

# Emergence of Nursing Innovation Influenced by Advances in Informatics and Health IT

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In the last three years, the nursing profession has seen a resurgence in focus on nurse-led innovation. To innovate is to bring forth purposeful change. Nurse-led innovation is not new to nursing. Yet, the dependency on electronic health records and other digital health information technology (IT) solutions is new within the last decade or two. The digitalization of patient data and information has created new opportunities to further improve care quality. Nurse leaders now have an opportunity to advance innovation within nursing through informatics expertise and health IT solutions that address the emerging quality needs of the health care team.

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“**W**ere there none who were discontented with what they have, the world would never reach anything better.”<sup>1</sup> In modern day terms, Nightingale saw the need for nurses to look beyond the status quo for opportunities to improve and drive change in health care. Innovation, as a concept, is not new to nursing.<sup>2</sup> Nurses are responsible for several innovations that are now staples in health care.<sup>3</sup> Yet, innovating in the nursing profession has seen a resurgence in the last several years.<sup>4-6</sup> An impetus for such resurgence can be attributed to national advancements in informatics and health information technology (IT) solutions as a result of the Health Information Technology for Economic and Clinical Health (HITECH) Act within the American Recovery and Reinvestment Act (ARRA) of 2009. Since ARRA, US health care environments have rapidly implemented and adopted clinical information system innovations.<sup>7</sup> Such rapid implementations have forced nursing leaders to focus on health care quality as a metric for success while understanding how to diffuse change throughout an organization. Nurse leaders now are increasingly dependent on informatics expertise to support the use of health care data and information to generate new knowledge and wisdom in health IT solutions through new innovations for the delivery of quality.<sup>8</sup> The purpose of this paper is to describe the role of informatics and health IT in identifying new opportunities to drive innovation in nursing and health care for improved care quality.

## BACKGROUND

### Innovation in Health Care

Throughout history, nurses exemplify the creativity and ingenuity needed to develop innovative ways to improve care quality for the benefit of our patients, families, communities, and populations in need. Some innovative ways have materialized as new products, new roles, and models of care delivery, and new ways to measure care needs not previously available (*Figure 1*). Every health care professional is familiar with the crash cart. The crash cart, invented by nurse Anita Dorr<sup>9</sup> in 1967, offered health care professionals an efficient and timely way to ensure that emergency situations would have a standard for how to access essential tools. A new role and model

### KEY POINTS

- **Nurse-led innovation is increasing in focus across the United States, striving to encourage innovation within our health care environments.**
- **Our health care environments are now dependent upon digital health information technology (IT), such as the electronic health record, to deliver quality care.**
- **Incremental innovations in mobility, interoperability, and patient education technologies are emerging as the next wave of informatics and health IT solutions.**



**Figure 1.** The UConn School of Nursing’s Josephine A. Dolan Nursing History Collection, assembled initially by the school’s first nurse faculty member and author of “Nursing in History,” includes archival documents and physical artifacts and technologies from the history of nursing. Today the collection and its permanent and changing exhibits are curated by Thomas Lawrence Long, PhD, a medical humanities scholar in the school.

of health care delivery emerged in 1965 with the first nurse practitioner (NP) program.<sup>10</sup> Loretta Ford, EdD, PNP, FAAN, and Henry Silver, MD, were the founding visionaries who established the first NP program at the University of Colorado.<sup>11</sup> The need for this innovative practice model and degree began in a response to a shortage of primary care physicians available to care for those in need of their services.<sup>10</sup> Today, the United States alone has more than 270,000 nurse practitioners.<sup>11</sup> Considering pain management, the common adult pain metric of scoring pain on a scale of 0 to 10 is unreliable with young children.<sup>12</sup> Wong and Baker, through their research, discovered a way to effectively measure childhood pain through the Wong-Baker FACES Scale.<sup>13</sup> That scale is an essential for pain management in the United States and in many countries overseas.<sup>14</sup> Without the following innovations, the quality of our care delivery for those affected populations would be severely impacted across the globe. Although keeping quality of care at the helm, today’s innovations are emerging as a result of national emphasis to digitalize care through health IT solutions and the use of informatics to design such solutions.

### Health IT and Quality

The focus on quality as the evaluative metric to determine next steps towards innovations is most notably described in *Crossing the Quality Chasm*.<sup>15</sup> This seminal report emphasized the six constructs that define quality: safety, efficiency, effectiveness, equity, timeliness, and patient-centeredness.<sup>15</sup> Although published nearly two decades ago, the National Academy of Medicine’s report drew attention to the need for electronic health records (EHRs) to improve quality across the six constructs.<sup>8</sup> Nurse leaders know there are always opportunities to improve health care quality. Addressing such opportunities becomes available when new innovative products, processes, or services become available to do so. A current challenge faced by nurse leaders today is ensuring that new innovations address at least one of the six quality constructs. Without a link toward a measurable improvement on quality, the innovation may be seen as nice to have or as a solution to a problem that is not currently in need of a solution. For the nurse leader, he or she must ask the innovator to explain how care quality can improve in a measurable way with the new innovation. More specifically, the primary innovations of our next decade will address informatics and health IT challenges. Nurse leaders must understand the driving

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force for this movement and the key opportunities we will soon be able to address through the advancement of digital health solutions.

### **Informatics and Health IT as a Driver for Innovation**

In the current era, the most prominent health IT innovation is the EHR. Although originally conceptualized in 1968 by Dr. Lawrence Weed,<sup>16</sup> mainstream national adoption of EHRs only occurred within the last decade.<sup>17</sup> The impetus for implementation and adoption of EHRs resulted from the federal HITECH Act through ARRA of 2009.<sup>7</sup> Whereas just a few EHRs were active in the late 1960s,<sup>8</sup> 50 years later, the United States is at 96% adoption in hospitals and 60% in office-based provider practices.<sup>18</sup>

The implementation and adoption of EHRs (more broadly defined as clinical information systems), across health care settings brought to the forefront the absolute dependency that nurses and health care professionals have on data, information, and knowledge to delivery quality care. The use of data and information to generate new knowledge (and wisdom) within a discipline is the definition of informatics.<sup>19</sup> With widespread EHR and clinical information system use, nurse leaders, nurses, and all health care professionals have likely been introduced to the change-making process involved with diffusing an innovation across an organization.<sup>20</sup> Thus, nurse leaders especially are familiar with the processes, essential milestones, and common behaviors among those working within the organization from that of other innovators through to the laggards.<sup>20</sup> Even more beneficial to nurse leaders is the current emphasis on nurse-led innovation.<sup>4-6</sup> Thus, recognizing current health IT limitations by way of informatics expertise of our current digital health state, combined with a resurgence in promoting nurse-led innovation, has led us to now imagine the future state of nursing and health care needs for quality care delivery.

### **INFORMATICS AND HEALTH IT INNOVATION OPPORTUNITIES**

As with any incremental innovation trajectory, the new products developed are building off of prior established innovations.<sup>21</sup> The incremental innovations strive to improve and advance what is already available.<sup>21</sup> An example of this in our day-to-day lives is the evolution of the telephone. The telephone serves the purpose of being able to communicate with someone else who is at a different geographical location.<sup>22</sup> In my lifetime, telephones have moved from being a rotary-based landline, which then advanced to a cordless-based phone that one could carry around the home. We then saw the emergence of cellular phones and subsequently the modern-day smartphones. The incremental improvements continued to build on the core purpose while improving on the convenience and

accessibility of the end user. Using this incremental conceptual approach toward innovation, nurse leaders may anticipate the future direction of innovations to address health care quality through IT and informatics solutions.

Major categories of emerging and foci of health IT and informatics innovations include (but are not limited to) mobility, interoperability, and reimagining patient education through gaming technologies.<sup>8</sup> These three categories were selected due to the immediate challenges facing nurses and health care professionals for the delivery of safe, efficient, timely, patient-centered, equitable, and effective care. From these descriptions, nurse leaders may identify other categories of opportunities that leverage informatics and health IT for their own organizations' strategic vision for the future. The following descriptions are providing a mere introduction to the many digital health opportunities we as nurse leaders, leading the future of innovation, must take on to further drive high quality patient care.

### **Mobile Applications and Hardware Devices**

The EHR is now the largest data repository of clinical data across our health care organizations. Yet, nurse leaders need more than a data repository to store information for their clinical staff. Nurse leaders need applications and devices that can support the information needs of the entire health care team wherever they are located within the organization. Nurses collect over 50% of the data and information needed for care delivery across the health care team.<sup>23</sup> Nurses also are rarely stationary while in direct care roles. Instead, nurses are with their patients, either in the patient room or in another location on the care unit working on something to delivery to their patients. Thus, access to information becomes essential where the nurse is located, not where the computer is located on the unit. This simple shift in perspective, paired with the right innovative solution(s), will transform how we deliver care with the right associated software and hardware solutions previously unavailable to us.

Mobile devices and the associated software applications have transformed consumer life. Over 96% of adults in the United States use a smartphone.<sup>24</sup> The increased accessibility to data and information has allowed for greater efficiency in many areas of day-to-day life. Health care organizations can greatly benefit from providing their health care professionals with tools that allow for increased efficiency and access to essential data and information for care delivery. This is an area ripe for innovation to alleviate some of the current pressures of having to decide between nursing the patient or nursing the computer.<sup>25</sup> Yet, those pressures will not likely be understood by individuals not experiencing them day to day. Thus, nurse leaders must recognize their role in identifying or developing the mobile

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solutions, hardware, and software, to benefit a more efficient use of data and information on a daily basis.

### Interoperability

Interoperability is, in its simplest form, the ability to seamlessly exchange data between two or more clinical information systems.<sup>8</sup> Care cannot be delivered in a timely, safe, patient-centered care and efficient manner if those who are delivering it do not have access to the data and information needed to make critical decisions at the point of care. In order to meet such an expectation, our clinical information systems must be interoperable. Having disparate sources of data within and across organizations about the same individual greatly limits what nurses and other health care professionals can know about that patient. Thus, although interoperability often is discussed in more technically oriented health care environments, nurse leaders must understand the opportunity that exists to address quality of care in ways not previously available to us in the health care industry.

As an innovation, interoperability presents new ways to exchange data at a baseline level. However, the opportunity available to us as nurse leaders is to recognize what we can now do with such an innovation. With the ability to soon exchange discrete data elements across clinical information systems (EHRs included), new clinical roles will emerge along with new digital solutions and processes of care. Informatics nurse specialists<sup>26</sup> will be needed to map data elements across systems and identify data flow workflows for bidirectional or unidirectional flow. Although this does occur today, the volume of professionals needed to execute interoperability at an enterprise level will dramatically increase. With new data exchange pathways (e.g., interoperability), the opportunity for new digital solutions will emerge. Nurse leaders will need to evaluate those solutions, strategize how the future of health care can be delivered with new access to data and information, and develop a supportive culture of innovation<sup>27</sup> to promote the new processes of care delivery that will result from our informatics and health IT advancements.

### Individualizing Patient Education Through Technology

Patient education is an essential component of delivering quality nursing care. Although the patient education process should be a daily activity between the patient and nurse, nurses are often challenged by the lack of available time. Nurses are already staying after their shift to catch up on their essential documentation.<sup>27</sup> Therefore, nurse leaders must consider other approaches to address the education needs of the patient while hospitalized.

One approach is to leverage the time patients are in their room. Hospitalized patients spend most of their time in their room. Knowing nurses will unlikely have

more free time, nurse leaders must consider leveraging the patients' time in their rooms and the available technology to address patient education needs at an individualized level. An opportunity exists to develop online patient education modules for patients to complete while hospitalized. Patients would complete the modules, reinforce the content with short quizzes, and subsequently be given feedback on areas for improvement. Nurses would receive reports on each patient's progress and review those areas where the patient is in need of more focused education. Such an advancement would leverage the expertise of informatics nurse specialists<sup>26</sup> and new health IT solutions to further support both the nurses and the patients. By recognizing the available opportunity, patient education can be more timely, effective, and patient-centered.

### DISCUSSION

Nurse leaders across the nation are currently being overtly introduced to innovation as a concept in health care. Although it is essential that the nursing profession innovate throughout our professional trajectory, nurse leaders must be searching for innovations that can be applied to their current and anticipated future care quality needs. In doing so, nurse leaders will inevitably model how to foster an innovative culture while addressing opportunities to improve the safety, efficiency, timeliness, patient-centeredness, effectiveness, or equity of care not previously available. Nurse leaders would be amiss if a strategic focus was not placed on addressing emerging opportunities available to our health care environments with innovative digital health solutions designed to address nursing-related quality of care issues. Such a focus would further strengthen the impetus for innovating in health care, gradually move toward a more proactive leadership style, and ultimately benefit the experience of patients and their families.

### Implications for Leadership, Practice, and Education in Nursing

Nurse leaders have the responsibility to lead the strategic vision for the future of their organizations and the profession. To fully embrace the current impetus for nurse-led innovation, nurse leaders must operate from a proactive approach toward change. Moving from a more reactive and risk averse perspective in nursing and health care to one that is proactive and open to exploring new innovations requires an internal acceptance and organizational culture that embraces change.<sup>27</sup> Nurse leaders may not be the individuals with the new innovations. However, nurse leaders will be the ones who will receive those ideas from staff, and innovations from companies. Knowing how to listen and evaluate those innovations may be a new responsibility in need of further education. Nurses who have ideas that they want to share will want to know

how to bring those forward for consideration. This step may also require further education. Therefore, a foundational knowledge base on innovation competencies may be necessary for all nurses. Such education does not require a formal graduate degree to support these processes in order to innovate. However, an understanding of core knowledge, skills, and attitudes will bring forth more consistency within the organization.

Embracing innovation through education and cultural acceptance is one step. The second major implication is in recognizing the incremental innovations in digital health designed to address current limitations with the EHR (and other clinical information systems) or simply improve on processes that previously could not be addressed in a paper-based world. Informatics nurse specialists are available to help support the next wave of advancement. Their expertise can guide nurse leaders on how to effectively evaluate the new and emerging health IT solutions for the appropriate quality of care construct(s). The opportunities are there but cannot be implemented and adopted without nursing leadership and expertise.

## CONCLUSION

Nurse leaders across the country are seeing the focus on nurse-led innovation grow. To innovate is to bring forth necessary change. Necessary change must have a strategic effort to address at least one of the six quality constructs.<sup>15</sup> While the impetus to foster innovation across health care organization grows, the day-to-day challenges faced by the entire health care team remain. Over the last decade, nurse leaders have seen the shift toward digitalization of health records through rapid implementations and adoptions of the EHR across the nation. One way to put the focus of nurse-led innovation into action is to address the forthcoming incremental innovations in health IT solutions designed to address opportunities that previously could not be addressed before digitalizing the patient record.

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