



The TIGER Initiative

Collaborating to Integrate Evidence and Informatics into
Nursing Practice and Education: *An Executive Summary*



Technology Informatics Guiding Education Reform (TIGER)

www.thetigerinitiative.org

EXECUTIVE SUMMARY

The TIGER Initiative, an acronym for **T**echnology **I**nformatics **G**uiding **E**ducation **R**eform, was formed in 2004 to bring together nursing stakeholders to develop a shared vision, strategies, and specific actions for improving nursing practice, education, and the delivery of patient care through the use of health information technology (IT). In 2006, the TIGER Initiative convened a summit of nursing stakeholders to develop, publish, and commit to carrying out the action steps defined within this plan. The Summary Report titled *Evidence and Informatics Transforming Nursing: 3-Year Action Steps toward a 10-Year Vision* is available on the website at www.thetigerinitiative.org.

A COLLABORATIVE APPROACH

Since 2007, hundreds of volunteers have joined the TIGER Initiative to continue the action steps defined at the Summit. Collaborative teams were formed to accelerate the action plan within nine key topic areas.

Each collaborative team researched their subject with the perspective of “What does every practicing nurse need to know about this topic?” The teams identified resources, references, gaps, and areas that need further development, and provide recommendations for the industry to accelerate the adoption of IT for nursing. The TIGER Initiative builds upon and recognizes the work of organizations, programs, research, and related initiatives in the academic, practice, and government sector, and references this work within the “references” and “resources” sections of the nine individual collaborative reports. Areas that need further action steps are listed in the “recommendations” section of each collaborative report.

SUMMARY REPORT

This report provides an executive summary of the TIGER activities through 2008, as well as a brief synopsis of each of the findings and recommendations of the nine collaborative teams. The comprehensive report from each of the nine collaborative teams will be available on the TIGER website at www.thetigerinitiative.org.

COLLABORATIVE TEAMS

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The TIGER Initiative focused on raising awareness with nursing stakeholders in three areas:

1. Develop a U.S. nursing workforce capable of using electronic health records to improve the delivery of healthcare.

In 2004, President Bush mandated that all Americans will be using electronic health records by the year 2014. As reported in *Building the Workforce for Health Information Transformation*¹, “A work force capable of innovating, implementing, and using health communications and information technology (HIT) will be critical to healthcare’s success.”

President Obama continued this momentum when he took office in 2009, proposing to “Let us be the generation that reshapes healthcare to compete in the digital age.” Less than 30 days after taking office, President Obama signed the American Recovery and Reinvestment Act, earmarking \$19 billion to develop an electronic health information technology infrastructure that will improve the efficiency and access of healthcare to all Americans. In addition to the substantial investment in capital, technology and resources, the success of delivering an electronic healthcare platform will require an investment in people—to build an informatics-aware healthcare workforce.

This has accelerated the need to ensure that healthcare providers obtain competencies needed to work with electronic records, including basic computer skills, information literacy, and an understanding of informatics and information management capabilities. A comprehensive approach to education reform is necessary to reach the current workforce of nearly 3 million practicing nurses. The average age of a practicing nurse in the U.S. is 47 years. These individuals are “digital immigrants²,” as they grew up without digital technology, had to adopt it later, and some may not have had the opportunity to be educated on its use or be comfortable with technology. This is opposed to “digital natives”: younger individuals that have

grown up with digital technology such as computers, the Internet, mobile phones, and MP3. There are a number of digital immigrants in the nursing workforce who have not mastered basic computer competencies, let alone information literacy and how to use HIT effectively and efficiently to enhance nursing practice.

Five of the TIGER collaborative teams developed recommendations focused on how to prepare nurses to practice in this digital era. The **TIGER Informatics Competencies Collaborative (TICC)** team helped develop a minimum set of informatics competencies that all nurses need to have to practice today.

Five Collaborative Teams Focused on Workforce Development:

1. Informatics Competencies
2. Education and Faculty Development
3. Staff Development
4. Leadership Development
5. Virtual Demonstration Center

The **TIGER Education and Faculty Development Collaborative** team focused on engaging stakeholders that influence and deliver nursing education and licensing, including academic institutions representing all levels of nursing education, educationally-focused professional organizations, federal organizations that fund nursing education, and state boards of nursing.

There was widespread support of this effort from all of the key stakeholders. Most notably, both the American Association of Colleges of Nursing (AACN) and the National League for Nursing (NLN) have

¹ AHIMA/FORE and AMIA, (2006). *Building the workforce*. Available online at www.ahima.org/emerging_issues/.

² Prensky, M. (2001, October). Digital natives, digital immigrants. *On the Horizon*. Available online at www.marcprensky.com/writing/.

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supported the inclusion of informatics competencies in all nursing curricula moving forward.

The Health Resources and Services Administration (HRSA) has recognized the critical need for faculty development efforts related to informatics education and has made federal funds available for related projects under the Integrated Technology into Nursing Education and Practice Initiative (ITNEP).

To address the educational needs of the existing nursing workforce, the **TIGER Staff Development Collaborative** team focused on practical approaches to professional development that meet the minimum informatics competencies defined by TICC.

The **TIGER Leadership Development Collaborative** team expanded on the model developed by TICC to include additional competencies that nursing leaders need to accelerate successful adoption of electronic health records. Professional organizations focused on nursing leaders such as the American Nurses Association (ANA), American Organization of Nurse Executives (AONE), American Academy of Nursing (AAN), Sigma Theta Tau International (STTI), and American Nurses Credentialing Center (ANCC) Magnet™ Program helped disseminate the TIGER agenda to their members and provided suggestions on how to integrate health IT into their practice.

Finally, one of the barriers to improving informatics education for nurses remains the limited access to information systems and technology that could improve healthcare delivery. Nursing schools frequently rely on the clinical practicum site to provide access to and education on electronic health records. In any given practice environment, exposure to technology is limited to the systems that are currently deployed. Yet this is inadequate to understand the capabilities that health IT can offer nurses. One TIGER collaborative team, the **Virtual Demonstration Center**, developed a virtual learning center supported by the Healthcare Information and Management Systems Society

(HIMSS) in order to provide exposure and education to nurses on a variety of technologies and information systems available today and in the future. The TIGER Initiative recommends further exploration into virtual learning platforms to improve access to information technology education.

2. Engage more nurses in the development of a national healthcare information technology (NHIT) infrastructure.

The TIGER Initiative focused on engaging nursing stakeholders from various practice settings by working with nursing professional organizations. Nurses comprise more than 55% of the current healthcare workforce in the U.S., and they can contribute to the redesign of the information flow of healthcare to be more efficient, patient-centered, equitable, accessible, and safe. Nurses are often at the center of care coordination for the patient and are well versed on the workflow and information flow critical to minimizing shortfalls with communication handoffs in the delivery of healthcare. Some practice specialty areas in nursing have been historically underrepresented in the development of use cases, technical infrastructure, and development of standards. This leaves a gap in creating interoperable electronic health records that cover the continuum of healthcare delivery through different practice environments. Two TIGER collaborative teams focused on engaging more nurses in the development of the NHIT infrastructure—the **Standards and Interoperability** team and the **National Health IT Agenda** team. Both of these teams recruited nurses from various practice settings to participate in use case discussions and standards organizations, and to provide their expertise with organizations representing the Office of the National Coordinator such as the Healthcare Information Technology Standards Panel (HITSP), American Health Information Community (AHIC), and Certification Commission for Healthcare Information Technology (CCHIT). Both teams also developed an inventory of standards and National Health IT activities relevant to nurses, as well as tutorials to assist in educating nurses about the urgency of these activities. Much work remains as the national and regional effort to develop and demonstrate health IT infrastructure is just getting

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started, so the effort to engage nurses from all practice and educational settings needs to remain a high priority.

Two Collaborative Teams Focused on National Health IT Initiatives:

1. Standards and Interoperability
2. National Health IT Agenda

3. **Accelerate adoption of smart, standards-based, interoperable technology that will make healthcare delivery safer, more efficient, timely, accessible, and patient-centered.**

Studies have demonstrated that the current information systems and technology in practice do not meet the workflow and information flow requirements of nurses, and this has hampered adoption of electronic health records. Nurses and their interdisciplinary colleagues need innovative technology to simplify their work and provide them clinical guidance for the safety of their patients. Additional nursing input into the design and implementation process can improve technology solutions to be more usable, accessible, timely, interoperable, patient-centered, and improve the safety and efficiency of nursing care.

Three collaborative teams—**Usability, Consumer Empowerment/Personal Health Records, and Standards and Interoperability**—have developed an inventory of resources and guidelines to enable nurses to participate in the design process for both provider and patient-centered applications. The recommendations of these three collaborative teams

build upon the efforts of organizations that are focused on the development and adoption of standards, usability, and personal health records, including the vendors that develop technology solutions. All teams advocate for broader participation of nurses in all of these interrelated efforts.

Three Collaborative Teams Focused on Improving Technology Solutions:

1. Usability and Clinical Application Design
2. Consumer Empowerment and Personal Health Records
3. Standards and Interoperability



BACKGROUND

National attention on health IT has accelerated since 2004 when President Bush announced plans to support adoption of electronic health records for all Americans. In January 2005, a small group of nursing leaders and advocates met and resolved to **strengthen the voice of the nursing profession** in the transformation of healthcare for the 21st century. This group organized the Technology Informatics Guiding Education Reform (TIGER) Initiative.

NURSING ENGAGEMENT

Nursing has embraced the opportunity to reform healthcare using technology as an enabler. In 2006, the TIGER Initiative held an interactive summit titled **“Evidence and Informatics Transforming Nursing.”** The summit gathered over 100 leaders from the nation’s nursing administration, practice, education, informatics, technology organizations, government agencies, and other key stakeholders to create **a vision for the future of nursing that bridges the quality chasm with information technology, enabling nurses to use informatics in practice and education to provide safer, higher-quality patient care.** While many of the statements resonate with a wide range of interdisciplinary health professions, the initial focus of the agenda was nurses and the nursing profession.

THE VISION

The vision focuses on seven components defined and ranked by the summit attendees using a wireless audience response system. Attendees concurred that essential components are interdependent and that culture is essential

to all other six areas. Together, all seven components act as pillars for the TIGER vision and provide the framework for TIGER’s action plan.

TIGER VISION

Allow informatics tools, principles, theories and practices to be used by nurses to make healthcare safer, effective, efficient, patient-centered, timely and equitable.

Interweave enabling technologies transparently into nursing practice and education, making information technology the stethoscope for the 21st century.



BACKGROUND

With the seven pillars as the framework, the TIGER Summit attendees developed an action plan to identify steps that the nursing profession must take over the next three years to achieve the TIGER vision.

Each of the organizations participating in the TIGER Initiative agreed that nursing must integrate informatics technology into education and practice. Each has pledged to incorporate the TIGER vision and action steps into their organization's strategic plans. Each fulfilled a critical role by distributing the TIGER Summit Summary Report within their network to engage additional support for this agenda. A list of the participating organizations is available on the TIGER website at www.thetigerinitiative.org/participants.

From the TIGER Summit in 2006 until now, these organizations, together with hundreds of additional volunteers and industry experts, have collaborated to complete the action steps necessary towards achieving the TIGER vision. Articles and presentations at regional, national, and international conferences have brought TIGER activities to nursing colleagues. The TIGER Initiative remains focused on raising awareness of the need to engage nurses in the national effort to prepare the healthcare workforce towards **effective adoption of electronic health records**.



Seven Pillars of the TIGER Vision

- 1. Management and Leadership:** Revolutionary leadership that drives, empowers, and executes the transformation of healthcare.
- 2. Education:** Collaborative learning communities that maximize the possibilities of technology toward knowledge development and dissemination, driving rapid deployment, and implementation of best practices.
- 3. Communication and Collaboration:** Standardized, person-centered, technology-enabled processes to facilitate teamwork and relationships across the continuum of care.
- 4. Informatics Design:** Evidence-based, interoperable intelligence systems that support education and practice to foster quality care and safety.
- 5. Information Technology:** Smart, people-centered, affordable technologies that are universal, useable, useful, and standards-based.
- 6. Policy:** Consistent, incentives-based initiatives (organizational and governmental) that support advocacy and coalition-building, achieving and resourcing an ethical culture of safety.
- 7. Culture:** A respectful, open system that leverages technology and informatics across multiple disciplines in an environment where all stakeholders trust each other to work together towards the goal of high quality and safety.

TIGER IMPACT

TIGER's mission of reaching the 3 million U.S. practicing nurses required widespread and rapid dissemination and support of the vision, action steps, and ongoing work with the collaborative teams. One of the challenges to reaching nurses is that there is no one professional organization representing all nurses. Instead, nurses are organized by professional associations that represent their role or specialty. As the timeframe for completing the action steps was 3 years, TIGER was intentionally structured as a program versus an organization. TIGER relied on the participating organizations to complete the action steps, recognizing that the organizations had the membership and existing mechanisms in place to organize activities and distribute information.

COLLABORATIVE APPROACH

By design, the TIGER Initiative was comprised of representatives from nursing specialty organizations that could work through the action plan ***within their own organizations***. The support received from the practice specialties was timely and set a new industry precedent in raising awareness for TIGER in the broader nursing community.

To accelerate their progress, nine collaborative teams were developed to help increase the ***collaboration across the participating organizations***. These teams were organized around strategic topics, and each was led by industry leaders and open to any interested participant. Over 400 individuals responded to the open call for participation on the collaborative teams.

Each of the nine collaborative teams developed their own wikis, similar to a website, to share information. The wikis were used as a project workspace and resource to communicate amongst the team, to other collaborative teams, and with the public. Most of the communication with the teams was done via webinars, or web meetings, teleconferences,

and email lists. A TIGER Advisory Council, comprised of the collaborative leaders and the program director, met monthly to coordinate activities and review progress. By the end of 2008, over 1,400 individuals had joined the TIGER effort and are helping to achieve the TIGER vision throughout the healthcare community. Most of this outreach was accomplished by the diverse communities that make up the TIGER Initiative, and a sampling of their activities is described in the following pages.

NURSING INFORMATICS COMMUNITY

Nursing informatics organizations provided numerous opportunities for TIGER presentations and meetings. The American Medical Informatics Association (AMIA) and Healthcare Information and Management Systems Society (HIMSS) organized TIGER presentations at several national, regional, and international conferences. The Alliance for Nursing Informatics (ANI), an umbrella organization for the nursing informatics community, provided financial and strategic support to TIGER for the collaborative teams. Nursing informatics organizations such as CARING, American Nursing Informatics Association (ANIA), Minnesota Nursing Informatics Group (MINING) and New England Nursing Informatics Consortium (NENIC) not only welcomed TIGER presentations at their meetings but were essential to distributing TIGER surveys and requests for information, and they were active participants on the collaborative workgroups.

PRACTICE SPECIALTY COMMUNITY

Several specialty organizations presented on TIGER at their regional and national conferences. For example, the Association of periOperative Registered Nurses (AORN), the National Association of Clinical Nurse Specialists (NACNS), and the Oncology Nursing Society (ONS) accepted TIGER presentations at their national conferences. Many participating organizations also presented on TIGER at

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specialized conferences within their organizations, such as state chapter meetings or conferences focused on technology. Numerous articles were published in journals distributed to nurses, including *Nursing Outlook*, *CIN (Computers, Informatics, Nursing)*, *Nursing Management*, and *Journal of Health Information Management*. Several organizations published articles in their member newsletters or journals, including the American Society of Peri-Anesthesia Nurses (ASPAN), Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN), and the ONS. Ongoing work within the specialty organizations is planned. To name a few examples, the National Nursing Staff Development Organization (NNSDO) has plans to further develop the informatics competencies recommendations. The American Health Information Management Association (AHIMA) is planning a conference in late 2009 to engage allied health professionals in adopting informatics competencies.

NURSING LEADERSHIP COMMUNITY

Nursing leadership organizations provided critical support for TIGER, enhancing visibility and access to nursing executives. The American Nurses Association (ANA) supported TIGER on several committees and provided strategic support through the ANI. The American Nurses Credentialing Center, a division of ANA, scheduled a TIGER workshop at their National Magnet™ Conference, as did Sigma Theta Tau International (STTI). AONE provided access to nurse executives for the TIGER Leadership survey, and also facilitated TIGER presentations at both state and national conferences. Long term care nurse executives contributed numerous articles and presentations related to technology and the TIGER effort through their alliance with the National Association of Directors of Nursing Administration in Long Term Care (NADONA/LTC). The American Academy of Nursing (AAN) publishes a monthly column on technology and devoted an entire issue of *Nursing Outlook* to nursing informatics.

EDUCATIONAL COMMUNITY

Nearly a fourth of the leaders and participants on the TIGER collaborative teams came from the academic community. As described in the TIGER Education and Faculty Development Collaborative report, all major stakeholders were active participants in the TIGER action plan. Numerous presentations to this community were done at national, state, and local levels. Comprehensive programs focused on nursing informatics are held annually at the University of Maryland through the Summer Institute in Nursing Informatics (SINI) and at the Rutgers International Nursing Computer and Technology Conference. Academic partnerships with industry are proliferating, and the National League for Nursing has plans to share resources on their website at www.nln.org.

STATE-WIDE COLLABORATION

Minnesota developed a state-wide approach to TIGER—bringing together stakeholders in an annual Minnesota TIGER conference. Other states have also brought together the key organizations to discuss issues related to technology adoption—including Massachusetts (Massachusetts Organization of Nurse Executives), North California, and California.

VENDOR COMMUNITY

Healthcare IT vendors that develop technology were active with TIGER in numerous ways. Many of the leaders of the TIGER collaborative teams were supported by the vendor community. The vendor sponsors of the TIGER Summit developed an interactive “Gallery Walk” to demonstrate technology capabilities to the attendees and supplied demonstrations and presentations to the TIGER Virtual Demonstration Center. Several vendors, such as GE Healthcare, McKesson, Cerner, CPM Resource Center and others, presented TIGER at their user group conferences or via webinars focused on their nursing community.

STANDARDS & INTEROPERABILITY COLLABORATIVE

One of the obstacles to widespread adoption of electronic health records is the lack of standardization of nursing-related data. The language that nurses use to describe their observations, actions, goals, and activities is important in communicating with other nurses as well as other healthcare professionals. The way that nursing data is organized is important to ensure consistent documentation and clear communication with other healthcare professions. If standardized across an organization, nursing data can be compared to identify practices that improve patient outcomes and those that do not. If nursing data is organized in a standard way, it can also be shared and compared across regional or national databases to identify trends, report outcomes, and research new opportunities to improve nursing practice. Consensus on the terms that are used to describe nursing problems, observations, actions, goals, outcomes and interventions is critical to aggregate, analyze and share nursing data with others. This process is called “standards harmonization,” and requires the involvement of nurses representing different specialties, different environments, and different roles to be comprehensive and meaningful to all practicing nurses.

Interoperable systems will assist clinicians in delivering safe, effective, efficient and patient-centered care. Clinical data standards are the building blocks towards interoperable systems, including electronic health records (EHRs), electronic medical records (EMRs), and personal health records (PHRs). It is important that nurses understand these standards and their impact on care delivery.



Standard - A definition or format that has been approved by a recognized standards organization or is accepted as a de facto standard by the industry. A standard specifies a well-defined approach that supports a business process and: (1) has been agreed upon by a group of experts; (2) has been publicly vetted; (3) provides rules, guidelines, or characteristics; (4) helps to ensure that materials, products, processes, and services are fit for their intended purpose; (5) is available in an accessible format; and (6) is subject to an ongoing review and revision process.

- Dr. John Halamka, Chair of the Healthcare Information Technology Standards Panel (HITSP)

Interoperability - "Interoperability" means the ability to communicate and exchange data accurately, effectively, securely, and consistently with different information technology systems, software applications, and networks in various settings, and exchange data such that clinical or operational purpose and meaning of the data are preserved and unaltered.

- President Bush, Executive Order (2006) to mandating the Federal Government use of interoperable standards

The benefits to nurses to adopt a standardized way of describing nursing practice and organizing nursing data are:

- Accurately describe the care delivered by nurses and facilitate communication among nurses and other healthcare providers.
- Enable the comparison of nursing data across clinical populations, practice settings, time, and geographic regions.
- Allow measurement of the impact of nursing interventions in relation to patient outcomes.

STANDARDS & INTEROPERABILITY COLLABORATIVE

- Provide timely access to evidence-based knowledge, especially during the delivery of patient care.

The TIGER Standards and Interoperability Collaborative team was formed to accelerate the following action steps identified at the TIGER Summit:

- Integrate industry standards for health IT interoperability with clinical standards for practice and education.
- Educate practice and education communities on health IT standards.
- Establish use of standards and set hard deadlines for adoption.

The TIGER Standards and Interoperability Collaborative team developed work groups to create tools and resources to promote health IT standards and interoperability. The first workgroup compiled a catalogue of nursing-related standards, standard organizations, and initiatives that are essential to building a national electronic health record framework. The standards in the catalogue are organized by what they describe: data exchange messages, terminologies, documents and assessment instruments, and technical infrastructure. The catalogue, titled the “Nursing Health IT Standards Catalogue” is available on the TIGER website at www.thetigerinitiative.org/standards.

Another work group developed a series of web-based tutorials to educate nurses on the benefits of interoperable systems and the standards adoption process required to achieve interoperability in healthcare. These tutorials explain why technology and informatics are important to improve patient safety, describe the various types of standards and sources (authors) of standards, identify the nursing terminologies recognized by the American Nurses Association, and explain the role of standards to improve workflow and provide decision support at the point of care.

A third work group focused on the dissemination strategy of the work of the collaborative to the broader nursing audience. This work group is an awareness campaign designed to stress the importance of adopting standards to achieve interoperability for widespread health information exchange.

All stakeholders play a role in the standards harmonization and adoption process to achieve safer, higher-quality, more efficient, timely, and patient-centered healthcare. The successful adoption of standards requires consensus and adoption on a national scale, and to that end, more nursing input is needed in two ways:

- For the betterment of clinical practice and the profession, nurses must embrace collaboration and build a consensus agreement regarding standardization of nursing language.
- Nurses have a professional responsibility to be engaged in standards development, harmonization and implementation activities, including encouraging adoption of and patient engagement in personal health records and electronic health records.

These efforts will support the overarching effort of the TIGER Initiative to ensure that all nurses are educated in using informatics and thereby empowered to deliver safer, higher-quality patient care.



NATIONAL HEALTH IT AGENDA COLLABORATIVE

The escalating cost of the U.S. healthcare system and the need to improve patient safety and reduce medical errors, coupled with national disasters, terrorism, and other unsustainable healthcare trends, has necessitated major healthcare reform in the United States. Focusing on the adoption of electronic health records as a priority within the U.S. National Health IT Agenda is the key driver cited to achieving the transformation needed.

The series of U.S. healthcare reform reports published by Institute of Medicine (IOM), other agencies, and universities concluded that information technology was key to transforming the healthcare system to achieve the IOM aims of safety, effectiveness, patient family centeredness, timeliness, efficiency, and equity. President Bush led the charge by establishing the goal that most Americans would have an EHR by 2014. In April 2004, President Bush issued an Executive Order that established the position and Office of the National Coordinator for Health Information Technology (ONC) within the Department of Health and Human Services (HHS), “to provide leadership for the development and nationwide implementation of an interoperable health information technology infrastructure to improve the quality and efficiency of health care.” Bush appointed Dr. David Brailer as the first Coordinator of this office. One of the first steps Brailer took in this new position was to convene a national conference to engage healthcare leaders in discussing the development of a “national health information infrastructure.” Recognizing the need to ensure that the nursing profession’s expertise is represented in the national HIT agenda and in EHRs, nurse informaticians and executives have advocated the need to transform nursing education and practice via the TIGER Initiative. The TIGER team’s vision and strategic action plan was aligned with the ONC’s strategic plan to ensure that the nursing profession’s voice could be heard at the national level.

As a result of TIGER’s strategic plan, the National Health IT Agenda Collaborative was formed. The purpose of this collaborative was to identify the most relevant health IT agenda and policies that are important to the TIGER and the nursing profession’s mission and to assist in closing any representation gaps on said policy issues. The collaborative identified three areas where the nursing profession required greater visibility and where their contributions would enhance and promote the national HIT agenda and the transformation of health and care in the United States:

- In clinical, standards, and policy initiatives generated by the AHIC/National eHealth Collaborative (NeHC) and the ONC (such as participation in Workgroups and in Use Cases),
- In the standards harmonization and interoperability efforts of ANSI-HITSP (such as working on the Committees and developing the Interoperability Specifications), and
- In the certification process for HIT products (such as, volunteering for a Workgroup, and reviewing and commenting on the CCHIT Work products).

Since the passage of the American Recovery and Reinvestment Act of 2009, momentum and activities to-date in the areas of governance, policy, technology, and adoption have accelerated in both the federal and private sector. Nursing’s involvement in the national HIT agenda, as the largest sector of the U.S. healthcare workforce, is even more urgent and critical today.

The TIGER National Health IT Agenda Collaborative has also developed tutorials (available on their website at www.thetigerinitiative.org) to educate and encourage nurses to participate in HIT-related policy development, healthcare reform, and accelerate widespread HIT adoption by 2014.

NATIONAL HEALTH IT AGENDA COLLABORATIVE

National Health IT Organizations that Need Nursing Participation:

1. National eHealth Collaborative
2. Healthcare Information Technology Standards Panel
3. Certification Commission for Healthcare Information Technology
4. HIT Policy Committee and HIT Standards Committee

How to Get Involved in the National Health IT Agenda

National eHealth Collaborative (NeHC)

www.nationalehealth.org

NeHC will have significant impact in setting the priorities for standards development and adoption. By participating in the development of these priorities into Value Cases, nurses and nursing informaticians can drive policies and HIT development that meet their needs and represent their practice. Nurses can:

- Become a member.
- Serve on the Board or committees.
- Stay abreast of the meetings and events.

Healthcare Information Technology Standards Panel (HITSP)

www.hitsp.org

The Panel's work is driven by a series of priorities, set by the AHIC/NeHC. Nurses can:

- Participate in the development of Use Cases

- Provide recommendations for Interoperability Specifications and related constructs in their related domain expertise.
- Serve on the Board, the Panel, or the Committees (i.e., Perspective, Domain, or Coordinating Committees).

Certification Commission for Healthcare Information Technology (CCHIT)

www.cchit.org

The best way for nurses to get involved with CCHIT is to

- Submit an application during calls for Commissioners' and Work Group Chairpersons' appointments.
- Volunteer to participate on one of their Work Groups that aligns most closely with the nurse's clinical specialty or expertise.
- Review draft materials and provide comments during Public Comment periods to ensure that nurses' voices are being heard.
- Attend Town Hall in-person meetings, Town Hall teleconference calls, and conference presentations.
- Monitor the Commission and Work Group activities through meeting minutes.
- Serve as a juror for CCHIT's commercial certification program.

HIT Policy Committee and the HIT Standards Committee

These two committees were formed to respond to the requirements outlined in the American Recovery and Reinvestment Act of 2009. They will facilitate the implementation of a nationwide health information technology.

INFORMATICS COMPETENCIES COLLABORATIVE

Nurses are expected to provide safe, competent, and compassionate care in an increasingly technical and digital environment. Yet technology has changed the role of the nurse and significantly altered the interactions between the nurse and patient and the nurse and healthcare provider. Nurses that do not have the basic skills to communicate within an electronic health record or other electronic medium will be significantly disadvantaged as we work to achieve 100% electronic health record adoption by 2014.

Nurses are directly engaged with information systems and technologies as the foundation for evidence-based practice, clinical-decision support tools, and the EHR. Nurses need to be equipped to integrate technology seamlessly within their workflow, and want better tools to work safer, more efficiently, and communicate more effectively with the patient and other healthcare providers. The American Nurses Association recognizes that nurses are “knowledge workers,” and as a result, need to access information and apply knowledge appropriately to deliver high-quality nursing care.

As the Institute of Medicine reported in their 2006 report titled *Building the Workforce for Health Information Transformation*, “A work force capable of innovating, implementing, and using health communications and information technology (IT) will be critical to healthcare’s success.” This has accelerated the need to ensure that all nurses master a minimum set of competencies needed to work with electronic records, including basic computer skills, information literacy, and an understanding of informatics and information management capabilities including how to augment nursing practice.

The TIGER Informatics Competencies Collaborative (TICC) was formed to establish the minimum set of informatics competencies for *all* practicing nurses and graduating nursing students. The work of this team was

foundational to all TIGER work related to preparing the nursing workforce for EHRs, and preceded the work of the TIGER Education and Faculty Development, Staff Development, Leadership Development, and Virtual Demonstration Center Collaborative teams.

Nursing has historically provided leadership in the development and publication of informatics competencies in the healthcare industry. The recommendations of TICC built upon the informatics competencies work that had been previously published. In total, TICC collected over 1,000 informatics competencies from published literature and practice examples, then narrowed their focus for the scope of this project to describe the minimum set of competencies for practicing nurses and graduating nursing students. In addition, they established a model to organize the competencies that could be expanded upon by specialties and advanced practice roles.

Following a review of the literature and survey of nursing informatics education, research, and practice groups, the TIGER Nursing Informatics Competencies Model consists of three parts, detailed in the TICC Collaborative final report and summarized in this document:

- (1) Basic Computer Competencies
- (2) Information Literacy
- (3) Information Management (including use of an electronic health record)

The model allowed the TICC to eliminate duplication and narrow down the specific competencies. Each of these categories is distinct enough to lend itself well to separate educational resources that can be completed in a modular fashion. There is also a logical progression to the order of mastering these categories. For example, basic computer competencies are necessary to easily search online sources of knowledge and information literacy competencies are essential to evaluate their appropriateness and applicability to

INFORMATICS COMPETENCIES COLLABORATIVE

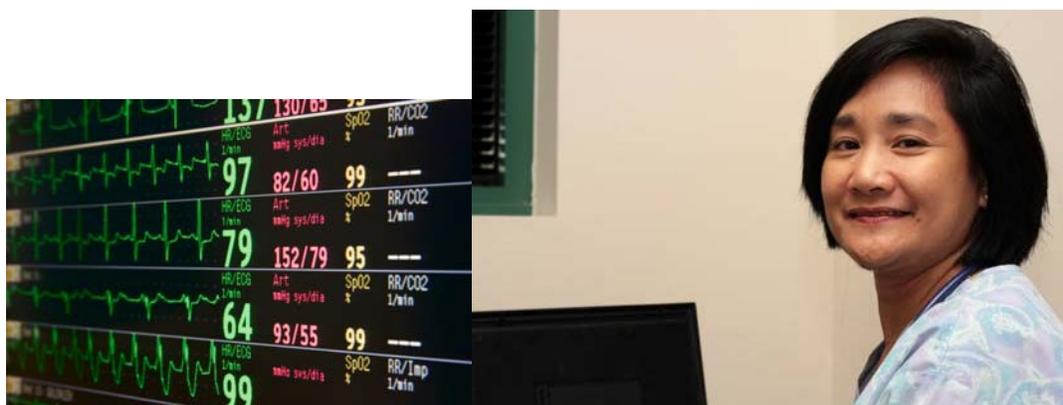
support their practice. Finally, information management describes how a nurse interacts with an electronic or personal health record, and requires a mastery of computer skills and ability to find and apply knowledge to practice.

The team also identified that there is a component of “awareness,” or professional consciousness and responsibility for learning, as a critical precursor to successful learning. Professional nursing practice can only advance as much as individual nurses are aware that a

knowledge gap exists in their practice, feel empowered to access further learning, and integrate evidence-based competencies into their professional practice to provide safe, effective, efficient, patient-centered, equitable care. This applies to achieving the minimum set of informatics competencies because until the nurse is aware of the need to master informatics and ready to learn new skills, the remaining competencies will be difficult to achieve.

TIGER Nursing Informatics Competencies Model

Component of the Model	Standard	Source (Standard-Setting Body)
Basic Computer Competencies	European Computer Driving License	European Computer Driving License Foundation
Information Literacy	Information Literacy Competency Standards	American Library Association
Information Management	Electronic Health Record Functional Model – Clinical Care Components	Health Level Seven (HL7)
	International Computer Driving License – Health	European Computer Driving License Foundation



INFORMATICS COMPETENCIES COLLABORATIVE

Once the model was developed, each component was aligned with existing sets of competencies maintained by standard development organizations or *de facto* standards. The TICC found very good fits with the existing standards of the European Computer Driving License Foundation, the Health Level Seven's (HL7) Electronic Health Record Functional Specification for Clinical Care Components, and the American Library Association information literacy standards respectively. (See table describing the TIGER Informatics Competencies Model on the previous page.) All these sets of competencies are standards maintained by standard-setting bodies or organizations. Finding sets of competencies that are maintained by standard setting bodies allows the TIGER Informatics Competencies Collaborative (TICC) to recommend standards that are relevant to nurses and ones that will be sustainable as the standards evolve.

TICC outlined specific dates for adoption of the recommendations for each component of the model, and this information will be available in the complete report on the TIGER website at www.thetigerinitiative.org. In addition to the recommended adoption dates, TICC also identified a number of educational resources available today for each component. (See sidebar on this page.)

TICC established the informatics competencies framework needed to “scale” or expand to include specialty practices, different environments, and advanced degrees or practice such as leadership roles.

Informatics Competencies Educational Resources

European Computer Driving Licence (ECDL) Foundation <http://ecdl.com>

The ECDL syllabus is maintained and periodically updated by the not-for-profit ECDL Foundation.

CSPlacement www.csplacement.com

Offers CSP Basic, an e-learning course and a certification exam that is substantially equivalent to the TICC recommendation of a first and significant step towards basic computer competency.

Healthcare Information and Management Systems Society www.himss.org

Provides a certificate program called Health Informatics Training System (HITS) that is substantially equivalent to the TICC recommendation of a first and significant step towards basic computer competency.

American Library Association

<http://www.ala.org/ala/mgrps/divs/acrl/standards/informationliteracycompetency.cfm>

Defines competencies for information literacy as well as performance indicators and outcomes.

The Information Literacy in Technology

<http://www.ilitassessment.com>

The iLIT test assesses a student's ability to access, evaluate, incorporate, and use information.

HL7 EHR System Functional Model

<http://www.hl7.org/EHR/>

Information management competencies

ICDL-Health Syllabus <http://www.ecdl.com>

Provides the US-based the ICDL-Health syllabus.

Digital Patient Record Certification (DPRC)

<http://dprcertification.com>

An end-user EHR competency certificate program advised by U.S. informatics subject matter experts and endorsed by AMIA.

EDUCATION & FACULTY DEVELOPMENT COLLABORATIVE

Recognizing the demands of an increasingly electronic healthcare environment, nursing education must be redesigned to keep up with the rapidly changing technology environment. As federal initiatives push the adoption of EHRs throughout all healthcare institutions by 2014, it is imperative that nursing graduates are fluent in the use of these tools in order to practice safe and effective patient care.

The TIGER Education and Faculty Development Collaborative team engaged stakeholders that influence and deliver nursing education and licensing, including academic institutions representing all levels of nursing education, credentialing organizations, educationally-focused professional organizations, federal organizations that help fund faculty development, and state boards of nursing.

The TIGER Summit identified numerous objectives related to the education of nurses and the respective development of faculty, which are listed below. Emphasis was placed on the need for more nursing informatics specialists. These issues were raised in a variety of venues, including HRSA meetings and conferences. Based on the TIGER Summit Summary Report, the following specific objectives were set for the TIGER Education and Faculty Development collaborative:

- Use the informatics competencies, theories, research and practice examples throughout nursing curriculums.
- Create programs and resources to develop faculty with informatics knowledge, skill and ability and measure the baseline and changes in informatics knowledge among nurse educators and nursing students.
- Develop a task force to examine the integration of informatics throughout the curriculum.
- Develop strategies to recruit, retain, and educate current and future nurses in the areas

of informatics education, practice, and research.

- Improve and expand existing Nursing/Clinical/Health Informatics education programs.
- Encourage existing Health Services Resources Administration Division of Nursing to continue and expand their support for informatics specialty programs and faculty development.
- Encourage foundations to start programs that provide funding for curriculum development, research, and practice in nursing informatics and IT adoption.
- Collaborate with industry and service partners to support faculty creativity in the adoption of informatics technology and offer informatics tools within the curriculum.

To address these objectives, the TIGER Education Collaborative established several work groups to address the specific issues relevant to each stakeholder.

Focus of Work Groups – Key Stakeholders:

1. Nursing school accrediting bodies
2. Health Resources and Services Administration
3. State-wide informatics initiatives
4. State boards of nursing
5. Associate degree nursing programs
6. Other nursing specialty organizations
7. Academic partnerships with industry

TIGER was effective in influencing the accrediting agencies to include informatics education be incorporated into nursing curriculum. Both the **National League for Nursing** and the **American Association of Colleges of Nursing** addressed this position in 2008. The National League for Nursing Board of Governors approved a position

EDUCATION & FACULTY DEVELOPMENT COLLABORATIVE

statement, titled *Preparing the Next Generation of Nurses to Practice in a Technology-Rich Environment: An Informatics Agenda*³. The position statement outlined 23 recommendations for nursing school administrators, faculty and for the organization itself. In late 2008 at their national conference, the **American Academy of Nursing** unanimously endorsed the NLN's Position Statement, adding more momentum to this transition.

The **American Association of Colleges of Nursing** took the lead incorporating informatics as an essential element of Baccalaureate and the Doctor of Nursing Practice Education. This document, *Essentials of Baccalaureate Education for Professional Practice*⁴, is an important step as the Essentials document serves as a framework for the preparation of nurses for professional practice in the 21st century. One of the nine essentials focuses on Information Management and Application of Patient Care Technology. For each essential element, a rationale is provided, and expected competencies and sample content are provided. It is the expectation that all baccalaureate education programs will incorporate the new essentials into their curriculum.

Both the associate degree nursing programs and the state boards of nursing were surveyed for their current inclusion of informatics competencies and related topics into their curricula or licensing criteria respectively. The surveys provided an opportunity to raise awareness of the mission of the TIGER Initiative as well as the changes occurring in the accrediting requirements. The detailed results of the survey are available in the TIGER Education and Faculty Development Collaborative report, available on the TIGER website at www.thetigerinitiative.org.

Four states were identified that had either initiatives focused on informatics or had the infrastructure in place to begin informatics initiatives. Leading the state-wide effort, Minnesota formed their own TIGER Initiative, and has held two annual conferences. In Massachusetts, a State Initiatives committee brought together two additional states (North Carolina and California) to examine current and potential work in the area of informatics. Both Massachusetts and California had state-wide initiatives for faculty related to teaching with technology, in particular using simulations in nursing education. Both states have a readily available statewide infrastructure in place to begin a campaign to incorporate informatics into nursing education. These leading examples are models that can be replicated in other states as well.

The TIGER Initiative has worked closely with the Division of Nursing within HRSA to identify funding opportunities to advance informatics education. A successful outcome was the formulation of the Integrated Technology into Nursing Education and Practice Initiative (ITNEP). This initiative made funds available for projects to provide education in new technologies.

Finally, disseminating this information to faculty is critical. The TIGER Education and Faculty Development Collaborative held two webinars for educators on how schools of nursing have incorporated informatics into their curriculum and on three different approaches to forming partnerships to teach nurses about the electronic health record and clinical documentation.



³ Available online at NLN's website at <http://www.nln.org/about/nln/PositionStatements/index.htm>

⁴ Available online at AACN's website at <http://www.aacn.nche.edu/Education/bacessn.htm>

STAFF DEVELOPMENT COLLABORATIVE

Nurses need the knowledge, skills and resources to communicate and manage information effectively and efficiently in today's electronic environment. Studies are showing that technology correctly used by healthcare professionals can help improve patient safety. The user of the technology must first have an understanding and comfort with that technology. If technology is not used properly, it can have a negative effect on patient safety. Education targeting the practicing nurse is often the responsibility of the healthcare provider organization, and their educational resources in staff development. These resources can have a significant role in the adoption of new technology and improving patient safety.

The TIGER Staff Development Collaborative focused on three goals:

- f* Identify educational resources and affordable programs within the practice setting that foster IT innovation and adoption.
- f* Create competency-based, cost effective staff development and continuing education programs and training strategies specific for informatics knowledge, skills, and ability.
- f* Improve and expand existing nursing/clinical/health informatics education programs by collaborating with industry, service, and academic partners to support and enhance the use of technology and informatics in practice.

The team's first strategy was to better understand the current challenges to providing effective education to practicing nurses. They sent an electronic survey to TIGER participants requesting an evaluation of how prepared their nurses were in using electronic health records. A separate work group evaluated the recommendations of the TIGER Informatics Competencies team, and developed strategies for adoption by Staff Development resources. Another work group researched the literature for

articles focused on learning methodologies and strategies related to informatics, and a fourth work group gathered and evaluated case studies or success and failure stories from practice.

WORKFORCE DEMOGRAPHICS

The demographics of the nursing workforce must be considered in order to develop a comprehensive strategy to educate nurses on the use of information technology. The average age of the nearly 3 million practicing nurses in the U.S. is 47. Practicing nurses often face more of an uphill battle than new graduates of colleges or universities in terms of computer literacy. Because of timing, the "average nurse" did not grow up with computer technology. Some nurses may have fear or anxiety related to using information technology, as they have not had the opportunity to learn basic computer skills. With the use of the electronic health record, nurses with higher levels of computer expertise are going to have more self-efficiency, or comfort and knowledge in being able to perform their work. Experienced nurses that have practice expertise may be disadvantaged if they have not developed computer expertise to keep up with the changing environment. A recent study⁵ confirmed the finding that practicing nurses are not using evidence-based sources of information for decision making.

Unfortunately, these discrepancies may not be uncovered until the implementation of a new computer system for nurses. As the technology moves closer to the bedside, nurses become the largest group of clinical information systems users, and their attitudes will influence those of other works in the same area. Education on the new system is one of the largest costs to the implementation, and efforts to trim the costs mean limiting the education to *how to use the system* versus *how to use technology to deliver safer, more effective patient care*. Assessment of attitudes (such as fear or anxiety) or gaps in basic

⁵ Pravikoff DS, Pierce ST, Tanner A. *Evidence-based practice readiness study supported by academy nursing informatics expert panel*. Nursing Outlook. 2005; 53: 49-50.

STAFF DEVELOPMENT COLLABORATIVE

computer skills must be addressed prior to system use or the success of even the most best-run projects is at risk.

STAFF DEVELOPMENT RESOURCES

Similar to the challenge with academic faculty, staff development personnel are often unfamiliar with the technology or do not have access to the system to master it. This often leaves the education to the vendor or consultants, or “super users,” and the basic computer competency issue is never addressed. Even worse, the education does not address benefits of the system or how to use to improve nursing practice.

INNOVATION IN PRACTICE

The TIGER Staff Development Collaborative gathered interesting case studies that could be replicated in other healthcare settings. This team identified six factors that lead to success:

- Addressing staff attitudes
- Improving access to technology
- Focusing on patient safety
- Using a variety of teaching methods
- Using Nursing Informatics specialists as resources
- Keeping the program competency-based



RECOMMENDATIONS

1. Adoption of technology may either be facilitated or impeded by attitudes towards technology. A strong association between attitudes and learning suggests that a first step in introducing new HIT should be an assessment of nurses’ attitudes and basic computer skills.
2. The development of HIT-focused education should consider the multigenerational learning needs and styles, especially for nurses that entered practice before computers were integrated into educational curriculums.
3. Develop competency-based education that utilizes pre- and post-tests to demonstrate the effectiveness in meeting the competencies.
4. Staff Development resources must have adequate access and opportunities to develop their knowledge related to the use of technology.

National Nursing Staff Development Organization (NNSDO)

Many of the lessons learned can save an enormous amount of time and energy to eliminate the challenges and ensure success. The professional organization for staff development, the National Nursing Staff Development Organization (NNSDO), is taking the lead in organizing an effort to evaluate TICC’s informatics-based competencies and provide further recommendations to the industry regarding strategies for practice-based education.

LEADERSHIP DEVELOPMENT COLLABORATIVE

Health information technology (HIT) has become a key focus of healthcare reform. Effective use of HIT will enable nurse executives to ensure nursing care that is safe, high quality, efficient, patient-centered, and help them deal with a looming workforce shortage. Today's leaders are required to transform their organization's values, beliefs, and behaviors. Technology is an underpinning to support the needed changes, but adoption of technology will not happen without leadership that is educated and prepared to lead future technology initiatives. This requires vision, influence, risk taking, clinical knowledge, and a strong expertise relating to professional nursing practice.

One of the highest priorities identified at the TIGER Summit was to develop ***revolutionary leadership that drives, empowers and executes the transformation of healthcare***. Nursing leaders are often developed on the job, and the competencies defined by the TIGER Informatics Competencies Collaborative (TICC) are only the beginning of the informatics competencies necessary to lead an organization through the change that technology requires. This transformation requires nursing leadership to understand, promote, own, and measure the success of health IT.

The TIGER Leadership Development Collaborative team evaluated current nursing leadership development programs for the inclusion of informatics competencies. They built upon research that had been conducted by the American Organization of Nurse Executives (AONE) and developed a survey to identify the most urgent program development needs. The survey findings illustrated the need to ensure development of informatics competencies at the beginning management role, or the charge nurse. For example, the charge nurse needs to be competent in providing feedback regarding the use of technology that enhances the delivery of patient care, as well as mentor others, and become involved in system selection. Another

key competency that all nurse managers need is the ability to evaluate outcomes from electronic clinical data. The informatics competencies for nurse executives require an expanded focus on budgetary, regulatory, safety, security and privacy policies related to the use of EHRs.

New implementations of EHRs put additional demands upon the nursing management team. As nurses are usually the largest group of clinical users of an HIT system, the nurse executive is expected to fully understand and articulate the goals and anticipated benefits of the technology implementation. Additionally, the nurse executive must remain engaged throughout the lifecycle of system selection, implementation and optimization.

Technology introduces change to many aspects of the role of the nurse, and nursing leadership is responsible for developing a culture that is innovative and ready to embrace change. Fortunately, a well-recognized professional model that engages nurses at all levels to incorporate change into their culture already exists. The TIGER Leadership Development Collaborative found significant alignment with the Magnet® Recognition Program, developed by the American Nurses Credentialing Center (ANCC). The Magnet Program exemplifies a model for change, and recognizes healthcare organizations that provide nursing excellence in the delivery of quality patient care, and demonstrates innovation in professional nursing practice.

As many HIT-savvy nurse leaders recommended correlating the Magnet Forces® to HIT success, the TIGER Leadership Development Collaborative collected dozens of examples of how organizations used HIT to demonstrate aspects of their Magnet Journey. These examples help to illustrate how technology can achieve each of the 14 forces of magnetism as well as transform the nursing organization to use technology for their benefit. The exemplars are meant to demonstrate the creativity and flexibility to

LEADERSHIP DEVELOPMENT COLLABORATIVE

transform the practice of healthcare delivery by rethinking current tools through gaining access to collective organizational experiences improved through fully automated integrated healthcare processes.

technology to improve nursing practice and the delivery of safer, more effective patient care.

RECOMMENDATIONS

- Develop programs for nurse executives and faculty that stress the value of information technology and empower them to use HIT knowledgeably.
- Expand and integrate informatics competencies into Nursing Leadership Development Programs.
- Promote sharing of best practices using HIT effectively to improve the delivery of nursing care.
- Promote alignment with the Magnet Recognition Program as a mechanism to demonstrate nursing excellence in using

AONE's Technology Task Force Toolkit

One of the most promising efforts to equip nursing leaders with the necessary resources to promote health IT adoption is the Technology Toolkit that AONE's Technology Task Force is creating. This toolkit will focus on topics related to standards, IT contingency planning for disasters, wireless technology, return on investment, competencies for managers and executives, job descriptions, and share key learnings. (www.aone.org)

Criteria for Leadership Development

The critical need for leadership in nursing has accelerated faster than ever before – both to maintain knowledge of cutting edge practice and for management of clinical teams. The recommendations for leadership development include the following areas of focus:

- **Evidence:** Addresses improvement of quality, safety and value-added healthcare delivery professionals to identify care practices derived from scientific evidence
- **Content:** Builds evaluation of care practices for technical and content gaps
- **Technology:** Manages life-cycle change consistently to close the gaps with technology and knowledge resources found through evaluation
- **Standards:** Formal educational structured program, including Advisory Board Leadership Programs, AMIA 10 by 10 Program, AONE leadership programs or AACN accredited academic programs for nursing service administration.

USABILITY & CLINICAL APPLICATION DESIGN COLLABORATIVE

Current information systems and technology in practice today do not meet the workflow and information flow requirements of nurses. In fact, they can hamper widespread adoption of electronic health records. For one thing, much of this technology was not designed to support nursing work or thought processes. Products with good clinical design would support nurses every day in their practices. Often the current IT systems clinicians use were originally intended for finance, laboratory or other ancillary functions that do not support professional practice at the point-of-care. More important, a lack of *vision* and lack of *voice* is absent for what nurses need most. Information technology should provide evidence-based, patient-centric technology that allows interdisciplinary collaboration at the point-of-care. IT should be an enabler versus a barrier. To redefine reality, nurses must first understand the significance of usability and clinical application design that can shape the future of the products nurses use every day.

During the TIGER Summit, two critical and interdependent pillars to be further defined and acted on were:

1. **Informatics Design:** Evidence-based, interoperable intelligent systems that support education and practice to foster quality care and safety.
2. **Information Technology:** Smart, people-centered affordable technologies that are universal, usable, useful and standards-based.

These two critical components of informatics led to the development of the TIGER Usability and Clinical Application Design Collaborative to further define key concepts, patterns and trends and recommendations to health information technology (HIT) vendors and practitioners to assure useable clinical systems at the point of care.

The Usability and Clinical Application Design Collaborative was ranked as the highest priority and had the greatest number of volunteers (53.5%) of all the TIGER Collaborative teams.

This speaks to the significance of the topic for practicing nurses and faculty today. Nurses who actively led and contributed to the collaborative cited reasons for their involvement to be: *“A good design can make the system easier to use and enhance clinical practice; Usability is a “make or break” part of a clinical informatics solution and “Many lessons from end-users as DESIGN is translated into PRACTICE. There is a definite need for standards and guidance.”*

The Usability and Clinical Application Design Collaborative recommends for the **TIGER Vision** to be fully realized, the nursing profession must educate itself on usability and key clinical application design principles. This education will determine how well evidence and informatics is integrated into day-to-day practice. The Usability and Clinical Application Design Collaborative organized their efforts to achieve the desired outcome of providing clear recommendations for good usability and clinical application design for technology.

USABILITY COLLABORATIVE OUTCOMES

- Synthesize a comprehensive literature review from nursing and other disciplines.
- Collect case studies and examples that illustrate usability/clinical application design – consisting of good examples to follow and bad examples to avoid.
- Develop recommendations for HIT vendors and practitioners to adopt sound principles of usability and clinical design for healthcare technology.

USABILITY & CLINICAL APPLICATION DESIGN COLLABORATIVE

The Collaborative established their goals and design principles for *Usability* and *Clinical Application Design*.

Usability Goals

1. An early and consistent focus on users of the product
2. Iterative design processes (multiple versions matched to users, tasks, and environments)
3. Systematic product evaluations (with product users and metrics)

Clinical Application Design

Clinical Application Design addresses how we integrate usability principles with evidence-based practice, interdisciplinary collaboration and knowledge discovery within a systems-thinking design (Figure 3, *adapted with permission from the CPM Resource Center, 2008*). In essence, we are *applying* usability and other design factors that are critical to making information technology the stethoscope of the 21st century.

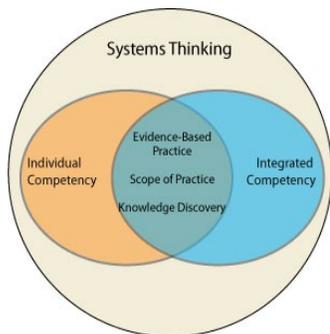


Figure 1 - Clinical Application Design Essentials

Literature Analysis

The Collaborative completed a comprehensive literature search, collected case studies, and synthesized material into a framework comprised of four areas:

- Determining Clinical Information Requirements
- Safe and Usable Clinical Design
- Usability Evaluations
- Human Factors Foundations

Each area includes a description of the topic, its significance for nursing, key points about the subject and recommendations for Health Information Technology vendors and point-of-care practitioners.

Case Studies

The Collaborative collected case studies that illustrated usability and clinical application design. These examples were intended to demonstrate best practice exemplars as well as challenging cases. Over 30 case studies were received.

Two key factors emerged. The first key factor was the ***involvement of end users throughout the life of the project***. A second key factor for end-user acceptance is ***integration with existing systems***. This affects:

- User acceptance and system adoption
- Accuracy (fewer transcription errors, avoids duplicate documentation)
- Patient safety due to synchronized, accurate information
- Timeliness of information collection, reporting and use

A second key factor for end-user acceptance is integration with existing systems. This affects:

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USABILITY & CLINICAL APPLICATION DESIGN COLLABORATIVE

Recommendations

Usability is the fit between system users, their work and environments. Imperatives include engaging the users early and often in the clinical systems lifecycle; understanding users, their tasks and their environments, conducting usability testing and redesigning before implementation. These steps better assure smooth implementations and user adoption of complex clinical systems. Clinical application design needs systems-thinking requirements that are critical to the complex health care environments. Contemporary designs include evidence-based practice, interdisciplinary collaboration and knowledge-discovery.

Good usability and clinical application design is no longer a choice but a mandate to support safe, effective decision-making. ALL nurses including practitioners, researchers, educators, and leaders should become aware of these principles and give voice to them at every venue where it impacts end-users and patient care. Nursing informatics specialists can help educate nurses about usability. Together nurses and nursing informatics specialists can assure that excellent clinical application design meets point-of-care practice needs for the 21st century.

DETERMINING CLINICAL INFORMATION REQUIREMENTS

An example of recommendations for vendors:

- Consider the requirements of different skill levels of practitioners. A novice nurse may need prompts and guidance more than an experienced nurse. Allow nurses to choose their own level of support.
- Clinician representation on vendor development teams is critical. Recommend clinicians as vendor product managers to assure understanding of clinical needs and to develop efficient and effective requirements.

An example of recommendations for practitioners:

- The requirements process should be owned by clinicians, not the information technology (IT) department or the vendor.
- Complete a workflow analysis for each user/department touching an electronic health record.

American Academy of Nursing Calls for the Thoughtful Development of Health IT

The AAN, in collaboration with the Robert Wood Johnson Foundation and other nursing organizations, has been instrumental in supporting efforts to improve how technology is developed and deployed in order to achieve an increase in the amount of time nurses and other providers spend with patients. The Academy's Workforce Commission started work on their Technology Targets Project in 2005. One component of the project is a process called Technology Drill Down (TD2), and provides medical/surgical units the opportunity to develop and improve their process and workflow inefficiencies by identifying technological solutions. This program has made available resources for others to follow, including a guide to replicating their process, available online at the Academy's website:

www.aannet.org/files/public/facilitator_manual.pdf.

VIRTUAL DEMONSTRATION CENTER COLLABORATIVE

One of the recognized barriers to improving informatics education for all nurses remains the limited access to information systems and technology that could improve healthcare delivery. Often times, access is limited to the systems that are currently deployed in a given location. Nursing schools often rely on the clinical practicum site to provide access and education on EHRs. Nurses in practice are limited to the currently-deployed technology solutions at their organization, and have limited exposure to new technologies that could be applied in innovative ways to their environment to improve healthcare delivery.

The TIGER Virtual Demonstration Center (VDC) Collaborative team was created to develop a dynamic Internet and possibly a physical destination to demonstrate highly effective and efficient, technology-enabled, solutions of exemplary healthcare delivery systems of the next three to ten years. One of their primary goals was to encourage innovative and disruptive approaches to improving healthcare delivery with the use of technology. A key requirement was to allow access to the Center from anywhere the Internet is available. A secondary requirement was to expand current thinking about what healthcare is, by engaging visitors to the demonstration lab in potential healthcare futures that demonstrate innovative, high-quality, and maximally efficient care scenarios in compelling ways. To create this future vision we built on what is known today, but also conceptualized what could be possible.

Two virtual conferences, held in April and November of 2008, were supported by the TIGER VDC team in conjunction with partners and colleagues. All TIGER participants were invited to attend the conference and share their feedback on the experience.

The VDC was intended to provide a virtual “Gallery Walk” to all nurses, nursing faculty and nursing students via web access to nurse-focused technology applications. The VDC provided exemplars of best practice for

technology utilization, contact resources and virtual networking opportunities. Guidelines and example scenarios were developed for vendors to ensure that the demonstrations would be based on the Integrating the Healthcare Enterprise (IHE) framework. Interoperability and security were among the principles highlighted in all demonstrations. The first conference had approximately 150 visitors provided feedback in a brief exit survey. Feedback was generally positive, but indicated that an “interactive experience” was most desirable by the attendees. The feedback was used to enhance the offerings in the second conference to more real-time presentations, interactive displays, and videos.

Virtual Demonstration Center Goals

Through these efforts, the TIGER VDC achieved the following goals:

- Provided visibility to the vision of IT-enabled nursing practice and education to the broader healthcare audience.
- Demonstrated future IT resources that will be in use by nurses to enhance their practice and educational environments.
- Demonstrated collaboration between industry, healthcare organizations, academic institutions, and professional organizations to create educational modules for nurses that were based upon informatics competencies.
- Provided universal accessibility to this demonstration for all nursing stakeholder groups.
- Used practice examples from different practice environments to demonstrate best practices, results of research, case studies and lessons learned by partnering with nursing professional organizations.
- Demonstrated how integrated IT systems impact nurses and the quality and safety of patient care.

VIRTUAL DEMONSTRATION CENTER COLLABORATIVE

Benefits and Virtual Demonstration Center Outcomes for 2008

Specific benefits and outcomes of the TVDC are intended to support nursing professionals as they adopt IT in their practice environments and also to support nursing education as curricula change to prepare nurses for the future. These benefits and outcomes are:

1. Nurses who can visualize the benefits of an IT-enabled future will be more likely to fully engage in the electronic health record within their practice setting.
2. Most exposure to IT capabilities are site-specific, the exception is nursing informatics resources, which are being increasingly woven throughout the practice environment.
3. Most academic institutions have very limited accessibility to IT demonstration resources to use within their curricula. The VDC provided a vision of how to partner with colleagues to widen the availability of resources.
4. Most IT education occurs in a specific field setting when a new system is implemented and focuses on system mechanics vs. user benefits and impact on patient care. The VDC provided an example of how education can be made more widely available through virtual resources and environments.
5. Universal adoption of informatics competencies for all nurses will require access to informatics resources at anytime from any site. The goal of the DVC was to support this outcome through innovative examples.

Future Opportunities

The Tiger VDC team would like to develop a virtual environment in order to extend the opportunity for clinical IT education via tools such as Second Life®. Virtual technology is being used by insurance companies, some schools of nursing and even the Centers for Disease Control

and Prevention for educational purposes. The virtual world provides 3D interactive “avatars” that allow the participant to interact with the program to increase their knowledge and familiarity with current and future technology. Social networks and virtual technology have proven to support behavior change and sustain that change over time. There are hundreds of nursing academic centers across the country, and for that matter the world, that need access to IT solution in order to educate nurses. The cost and growing demand for health IT educational tools demand a virtual solution that can be accessed by nurses from various locations. As part of the TIGER legacy, the goal is to secure funding to help build out a virtual island that will support the TIGER mission of educating nurses about the possibility and benefits of IT with the goal of improving patient care and outcomes.



CONSUMER EMPOWERMENT & PERSONAL HEALTH RECORDS COLLABORATIVE

Healthcare consumers are only too aware of the fragmentation of the current healthcare system. According to one poll, “only one third (33%) of adults are very confident in their physicians and other healthcare providers having a complete and accurate picture of their medical history”⁶. In fact, many errors occur because individual professionals are not fully aware of all the therapies that the patient is receiving or has received⁷. There is ample evidence of the need for consumers to take a more active role in their healthcare, starting with a comprehensive personal health record controlled and maintained by the consumer. The Personal Health Record (PHR) is an Internet-based set of tools that allows people to access and coordinate their lifelong health information and make appropriate parts of it available to those who need it.⁸

If the PHR is a tool that promotes patient empowerment and supports the patient’s engagement in their own healthcare, then nurses as healthcare professionals and patient advocates are obligated to become familiar with the technology and to promote its use when the technology is available and the patient is amenable. Education in the health professions for all disciplines should include information about PHRs as well as methods for teaching patients how to use them⁹. One of the primary objectives of TIGER’s Consumer Empowerment and Personal Health Records Collaborative team was to make information available to nurses

about PHRs and to encourage inclusion of this content into nursing curricula.

This collaborative team identified several ways that nurses can impact the adoption and use of consumer empowerment strategies such as the PHR. First, PHRs must be easy to use and accessible to consumers. Applications do not always take into account the needs of consumers, who may suffer from disabilities, lack of computer expertise, and poor health literacy. To address this concern, the collaborative developed an inventory of usability principles for patient-focused applications.

Another barrier to adoption of PHRs is the lack of interoperability with other systems. If the PHR is to be an aggregation of health information, it would be most useful to be able to interact with other systems to share information. National Health IT activities have focused on identifying and supporting the adoption of standards for PHRs. As with the other National Health IT Agenda items, more nursing input is critically needed to ensure that safer nursing practice is enabled with the use of this technology.

President Obama is supporting greater use of technology in healthcare and has included significant funds in the economic stimulus package to increase adoption of PHRs. The environment has never been more promising for the prospect of achieving PHRs that are complete, accessible, affordable, easy-to-use, feature-rich, interoperable and secure.

⁶ Harris Interactive (2007). *U.S. Adults Not Very Confident that Physicians have the Complete Picture*. Available online at <http://www.harrisinteractive.com/news/printerfriend/index.asp?NewsID=1264>.

⁷ Ghandi TK, Weingart SN, Borus J, et al (2003). *Adverse Drug Events in Ambulatory Care*. *N Engl J Med*. 348:1556-64.

⁸ Markle Foundation/Connecting for Health. *The Personal Health Working Group Final Report*. (July, 2003). Available online at http://www.connectingforhealth.org/resources/final_phwg_report_1.pdf

⁹ Tang P, Ash J, Bates DW, Overhage JM, Sands DZ (2006). *Personal Health Records: Definitions, Benefits, and Strategies for Overcoming Barriers to Adoption*. *Journal of the American Medical Informatics Association*, Vol 13 No 2: 121-126.



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TIGER ADVISORY COUNCIL

Dana Alexander, RN, MSN, MBA
Chief Nurse Officer
GE Healthcare Integrated IT Solutions

Christel Anderson
Senior Manager, Clinical Informatics
Healthcare Information and Management
Systems Society

Marion J. Ball, EdD, FHIMSS, FCHIME, FAAN
IBM Research, Fellow, Center for Healthcare
Management, Professor Emerita
Johns Hopkins University School of Nursing

Connie White Delaney, PhD, RN, FAAN, FACMI
Professor and Dean, School of Nursing
University of Minnesota

Donna DuLong, RN, BSN
Program Director
TIGER Initiative

Carole A. Gassert, RN, PhD, FACMI, FAAN

Karen Greenwood
Executive Vice President
American Medical Informatics Association

Brian Gugerty DNS, RN
Clinical Informatician
Principal Consultant
Gugerty Consulting, LLC

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The MITRE Corporation

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Center

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Tenet Health System

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Chairman, University HIPAA Compliance
Associate Professor
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Chief Nursing Strategist
McKesson

CDR Alicia Morton MS, RN-BC
Department of Health and Human Services
Office of the National Coordinator for Health IT

Judy Murphy, RN, FACMI, FHIMSS
Vice President, Information Services
Aurora Health Care, Milwaukee, WI

Carolyn Padovano, PhD, RN

ACKNOWLEDGEMENTS

Mary Anne Rizzolo, EdD, RN, FAAN
Interim Chief Program Officer
National League for Nursing

Joyce Sensmeier, MS, RN-BC, CPHIMS, FHIMSS,
VP, Informatics
Healthcare Information and Management
Systems Society

Diane J. Skiba, PhD, FAAN, FACMI
Professor
UCDHSC and Chair, Task Force Faculty
Development related to informatics
National League for Nursing

Nancy Staggers, PhD, RN, FAAN
Professor, Informatics, College of Nursing
University of Utah

Michelle Troseth, MSN, RN
Executive VP and Chief Professional Practice
Officer
CPM Resource Center
Elsevier/Mosby/MC Strategies

Charlotte Weaver RN, PhD
Senior VP and Chief Clinical Officer
Gentiva Health Services

Bonnie Westra, PhD, RN
Assistant Professor and Co-Director ICNP Center
University of Minnesota, School of Nursing

Rita D. Zielstorff, RN MS, FACMI

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