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Strategies to Address the Health Care Information Technology Workforce Shortage

Presented By: Nashville Health Care Council, Nashville Technology Council, Nashville Area Chamber of Commerce

Abstract
This article aims to define the Health Care Information Technology (HIT) sector, quantify the current workforce shortage, outline its contributing factors, and provide strategies that local economies can use to address the shortage. These strategies are anticipated to not only improve local economic development but also improve the efficiency and effectiveness of health care delivered in the immediate community and beyond.

The Health Care Information Technology Industry
Health care is the fastest growing industry in United States. It is estimated that by 2020, health care will account for more than 20 percent of the nation's GDP and will become the single largest national expenditure at $4.6 trillion. Health care expenditure is currently at $2.58 trillion and represents 17.6 percent of the total GDP. The growth can be attributed to several factors, which include an aging population, increased lifespan, and growing costs associated with providing health care. While numerous industries have pursued cost and quality efficiency gains provided by technology such as automated supply chains, robust knowledge management systems, and customer relationship management software, the adoption of technology within the health care industry has been slow and inconsistent among various facilities and sectors. HIT utilization has primarily been spurred by government incentives, most recently including the American Recovery and Reinvestment Act of 2009 and the Health Information Technology for Economic and Clinical Health Act. Through these measures federal stimulus money has been made available for electronic medical records, online quality reporting, and other technologies.

It is critical for the industry to rapidly adopt HIT if the United States is to reduce health care costs, increase efficiency, and ultimately improve the effectiveness of care. While core technology from other industries can be applied to health care, and financial incentives are now available, the industry lacks a key component to successfully deploy HIT: a skilled HIT workforce available on a broad basis.

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Global Scope of HIT Shortage

The U.S. health care industry is not alone in experiencing an HIT talent shortage. The global health care market for information and communication technology is estimated to be $53.8 billion in 2014 and growing rapidly. According to research from KPMG, developed countries and multi-national IT companies are responding to the market shortage by building HIT infrastructure. For example, IBM Acure partnered with the Danish Medicines Agency to create the database and application for the national Danish e-health portal; and Dell Healthcare through the Perot acquisition provided consulting services to Meditech during implementation of 6.0 Health Care Information System (HCIS) at United Kingdom's Rotherham National Health Service Foundation Trust.

The global HIT workforce market is primarily fueled by corresponding growth of the health care market. However, other factors are also responsible for triggering the large-scale growth in HIT workforce demand:

- New government regulations such as health information exchanges and quality reporting systems

- Recent investments in HIT, including electronic medical records and physician order entry

- Changes in care delivery models: Accountable Care Organizations (ACOs), remote monitoring and integration with diagnosis instruments into patient medical records

- Increased consumer comfort with technology

- Increased industry pressure to manage cost

Numerous member countries of the Organization for Economic Co-operational and Development (OECD) are pursuing innovative HIT strategies, such as e-health and telehealth according to a study from KPMG and The Future of Global Healthcare Delivery and Management. E-health gives patients online/electronic access to their health information and physicians/staff, empowering them to take an active role in their own care. Telemedicine drives straight to the cost component of the health care industry by connecting patients and physicians remotely to optimize care delivery and time spent on cases. A study at the Orchard Medical Centre in Bristol, United Kingdom, identifies telehealth benefits of a 46 percent reduction in admissions, a 67 percent reduction in accident and emergency attendances, and a general increase in patient reassurance and quality of life.

Furthermore, the number of gateways used in telehealth applications is expected to reach one million in 2014 with health hubs constituting about 80 percent of total telehealth gateways in 2009. Telehealth and e-health are promising IT tools for the global health care industry.

The ONC estimates that hospitals and physician practices need an additional 50,000 HIT workers by 2015.
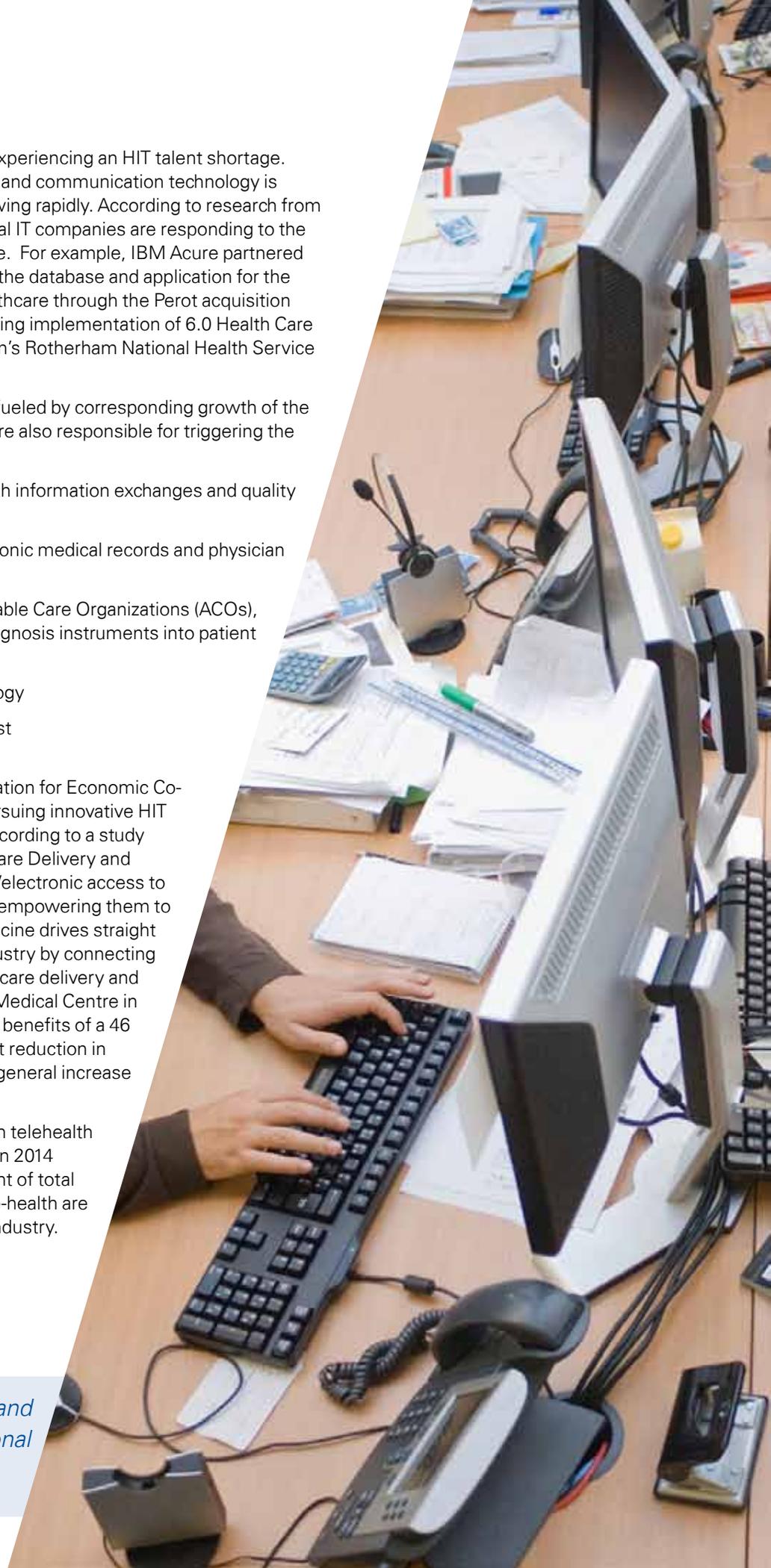
Profile of HIT Employee

HIT encompasses many markets, including the product market, application market and services market. Such a broad scope often makes it difficult to qualify HIT and its prospective employment opportunities. Examples of HIT in practice include:

- Technical development of applications used by insurance companies;

- Enterprise clinical systems design used by providers and health systems;

- Clinical informatics used by clinicians and administrators to improve care outcomes; and

- Telemedicine systems that change the care delivery model.

Additionally, the organizations that employ HIT talent range from traditional software companies to in-house IT staff at health care facilities.

While the HIT workforce can encompass many roles and require a wide-range of skill-sets, the one unifying requirement is an individual who creates, designs, implements, and maintains technology systems to improve the efficiency and effectiveness of care delivered by health care's frontline workers (i.e., nurses, physicians, etc.). A unique skill-set is necessary in order to be an effective HIT employee, including a blend of technical know-how and functional expertise within clinical practices, operational process, or both. For example, an effective HIT workforce would have experience in both database design as well as hospital care pathways, in project management as well as hospital operations, or even software development/design and payer/provider reimbursement structures.

The Nashville HIT Economy

Commonly referred to as the Silicon Valley of Health Care, Nashville is home to more than 250 health care companies, including market leaders and world-class institutions such as HCA, Community Health Systems, Healthways, Brookdale Senior Living,

AmSurg, Emdeon, Vanderbilt University, and many more. Nashville's health care industry generates more than $70 billion in annual revenues and employs over 400,000 globally. Nashville's important role in the health care industry not only provides a unique opportunity for the city to aid in widespread adoption of HIT, but also acutely highlights the HIT workforce shortages experienced by the entire industry.

According to the U.S. Department of Health and Human Services' Office of the National Coordinator, current estimates place the nationwide HIT workforce shortage at 50,000 jobs by 2015. Within Nashville, it is estimated that there will be a demand for 5,000 HIT positions by 2014. The estimate is based on data from local health care providers (hospitals, physicians, nursing homes, ambulatory surgery center, outpatient center, and urgent care) and the numerous health care management companies who call Nashville home. In a survey of Nashville's leading health care providers, university partners, and other community associations conducted in September 2010, almost 80 percent of the participants indicated an inadequate supply of qualified HIT talent in Nashville and the surrounding Middle Tennessee region. In terms of the biggest barriers facing HIT workforce development more than 30 percent cited "Educational/Training Constraints." An additional 10 percent cited "Uncertainty with Scope of Services to be Provided" and "Low Awareness/Misperception," respectively, as the main reasons for the HIT workforce shortage.

In an effort to further strengthen Nashville's role in the health care industry and position the region as a national leader in HIT innovation, the Nashville community began a two-year effort to analyze the HIT workforce shortage, discover and address areas of weakness and ultimately position the city to become a future hub for HIT talent development.

HIT roles descending by education requirement:

Advanced Degrees
- Clinician/Public Health Leader
- Health Information Management and Exchange Specialist
- Health Information Privacy and Security Specialist
- Research and Development Specialist
- Programmers/Software Engineers
- Health Analyst
- Implementation Manager

Non-Advanced Degrees
- Quality Analyst
- Practice Workflow/Information Management Redesign Specialist
- Clinician/Practice Consultant
- Implementation Practice Support
- Technical/Software Support Staff
- Trainer
- Medical Records
- Quality Improvement Specialist

Source: Middle Tennessee HIT Working Group

Addressing the HIT Workforce Shortage - Initial Solutions

Nashville area community and industry partners have taken a multi-pronged approach to address the region's HIT workforce shortage. As such, the city is actively working to increase coordination among employers, educators and industry associations to address the barrier issues cited related to education, awareness and misperception.

KPMG's Global Head of Health Care Mark Britnell underscored that a skilled HIT workforce is necessary to implement new technologies at the Nashville Health Care Council and Nashville Technology Council's city-wide Health Care IT Workforce Solutions Forum where more than 200 diverse parties connected for networking and sharing of best practices. The event

was structured to provide participants with a high-level global view of the HIT workforce needs, followed by state and local perspectives about where HIT is today and where it will be in five years. Following presentations from thought leaders, the participants broke into small work groups to review the challenges and determine strategic directions and solutions for the local community. The Health Care Council, Technology Council and the Chamber summarized this work group data and then delegated it for review to smaller group sessions that took place over the next year. These follow on meetings included executives representing HIT Human Resources and academic institutions providing HIT-related curriculum. In all, more than 60 diverse professionals engaged in these community discussions.

Building on recommendations from key stakeholders collected during the discussion phase, a number of short-term and long-term strategies were identified for Nashville to address the key barrier issues related to the HIT shortage. These tactics ranged from utilizing government sponsored workforce retraining and economic development funds for training, to outsourcing, to increasing the overall number of graduates from master's programs and traditional four year universities. Accounting for the time and resources it would take to truly transform these strategies into viable suppliers to meet the HIT workforce demand, the above group identified several short-term approaches to ramp-up workforce development in keeping with the solutions that were identified and funded in the American Recovery and Reimbursement Act of 2009 (ARRA) Workforce Development Program:

- **HIT Economy**: Identify top HIT job opportunities and develop descriptions (including academic requirements and salary) for these positions to be shared with interested parties in the private, public and academic realm.

- **Community College Consortia Program**: Create a college training program to be shared among

Tennessee's Community College System to create a workforce that can facilitate the implementation and support of an electronic health care system.

- **Curriculum Development Centers Program**: Develop high quality educational materials that institutions of higher education across the state can use to construct core instructional programs.

- **Competency Examination Program**: Offer a broadly-used examination to evaluate trainee knowledge and skills acquired through non-degree training programs.

- **University-Based Training Programs**: Create additional university programs to support advanced degree training. It is anticipated that local universities will work collaboratively around this

data to create long-term sustainable curriculum designed to train future leaders in HIT skills. This would include all layers of the health care employer continuum from physician practice management to EMR specialist within the hospital. The level of skill training would include everything from office management to software engineering. It is the desire of the community that the universities would each develop programs ideally suited for their current expertise while developing new tracks for industry need.

- **Corporate Internship Programs**: Connect students with industry experience to gain real-world HIT knowledge from health care leaders to further develop career pathways.

Addressing the HIT Workforce Shortage - Future Solutions

As a longer-term strategy going forward, Nashville group discussions yielded the suggestion of creating a permanent entity comprised of various employer, academia, and local government stakeholders to coordinate activities and ensure a consistent approach toward HIT workforce development. Several examples of future activities maintained by the entity could include:

- Acting as a centralized regional career center to coordinate placement for internships and full-time positions;

- Working with corporate partners to better define roles, required skill-sets, and further quantify demand;

- Developing on-the-job training programs by involving corporate partners;

- Collaborating with academic leadership to align curriculum at various levels (i.e., high school to two-year colleges and four-year universities) to various positions;

- Designing marketing and branding campaigns reinforcing the area as a HIT center;

- Working with local government to expand economic incentives to make the area more attractive to HIT companies while also encouraging workforce development; and coordinating with the state and regional economic development officials to recruit new HIT companies to the area.

Middle Tennessee HIT Career Pathways

CRITERIA	SALARY	EDUCATION	UNIVERSITY GRADUATES	OPEN IT JOBS Q4 2010	CURRENT EMPLOYERS	POSITION DESCRIPTION
Clinician/Public Health Leader	$225,000 – 450,000	Ph.D, MD, 8+ Years	VU, UT Health Sciences	10	Hospitals and Hospital Systems	Chief Medical Information Officer (CMIO), Chief Nursing Informatics Officer (CNIO). Public Health - Chief Information or Chief Informatics Officer.
HIM/Exchange Specialist	$75,000 – 125,000	MA, 6-8 Years	VU, UT, Trevecca	41	Regional Health Exchanges, Hospitals, Physicians, Pharmacy, Consultants	Supports the collection, management, retrieval, exchange, and/or analysis of technical information, in health care and public health organizations.
Health Information Privacy/Security Expert	$88,000 – 118,000	MA, 6 Years	VU, UT, Lipscomb	3	Accounting Firms, Consultants, Hospitals, Health Systems, State and Local Government	Supports the collection, management, retrieval, exchange, and/or analysis of information in electronic form, in health care and public health organizations. Chief Information Security Officer
Research, Product and Development Specialist	$94,000 – 138,000	BS, MA, 4-6 Years	VU, UT Health Sciences	2	Large Health Systems, Consultants	Supports efforts to create innovative models and solutions that advance the capabilities of health IT, and conduct studies on the effectiveness of health IT and its effect on health care quality. Product Management and Outcomes
Programmers/ Software Engineers	$75,000 – 140,000	BS, 4 Years	VU, UT, MTSU, TSU, Belmont, Trevecca, Lipscomb, MSU, TTU	65	EMR Vendors, Health Systems	Architects and developers of advanced health IT solutions.
Health Analyst	$75,000 – 125,000	BS, 4 Years	Trevecca, Lipscomb, MTSU, VU, Cumberland	29	Hospitals, Health Systems, Large Physician Clinics	Training combines health care or public health generalist knowledge, knowledge of IT, and deep knowledge drawn from disciplines that inform health IT policy or technology.
Implementation Manager	$87,500 – 125,000	AS, BS, 2- 4 Years	MTSU, Vol State, Nashville State, Walter State, UT Health Sciences	2	Hospitals, Physician Offices, EMR Vendors	Provide on-site management of mobile adoption support teams for the period of time before and during implementation of health IT systems in clinical and public health settings.
Quality Analyst	$50,000 – 90,000	BS, 4 Years	VU, UT, MTSU, Belmont, Trevecca,	0	Hospitals, Health Systems, Large Physician Clinics	Utilization Review, Business Analyst
Practice Workflow / Information Management Redesign Specialist	$91,000 – 126,000	BS, 4 Years	UT, VU, MTSU, Trevecca	8	Hospitals, Physician Offices, EMR Vendors	Assist in reorganizing the work of a provider to take full advantage of the features of health IT in pursuit of meaningful use of health IT to improve health and care.
Clinician/Practice Consultant	$67,000 – 98,000	LPN, AS, BSN, RN, 2 – 4 Years	Vol State, Nashville State, Walter State, UT Health Sciences	15	Hospitals and Health Systems	Similar to the "redesign specialist" role listed above but brings to bear the background and experience of a licensed clinical and professional or public health professional.
Implementation Practice Support	$75,000 – 100,000	AS, BS, 2 – 4 Years	Vol State, Nashville State, Walter State, UT Health Sciences	28	Hospitals, EMR Vendors	Provide on-site user support for the period of time before and during implementation of health IT systems in clinical and public health settings. HL7 Interfaces.
Technical/ Clinical Software Support	$44,000 – 59,000	AS, 2 Years	Vol State, Nashville State, Walter State, UT Health Sciences	0	EMR Vendors, Hospitals, Clinics, Physician Offices	Maintain systems in clinical and public health settings, including patching and upgrading of software.
Trainer	$58,000 – 83,000	AS, BS, 2 – 4 Years	Vol State, Nashville State, Walter State, UT Health Sciences	8	All levels of Healthcare	Design and deliver training programs, using adult learning principles, to employees in clinical and public health settings.
Medical Records	$43,400 – 62,000	AS, BS, 2 – 4 Years	Vol State, Nashville State, Walter State, UT Health Sciences	8	Clinics, Hospital Medical Records, Physician Offices	Evaluates medical records and charge tickets to ensure completeness, accuracy, and compliance with ICD-9, CPT4, DRG.
Quality Improvement Specialist	$32,000 – 50,000	AS, 2 Years	Vol State, Nashville State, Walter State, UT Health Sciences	5	Health Plans, Physician Offices, Hospitals	Conducts and coordinates quality and utilization review activities of mental health inpatient and outpatient services.

This chart outlines the positions required for HIT development, universities supporting growth, average salary ranges and a description of job functions.

Challenges to HIT Workforce Development

There are several key challenges to fully implement the short and long-term strategies proposed by the Nashville group. As previously stated, the top three barriers to HIT workforce development are: educational/training constraints, uncertainty with scope and low awareness/misperception.

Through Nashville area academic stakeholder discussions it became apparent that new HIT curriculum development would need state government approval and funding to create adequate infrastructure to support newly-designed educational programs. Additionally, meetings with HR executives determined that the HIT curriculum currently in place is misaligned with the current needs of employers. This is further compounded by the lack of fully developed community employer groups to advise HIT curriculum design. Lastly, given the inadequate size of the area's existing HIT workforce, academic institutions are often faced with industry competition to staff, train and compensate instructors.

Employers also confront hurdles as they work to develop their own internal HIT workforces. One approach often utilized is to retrain existing employees and equip them with the necessary HIT skillset. This approach, however, may create competing priorities with incumbent workers as they try to balance time for on-site training and education with the roles for which they have been hired. On a broader scale, employers are already facing strong industry constraints regarding profitability and costs, so balancing investment in re-training current workers or developing new candidates/students is often sacrificed in order to ensure core and critical operations are maintained.

The various roles that academia and employers play in HIT workforce development have also proven to be highly competitive with academic institutions and employers vying for exclusive training contracts and preferred graduate sources to meet the growing HIT workforce demand.

Stakeholder discussions revealed that on a community-wide level, it will be important for employers to work collectively toward improving the development infrastructure and growing the available pool of HIT talent, competing over resources only once participants graduate from their respective programs (i.e., certificate, 2-year community college, graduate program).

IT firms are expected to add 150,000 jobs this year. Dice.com, a leading IT job-listing site, currently has more than 80,000 postings from companies looking for workers. The industry jobless rate was just 4.7 percent in July, while the U.S. as a whole was 9.1 percent.

Conclusion

In conclusion, increasing national adoption of HIT has the opportunity to bring much needed change to the U.S. health care industry, which is growing rapidly in size and cost. The industry's complex interdependencies among providers, payers, and patients; the importance of information in clinical decision making; and the broad challenges associated with operating a health care enterprise all make the industry primed to benefit from further HIT integration. Such enhancements include electronic medical records to improve knowledge sharing among clinicians; telemedicine systems to present the chance to drastically reduce costs and alter the care delivery model; clinical outcomes reporting and data transparency to provide further support of educating the consumer; and management dashboards and analytics to improve leadership's ability to effectively manage and allocate resources across the system. However, these opportunities will remain unrealized unless the global and local HIT communities can identify strategies to successfully develop a HIT workforce to meet the burgeoning needs of the HIT sector.

Given Nashville's role as a dynamic health care hub with significant influence on the national health care landscape, the community has a unique opportunity to address an HIT shortage that is global in scope, while positioning the region as a center of HIT innovation. In order to do so, leading industry, academic and other key community partner groups have created an on-going collaborative discussion focused on overcoming key barriers to solve the problem at hand through short and long term solutions.

References:
Sources:

Mark Britnell, KPMG Presentation, HIT Workforce Summit, September 17, 2010 at Frist Center for the Arts, Nashville, TN

http://www.ahima.org/membership/salarystudy08.aspx http://www.himss.org/Content/Files/CSC_US_Healthcare_Workforce_Shortages_HIT.pdf

A 2008 Bureau of Labor Statistics (BLS) report projected the need for an additional 35,000 HIT workers by 2018.

Contributing Organizations from the Nashville Community:

The following is a list of participating organizations and educational institutions that have attended the HIT meetings:

Companies and Partner Organizations

Avondale Partners
BioTN Foundation
C3 Consulting
CogentHMG
Community Health Systems
Consensus Point
Cumberland Consulting Group
Emdeon
eMids Technologies
First Bank
HCA
Healthcare Management Systems
HealthSpring
Healthways
IBM
Intel
KPMG
MedSolutions
Midas+ Solutions, ACS a Xerox Company
Nashville Career Advancement Center
NOVAS Technology Group
Passport Health Communications
Qualifacts Systems
Tennessee Hospital Association
Tennessee Technology Development Corporation
tnREC
Vanderbilt University
W Squared

Educational Institutions

Belmont University
Columbia State Community College
Cumberland University
Lipscomb University
Meharry Medical College
Metro Nashville Public Schools
Middle Tennessee State University
Murray State University
Nashville State Technical Community College
Tennessee Board of Regents
Tennessee State University
Tennessee Technological University
Trevecca Nazarene University
Volunteer State Community College
Western Kentucky University
Williamson County School System

Presented at the HIMSS Summit of the Southeast, September 28, 2011

About the Nashville Health Care Council

The Nashville Health Care Council, founded in 1995 as an initiative of the Nashville Area Chamber of Commerce, is an association of health care industry leaders working together to further establish Nashville's position as the nation's health care industry capital. Worldwide, Nashville's health care industry generates over 400,000 jobs and more than $70 billion in annual revenue, and is Nashville's largest and fastest growing employer. For more information on the Council, please visit www.healthcarecouncil.com.

About the Nashville Technology Council

The Nashville Technology Council, an affiliate of the Nashville Area Chamber of Commerce, is an exclusive, 501(c)(6) not-for-profit organization devoted to helping the Middle Tennessee technology community succeed. Membership is open to technology companies, technology employers, service providers, educational institutions, and non-profit companies interested in supporting the growth of technology business in Middle Tennessee. Since its formation in 1999, membership has grown to more than 400 organizations. New programs and events such as technology roundtables, educational initiatives, annual technology conferences, a technology job board and other activities are designed to foster Nashville's technology industry. For more information, visit www.technologycouncil.com.

About the Nashville Area Chamber of Commerce

The Nashville Area Chamber of Commerce is Middle Tennessee's largest business federation, representing more than 2,000 member companies. Belong, engage, lead, prosper embodies what the Chamber focuses on for its members. Together with its affiliates, the Nashville Chamber works to strengthen the region's business climate and enhance Nashville's position as a desirable place to live, work and visit. For more information, visit www.nashvillechamber.com.