

Nurse-scientists and nurse-engineers

Nurse-driven device innovations and inventions can improve patient care.

By Charles R. Davis, PhD, BSN, RN, AE-C, and Mary Ellen Smith Glasgow, PhD, RN, ANEF, FAAN



Nursing contributions to medical inventions and innovations aren't unheard of, but the role nurses play as frontline healthcare professionals begs the question: Can nurses contribute more? After all, we do spend the most time with patients and understand what's needed to enhance their experience, care, and outcomes.

So, how does health care take advantage of this untapped resource? Are you interested in making a contribution to medical device development? In this article, we'll look at some recent nursing inventions and discuss how the profession can provide nurses with a path to education that encourages invention and innovation.

Where are the nurses?

Did you know that 42 nurses have been responsible for 94 inventions from 1865 to 2003? Here are some of the more recent contributions.

Bili-Bonnet—A neonatal intensive care nurse invented this latex-free compression net bonnet that holds eye guards in place to reduce the risk of ultraviolet light exposure when neonates are treated for jaundice.

Aqua-Box—This wall-mounted canister allows contaminated fluids to be treated with a U.S. Food & Drug Administration–approved disinfectant for safe disposal.

Neonur—Used to measure the complex choreography of sucking, breathing, and swallowing that can indicate developmental issues in



premature infants, this device decreases the risk of failure to thrive, which affects half of all newborns with congenital heart defects.

However, an investigation of medical innovations from the United States Patent and Trade Office shows that 5,639 medical device patents have been awarded from 1976 to 2015, but fewer than 5% ($P = 0.006$) are associated with nurses. This would seem to demonstrate that valuable discovery and innovation opportunities are being missed because of the lack of nursing engagement.

How can the profession better prepare nurses for innovation?

Nursing students have always had the opportunity to pursue nursing and basic science or nursing and engineering education, but independent of each other. A better way to encourage nurses to con-

tribute to technology innovation might be with dual-degree programs. If baccalaureate and advanced practice nursing education institutions offered structured nursing and science or nursing and engineering curricula, students would have an opportunity to build foundational skills that would better position them to participate as future healthcare innovators and inventors.

Ultimately, dual-degree programs would produce a new demographic of nurses who would be uniquely trained to comprehend technical challenges and prepared to methodically and systematically explore and develop solutions to resolve patient-care issues. (See *Pioneering institutions*.)

What can you do?

As primary healthcare providers, nurses should be at the forefront of invention and innovation, but they're not. Encouraging them to contribute to the creation of medical devices that improve patient care and safety requires providing them with the foundational education in science and engineering that gives them the confidence to step up. Creating dual-degree programs will result in the development of nurse-scientists and nurse-engineers who lead patient care into the future.

You can help in this effort by encouraging nursing schools and nursing organizations to make the development of these dual-degree programs a priority. Aspiring nurses interested in invention and innovation can consider applying to a school that already has a dual-de-

Pioneering institutions

Several institutions already recognize the importance and power of combining nursing with more extensive science or engineering education and experience. Examples of those pioneering efforts to trail blaze the nurse-scientist or nurse-engineer role include the following.

- **Duquesne University School of Nursing** has a 5-year biomedical and bachelor of science in nursing dual-degree program.
- **The MakerNurse movement at the Massachusetts Institute of Technology** is a unique environment where creative and innovative nurses can collaborate with experts who have the tools and resources to fabricate engineering prototypes of their concepts or one-off solutions. Example collaborations in the MakerNurse setting include: Bon Secours St. Mary's Hospital in Richmond, Virginia; Driscoll Children's Hospital of Corpus Christi, Texas; Maimonides Medical Center in New York City; the Mayo Clinic in Rochester, Minnesota; South Shore Hospital in South Weymouth, Massachusetts; and the Hospitals of Providence and the Texas Tech University Health System, both in El Paso, Texas.
- **University of Detroit Mercy Colleges of Nursing and Engineering** collaborated to provide assistive devices to disabled individuals while teaching innovation, technology, and collaboration to students.

gree program. Practicing nurses (at the baccalaureate and graduate level) can consider additional basic science or engineering training or other degrees to support their efforts, as well as seek opportunities at institutions that recognize and embrace the concept of the inventive nurse. ★

Charles R. Davis is a school nurse in the Webutuck Central School District in Amenia, New York. Mary Ellen Smith Glasgow is dean and professor at Duquesne University School of Nursing in Pittsburgh, Pennsylvania.

Selected references

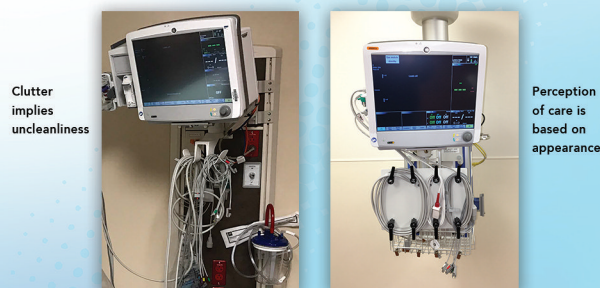
- Kliger J, Lacey SR, Olney A, Cox KS, O'Neil E. Nurse-driven programs to improve patient outcomes: Transforming care at the bedside, integrated nurse leadership program, and the clinical scene investigator academy. *J Nurs Admin.* 2010;40(3):109-14.
- McClelland M, Klienke D. Improving lives using multidisciplinary education: Partnering to benefit community, innovation, health, and technology. *J Nurs Educ.* 2013;52(7):405-9.
- Metler R. Patented technologies of nurse-innovators. Proceedings of the American Public Health Association Meeting, Washington, DC. 2005. apha.confex.com/apha/132am/techprogram/paper_77202.htm
- Prototype online: Inventive voices. Sharon Rogone, a neonatal nurse-turned-inventor, talks about her first invention. *Smithsonianmag.com*. March 2008. smithsonianmag.com/arts-culture/prototype-online-inventive-voices-22054192/
- Rice S. Nurses devise their own innovations. *Mod Healthbc.* 2015;45(42):28.
- Robert Wood Johnson Foundation. Bringing nurse making to the forefront of health care. 2014. rwjf.org/en/library/articles-and-news/2014/02/bringing-nurse-making-to-the-forefront-of-health-care.html



by Evolution Medical Products

What message does your monitor convey to patients, families, and staff?

Cord Caddy better patient care every day!



Cord Caddy enhancements to your patient rooms include:

- | | |
|---|----------------------------|
| Infection Prevention | Nursing Efficiency |
| Patient, Staff, and Visitor Safety | Accident Prevention |
| Room Readiness and Appearance | Cost Savings |

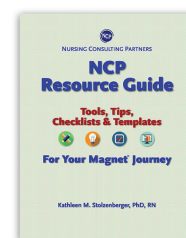
www.cordcaddy.com

Nursing Consulting Partners has over 60 collective years of experience with Magnet® and Pathway to Excellence® consultation with national and international health care organizations. We have assisted over 300 clients in successfully obtaining Magnet® designation. We offer customized services to address each client's unique needs.



NOW Available!

The **NCP Resource Guide for the Magnet® Journey®** is an easily accessible e-book of resources to help you prepare for Magnet designation and redesignation, full of information, tips, tools, and templates to download for use in your own organization.



NURSING CONSULTING PARTNERS
Sustainable Results for Healthcare Solutions
nursingconsultingpartners.com