California HealthCare Foundation

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Case Study

High Resolution: Laser Scans Improve Wound Care at Kaiser Permanente

Nursing 2.0 Series

Put together, technology innovation and nursing can decrease costs, and lead to a better patient experience and improved population health. This series of case studies explores different types of technology innovation being deployed in the field of nursing. It features members of the Innovation Learning Network, a community of health care leaders and innovators focused on making health care better through good design.

This case study about the use of laser scanning technology at Kaiser Permanente is part of a series titled *Nursing 2.0: How Technology Innovations Are Enhancing Care,* which can be found at www.chcf.org/nursing-technology.

THE INNOVATION LEARNING NETWORK

The Need for Instant Information

Nurses work hard to access and share information quickly. Accurately capturing and documenting patient information while being efficient with time and fulfilling patients' needs are routine challenges. Old practices of storing information in three-ring binders, on hard-to-search websites, or deep inside flow sheets in the electronic medical record (EMR) system create impediments to efficiency and quality. A study found that more than 30% of surgical nursing work is hunting and gathering information, people, and supplies.[1]

For wound care nurses, whose patients require extensive documentation of wound appearance and size, these challenges are pronounced. Health care reform has heavily impacted how wound care is delivered. The Centers for Medicare & Medicaid Services (CMS) no longer reimburse for treatment of wounds that develop while a patient is in the

1. Ann Hendrick et al., "A 36-Hospital Time and Motion Study: How Do Medical Surgical Nurses Spend Their Time?," *The Permanente Journal* 12, no. 3 (Summer 2008): 25-34, www.ncbi.nlm.nih.gov.

Immediate imaging. Laser measurement technology and a camera are used to create 3-D images, which accurately measure the wound size and depth and record a high-definition image of the wound.

Image courtesy of ARANZ Medical.

hospital, requiring the hospital to shoulder this cost. As a result, hospitals have instituted extensive skin and wound checks when admitting a patient, which has significantly increased the workload of the bedside nurse. Nurses specializing in wound care are in short supply and are managing large panels of patients.

Technology solutions for instant access to information and real-time data to better identify and prioritize care and treat patients offer opportunities to dramatically improve the way nurses manage information flow in the care delivery setting.

Wound Care Nurses, Meet Laser Measuring

Kaiser Permanente, a large, integrated health care system employing 49,000 nurses across seven regions of the United States, recognized the need to better document wound care. Between 2009 and 2014, Kaiser Permanente conducted several pilots using the Silhouette, a wound-imaging, 3-D measurement and documentation system, to improve accuracy and timeliness in assessment for wound care patients. More than 100 patients participated in the pilots using the device.

The Silhouette, a product of ARANZ Medical, uses laser measurement and a camera to create 3-D images that accurately measure the wound size and depth, and records a high-definition image of the wound. Holding the device — weighing about as much as a large coffee cup — above the wound, the nurse lines up laser lines over the center of the wound, clicks a button, and the data are uploaded to a computer. The device's wound management software allows nurses and other clinicians to easily see the data and images for a panel of patients.

Two Kaiser Permanente frontline wound care nurses in Hawaii and a leader in Kaiser Permanente's Innovation and Advanced Technology unit shared their experiences with piloting the technology. Both nurses are certified in WOC — wound, ostomy (surgically created opening for waste discharge), and continence — care, a specialization that is in short supply. One WOC nurse works in an inpatient setting, while the other works in an outpatient setting.

The technology offers a number of significant benefits and improvements for wound care and the nurses who provide this care: greater precision and consistency in measurement, the availability of trending data showing wound progression over time, and a reduced need for in-person visits. Nurses involved in the pilot also found the technology generally easy to learn and easy to use. Somewhat unexpectedly, they also noticed that the device had allure, observing other nurses, clinicians, and patients fascinated by the laser camera and excited by the "cool new technology."

Improved Precision and Teamwork

This technology's improvements to team communication and to documentation, an integral part of wound assessment, are significant. Lynn Ikeda, RN, family nurse practitioner and outpatient wound care coordinator at Kaiser Permanente Hawaii, shared her experience using the device:

> *"Using photo documentation of wound care is really telling — more than words — to tell the provider and other nurses what to see. . . . Something about [the device] that is even more valuable and hopefully will be integrated into our current EMR is the trending graph. You take the photo, and it automatically computes the length, width, and depth, and anything else that needs to be captured by laser, as opposed to us manually measuring it. . . . I think this might help with standardization."*

Easy to use. Holding the device — weighing about as much as a large coffee cup — above the wound, the nurse lines up laser lines over the center of the wound, clicks a button, and the data are uploaded to the computer. In one click, the wound is measured and and image taken.

Image courtesy of ARANZ Medical.

Ikeda said that replacing the old tape measure method of measuring wounds with a 3-D laser camera improves consistency of care between providers. She also said that the ability for everyone on the care team to see the progression of the wound over time in the trending graph helps in their decisionmaking process. Ikeda reported using the device on 7 or 8 of the 30 to 40 patients she sees each morning in her clinic during the pilot, and thinks this proportion will grow as protocols are refined and use expands after the pilot phase.

Benefits to Workflow and Care Quality

Viki LaiHipp, RN, clinical coordinator of inpatient wound care at Kaiser Permanente Hawaii, who sees about 14 wound care patients a day, believes that about 80% of those patients could be consulted by telehealth technologies, rather than at an in-person visit. She expects her workflow to greatly improve when the 3-D camera is more widely used. As one of the few nurses in the system with WOC nursing certification, she could participate in more consultations by viewing images taken by other nurses and providing treatment recommendations remotely. In the future, with the accuracy and documentation advantages this technology provides, patients will not need to wait to see the WOC nurse specialist. She explained:

> *"There are a lot of consults we can do just through pictures alone, and I don't have to be right there to come up with recommendations. It opens up a big door there. . . . A photograph, like they say, speaks a thousand words. It can give you an accurate description of what you would be looking at [during an in-person visit]."*

Suzanne Furuya, MPH, MBA, innovation accelerator for Kaiser Permanente's Innovation Fund for Technology, said that this technology's ability to reduce the need for in-person visits will help nurses serve all patients better, especially Medicare patients, who are often seen by nurses at home and at outpatient facilities. The technology increases the potential for telehealth visits.

Patient Approval

Initial patient feedback on the device was also positive. Furuya noted that patients appreciated not needing to have their wounds touched as frequently as the tape measure method requires.

Both Ikeda and LaiHipp said their patients were generally intrigued and impressed by the device, particularly younger, tech-savvy patients. LaiHipp shared this:

> *"I've never had a patient refuse to let me use it. . . . I think it's actually comforting to patients. They're excited about the technology. Let's face it, everyone out there has heard about technology like this, but not everyone has participated with it."*

Summary of the Technology's Wound Care Benefits

- Precision of 3-D laser measurements compared to old method of using a tape measure, which has more room for human error.
- Greater consistency in measurements across users, including nurses.
- Trend data available through a graph showing wound progression over time, which can be uploaded to the EMR and seen by all team members.

Central database. Communication, clinical decisionmaking, and risk management are facilitated through a database of patient information. Care providers can see changes over time and quickly understand the wound's "story."

Image courtesy of ARANZ Medical.

- Quality of imaging and ability for the whole team to view the wound in the same way at any time in the EMR.
- Easy to learn, easy to use. The nurses noted that hands-on training was key.
- Reduced need for in-person visits, makes remote consultation more viable.
- Sped-up development of wound care and recovery plan.
- Positive patient experience — patients enjoyed both not having to have their wounds touched as frequently and feeling they were getting top-notch care with cutting-edge technology.

Accessible data. Synchronized via the Internet, wound information becomes centrally available to care teams, specialists, and administrators. It can be integrated with the facility's EMR.

Image courtesy of ARANZ Medical.

Challenges and Considerations

Four main challenges emerged during the pilots:

***Challenge:* EMR integration.** The biggest challenge the nurses faced in using the device during the pilots was the lack of integration with their EMR system, Kaiser Permanente HealthConnect. EMR integration is a complex process that continues to be a challenge for many organizations. Although integration is underway, nurses have had to perform several extra steps to manually upload the photos and patient information. Both Ikeda and LaiHipp said that this process factors into their decision about whether to use the device with a patient, as they don't always have time to manually upload data. However, they believe this issue will be alleviated when integration is complete. Furuya noted that how to integrate with the EMR — for example, during a successful pilot versus later, when expansion plans are set — is an ongoing debate in the process of piloting and spreading technology innovation.

How to overcome. Integration with KP Health Connect is underway. As technology evolves and devices become more connected, this integration will be important for efficient and coordinated care.

***Challenge:* The device is cumbersome.** The nurses noted that they found the device difficult to set up and clean at first, and they wish it were wireless. Ikeda said:

> *"To tell you the truth, [the set up] weighs on my decision of whether or not to use it because I have to think about it before I go in the room, and it's one more thing to prepare."*

How to overcome. Establishing standards for use are addressing workflow challenges presented by the new technology. For example, LaiHipp said that although figuring out how to clean the device was initially a challenge, her team was able to develop recommendations that have helped make the process easier. The results of pilot studies like this are informing manufacturers about adaptations needed to further the benefits of technological innovation in practice.

***Challenge:* Not for all types of wounds.** As they use the device, the nurses consider which patients and wound types are the best match for the technology. Ikeda said the device is great for patients with new wounds, and for those with serious wounds that may worsen over time, because she can track the healing trend. The device does not capture tunneling wounds, which look like surface wounds but have decay under the skin and muscle that is not visible.

How to overcome. Findings from the pilot and feedback from the WOCN specialists will inform protocols for use. These protocols will help nurses know how to use the technology, which patients and wounds are most appropriate for its use, and how to ensure the data are shared among care team members. The pilot also informs how the device changes workflows to better meet patient needs.

***Challenge:* User error leading to poor image quality.** Because the device involves a camera, both Ikeda and LaiHipp said there were challenges

with making sure the lighting and positioning were appropriate. LaiHipp said that the camera can sometimes pick up shadows and produce images of poor quality. She thinks that these issues will be addressed through staff training and improved technique with more frequent use.

How to overcome. Developing training sessions on how to use the equipment and recommendations for camera positioning and lighting will address these technical issues.

Looking Ahead and Lessons Learned

Given the positive experience of the pilots, Kaiser Permanente plans to spread use of the device throughout the organization nationally. Further evaluation data, including more metrics, will be available in late 2015 to inform this process. Overall, both nurses who shared their experiences piloting the device felt that most of the challenges they encountered will be addressed as the pilot is complete and solutions integrated into the broader rollout. Protocols and best-practice recommendations will reduce challenges among other nurses using the device for the first time. Nurses, patients, and change management leaders all expressed enthusiasm to see use of the technology expand to more settings.

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About the Foundation

The California HealthCare Foundation works as a catalyst to fulfill the promise of better health care for all Californians. We support ideas and innovations that improve quality, increase efficiency, and lower the costs of care. For more information, visit www.chcf.org.