

# Preparing the Next Generation of Advanced Practice Nurses for Connected Care

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**Abstract.** The health care delivery system in the United States is transforming at a rapid pace. Several trends, including the emergence of a Connected Health care system, will require advanced nurse practitioners to have new knowledge, skills and competencies to practice in the future. This paper describes the redesign of coursework and the development of a Connected Care Framework to guide the learning needs of nurse practitioners. A Connected Care Quotient consisting of ten relevant questions and learning activities will serve as a guide for the future development of competencies for advanced practice nurses.

**Keywords.** Connected Health, Education, Competencies, eHealth

## 1. Introduction

Since the introduction of the Health Information Technology for Economic and Clinical Health (HITEC) Act of 2009, the United States health care system has increased adoption of electronic health records systems (EHRs) across hospitals, clinics and physician practices. In *The Future of Nursing: Leading Change, Advancing Health* Report, health information technologies, primarily EHRs were highlighted as a fundamental change in how “RNs plan, deliver, document, and review clinical care.”<sup>1(104)</sup> The report noted that nurses were “expected to use a variety of technological tools and complex information management systems that require skills in analysis and synthesis to improve the quality and effectiveness of care.”<sup>1(7)</sup> In response to the increased adoption of EHRs, the American Association of Colleges of Nursing has defined information management competencies for baccalaureate, masters and doctorate of nursing practice academic programs.

To prepare our graduate level nurses to practice in an ever increasing technology enabled health care system, the College of Nursing received a Health Resources and Services Administration (HRSA) advanced nursing education training grant focused on interprofessional education (IPE) and the use of technologies. The goal of the iTEAM (*Interprofessional Technology Enhanced Advanced practice Model*) is preparing advanced practice nurses (APNs), physicians and pharmacists with the necessary interprofessional (IP) core competencies to “provide technology enhanced collaborative care by: offering technology enhanced learning opportunities through a required informatics course, advanced practice courses (team based experiences with both standardized and virtual patients) and team based clinical experiences including eHealth experiences.”<sup>2(58)</sup> *The Core Competencies for Interprofessional Collaborative*

*Practice* identified by the Interprofessional Education Collaborative Practice (IPEC)<sup>3</sup> focused on values/ethics, roles and responsibilities, IP communication, and teams and teamwork.

The initial objective was to develop a series of learning activities to address the IP communications using the EHR to facilitate teamwork and the care of patients. As described in an earlier publication, learners were engaged in various courses using a variety of tools to foster communication and practice as a collaborative team to provide care.<sup>1</sup> After some experimentation with several types of learning activities (EHR assignments, simulations with patients in a face-to-face experience, virtual simulations with virtual patients in Second Life- a 3D virtual world with avatars), it was realized that our project focused on the current health care system and was not focused on the emerging changes in the health care system. Our task then was to examine current trends in health care as it entered into the Post-EHR era<sup>4</sup> and revise our learning activities and formulate new competencies for our future nurse practitioners.

The Post EHR era is being fueled by three major trends. The first trend is the concept of the Connected Age. According to Siemens Internet of Things Facts and Figures,<sup>5</sup> there are currently close to 20 Billion connected devices linked to the Internet and forecasts from 26 to 33 Billion expected by the year 2020. The connected age is all about everything and everyone being connected. Oblinger described it best as “*Connecting* is about reaching out and bringing in, about building synergies to create a whole that is greater than the sum of its parts. *Connecting* is a powerful metaphor. Everyone and everything—people, resources, data, ideas—are interconnected: linked and tagged, tweeted and texted, followed and friended.”<sup>6(4)</sup> In higher education, connected age is described as an environment that “offers new ways to connect things that were previously considered disparate and ‘un-connectable’: people, resources, experiences, diverse content, and communities, as well as experts and novices, formal and informal modes, mentors and advisors.”<sup>7(88)</sup> In this environment, “learning pathways can be created by the individual or can be guided by other students or faculty. The bottom line is... learning pathways are about connecting the dots through connections that can be in the classroom, online or even with people and places outside the traditional academic environment.”<sup>8(63)</sup>

It is not surprising that the health care community has also recognized the concept of connectedness. Caufield and Donnelly defined connected health as “a conceptual model for health management where devices, services or interventions are designed around the patient’s needs, and health related data is shared, in such a way that the patient can receive care in the most proactive and efficient manner possible.”<sup>8(704)</sup> Iglehart<sup>9</sup> views connected health as an umbrella concept that incorporates telemedicine, telehealth and m-health. Although connected health incorporates many digital tools as part of its infrastructure, it is also about connecting people, ideas, resources and communities. It is about putting the patient front and center in the care process.

The second trend is that “the health care system is undergoing rapid changes that put new emphasis on population health, quality of care, and the value of the services delivered.”<sup>11(1)</sup> New health care delivery systems are being implemented that require a shifting of the workforce from acute to outpatient settings. “In this new system, nurses will need to consistently apply skills associated with a continuous learning health system, including care coordination and transitional care; optimize care through use of data and evidence, often gleaned from electronic medical records; collaborate interprofessionally, and actively engage in performance improvement.”<sup>11(2)</sup> This second

trend is built upon the Institute of Medicine's initiative, Better Care at Lower Cost and the Continuously Learning Health Care System.<sup>12</sup>

The third trend is the rise of patient engagement and their use of digital tools. The engagement of patients, families, caregivers and consumer in their health care is an important component of the transformation of health care. Leonard Kish refers to Patient Engagement "as the blockbuster drug of the century."<sup>13(1)</sup> *The National Action Plan to Support Consumer Engagement via E-Health* proposed in 2013 highlights the importance of patients, families, caregivers and consumers being engaged in their care and having access to their health information. Their three-pronged strategy is "to increase patients' Access to their health information; to enable consumers to take Action with that information; and to shift Attitudes so that patients and providers think and act as partners in managing health and health care using health information technology."<sup>14(378)</sup> Their e-health tools include patient portals to access information from their EHRs as well as secure messaging with their clinicians, personal monitoring devices, mobile apps, health information websites and social media sites for peer support.

The three trends are also influenced by two recent strategic initiatives proposed by the Office of the National Coordinator for health information technology. The first is the proposed *Connecting Health and Care for the Nation A Shared Nationwide Interoperability Roadmap*.<sup>15</sup> If the United States Health care system is to reach its goals of improving health outcomes, improving the quality of care and lowering costs, it is important that health information from institutions, providers and the patient are accessible at the point of care. The goal is to create a nationwide learning health care system, which is an "interoperable health IT ecosystem that is person- centered makes the right electronic health information available to the right people at the right time across products and organizations, in a way that can be relied upon and meaningfully used by recipients."<sup>15(9)</sup> The roadmap defines the functional and business requirements for technical and semantic interoperability. The second initiative encompassed a five-year *Federal Health IT Strategic Plan*.<sup>16</sup> This plan builds on the better health, better care and lower costs aim but also now included the engaged patient as part of the vision. There are three overarching goals set forward. The first is "to advance person-centered and self-managed care" <sup>16(9)</sup> by engaging patients, families and caregivers to manage their health care and to facilitate partnerships among individuals, clinicians and communities. The second goal is "to transform the delivery of health care and community health." <sup>16(9)</sup> The last two goals focus on facilitating research, science & innovation as well as enhancing the Health IT infrastructure of the United States.

## 2. Methods

Upon completion of our analysis of trends, review of the literature and the newest federal strategic initiatives, a Connected Care Framework was developed to guide the curriculum development and create an initial set of competencies for our APNs. Advanced practice nurses include direct practice roles such as nurse practitioners and clinical nurse specialists as well as indirect care roles such as informatics specialists and administrators. The Connected Care Framework allows the inclusion of the IP core competencies, their use of the EHR and a new set of knowledge, skills and attitudes build upon the concepts of connected health, patient engagement, clinical transformations and new digital tools. These new concepts were framed within the

context of the continuously learning health care system, interoperability principles and the federal health IT strategic plan. A diagram of the Connected Care Framework is shown below.

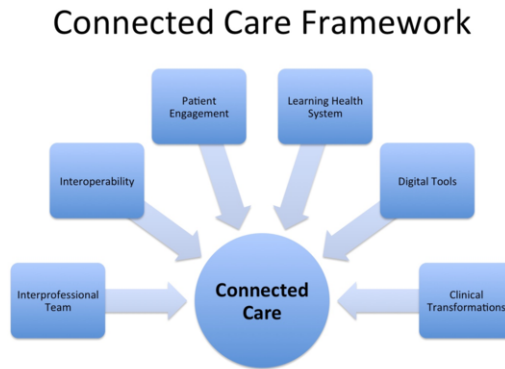


Figure 1: Connected Care Framework

Coursework was then redesigned to incorporate all the concepts of Connected Care. Interprofessional learning activities were redesigned to focus on three areas: electronic communication for teams, patient engagement and conducting an eVisit with patients. Each are briefly described highlighting the IP experiences in Connected Care.

### 3. Results

#### 3.1 Electronic Team Communication

In the Health Assessment and Advanced Pharmacology courses, APN students are paired with second or third year PharmD students for various IP experiences. Both nursing and pharmacy students have access to patient electronic record through the Cerner Academic Education Solution EHRs. These records are crafted by faculty and serve as a means of the team sharing information about the patient and developing collaborative care plans. “These various IPE experiences allow students to understand how EHRs can be used as a communication mechanism to provide collaborative care when all disciplines are not present with the patient. It is also used as a mechanism to keep teams informed of their patient’s health progress and to insure teams are working together to provide the best care.”<sup>15</sup>

#### 3.2 Patient Engagement

All students receiving a Master of Science (MS) or a Doctorate of Nursing Practice (DNP) degree are required to enroll in the Foundations of Health Care Informatics course. There are four modules in the course that include students learning the core concepts of informatics, data-information-knowledge continuum & decision support tools, consumer engagement and professional issues (privacy, security, roles). The course is taught within the context of a continuously learning health care system and takes into account the Federal Health IT Strategic Plan and the Interoperability. The consumer engagement module involves an IP learning experience. This module focuses on the use of digital tools with patients, families, caregivers and consumers to encourage engagement in their health care. Digital tools covered in the course are:

personal health records/patient portals with secure messaging, mobile apps, consumer-facing tools, social media, and patient generated health data tools. For their IPE experience, the collaborative care team (nursing & pharmacy students and the patient) helps a patient who has requested advice for some digital tools to manage their health condition. The patient has sent a secure message to the team requesting a trusted website, a social network group for peer support and any mobile apps that can help to manage his care. Both the nursing and pharmacy students have access to the patient's EHR. The team accesses the patient record and then meets virtually to determine how to proceed and accomplish this patient request. Students can meet using one of several platforms (Skype, Zoom, Canvas Learning Management system, Google Hangouts or Firefox Hello) to review the patient's health record, determine criteria to use for the evaluation of these requested items (website, social network and mobile apps). The students must then find the tools, evaluate them and write a response to the patient taking into account the patient's knowledge and health literacy.

### 3.3 eVisits

With increasing demand for eVisits, nursing and pharmacy students were given connected care opportunities to practice using patient digital tools (ThinkLabs Digital Stethoscope, Masimo iSpO2 Pulse Oximeter, Withings Wireless Blood Pressure Monitor & Withings Smart Body Analyzer) and to conduct an eVisit with a standardized patient (SP). A SP is an "actor" trained to portray a particular patient scenario. The SP was a 74-year-old man who was comfortable using technology. The pharmacy and advanced practice nursing student had to virtually meet to review the patient record using the Cerner Academic Education Solution EHRs, determine the intent of the eVisit and then conduct the eVisit.<sup>17</sup> The virtual platform was Zoom (<https://www.zoom.us/>). It is easy to use and allows participants to use their speakers, microphones and cameras on their computers, tablets or smartphone to have an interactive virtual meeting.<sup>17</sup>

## Discussion

For each of these areas, we learned many valuable lessons to inform our curriculum redesign. There were several challenges from these experiences. First, there is a need to challenge nurses to reflect on their engagement with patients, families and caregivers. There is a need to give them more experiences to include patients as a part of the health care team. Second, nurses "need more experiences not only using digital tools themselves, but to gain a greater understanding of how patients, families, and caregivers use these tools." <sup>17(201)</sup> Third, nurses need more knowledge, guidance and skills in conducting eVisits with patients and within a collaborative care team. In response to these challenges, A *Connected Care Quotient (CCQ)* was developed as part of a talk for the Institute of Medicine's five year review of *The Future of Nursing: Leading Change, Advancing Health* Report.<sup>1</sup> The CCQ was adapted from Topol's "Digital Quotient,"<sup>18 (178)</sup> which is composed of five questions one can ask potential graduates of medical school. The CCQ poses 10 questions<sup>19 (347)</sup> to ask future APNs in direct care roles:

- Will you & the care team include me as an active partner in the collaborative care team?
- Will you & the care team advocate patient generated health data (PGHD) so I can choose the right digital tools to capture essential data relevant to my health?

- Will you and the care team be supportive of patients/families/caregivers activation and maximum engagement in my care?
- Will you & the care team share your clinical notes with me?
- Will you & the care team leverage numerous forms of data to inform my clinical decision making?
- Will you & the care team recognize that health and health care go beyond your walls and provide care through various digital tools?
- Will you & the care team connect me to patients, resources and evidence based practices?
- Will you & your care team help to transform the way health care is experienced and delivered?
- Will you & the care team provide personalized health care based not only clinical data but social & behavioral measures & patient preferences?
- Will you & the care team help me understand my health data to make better health decisions?

The next step will be to translate these connected care quotient into measureable competencies and to develop the curricular materials to support student learning.

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