care professionals are frequently exposed to diseases, they contract relatively few. When they do get sick, it is not clear that poor hand hygiene is the culprit. Thus, it may be easy for health care professionals to recall instances in which they failed to wash their hands without getting sick, but difficult for them to recall episodes in which failing to wash their hands made them ill. According to research on the availability heuristic (Tversky & Kahneman, 1974), because the ease with which an event comes to mind serves as a cue for its likelihood (Schwarz et al., 1991), health care professionals should perceive that failing to wash their hands poses little personal risk. Consequently, messages emphasizing the personal consequences of hand hygiene for health care professionals may fall on deaf ears.

Research on persuasion reveals that for a message to resonate with an audience, it must be relevant to that audience's perspective (Cialdini, 2003; Clary & Snyder, 1999; Rothman & Salovey, 1997). We hypothesized that health care professionals would be more motivated to wash their hands by messages highlighting patient consequences than by messages highlighting personal consequences. Whereas people tend to overestimate their own invulnerability, for both motivational and cognitive reasons, they are less susceptible to this bias when estimating the vulnerability of other people (Dunning et al., 2004). Moreover, the fact that patients are by definition a vulnerable population may make their risks salient to health care professionals, who are trained to err in favor of caution when treating patients (Gigerenzer, Gaissmaier, Kurz-Milcke, Schwartz, & Woloshin, 2008).

Thus, messages aimed at health care professionals should be most effective when they emphasize how hand-hygiene practices can protect patients' health rather than personal health. We tested this hypothesis in two field experiments in a hospital by subtly manipulating the content of signs about hand hygiene and testing their influence with unobtrusive measures (Webb, Campbell, Schwartz, & Sechrest, 1966). To measure the signs' effects, we used two strong, complementary assessment techniques recommended by The Joint Commission (2009) as part of the Consensus Measurement in Hand Hygiene project: objective measurements of the use of hand-hygiene products and independent observations of adherence to safe hand-hygiene practices.

Experiment 1

Method

We compared the effects of signs emphasizing personal consequences, patient consequences, or neither on the hand-hygiene behaviors of health care professionals in a U.S. hospital. Our focus on signs was based on evidence that small variations in the content of messages can produce powerful changes in mindsets and behaviors (Cialdini, 2003; Crum & Langer, 2007). We assessed hand hygiene by measuring the percentage of soap and hand-sanitizing gel used from dispensers in hospital units; this technique was both objective and unobtrusive (The Joint Commission, 2009). Our sample comprised 66 dispensers available for physicians and nurses in the hospital, and we measured the amount of soap and gel used during 2-week periods before and after we introduced our signs. To measure baseline product use, we had an environmental-services team fill the bag in each dispenser with soap or gel and weigh each bag 2 weeks later. This team, which was blind to our hypotheses, then refilled the dispensers before we began the experiment. To minimize demand characteristics and cross-contamination, we did not inform employees at the hospital that research was underway.

We randomly assigned one of three signs to each dispenser. The personal-consequences sign read, "Hand hygiene prevents you from catching diseases." The patient-consequences sign read, "Hand hygiene prevents patients from catching diseases." The control sign, which was developed by hospital managers, read, "Gel in, wash out." Except for these subtle differences in wording, the signs were identical. One sign was posted above each dispenser by a safety professional. After 2 weeks, the environmental-services team weighed each bag again. Because the bags were of different sizes, we report our dependent measure as the percentage by weight of soap or gel used.

Results and discussion

Table 1 reports the mean percentage of soap or gel used from the dispensers in each condition, before and after the signs were introduced. A repeated measures analysis of variance on the amount of hand-hygiene product used showed a significant interaction between time (pretest, posttest) and condition

Table 1. Mean Percentage (by Weight) of Hand-Hygiene Products Used as a Function of Condition in Experiment 1

Condition	Pretest product usage	Posttest product usage
Control (n = 21)	38.24% (24.90)	40.13% (24.43)
Personal consequences (n = 23)	35.49% (28.18)	33.98% (19.65)
Patient consequences (n = 22)	37.25% (36.46)	54.18% (18.33)

Note: Standard deviations are in parentheses.

(personal consequences, patient consequences, control), $F(2, 63) = 3.30$, $p = .04$, $\eta^2 = .09$, $p_{rep} = .89$. Paired-samples t tests showed a significant increase from pretest to posttest in the amount of hand-hygiene product used from dispensers with the patient-consequences sign (37.25% to 54.18%), $t(21) = 2.72$, $p = .01$, $d = 0.59$, $p_{rep} = .96$, but not from dispensers with the personal-consequences sign (35.49% to 33.98%), $t(22) = -0.27$, $p = .79$, or the control sign (38.24% to 40.13%), $t(20) = 0.64$, $p = .53$. Tukey's multiple comparison test showed no significant differences between conditions in the pretest use of hand-hygiene product, but in the posttest, the amount of hand-hygiene product used from dispensers with the patient-consequences sign was significantly greater than the amount used from dispensers with the personal-consequences sign ($p < .01$, $d = 1.06$, $p_{rep} = .97$) or the control sign ($p < .05$, $d = 0.65$, $p_{rep} = .89$).

Although these results are encouraging, they are subject to two key limitations. First, health care professionals may have been influenced by a sign near one dispenser but used hand-hygiene products from a different dispenser. Second, it is possible that the effects were influenced either by a small number of health care professionals who used large quantities of hand-hygiene products or by patients who gained access to the dispensers. To address these potential confounds, in Experiment 2, we assigned the personal-consequences and patient-consequences signs to separate hospital units and asked experts to directly observe health care professionals' hand-hygiene behaviors.

Experiment 2

Method

Nine months after Experiment 1, we conducted a second experiment in different units of the same hospital, using the same personal- and patient-consequences signs. We enlisted three experts—a physician in charge of patient safety, an infectious-disease specialist, and a lead nurse manager—to organize hospital units into matched pairs on the basis of similar types of patients, health conditions, and professional specialties. The three experts achieved consensus on four matched pairs of units: pediatric and neonatal intensive care units (ICUs), cardiac and neurological critical care units (CCUs), cardiology and chest-pain units, and general-observation and medical-teaching units. We assigned the personal-consequences sign to four of the units (pediatric ICU, cardiac CCU, cardiology, and general observation) and the patient-consequences sign to the other four units (neonatal ICU, neurological CCU, chest pain, and medical teaching).

We measured hand hygiene using observations of the behaviors of health care professionals. For each unit, the patient-safety team identified one expert observer with professional training and certifications in nursing. The observers were blind to our hypotheses and conducted their observations covertly, thereby minimizing demand characteristics and reducing the likelihood that the observed health care professionals would be aware that research was underway and that their behavior was being tracked. Following the guidelines recommended by the Consensus Measurement in Hand Hygiene project team (The Joint Commission, 2009), we asked the observers to count health care professionals' opportunities for hand hygiene and to indicate whether the health care professional in each instance adhered to safe hand-hygiene practices. We defined an opportunity for hand hygiene as occurring before or after contact with a patient. To ensure that only health care professionals' behavior was included in the data, the observers recorded the date of each hand-hygiene opportunity and the type of practitioner involved. Observers identified three types of practitioners: nurses (59% of observations), physicians (17% of observations), and ancillary staff (technicians, nutritionists, social workers, pharmacists, and transporters; 24% of observations).

We collected pretest data over a 2-week period, during which the observers identified 322 hand-hygiene opportunities (the practitioners adhered to hand-hygiene guidelines in 259 of these instances). After the pretest, medical-safety professionals posted the signs in their assigned units. The ratios of signs to patient beds were equivalent in the two conditions: .80 for units assigned to the personal-consequences condition (57 signs, 71 beds) and .79 for units assigned to the patient-consequences condition (69 signs, 87 beds). The observers identified 245 hand-hygiene opportunities during the 2-week posttest period (the practitioners adhered to hand-hygiene guidelines in 212 of these instances). We tested whether hand-hygiene adherence increased on units with the patient-consequences sign but not on units with the personal-consequences sign.

Results and discussion

Table 2 reports the percentage of instances in which health care practitioners adhered to safe hand-hygiene practices in each condition, before and after the signs were introduced. A contingency-table analysis showed that hand-hygiene adherence increased

Table 2. Adherence to Safe Hand-Hygiene Practices as a Function of Condition in Experiment 2

Condition	Pretest hand-hygiene adherence	Posttest hand-hygiene adherence
Personal consequences	80.00% (96/120)	79.71% (55/69)
Patient consequences	80.69% (163/202)	89.20% (157/176)

significantly on units with the patient-consequences sign (80.69% to 89.20%), $\chi^2(1, N = 378) = 5.25$, $p = .02$, $d = 0.33$, $p_{rep} = .93$. In contrast, hand-hygiene adherence did not change significantly on units with the personal-consequences sign (80.00% to 79.71%), $\chi^2(1, N = 189) = 0.04$, $p = .85$. During the pretest period, the units assigned to the personal- and patient-consequences conditions did not differ significantly in hand-hygiene adherence, $\chi^2(1, N = 322) = 0.02$, $p = .88$. However, during the posttest period, hand-hygiene adherence was significantly greater on units with the patient-consequences sign than on units with the personal-consequences sign, $\chi^2(1, N = 245) = 3.83$, $p = .05$, $d = 0.36$, $p_{rep} = .88$.

Although the units were matched and then randomly assigned to condition, we reanalyzed the data to control for unit; the same pattern of results emerged. To examine whether the observed effects of the patient-consequences sign were due to unique characteristics of the high-risk units or of the health care professionals who worked in such units, we compared the higher-risk units (ICUs and CCUs) with the lower-risk units. Binary logistic regression analyses showed no significant differences between unit types in the effects of the patient-consequences sign ($b = 0.31$, $SE = 0.62$, Wald $z = 0.25$, $p = .62$) or of the personal-consequences sign ($b = 0.19$, $SE = 0.88$, Wald $z = 0.05$, $p = .83$); this result suggests that the effects were robust across units. We also investigated whether the effects varied by practitioner type (see Table 3). The patient-consequences sign significantly increased hand hygiene for physicians, marginally increased it for nurses, and did not affect the hand-hygiene behavior of ancillary staff. The personal-consequences sign had no significant effects.

General Discussion

Together, these findings suggest that messages about patient consequences, rather than personal consequences, can encourage hand hygiene among health care professionals. Our results have important theoretical and practical implications for the design of persuasive communications about health and safety. In theoretical terms, whereas research has typically focused on the effects of highlighting the personal consequences of health- and safety-related behaviors (Williams & Noyes, 2007), our studies demonstrate the value of highlighting the consequences of such behaviors for other people. Psychologists have long recognized that seemingly innocuous situational forces, such as time pressure, can impede prosocial behaviors even among good Samaritans with the best of intentions (Darley & Batson, 1973). It is tempting to conclude that capturing the attention of busy health care professionals to encourage hand hygiene depends on appealing to their immediate self-interest (Korniewicz & El-Masri, 2010). However, our research reveals that reminders of prosocial consequences may have a greater influence on the hand-hygiene behavior of health care professionals than reminders of personal consequences do (see also Grant, 2008).

In practical terms, the significant effects of our subtle experimental manipulation on a difficult-to-change dependent variable have substantial real-world implications (Prentice & Miller, 1992). Over 2-week periods, the patient-consequences signs produced an increase of more than 45% in the amount of hand-hygiene product used per dispenser (Experiment 1) and an increase of more than 10% in hand-hygiene behavior among health care professionals before and after contact with patients (Experiment 2). These results are particularly meaningful given that the few hand-hygiene interventions known to be successful tend to rely on expensive technologies and large-scale cultural changes (Pittet et al., 2000; Whitby et al., 2007).

A key limitation of both studies is that they lasted for only 2 weeks. Because the effects of hand-hygiene interventions are often short-lived (Pittet et al., 2000), an examination of their sustainability is of critical importance. If they fade because of habituation and desensitization, researchers should explore strategies for maintaining novelty, such as rotating messages or incorporating photos of patients into messages. Nevertheless, 2 weeks of increased adherence to safe hand-hygiene practices can have considerable effects. Applying the findings of Pittet et al. (2000) and Rosenthal, Guzman, and Safdar (2005), we estimated the number of infections prevented in the patient-consequences condition in each study to

Table 3. Results of Analyses of Adherence to Safe Hand-Hygiene Practices in Experiment 2

Type of practitioner and condition	Hand-hygiene adherence		$\chi^2(1)$	p	d	p_{rep}
	Pretest	Posttest				
Nurses						
Personal consequences	81.43% (57/70)	83.87% (26/31)	0.09	.77	—	—
Patient consequences	79.53% (101/127)	88.39% (99/112)	3.43	.06	0.33	.86
Physicians						
Personal consequences	72.73% (16/22)	87.50% (14/16)	1.22	.27	—	—
Patient consequences	72.41% (21/29)	92.86% (26/28)	4.12	.04	0.76	.89
Ancillary staff						
Personal consequences	85.19% (23/27)	68.18% (15/22)	−2.01	.16	—	—
Patient consequences	89.13% (41/46)	88.89% (32/36)	−0.00	.97	—	—

be between two and nine; these infections would have cost the hospital between $9,000 and $30,000 per study (see Chen, Chou, & Chou, 2005). This prevention of infections is a substantial return on investment, given the minimal costs of printing and posting signs. If the increased hand-hygiene adherence were sustained for a year across the hospital, the potential benefits could include the prevention of more than 100 infections and a savings of more than $300,000.

Future research should test perceived vulnerability and other mediating mechanisms. For example, the patient-consequences sign highlighted the implications for a group, whereas the personal-consequences sign highlighted the implications for an individual. Did the responsiveness to messages about patient consequences reflect utilitarian reasoning, whereby health care professionals aimed to promote the greatest good for the greatest number of people? Given that individuals are more likely to help a single person than to help multiple people (Kogut & Ritov, 2007; Slovic, 2007), the opposite seems likely. Signs might catalyze greater empathy by mentioning "a patient" or "the patient in this room" instead of "patients" (Goldstein, Cialdini, & Griskevicius, 2008). However, the effects of this change in wording might be mitigated by health care professionals' perception of patients as part of a unitary, cohesive group (Burson, Smith, & Faro, 2010). To investigate these issues, future studies should systematically vary group size. Nevertheless, if group size is a contributing factor, it may be an explanatory mechanism rather than a confound: Hand-hygiene behaviors can protect only one self, but many other people. This fact accentuates the value of examining whether patients are perceived as being part of a uniquely vulnerable and valued population. Would similar effects emerge if signs highlighted other groups affected by hand hygiene, such as nurses, physicians, or health care professionals in general?

We also recommend combining quantity-based measures of the use of hand-hygiene products and frequency-based observational measures with quality-based measures, such as microbiological tests and assessments of infection rates. Finally, future research should investigate the implications of our findings for other health, safety, and prosocial behaviors in different populations. Are people more likely to improve their exercise and eating habits, to quit smoking, to purchase life insurance, to wear seat belts and helmets, to protect the environment, or to take prescription medication when they are reminded of the consequences of these behaviors for their families rather than for themselves?

In conclusion, our findings suggest that health and safety messages should focus not on the self, but rather on the target group that is perceived as most vulnerable. As Levitt and Dubner (2009) suggested, "When a doctor fails to wash his own hands, his own life isn't the one that is primarily endangered. [The life endangered is that of] the next patient he treats" (p. 207). Merely emphasizing the consequences for patients motivates health care professionals to take more everyday health-protective action. From the perspective of a health care professional, safety behavior is not necessarily "all about me."

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The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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