



EU*US eHealth Works to Improve Global Workforce Development



Measure ♦ Inform ♦ Educate ♦ Advance





Technology Informatics Guiding Education Reform



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ABSTRACT

For the past several decades, healthcare organizations and providers in the United States, the European Union and other countries around the globe, have advanced the digital transformation of healthcare to help increase quality, safety and efficiency. Health information technology/eHealth enables healthcare workers and providers the opportunity to maximize their care delivery, ultimately resulting in better outcomes for patients, consumers and society.

The core of any healthcare system is its workforce. Therefore, healthcare systems require a robust supply of highly skilled professionals who are proficient in eHealth/health IT to use, operate and maintain the digital services, which are an increasingly essential part of their infrastructure. Some of these professionals are front-facing care providers such as doctors, nurses, pharmacists and other caregivers and need “eSkills” to achieve and sustain success in their work. Others are on the extended healthcare team, such as clinical informaticists, health information staff, biomedical engineers and researchers, employ eHealth on a daily basis where the use of ICT (information and communications technology) is critical. Furthermore, some healthcare staff that may not be traditionally thought of as using ICT in their work, such as pastoral care workers (clergy), environmental workers, or nutritional staff, who are also more frequently relying on digital services and technology to manage their daily tasks.

To take on these expanded duties, all workers within the healthcare environment must be trained in eHealth, preferably before they even receive their first job. Therefore, the development and advancement of a healthcare workforce equipped with eHealth skills is vital to the present and future state of healthcare. This eHealth enabled workforce will assure that systems keep working functionally, that clinical workflows are incorporated into technology, and that healthcare is delivered in a manner that is safe, secure and quality-infused.

*This paper will discuss the ways in which the EU*US eHealth Project, in cooperation with its Consortium members and a large stakeholder community, will work to measure, inform, educate and advance development of a skilled eHealth workforce throughout the European Union, United States and globally, with the goal of creating a legacy of digitally empowered health care professionals now and in the future.*

The Current Status of the eHealth Workforce

Today we are facing a global shortage of skilled eHealth workers for to a variety of reasons. First, health technology implementation often outpaces the training and preparation of skilled workers able to use and contribute to development of eHealth systemsⁱⁱ. Because implementations are often driven by capital resources, human resources may not be the key drivers for pushing projects and training needs forward. eHealth systems may be activated without assurance that all clinical, administrative and operational staff are fully trained and ready to support the system when it goes live.

Additionally, as the industry continues to develop and expand (especially in the European Union), there are many jobs and roles that utilize eHealth but few workers adequately trained for these types of positions. This global eHealth worker shortage spans the full spectrum of job roles, including clinical, social care, research, biomedicine, informatics, and administration. These increasingly unmet needs for eHealth-skilled professionals include classical clinical roles such as nurses, doctors and pharmacists; administrative positions including data analysts, technicians, social workers and support staff; and new eHealth roles such as health informaticists, clinical coders, and chief medical and nursing information officers.

There is also a dearth of structured eHealth education and training opportunities, especially in developing countries and regions that have been slow to adopt health information technologyⁱⁱⁱ. Students often take traditional core educational courses without getting any specialization in the electronic health disciplines, making them educated in health sciences, but not “IT skilled”. According to the Chain of Trust Consortium Report of 2014^{iv}, the lack of appropriate education and training is perceived as one factor that affects health professionals’ confidence towards integrating telehealth into their workflows; having these adequate skills are vital because they also contribute to ensure efficiency and patient safety. In addition, despite the unquestionable need for sound eHealth competencies, many curricula do not include the respective knowledge and skills. This deficiency has led to an increase in recommendations for Biomedical and Health Informatics^{iv}.

Finally, incumbent clinical workers frequently find themselves unable to move up the career ladder without receiving additional eHealth training^v. Courses and certifications in eHealth may be available, but these workers may not know how to access these training or education tools and resources. The Chain of Health Consortium recommends that eHealth and telehealth-related knowledge and skills should be included as a subject in health professionals’ curricula and be part of *Continuing Professional Development (CPD) programs*, according to interdisciplinary professionals’ needs.

The EU-US eHealth Cooperative Initiative and Memorandum of Understanding

To address the lack of skilled eHealth workers, along with interoperability of various eHealth systems, the European Union and the United States formed a collaborative cooperation in 2010: The EU-US eHealth Cooperative Initiative^{vii}. This effort was formalized in a Memorandum of Understanding (MoU)^{viii}. The vision for this partnership was to support an innovative, collective community of public- and private-sector entities inclusive of eHealth solutions suppliers, working toward the shared objective of developing, deploying, and using eHealth science and technology to empower individuals, support care, improve clinical outcomes, enhance patient safety and improve the health of populations. Incidentally, this vision parallels the World Health Organization’s (WHO) goal of improving world primary care health, laid out in five steps^{ix}:

- Reducing exclusion and social disparities in health (universal coverage reforms);
- Organizing health services around people’s needs and expectations (service delivery reforms);
- Integrating health into all sectors (public policy reforms);
- Pursuing collaborative models of policy dialogue (leadership reforms); and
- Increasing stakeholder participation.

There is a strong global imperative within the healthcare community to ensure that service delivery reforms occur in association with public policy reforms. The EU-US MoU was therefore developed in line with global goals.

The instrument to enable the signatory organizations to carry out the objectives of the MoU was brought forward in 2013 by the Transatlantic Economic Council in the form of the Transatlantic eHealth/Health IT Cooperation Roadmap^x. The Roadmap document sets out the vision, the main challenges, the scope and descriptions of each work stream. The Roadmap Annex contains the specific actions and outcomes for deliverables, which correspond to milestones, and due dates for each work stream.

Initially, two work streams were identified in the first Roadmap: Interoperability and Workforce Development. As defined in the initial Roadmap, the two work streams focused on:

- a) Development of internationally recognized and utilized interoperability standards and interoperability implementation specifications for electronic health record systems that meet high standards for security and privacy protection.
- b) Strategies for development of a skilled health IT (HIT) workforce and of eHealth/health IT proficiencies in the health professional workforce such that these clinicians can fully utilize the technology's potential to enhance their professional experience and performance.

In 2016, the Roadmap was updated, and a third work stream, Innovation, was officially added (originally referenced in the MoU as the “promotion of continuous innovation”).

The Workforce Development Workgroup and HITCOMP

The first phase of the eHealth/Health IT Workforce Development work stream began in August 2013 with the convening of subject matter experts in eHealth, health IT and informatics with backgrounds in education, policy, clinical care and industry, from 13 countries: Canada, Great Britain, Finland, France, Germany, Greece, Ireland, Israel, Italy, Mexico, Norway, Scotland and the United States.

It is important to note that the two initial work streams, workforce development and interoperability, were always fundamentally connected. The initial objectives and goals of the EU-US eHealth Workforce Development Workgroup (WDW) (the working name given to the second work stream), summarized by Steven Posnack of the US Office of the National Coordinator for Health Information Technology (ONC-HIT), in the group's Closing Ceremony, reflected that synergy:

“As important as interoperability is, the determination of interoperability success is not on technology alone. Interoperability requires a both a human and technology solution. Without skilled health IT workers, interoperability cannot be achieved. In order to make interoperability happen a focus needed to be placed on the education and development of a qualified workforce.”^{xi}

The WDW, with the help of the roadmap, went about the task of working on actionable and achievable goals that included:

- Achieving a robust supply of health professionals proficient in health IT
- Assuring current and future workforces are prepared for an ever advancing health IT environment
- Supporting a collaborative multi-national community
- Defining competency standards for the health IT profession, including developing competencies and producing tools to help advance and support this work

Between 2013 and 2015, WDW members met every week for 20 months, in addition to extra meetings, conferences and presentations, and achieved several major milestones, including:

- Identifying a health care setting in which to evaluate health IT competencies (acute care)
- Mapping over 250 roles in the selected healthcare setting between the US and the EU
- Compiling and aggregating data from over 3000 HIT competencies, supplied by 15+ health information organizations and sources
- Integrating Bloom's taxonomy^{xii} and instructional design concepts
- Organizing competencies into the following categories:
 - » *Domain: Direct Patient Care, Administration, Informatics, Information Systems/ICT, and Research/Biomedicine*
 - » *Skill level: Baseline, Basic, Intermediate, Advanced and Expert*
 - » *Area: Groupings such as Privacy and Security, Quality and Safety, Clinical Workflows and Care Coordination*
- Synthesizing data down to 1000+ standard HIT competencies

The volume of data the WDW compiled and aggregated was comprehensive but not practicable. The WDW approached this challenge by compiling the results of the competency analysis and mapping the results in the form of a consumable, usable tool and repository. It was felt that a resource such as this would be useful to educators, managers, new and incumbent healthcare workers, as well as all staff in healthcare delivery, management, administration, and support, HIT specialists and researchers in the field. The concept was developed and became a digital open-source tool and repository, integrating the roles and competencies into a multi-language, comprehensive interactive database where results can be accessed, searched, aggregated and stored using a variety of filters.

The results are the Health IT Competencies (HITCOMP) Tool and Repository (<http://www.hitcomp.org>), an open source and globally accessible workforce development resource.

The EU-US WDW Initiative ended in May 2015, but several objectives of the original MoU were still outstanding at that time, including:

- Completing the mapping of competencies to other healthcare settings, linking competencies to educational resources, and providing access to foundational eHealth training;
- Surveying patterns and trends while analyzing gaps and disparities, especially throughout less densely populated areas of Europe and other areas globally;
- Developing new, collaborative tools and resources to measure, inform and educate current and future eHealth workers; engaging stakeholders throughout European states;
- Disseminating and exploiting the results to make an impact in eHealth by heightening skills and knowledge.

The Horizon 2020 Call

The work accomplished by the WDW and other stakeholders, along with the success and widespread use of the HITCOMP Tool and Repository, in part answered the need for a transatlantic request by global stakeholders and constituents within the private and public sectors to support health information technology workforce strengthening skills. However, the MoU still had unfulfilled objectives and significant work remained to be done under the outlined work streams.

Therefore, the European Commission launched a new Society Challenge call under the EU's Horizon 2020 research and innovation grant program to continue the work and meet these objectives in the fall of 2015 – which resulted in continuing the project as “Part II”. The call solicited bids focused on mapping, quantifying and projecting the need, supply and demand of workforce IT skills, competencies and training programs for the healthcare workforce while taking into account the EU-US collaboration under the EU-US MoU eHealth Roadmap.^{xiii}

The Consortium

In late 2015, a consortium formed as an offshoot to the EU-US WDW to answer this call. The consortium began with three core members of the WDW representing Belgium/Israel, Finland and Germany/US. At the outset, the consortium had strong membership from small and medium business enterprise in the form of a healthcare consultation and technology development firm for coordination (Omni Micro Systems/Omni Med Solutions, Germany), an established multi-stakeholder platform for eHealth and Digital Health in Europe and beyond since 1999, with members from the full spectrum of healthcare providers, healthcare authorities and eHealth competence centers as well as from patient organizations and industry (EHTEL – European Health Telemedics Association, Belgium), and a ground-breaking health technology and informatics research university (Tampere University of Technology, Finland), the consortium wished to expand to a few more members to solidify its reach, depth and ability to accomplish its goals.

Steinbeis Europa Zentrum, for project management assistance, along with HIMSS North America's TIGER (*Technology Informatics Guiding Education Reform*) Initiative and the University of Osnabrück, were invited to join the consortium.

The Consortium includes:

- Omni Micro Systems/Omni Med Solutions GmbH (Project Coordinator) (Germany)
- HIMSS Foundation, North America, project fulfillment via the TIGER Initiative (United States)
- EHTEL (European Health Telematics Association) (Belgium)
- University of Applied Sciences Osnabrück (Germany)
- Tampere University of Technology (Finland)
- Steinbeis Europa Zentrum (Germany)

This Consortium is poised to be uniquely qualified to answer the Horizon 2020 call. The Consortium is built of networks with partners from academia, healthcare providers and industry, and allows access to a rich wealth of experience and knowledge in health informatics education and training. The Consortium is, in effect, a “network of networks” that join together organizations, experts and stakeholders from around the globe to work together for a common goal of positively impacting the healthcare IT workforce by heightening skills and knowledge. For example, the Healthcare Information and Management Systems Society Foundation (HIMSS) TIGER International Committee, which is represented in this Consortium via HIMSS North America (the global body for HIMSS Europe) as well as University of Applied Sciences Osnabrück, will be responsible for large segments of the work plans. The TIGER Initiative includes representation from the following European countries: Austria, Denmark, Finland, Germany, Ireland, Portugal, Switzerland and United Kingdom.

The TIGER Initiative also includes representation on a more global level, expanding stakeholder input, impact potential, and dissemination and exploitation possibilities. Additional membership includes the following countries: Australia, Brazil, Canada, China, Israel, Japan, New Zealand, The Philippines, Saudi Arabia, Singapore, Taiwan and United States.

Similarly, EHTEL (European Health Telematics Association), who will lead the dissemination and exploitation work plan, has an extended network within its leadership board and membership that includes the following countries: Belgium, Estonia, France, Hungary, Israel, and an extensive stakeholder community throughout Central and Eastern Europe.

Additionally, Steinbeis-Europa-Zentrum (SEZ) is partner of the largest technology transfer network in the world, namely the Enterprise Europe Network - EEN. SEZ was chairperson and is active member in the Healthcare of the EEN encompassing members out of more than 30 regions with the mission to raise awareness and empower academia and industry to engage in innovation and the transfer of knowledge as well as engage stakeholders in policy design. SEZ is coordinator of the EU initiative DanuBalt dealing with analyzing the innovation gaps in the Baltic Sea and Danube macro regions.

TIGER Initiative and the Virtual Learning Environment (VLE)

In the light of the paramount importance of training the healthcare workforce, the TIGER Initiative was founded in the United States of America 2006 and within six years expanded globally. It emerged as a grass roots effort to allow clinicians and consumers to make better use of informatics tools, principles, theories and practices by interweaving these technologies into practice, education and research for the sake of better outcomes, patient safety, and cost reductions.

Since TIGER held its first invitational conference in 2006, it has proven to be a platform and an information hub for many organisations and individuals^{xiv}. More than 70 organisations participated in the TIGER Summit, and each agreed that nursing must integrate informatics technology into education and practice. Each has pledged to incorporate the TIGER vision and action steps into their organisation's strategic plans. All of them fulfilled a critical role by distributing the TIGER Summit Summary Report within their network to engage additional support for this agenda. After the initial summit, members of this initiative moved onto TIGER Phase II. Nurses across the United States, from differing aspects of the profession, joined in the work of nine initiatives to develop recommendations for change in nine critical areas: Education and faculty development; Staff development; Informatics competencies; Standards and interoperability; Usability and clinical application design; Leadership development; National Health Information Technology Agenda; Virtual demonstration center; and Consumer and personal health record.

These reports, including a 10th one on Magnet[®], are available on the TIGER landing pages on HIMSS.org^{xv}. These themes can be clustered into the overarching problem areas:

1. Workforce development
2. National health IT initiatives
3. Improving technology solutions

In 2012, the TIGER International Committee was launched to broaden the reach of TIGER activities beyond the United States of America and to empower educators worldwide to act as change agents for paving the way towards greater awareness, acceptance, better design, and use of health IT. The results of TIGER's North America activities, combined with the perspective of the international TIGER community, were compiled in a book on nursing informatics with contributions from North and South America, Europe, and Asia.^{xvi} This book highlights the dialogue between experts from different fields and cultures. The TIGER International Committee, which consists of members from 21 countries, regularly convenes at major international medical and health informatics conferences (e.g. MEDINFO, Nursing Informatics, Medical Informatics Europe (MIE)) and organises workshops to inform community members about the latest developments and offerings while engaging them to get involved in TIGER activities. Focused on better preparing all members of the clinical workforce to use

technology and informatics and to promote inter-professional cooperation through health IT, TIGER transitioned from a standalone foundation to the Healthcare Information and Management Systems Society (HIMSS) in 2014 under Clinical Informatics.

Rooted in the early activities for setting up a virtual demonstration centre, the TIGER Virtual Learning Environment (VLE) emerged as a web-based education portal for academic professionals, students, adult learners, and clinical educators 2009 with a re-launch in 2015. The VLE is a dynamic resource that contains materials reflective of core international competencies.

Supporting the classic eLearning approach, the VLE allows a personalised approach to learning and expanding one's own skillset and knowledge on important health IT subjects in a self-paced learning format, which enables users to go at their own speed. The blended learning approach reflected in the VLE makes it possible to integrate health IT modules and resources into classroom curriculum to share common learning resources across academic institutions and healthcare provider organisations.

The EU*US eHealth Work Project

In February 2016, the EU*US eHealth Work Consortium submitted a sealed proposal to bid for the Horizon 2020 call. In May, the proposal was positively evaluated by the European Commission, and in June, the project was given the green light for funding. This project officially began on September 1, 2016. The project will span 18 months, culminating in February 2018.

The EU*US eHealth Work Project is meant to reach a large audience, including students, new and incumbent healthcare workers and practitioners, educators, governments and industry. The project will encompass five work plans: Management, Mapping, Access, Assessment and Dissemination. In this project, the Consortium is not planning to “reinventing the wheel”, but proposes to leverage work that has already been done in various areas. The Consortium intends to utilize its “network of networks” to disseminate and exploit the results of the work to create an enduring legacy.

The goal of this project is to address this workforce shortage and lack of full access to eHealth skills and competence. We will use the following mechanisms to accomplish our goals:

- **Measuring:** the project will measure the needs, gaps, skills and competencies, and outcome models of eHealth. Key milestones will include a survey of current state of needs, gaps and trends, a comprehensive gap analysis, and continuing the mapping and alignment of competencies and skills with curriculum that began in HITCOMP coupled with the VLE to form an Interactive Web Platform.
- **Informing:** the project will provide access to knowledge tools and platforms, and resources to assess and improve eHealth skills. Key milestones will include stakeholder events, an Interactive Educator Demonstrator Module, and a wider Skills and Knowledge Assessment and Development Framework that will be a hub for workforce members, educators, students, policy makers and stakeholders to share and disseminate information regarding eHealth workforce development.
- **Educating:** increasing eHealth educational and training opportunities. Key milestones include development of foundational eHealth curricula with a comprehensive links to a variety of educational resources through the TIGER VLE. **Advancing:** promoting knowledge and development in the field by strengthening, disseminating and exploiting success outcomes for a skilled transatlantic eHealth workforce. Key milestones include, in addition to stakeholder events, engagement of stakeholders, policy makers and key champions in ongoing dialogue, regular presentations of our work globally, and publications of our findings to a wide audience.

Key project deliverables include:

- A comprehensive survey of the current state of needs of the eHealth workforce, with gap analyses that lead to case studies and recommendations for gap closure and mitigation
- Dissemination and exploitation of our results through the following approaches: several presentations, publications and white papers detailing the synthesis of eHealth workforce initiatives with milestones and advancements in health informatics
- Development of eHealth foundational curricula for European States and the US
- An interactive web platform in which end-users, educators, governments and industry can: communicate; exchange information; provide and locate opportunities for training, skills development and employment opportunities; and increase knowledge related to the eHealth, HIT, and health informatics across disciplines
- An integrated, international eHealth skills and education assessment and development framework
- Building and maintaining robust and dynamic partnerships focused on HIT workforce development - not only within all European states but inclusive of the United States as well. A key success factor will be the involvement and integration of all partners and stakeholders trans-Atlantically in all dialogues, work streams and dissemination actions.

Key project events include:

- **EU-US Collaboration Event** (@HIMSS17, Orlando, Florida, US, February 2017)
- **Stakeholder Engagement Event #1** (@Tampere University of Technology, Tampere, Finland, mid-2017)
- **Stakeholder Engagement Event #2** (@University of Applied Sciences Osnabrück, Germany)
- **Final Conference** (venue TBD, Brussel, Belgium, January 2018)

Summary

The eHealth education of the existing workforce requires investments in both time and money. The project will further explore how to maximize the return of these investments. Furthermore, the project will also elaborate on how these costs can be shared among the stakeholders in a feasible way.

It will be our duty and obligation to take a leadership role in building strategic partnerships with relevant stakeholders from education, healthcare organizations, vendors, clinicians and providers, and government and policy leaders. With these established alliances, we will be able to play a role in the creation of sound policies related to assessing and improving workplace skills requirements to positively impact current and future healthcare labor market needs. These partnerships will also work to ensure there is a high-level of support, commitment and acceptance from leadership that will create a legacy beyond the lifetime of the project.

Because of this, it will be imperative for our project consortium members, stakeholders and comprehensive network participate in frequent and constructive dialogues that engage policymakers, health ministries, and others in the public as well as private sectors who play key decision-making roles. These steps are both vital and necessary to ensure this work will not only be successful over the project lifetime, but will establish a footprint for the future in contributing to a skilled and competent workforce now, in 2020 and beyond.

For More Information

For more information, please visit TIGER's project landing page:

<http://www.himss.org/professionaldevelopment/tigers-euus-ehealth-work-project>

Official project landing pages:

<http://ehealthwork.org> & <http://ehealthwork.com>

ABBREVIATIONS AND ACRONYMS

Acronym	Description
AHIMA	American Health Information Management Association
EC	European Commission
EHEALTH	See HIT
EHTEL	European Health Telematics Association
EEN	Enterprise Europe Network
ESKILLS	Electronic Skills
EU-US	European Union-United States
EUUSEHEALTHWORK; EU*US eHealth Work	EU-US eHealth Work Consortium and Project (under Horizon 2020 grant #727552 funded by the European Commission)
FH OS	Stiftung Fachhochschule Osnabrück (University of Applied Sciences, Osnabruck, Germany)
H2020	Horizon 2020
HIMSS FDN	Healthcare Information and Management Systems Society Foundation
HIT	Health Information Technology, or health IT
HITCOMP	Health IT Competencies Tool and Repository
ICT	Information and Communications Technology
IMIA	International Medical Informatics Association
MoU	Memorandum of Understanding (refers to the EU-US Memorandum of Understanding and Roadmap of 2010)
OMS-UG	Omni Micro Systems/Omni Med Solutions UG
ONC-HIT	Office of the National Coordinator – Health Information Technology
SEZ	Steinbeis-Europa-Zentrum
TIGER	Technology Informatics Guiding Education Reform
TUT	TTY-SAATIO (Tampere University of Technology)
VLE	HIMSS TIGER Virtual Learning Environment
WDW	(EU-US) Workforce Development Workgroup
WHO	World Health Organization

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- ^{ix} World Health Organization (WHO) Primary health care definition: http://www.who.int/topics/primary_health_care/en
- ^x Transatlantic eHealth/Health IT Cooperation Roadmap: <http://www.state.gov/p/eur/rls/or/2016/260926.htm>
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