Nursing Considerations & the Future of Telehealth
Chapter 5

WRITTEN BY:
VALERIE FISHER, RN, MA
HEALTH WORKFORCE INITIATIVE
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The purpose of this module is to explore newer applications of broadband adoption of telehealth technologies in hospitals (both inpatient ICUs and post acute care) with specific emphasis on telehealth nursing or its implications in nursing practice.

We will also examine the benefits, barriers and successes of telehealth in outpatient chronic disease management while considering how futuristic telehealth models may be an answer to projected physician shortages in the future.
Objectives

Upon completion of this chapter, the nurse will be able to:

1. Define telehealth nursing and its role in delivering patient care.

2. List the areas of the hospital in which telehealth technology is advancing and how it can facilitate improved patient care.

3. Describe the functions of a tele-ICU and how it is different from a traditional hospital ICUs.

4. List at least 3 nursing competencies needed to be a successful tele-ICU nurse.

5. Give one example of a tele-ICU or e-ICU nursing intervention.

6. Discuss chronic disease in America and the use of telemonitoring.

7. List at least 3 elements needed for a successful telemedicine system.
Telemedicine or Telehealth is comprised of the use of medical and other health information exchanged via electronic communications from one site to another with the intent of improving the health status of consumers (ATA, 2007).

Telehealth nursing is the delivery, management, and coordination of care and services provided via telecommunications technology within the domain of nursing. (American Association of Critical Care Nurses - AACN, 2004)

Tele-ICUs are networks of audiovisual communications and computer system that link critical care physicians (intensivists) and nurses to intensive care units (ICUs) in other remote hospitals. (AACN)

Tele-ICU Nursing as defined by AACN, is a highly skilled critical care nurse who continuously monitors data on large populations of patients and acts as real-time clinical decision support to collaborate with the bedside nurses on conditions that require immediate attention.

Cloud Technology - A model for delivering information technology services in which resources are retrieved from the internet through web-based tools and applications, rather than a direct connection to a server. “Cloud” structure allows access to information as long as an electronic device has access to the web.
Why Broadband and Telemedicine?

- Improve access to all communities encouraging frequent, and meaningful interactions with a health care team in collaboration which leads to improved patient outcomes.
- Patients gain improved access to care while decreasing or reducing the need to travel distances to see a specialist or subspecialist.
- In the case of an emergency (head injury or stroke patient), transportation cost via air/ground ambulance to a level IV trauma center can be diverted if emergency specialist can be accessed via telehealth technology and appropriate care can be given at the current facility.
- Patients with chronic conditions (diabetes, HTN, CHF, CAD) will have the opportunity to be closely monitored, and with early intervention admissions to the hospital can be averted.
Diagnosis & Therapy Changes with Telehealth Consultations

Utilization of Telehealth & Nursing Practice

“Telehealth nurses need the same nursing skills as all nurses practicing in specialty areas, but with an ability to utilize the technology to the best of its ability to assess and communicate the patient’s physical and mental status,” Leenknecht said. “Excellent organization, critical thinking and communication skills are required also, but the most important skill is to understand the technology and its potential and limitations and have the intuitiveness in how to utilize it to provide the care needed at the time.”

Cindy K. Leenknecht, MS, ACNS-BC, chair of the ATA Telehealth Nursing Special Interest Group (SIG)

Nursezone.com, Devices & Technology, 
The benefits of telehealth for both the patient and the healthcare provider is well documented. But how do these new technologies impact direct patient care, and your nursing practice? In many ways it doesn’t because:

- In all areas of telehealth nursing, including all related roles and functions, telehealth nurses are committed to leveraging technology and nursing expertise to provide quality nursing care, to delivering nursing expertise to those who need care, to improving health and patients’ outcomes.
- The body of nursing knowledge and competencies remain constant; it is merely the medium of delivery that is different from traditional nursing care.
- The nurse remains the conduit between the patient and the remote practitioner by assisting in the “presentation” of the patient, their complaints, symptoms and clinical data.
- Telehealth nurses adhere to the same standards of quality, patient privacy, and confidentiality as established in traditional nursing practice & as governed by law.

(American Telemedicine Association: Telehealth Nursing, April 2008)
Innovative Use of Telehealth in the Inpatient Settings*

Many departments within a hospital can utilize telehealth functionality, and some now rely on it exclusively to increase the hospital’s spectrum of care, especially for facilities with limited resources.

*Telemedicine: The Road to Improved Rural Health Care? (Click on link, 5:58)

Some other Examples:

- **Tele-ICU** – For advanced patient monitoring of ICU patients by distant staff/MD Intensivist via cameras, microphones, and monitoring of vital signs via specialty devices.

  *Avera Health Video on eICU Program* (Click on link, 5:28)

- **Neurology/Telestroke** - Neurologists are available to provide collaborative care recommendations to emergency physicians on patients with acute stroke, transient ischemic attack (TIA), and stroke-like conditions.

  *UC San Diego Telemedicine for Stroke* (Click on link, 4:50)
  (Note how the ER nurse facilitates the physical exam for the telemedicine MD)
Continued Telehealth Inpatient Use*

- **Telepathology** – When a pathologist is not available or on staff, technology can facilitate the transfer of image-rich pathology data for a real-time diagnosis.

  *Arizona Telemedicine Program* (Click on link, 5:32)

- **Teleradiology** – Yes, you guessed it! Sharing of high definition images over broadband for evaluation and consultation of patients in remote areas with regional radiologist located at larger teaching facilities or via private radiological consultation companies.

- **Psychological/Mental Health Services** – for remote psych evaluations

  *Cloud Visit Psychiatry for HIPAA-Compliant Telemedicine* (Click on link, 0:51)

* Vendor technology is being shared to illustrate this field and is not an endorsement of the product or vendor.
Definition of a Tele-ICU

“A tele-ICU uses state-of-the-art equipment to connect patients to nurses (sic) intensivists 24 hours a day, seven days a week, from anywhere in the country – or the world. These doctors and nurses, at a centralized location, use remote-control cameras, video conferencing and continuous monitoring technology to access real-time patient information – including vital signs, physiologic data, medications and lab results. The intensivists and nurses also have access to patients’ complete medical history and local attending physicians’ care plans and can talk to patients directly. This technical leverage allows a qualified medical team to care for large numbers of patients and meaningful impacts the labor shortage.”

Mary Jo Gorman, M.D., MBA, CEO of Advanced ICU Care*

* Please note: Vendor technology is being shared to illustrate this field and is not an endorsement of the producto or vendor.

How an eICU Program Works (Click on link, 1:58)
Telemedicine ICUs use a host of different technologies to monitor the sickest patients; improving patient outcomes and decreasing hospital stays and cost.
“Because tele-ICU nursing is a subspecialty still in its early days, solid research evidence on the practice does not yet exist.......The rapidly changing and diverse nature of tele-ICU nursing practice requires nurses to be nimble and collaboratively create the best environments and models for advancing the practice.......There is no doubt that tele-health services will continue to expand beyond what can even be imagined today. Research focused on best practice models and operational interventions must be ongoing and disseminated widely to enhance the level of practice and patient outcomes as tele-ICU nursing practice evolves.”

AACN Tele-ICU Nursing Practice Guidelines
American Association of Critical Care Nurses
March 2013
AACN’s Tele-ICU Nursing Practice Guidelines

1. Tele-ICU leaders and nurses must establish and sustain an environment that promotes effective communication, collaboration, and collegiality to ensure optimal quality outcomes.

2. Tele-ICU nurses must demonstrate proficiency in specific knowledge, skills, and competencies to contribute maximally to patient outcomes and nursing practice.

3. Tele-ICU leaders and nurses must be actively engaged in measuring and analyzing outcomes to ensure ongoing improvement in patient care and tele-ICU nurses’ contribution to care.

To download a free full PDF text of this document, Click here: AACNs website
AACN’s Tele-ICU Model of Success

Figure 1  Tele-ICU Model of Success
# Tele-ICU Nurse Competencies

## Table 6

Eleven competencies or attributes of nurses working in the tele-intensive care unit (tele-ICU)\(^{a,b}\)

- Proficiency with each organization’s hospital/clinical information systems
- Basic “Windows” skills
- Effective utilization of the tele-ICU application tools
- Effective listening skills
- Ability to foster collaboration
- Expert critical care knowledge base
- Patient advocacy skills
- Use of evidence-based practice
- Ability to prioritize patients’ issues
- Ability to mentor others
- Conflict management skills

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\(^a\) Based on data from Breslow,\(^9\) Jarrah et al,\(^10\) Myers and Reed,\(^11\) Lilly and Thomas,\(^12\) Stafford et al,\(^31\) and Zapatachyny Rufo.\(^32\)

\(^b\) Survey respondents were asked to rate each attribute to determine the priority of the attributes. Competencies/attributes that were rated extremely important by more than 85% of respondents are **bolded**.
Examples of e-ICU Nursing Interventions

Example #1 – Clinical Judgment
During virtual rounds, the tele-ICU nurse notes that the patient is experiencing a new onset of bradycardia with a 16-point reduction in systolic blood pressure. The nurse reviews the patient’s pertinent data including the medical history, trends in vital signs, laboratory values, and any change in medications in the past 6 hours. Upon review of the nursing documentation, it is noted that the patient was given an unusually large dose of dexmedetomidine to achieve effect. The tele-ICU nurse is aware that the nurses in this ICU have limited experience with the use and titration of this medication and phones the bedside nurse to offer assistance. Together they review the side effects and titration of the medication, and the decision is made to decrease the dose. Within 2 hours, the patient’s bradycardia has resolved with a return to baseline blood pressure.

Example #2 – Systems Thinking
A 42-year-old woman in a community hospital has a cardiac arrest; the tele-ICU nurse (tele-intensivist not on duty) assists with the resuscitation efforts, which are successful. However, when the tele-ICU nurse raises the question of post resuscitation hypothermia, the bedside team appears unaware of this option. At the request of the ICU, the tele-ICU nurse notifies the on-duty intensivist at the tertiary care facility and arranges a transfer for the patient.
Remote Monitoring in e-ICUs, a New Study

A recent study published in JAMA, the University of Massachusetts Memorial Medical Center compared over 6000 pre/post Tele-ICU monitoring patients with very positive results. According to the article:

- ICU hospital acquired infections decreased by over 12%.
- Mortality rates dropped by 2% in e-ICU patients compared to non-remote monitored patients.
- Length of stay decreased by 4.5 days for patients with interventional monitoring.

Journal of the American Medical Association.
Telemonitoring in a Post Discharge Setting

- Often even with the most optimal care during hospitalization, complications can occur post discharge and/or the patient still requires close monitoring for their condition once discharged.

- In these circumstances, home monitoring is utilized and can greatly assist with the recognition of problems before they become major complications hopefully eliminating the need for additional hospitalization.

- One example of this scenario is a heart patient with a post operative cardiovascular implantable electronic devices or CIEDs. (Pacemaker or Implantable Cardioverter Defibrillator)

*Remote Cardiac Monitoring System* (Click on link, 3:56)
How can remote or wireless monitoring help a patient with a cardiac pacemaker or internal defibrillator?

- It is imperative that Cardiac Pacemakers and Intra Coronary defibrillators (hereby identified as cardiovascular implantable electronic devices or CIEDs) be assessed frequently to assess battery life and to ensure the device is working correctly and delivering the appropriate therapy.

- Until quite recently CIEDs required the patient to physically visit the cardiac clinic for a device interrogation and evaluation every 6 months.

- With the advent of remote home monitoring it has become possible to interrogate the CIED from the patient’s home thus providing increased frequency of monitoring while ensuring effective and timely interventions. Both remote and wireless technology now is available.

**Long-Term Home Monitoring of Cardiac Patients with IMEC’s Patch**

(Click on link, 2:11)

*Patient Adherence in Remote Follow-up of Cardiovascular Implantable Electronic Devices.*
Case Study – Home Telemonitoring for CHF

Aim of the study

• A literature review comparing home Telemonitoring with usual care.

• 21 original studies on home telemonitoring for pts with CHF were included (3082 pts)

Results

• Patient quality of life was measured as similar or better than with usual care

• Patient satisfaction was measured as similar or better than with usual care.

In 2010, the most common chronic conditions among Medicare beneficiaries were:

1. High blood pressure (58%), 2. High cholesterol (45%), 3. Heart disease (31%), 4. Arthritis (29%) and 5. Diabetes (28%).

14% of Medicare beneficiaries have 6 or more chronic conditions (percent of chronic disease increases with age).

In 2010, about one in five Medicare beneficiaries were admitted to a hospital (cost of over $100 billion). However, among the 14% of beneficiaries with 6 or more chronic conditions, over 60% were hospitalized, (accounting for 55% of total Medicare hospitalizations cost).

Beneficiaries with 6 or more chronic conditions accounted for 63% of post hospitalization costs ($54.7 Billion).

Medicare spending for 2010 was over 300 billion dollars!

Use of Telehealth in Chronic Disease Management

- Use of telehealth technologies gives us the opportunity to reduce Medicare cost by not only remodeling how we provide care, but by also facilitating early and direct intervention for patients with multiple chronic disease conditions.

- The US Department of Veterans Affairs leads industry in telehealth programs that reduce over all health care cost. (Estimated at $2K/yr./pt)

- In 2010, over 43,000 veterans were enrolled in home telehealth care for chronic diseases. Another 49,000 patients in rural areas go to VA clinics to consult with physicians and specialists via telehealth videoconferencing services. (The Business of Federal Technology – May 2010)

- In 2008 a study by the VA showed a reduction of rural veterans hospital admissions by 50% with the use of telemedicine. (Source as above)

*Telehealth - DeptVetAffairs*

(Click on link, 2:36)
As a Nurse, How do you feel about telehealth technologies in your workplace?

- Will telehealth technology diminish the quality of nursing care due to an absence of direct hands-on assessments or face-to-face interactions? Or will it enhance care especially for seniors who are isolated at home?

- How comfortable are you working with technology? Are you a digital native or a baby boomer who sometimes needs more time to catch on? What is your ability to troubleshoot should the technology fail? Do you have a back up plan in place for the patient if it does?

- As an experienced ICU nurse not accustomed to working with a remote ICU monitoring system, does the ability to access immediate consultation on your patient’s status give you a feeling of extra security or kind of make you nervous that someone is watching you and your patient?
More Questions for the Nurse to Contemplate

- Will use of technology in the clinical setting provide an additional opportunity for patient education and communication? Or do you feel it might get in the way of required health education and teaching?

- Do you feel that the patients health information is more or less secure using EHR with broadband technologies?

Remember........

No matter which technology you are using in the clinical setting it remains just a technological tool; a means of transferring information to a remote location to others for evaluation or consultation.

The primary patient care role of the nurse does not change, it remains based in nursing expertise and evidence based practices.
Benefits of Telehealth for Nurses

- If remote monitoring, you can “see” patient and catch possible problems early and offer effective interventions.

- If facilitating home care monitoring, you will spend less time traveling between patients, thus using time more efficiently and increasing time with patients and their families.

- Increased patient satisfaction of their care assist with self-empowerment and facilitates active participation in recovery or disease management.

- Improvement in communication by sharing patient data increases team collaborative practices while improving patient care.

- Continuously working with new technology guarantees life-long learning.

- It just might be fun to work with new technologies!
Necessary Elements for Successful Telemedicine

- **Reliable broadband connectivity** (both wired & wireless)
- **Distribution of equipment** – Broadband access is still lacking in many areas of the US.
- **Standardization with interoperability** – Hardware, software, peripheral devices, protocols – everything needs to “talk” to everything else.
- **New regulatory policies that support Telemedicine** - reimbursement, credentialing, interstate/national licensing.
- **Advances in technology** to gain even wider uses - mobile apps, bluetooth and use of the “Cloud”.
- **Trained workforce** to utilize all of these technologies

As a nation, we still have a long way to go before telemedicine is woven into everyday medicine, but we are on our way with at least 50% of large teaching hospitals already wired and using technology regularly.
Some Potential Barriers of Telemedicine

- Facilitating any change can be complex, confusing and time consuming. Specific barriers need to be identified early in the change management process and a reasonable time-line part of the implementation process.

- Educating providers, patients, families and communities will require additional resources, education and support over a considerable timeframe.

- Broadband access needs to be readily available and straightforward to use. All technology interfaces need to be adaptable, easily updated and compatible with other systems.

- Cost of equipment and software for telehealth solutions can be costly upfront investment even with government support.
New Ways to Address Physician Shortages?

While there are still many barriers to overcome with the use of telemedicine in the United States; one area which it may prove to be invaluable is in helping to ease the crisis of the anticipated physician shortage.

More specifically, physicians are needed in rural areas where 25% of Americans live but only 9% of physicians practice. And it is predicted that by 2025, the nation will be short over 52,000 physicians! Now, with new advances in telehealth robotic technology physicians can be brought to the patient via mobile robots.

Robotics Advance Practice of Tele-medicine (Click on link, 1:32)  
Mercy Telehealth Network (Click on link, 3:01)

Evidence based literature shows that the future of health care is rapidly evolving to include many hospital-based technologies and home care via telemedicine.

Both public and private healthcare providers need to continue substantial investment to assure the existence of technology-enabled health care that is both seamless and efficient.

Advanced technology in health care has already provided for new career opportunities for nurse; but many more diverse roles will evolve as nursing expertise continues to be pivotal in the implementation of new technology and improvements in patient care.

Although the impetus for change in the health care paradigm is largely a result of economic constraints, the benefits to patients and healthcare providers are vast. As this shift moves us into the future, we can be assured there will be more and even better technological advances that will expand the future of healthcare for all of us.