



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

AMPLIFYING INFECTION PREVENTION SELF-MANAGEMENT AMONG PATIENTS AND PEOPLE IN THE COMMUNITY



Shanina C. Knighton, PhD, RN, Cleveland, OH

The World Health Organization declares 2020 “Year of the Nurse,” 2020 marks Florence Nightingale’s 200th birth anniversary, and simultaneously, coronavirus disease (COVID-19) is declared one of the most life-altering communicable infections of our time. As I reflect back on my time as a nurse, I recognize that infection prevention and control has always been a major cornerstone of nursing. Nightingale’s use of sanitary techniques for maintaining a clean environment and clean soldiers resulted in a reduction of death rates during the Crimean War (1853-1856), even during a time when the prevailing theory of germ transmission posited that disease was caused by a miasma, or “bad air.” The same foundation for infection prevention in nursing rang true even during my time in nursing school. I learned early of the importance of infection prevention, from meticulous techniques such as not fluffing sheets and avoiding germs moving in the air during bed change to learning the proper ways to cleanse and dry patients’ faces and bodies with specific wash towels to prevent cross-contamination. This special issue of the *Journal of Emergency Nursing* focuses on infections, a problem that faces us not only in times of a pandemic, but also one that nurses have challenged since

the beginning of time. Often, before an infection is diagnosed, health care workers and the public are exposed, and the condition of patients can go from minimal signs and symptoms to severe within a matter of minutes, hours, or days. Thus, an infection requires early recognition and containment. But, as with most communicable infections, by the time diagnostic tests are confirmed, patients and staff have unknowingly transferred the infection to others owing to the general public’s limited knowledge of infection transmission and prevention. The purpose of this editorial is to briefly share my journey from bedside nurse to clinical nurse scientist, and the role my research and community advocacy play in shifting the paradigm to include the education and practice of infection prevention by patients and people in the community.

Every person will encounter harmful bacteria, fungi, or viruses, whether in health care or community settings, and therefore every person should know how to combat them. Nearly 15 years ago, I delivered my child by way of an emergency cesarean. I signed an informed consent and was educated on the risk for infection. I saw the signage in my room empowering me to ask my nurse and doctor to clean their hands. Yet, as a “falls risk” while the anesthesia wore off and I regained my strength, I could not get out of bed to clean my own hands before changing my baby’s first meconium diaper or to simply hold him when I wanted to. Even as an adult patient who learned the personal value of hand hygiene as a child, I second-guessed my personal value of maintaining clean hands not because I did not know better, but because I felt vulnerable to needing instructions about myself while I was the patient under care. My nurses rightfully focused on not transmitting harmful germs to me or my baby by cleaning their hands, but did not consider the germs that I myself could get by touching a contaminated bedrail or equipment that I could then transmit to my baby. In nursing school, the first technique I learned in preparation for my first clinical rotation was proper hand-washing and drying. After constantly being reminded verbally and through signage of hand hygiene and reflecting back on my experience as a patient, one day I asked my clinical instructor, “Why is it that hospitals do not educate and teach patients how to maintain their own hand hygiene?” She stated to me, “Our hands are more important in stopping infections.”

Shanina C. Knighton is a CTSC KL2 Clinical Research Scholar, Frances Payne Bolton School of Nursing, Case Western Reserve University, Cleveland, OH.
Twitter: @shaninaknighton

For correspondence, write: Shanina C. Knighton, PhD, RN, Frances Payne Bolton School of Nursing, Case Western Reserve University, 9401 Euclid Avenue, Cleveland, OH 44106; E-mail: sck46@case.edu.

J Emerg Nurs 2020;46:727-30.
0099-1767

Copyright © 2020 Emergency Nurses Association. Published by Elsevier Inc. All rights reserved.

<https://doi.org/10.1016/j.jen.2020.08.002>

When I graduated from nursing school and started my first job, I experienced outbreaks, epidemics, and pandemics such as H1N1 influenza, and experienced the donning and doffing of personal protective equipment for hundreds of isolation precautions to prevent the transmission of multidrug-resistant organisms colonized in patients' wounds, bloodstreams, urine, and nares. I watched patients attempt to touch their wounds, and use the urinals and then eat their food with no hand hygiene practice, and did my best to educate them and correct their behaviors. Unforgettably, I cared for a patient with *Klebsiella pneumoniae*, *Clostridium difficile*, and *Escherichia coli*. Despite educating my patient about hand hygiene, procedural use, disposal of personal protective equipment, and his ability to transfer germs to others and advising him to clean his hands, he left the nursing unit to go get lunch in the hospital eatery. As my mind raced, thinking about how many germs my patient could spread, I promised myself I would put more efforts toward educating patients about infection prevention and figure out ways to validate or invalidate the value of patient hand hygiene in health care settings.

As I continued my nursing journey, I began to look for evidence to gain a deeper understanding of why infection prevention education and patient hand hygiene were not common practice in health care settings. My predoctoral to postdoctoral experience involved the development of a patient hand hygiene model, its use among providers, and the discovery that although patients are aware of the importance of hand hygiene, they rarely practice it without assistance.¹ I learned that placing the responsibility on nurses to assist patients with their hand hygiene can be effective, but the procedure can burden nurses who have many important responsibilities to perform for many patients. Thus, my science primarily focuses on innovative strategies that will engage patients in infection prevention self-management. My colleagues and I have standardized the most important times when patients should practice hand hygiene¹; explored the use of verbal, electronic, and visual cues^{2,3} as reminders for patient hand hygiene; evaluated product usability^{4,5}; and have measured outcomes through pathogen transmission,^{6,7} observations,⁸ and product consumption.³ Although patient hand hygiene is an emerging area of research, our goal is to create a sustainable patient-centered infection prevention program that will ultimately contribute to effective infection prevention in hospitals and long-term centers. Through our work, we know that patients are able and willing to practice hand hygiene if they are reminded and if their hand hygiene products are conspicuously placed and easy to use.³ I learned from one of my studies that most patients perceive health care worker hand hygiene to be more important than their own, and that the hand hygiene products in the hospital are intended for

health care workers, not for patients.⁹ Even after our continual effort at exploring innovation that put forth unconventional interventions in acute care settings, I wanted to know more about how pathogens transferred among surfaces and about people's hand hygiene behaviors in various settings, including the emergency department. In February 2020, I began a study (unpublished) in the emergency department of a public hospital for which I had collected data for 6 observational periods of hand hygiene performed by ED visitors. Of nearly 200 people visiting, only 1 cleaned their hands; yet, many of them came in contact with 2 or more surfaces on average and our environmental swabs revealed 1 or more harmful bacteria on various surfaces such as translator phones, counter tops, and signature pads. As nurses, we have an understanding that our patients are the community, that communities encompass our patients, and that we have a responsibility to know what patients need even if they do not. I witnessed patients coming into the emergency department for various reasons lacking hand hygiene and protective measures to keep themselves safe from each other as each patient sat with various illnesses not knowing each other's ability to transmit illness among one another while waiting to be seen by a provider.

The recent emergence of COVID-19 exacerbates the public's knowledge deficit and shows us how vulnerable we are to the acquisition and spread of communicable diseases. COVID-19 also shows us that it takes more than just health care workers doing their part to prevent infections—that there has to be a collaborative effort with the people we care for. We also understand that at some point in our lives we will all be patients. From early February, when the impact of COVID-19 began to affect our daily lives, I said, "America is being given a crash course in infection prevention overnight," and most people are overwhelmed with implementing additional infection prevention practices in their daily work, personal routines, and habits. Traditional infection prevention and control protocols and practices primarily focus on quality and safety in health care settings, with the ultimate goal of preventing patient-to-patient transfer of germs. Mandates and requirements put in place by governing and accrediting bodies primarily focus on hospital settings, and are major drivers of the public's dependence on the health care system to prevent and mitigate germ transmission even in the communities in which they live. Patients, who are the center of health care, rely heavily on the personal protective equipment, environmental cleaning, antibiotics, and best evidence-based practices of health care workers to keep them safe from infections. However, patients are not often educated or asked to partake in infection prevention except in reminding their health care workers to clean their hands.

Hand hygiene was among one of the first messages delivered by the leadership in our country and internationally as a preventive practice, and most assumed hand hygiene to be a simple behavior; yet, it is known that approximately only 5% of people clean their hands correctly.¹⁰ At the beginning of March when COVID-19 shut down establishments in my state, and many people were given guidance on preventive practice, I was seeing the world differently. I was watching people take their perception of infection prevention and adapt it to their daily lives without understanding preventive practice techniques. I saw every person I came across as my patient in need of infection prevention education. When I visited the grocery store, I observed gloves being treated as the wearers' hands, with the wearers touching multiple items in the store, their cell phones, and

their faces with no hand hygiene in between. I observed 5- to 10-second handwashing occur with no drying. I observed people wear their masks beneath their chins. I watched people move through their daily lives with frustration owing to not knowing how to balance frequent and proper hand hygiene, social distancing, and mask use.

America was given a crash course in infection prevention overnight, and immediately I knew that the messaging from local, state, and federal entities had a different meaning depending on the many internal and external factors affecting individuals. Although COVID-19 education is being provided electronically, these resources are not always readily available at the time the information is needed, and they lack capable practical steps that people can take while managing their activities of daily living. In addition

CORONAVIRUS: PREVENTION IS KEY

Shanina Knighton PhD RN

A RESPIRATORY ILLNESS WITH SYMPTOMS SUCH AS:

- FEVER
- HEADACHES
- FATIGUE
- COUGH
- BLOOD CLOTS
- STROKE

TRANSMITS DIRECTLY

& INDIRECTLY

IF YOU FEEL OFF... STAND UP AND SPEAK OUT FOR YOURSELF

KEEP UP WITH YOUR MEDICAL APPOINTMENTS & MEDICATIONS

SYMPTOMS OR NO SYMPTOMS- COVID-19 CAN CAUSE HOSPITALIZATION OR DEATH

DEFEND YOURSELF

★ HAND WASHING

KILLS THE VIRUS WHEN DONE RIGHT

WASH WITH SOAP FOR 25 SECONDS

SING HAPPY BIRTHDAY SONG TWICE

MAKE SURE TO WASH UNDER JEWELRY, WATCHES & FINGERNAILS

USE A TOOTHBRUSH YOU DEDICATE FOR THIS TASK

★ AVOID TOUCHING YOUR FACE

VIRUSES ENTER OUR BODIES THROUGH OUR EYES, NOSE & MOUTH

★ KEEP SURFACES CLEAN

COVID-19 CAN LIVE ON SURFACES LIKE CARDBOARD, PLASTIC & METAL FOR 3 DAYS

WIPE DOWN

PHONES

MEDICAL EQUIPMENT

TAKE OUT CONTAINERS

COVID-19 CAN LIVE ON BUTTONS & ZIPPERS

★ FACE MASKS

CAN HELP STOP THE SPREAD OF DROPLETS FROM COUGHS AND SNEEZES

STILL USE SNEEZE & COUGH ETIQUETTE WHEN WEARING A MASK

©SHANINA KNIGHTON SEEYOURWORDS.COM

FIGURE
Prevention of coronavirus disease. COVID-19, coronavirus disease.

to the challenge of health literacy, people, during COVID-19, are challenged with both misinformation and a lack of accessible visual information regarding practical infection prevention steps they can take to manage their care and quality of life. Owing to the aforementioned barriers, communication regarding the management of infection prevention during daily activities is being minimally addressed on multiple fronts, which is why I felt compelled to do something for communities. I wanted to walk with people in their day-to-day lives so that I could ease their stress levels by providing them with practical tools.

My science took on a different meaning. It became bigger and took the shape of an implementation and dissemination approach. I began rapidly developing and disseminating “Practical Accessible Preventative Education that’s Readable and Seeable” (PAPERS), an innovative approach to providing education, which aligns with nurses’ commitment to providing easy-to-understand communication to patients and helping them self-manage. PAPERS addresses health literacy, self-management, and empowerment, and provides practical information to the community by (1) helping them identify best practices in an easy reading format, (2) providing visuals of the steps that should be taken, (3) providing material written at a third- to fifth-grade level, and (4) providing material evaluated by community members for readability of the content. To address the communication barriers and education insufficiency, I created a series of a dozen infographics that is being disseminated across multiple communities electronically in collaboration with organizations and through door-to-door delivery, with the ultimate goal of empowering ordinary people to prevent infections and to help them embrace the ideal that prevention is better than treatment. The [Figure](#) is an infographic created and disseminated initially to help people remember key information about COVID-19 and its prevention at the beginning of the pandemic before we discovered a decrease in taste and smell to be an early symptom. Some of the other infographics created demonstrate managing infection prevention during shopping, care of babies and children, use of assistive devices, lifestyle benefits and risks, playing board and card games, and navigating doctor visits. PAPERS provides an innovative framework for not just COVID-19 materials, but also for addressing nurses’ commitment to educating our patients and enhancing their quality of life throughout their lifespan. My professional philosophy as a nurse, infection preventionist, and nurse scientist is to “treat patients as I want to be treated as a patient”; therefore, I make a conscious effort to ensure that I can innovatively mainstream science to the public in a way that they can apply it in their day-to-day lives.

Author Disclosure

This project was supported in part by National Institutes of Health/National Center for Translational Sciences (KL2TR0002547 and UL1 TR002548) and by the Department of Veterans Affairs. The contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIH or Department of Veterans Affairs.

REFERENCES

1. Sunkesula VC, Knighton S, Zabarsky TF, Kundrapu S, Higgins PA, Donskey CJ. Four moments for patient hand hygiene: a patient-centered, provider-facilitated model to improve patient hand hygiene. *Infect Control Hosp Epidemiol.* 2015;36(8):986-989. <https://doi.org/10.1017/ice.2015.78>
2. Rai H, Knighton S, Zabarsky TF, Donskey CJ. A randomized trial to determine the impact of a 5 moments for patient hand hygiene educational intervention on patient hand hygiene. *Am J Infect Control.* 2017;45(5):551-553. <https://doi.org/10.1016/j.ajic.2016.12.022>
3. Knighton SC, Dolansky M, Donskey C, Warner C, Rai H, Higgins PA. Use of a verbal electronic audio reminder with a patient hand hygiene bundle to increase independent patient hand hygiene practices of older adults in an acute care setting. *Am J Infect Control.* 2018;46(6):610-616. <https://doi.org/10.1016/j.ajic.2018.01.005>
4. Rai H, Knighton S, Zabarsky TF, Donskey CJ. Comparison of ethanol hand sanitizer versus moist towelette packets for mealtime patient hand hygiene. *Am J Infect Control.* 2017;0(0):1033-1034. <https://doi.org/10.1016/j.ajic.2017.03.018>
5. Knighton SC, McDowell C, Rai H, Higgins P, Burant C, Donskey CJ. Feasibility: an important but neglected issue in patient hand hygiene. *Am J Infect Control.* 2017;45(6):626-629. <https://doi.org/10.1016/j.ajic.2016.12.023>
6. Rai H, Saldana C, Gonzalez-Orta MI, Knighton S, Cadnum JL, Donskey CJ. A pilot study to assess the impact of an educational patient hand hygiene intervention on acquisition of colonization with health care-associated pathogens. *Am J Infect Control.* 2019;47(3):334-336. <https://doi.org/10.1016/j.ajic.2018.09.004>
7. Sunkesula VC, Kundrapu S, Knighton S, Cadnum JL, Donskey CJ. A randomized trial to determine the impact of an educational patient hand-hygiene intervention on contamination of hospitalized patient’s hands with healthcare-associated pathogens. *Infect Control Hosp Epidemiol.* 2017;38(5):595-597. <https://doi.org/10.1017/ice.2016.323>
8. Sunkesula V, Kundrapu S, Macinga DR, Donskey CJ. Efficacy of alcohol gel for removal of methicillin-resistant *Staphylococcus aureus* from hands of colonized patients. *Infect Control Hosp Epidemiol.* 2015;36(02):229-231. <https://doi.org/10.1017/ice.2014.34>
9. Knighton SC, Richmond M, Zabarsky T, Dolansky M, Rai H, Donskey CJ. Patients’ capability, opportunity, motivation, and perception of inpatient hand hygiene. *Am J Infect Control.* 2020;48(2):157-161. <https://doi.org/10.1016/j.ajic.2019.09.001>
10. Borchgrevink CP, Cha J, Kim S. Hand washing practices in a college town environment. *J Environ Health.* 2013;75(8):18-24.