Reimagining the U.S. Healthcare System:

Investing in Innovative Health IT to Support the 21st Century Personal Health Model

Featuring information from the HIMSS11 Intel Executive Breakfast.

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"***The 4Cs of Global Healthcare Reform,***"
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Healthcare Industry in Distress

Today's U.S. healthcare system is being challenged to transform itself in the face of escalating trends impacting cost, quality and access. Total healthcare spending reached almost $2.5 trillion in 2009 or 17.3 percent of the U.S. economy, according to an annual report by the Centers for Medicare & Medicaid Services (CMS). The Congressional Budget Office released long-term budget projections in December 2007 in which total healthcare spending would rise to 25 percent of gross domestic product in 2025, 37 percent in 2050 and 49 percent in 2082 in the absence of changes in federal law.

The physician and nurse shortage continues to hamper access to and quality of healthcare. The U.S. Bureau of Labor Statistics reports that more than 1 million new and replacement nurses will be needed in the U.S. by 2016. A 2008 University of Missouri study published in Health Affairs revealed that the U.S. could face a shortage of up to 44,000 primary care physicians (PCPs) by 2025.

U.S. population growth trends are further compounding the barrier to access to care. While the rate of the U.S. population growth is slowing, it is still substantial – projected to increase to 392 million by 2050, a 50-plus percent increase from the 1990 population size, according to the U.S. Census Bureau. More importantly, the country is undergoing a significant shift in demographics.

In 2009, the number of persons aged 65 years or older was 39.6 million – 12.9 percent of the U.S. population or about one in every eight Americans, according to the Department of Health and Human Services' Administration on Aging. By 2030, the total population will comprise 72.1 million older persons in that age group, which will represent 19 percent of the population. This shift is already negatively impacting the healthcare system, as the elderly have more expensive chronic conditions than the non-elderly. In 2002, people aged 65 and older comprised 13 percent of the U.S. population but consumed 36 percent of the total U.S. personal healthcare expenses, according to the Agency for Healthcare Research and Quality. The group aged 65-79 represented 9 percent of the total population but represented 29 percent of the top 5 percent of spenders.

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Many of these projections are based on the healthcare industry retaining its status quo. The bottom line is that the current healthcare delivery system is straining to support a greater number of patients, which includes an older, more chronically ill population, with fewer human and financial resources. In addition, the fee-for-service reimbursement model, which rewards volume, has created more demand on those limited resources. The current system is simply too expensive and therefore unsustainable.

First Steps toward Healthcare Reform and Transformation

The federal government has attempted to address these issues with the passages of the American Recovery and Reinvest Act's HITECH Act of 2009 and the Patient Protection and Affordable Care Act (PPACA) of 2010. One of the goals of the HITECH Act is to drive implementation of electronic health records (EHRs) by physicians and other healthcare providers. The adoption and meaningful use of EHRs and health information exchange are expected to help create a more efficient healthcare system with better clinical outcomes, lower cost, decreased medical errors and higher quality of care. One of PPACA's goals is to enable greater access to healthcare.

Finally, CMS, commercial payers, state Medicaid programs, and hospitals and healthcare systems have been either implementing pilots for or expanding their patient-centered medical homes (PCMHs), a model promoting comprehensive primary care with PCPs leading a collaborative care team. Payers and providers are also looking at other payment and delivery reform care models that align quality and cost with reimbursement. Accountable care organizations (ACOs), currently the most popular model being explored, reimburse a collaborative healthcare provider team based on improved clinical outcomes and quality measures for assigned patient populations in a cost-efficient manner. PPACA includes a provision called the Medicare Shared Savings Program, which allows ACOs to contract with Medicare beginning in 2012.

While all of these efforts, both disparate and connected, by various stakeholders are positive steps toward moving the healthcare system into the 21st century, more needs to be done. All stakeholders in the healthcare ecosystem must undergo a cultural shift and embrace new ways of delivering care using health IT as an enabler, according to Eric Dishman, Intel Fellow, Director of Health Innovation for Intel Corp. and Director of Health Policy for Care Innovations, an Intel-GE company.

Reigniting Imagination and Striving for Innovation in Healthcare

Dishman founded Intel's first Health Research & Innovation Lab in 1999. He has led ethnographic research of the continuum of care, comprising deep studies in such areas as Alzheimer's, cancer, cardiovascular disease and medication of 1,000 patient households and 250 facilities in more than 20 countries. His team discovered that across the world

countries are struggling with cost, quality and access issues, which is being exacerbated by the graying global population.

Despite a rapidly changing world, the model of care has not evolved in more than 200 years: When people get sick or injured, they go to a physician's office or hospital. "Our modern medical 'mainframe' is filled with miraculous technologies, but this centralized, expert-driven, campus-centric model is unscalable and unsustainable for all people in every care encounter," Dishman said. Medical mainframes should only be used when absolutely necessary, he said.

Addressing where and how care can be delivered – essentially where people live, work and play – requires imagination and innovation. "In some sense, our biggest problem is an imagination problem," Dishman said. "It's getting our culture to imagine there can be a very different way of doing care." Disruptive technologies can deliver the innovation needed to move from mainframe to personal health and can be used to place-shift where care occurs and skill-shift who provides the care. "There are more ways to care for people in the world than sending them to an institution like a hospital or a nursing home, and we now have the technology to distribute care and do it in very different ways and very different places," Dishman said.

Doing care differently means expanding the care coordination team to accommodate more patients in a cost-efficient manner while actually enhancing the quality and personalization of care. Health IT will be called on to train and educate a workforce of empowered patients and family members.

In order for health IT to address the cost, quality and access issues, stakeholders must understand four trends that are impacting global healthcare reform – complexity, coordination, collectivity and community, according to Dishman. The healthcare system is becoming even more complex with the influx of data arising from the transition from ICD-9 to ICD-10 codes; new drugs, therapies and interventions in the pipeline and coming to market; more patients with more co-morbid conditions; genomic and proteomic advances; and new data types derived from new data streams. Stakeholders need to build a health IT infrastructure that can accommodate all these complexities and an informatics system that can use all the data to personalize treatments.

Lack of care coordination and gaps in care have been well chronicled, with the Institute of Medicine's Crossing the Quality Chasm: A New Health System for the 21st Century being the most significant documentation. Little has changed since the landmark report's release in 2001. Nearly one third of healthcare encounters in the U.S. don't have appropriate records on hand or generate duplicative tests, Dishman said. With the proliferation of PCMHs and creation of ACOs, proper care coordination is key to their success. "Coordinating care given by patients themselves, family members and non-clinical community health workers will be critical to sustainable models," he said. "We must build a health IT infrastructure that facilitates team-based care and real-time coordination across specialties, locations and skillsets."

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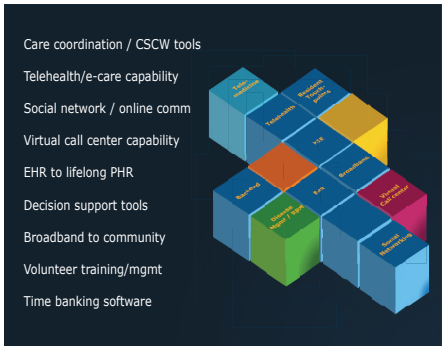
Collectivity incorporates both pay and responsibility. Stakeholders are piloting or exploring models of care that align economic incentives with clinical and quality outcomes. "Paying a collective team collectively for the longitudinal care of a group of people and holding them responsible for that care collectively over a period of time – this is a game changer," Dishman said. While these models are still emerging, health IT can help meet their goals with cross-organizational data-sharing, reporting and quality tools.

Building Blocks of Personal Health Model



For new models of care to succeed, stakeholders must engage the community and include community members and resources, as well as shift where care is delivered, from the mainframe healthcare model to a community-centric model. "A patient's health and wellness experiences cover far more places than the hospital or doctor's office," Dishman pointed out. Community-based care requires financial alignment and health IT infrastructure that supports connectivity and broadband to bedside capability in order to deliver true end-to-end, high-quality, cost-efficient care.

The ideal personal health model comprises multiple health IT building blocks, including care coordination and computer-supported cooperative work tools, telehealth and e-care capability, social networks and online communities, virtual call center capability, EHRs to lifelong personal health records, decision support tools, broadband to community capability, volunteer training and management, and time banking software. "Many capabilities will be needed over time to enhance and sustain ACO-type models," Dishman said. "This is about distributing the right care to the right people in the right place and time."

Health Technologies for the New Paradigm of Care Delivery

The findings of Dishman and his multidisciplinary research teams' ethnographic studies have informed and continue to inform the development of Intel's products and solutions. After studying more than 1,000 patient homes, Dishman and his teams noted that the number one predictor of overall health and wellness of the household was not the economic wealth but the size and quality of a person's social support network. "This is why you'll see Intel's research and products focus so much on supporting the social network," he said.

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Care Innovations, an Intel-GE company, develops products and services that support care models in the areas of disease management, independent living and assistive technologies. One of its products, the Intel Health Guide, enables clinicians to remotely monitor their patients with chronic conditions via an in-home patient device and online interface. These types of products support healthy independent living at home and in assisted living communities. Numerous studies have been conducted on the benefits of remote monitoring. The New England Healthcare Institute's 2008 "Remote Physiological Monitoring: Research Update" reported that remote patient monitoring resulted in a 60 percent reduction in hospital readmissions compared to standard care and a 50 percent reduction in hospital admissions for disease management programs compared to those without remote monitoring. Furthermore, the report estimates that remote monitoring has the potential to prevent between 460,000 and 627,000 heart failure-related hospital admissions a year.

In addition to patient-empowerment solutions, Intel supports healthcare providers with solutions that allow them to operate within the new care models. The Mobile Clinical Assistant (MCA) reference architecture lets clinicians access patient data and document patient conditions at the point of care in real time. Intel's service-oriented architecture (SOA) computing infrastructure enables multiple activities such as secure messaging within small- to large-scale health information exchanges. Such functionalities connect care team members to share patient information, communicate and coordinate care.

Once healthcare organizations redesign their workflow and workforce, their health IT plan should be built to support changing practices, Dishman said. Intel's enterprise technologies for PCs and notebooks and server technologies for healthcare data centers allow IT professionals to create flexible IT infrastructures that can support rapidly changing environments. This is critical as healthcare organizations establish and expand PCMHs, ACOs, other initiatives and programs such as pay for performance, and future models of care. "Defining an IT infrastructure that is ready for these '4Cs' (complexity, coordination, collectivity and community) is crucial for sustainability," he said. "To sustain ACOs, it's critical to place-shift and skill-shift appropriately."

Healthcare innovation: The U.S.'s Sputnik moment

Creating a culture of continuous innovation and iteration will move the country beyond the 19th century "mainframe" model to the personal health model of the 21st century, Dishman said. Within five years, team-based care will be more common than it is today. "Within 10 years, we can move 50 percent of care that is provided in institutional settings today into the home and the community," he said. Dishman called this 2020 vision the Sputnik moment for the U.S. "It's partly about IT, partly about retraining the workforce, partly about re-educating the patients to have a very different relationship with health, prevention, wellness and ownership of their health," he said.

Rather than view the unsustainable healthcare system as a threat, the U.S. needs to generate new opportunities, jobs and competition in the race to build a nimble care model that supports all patients. He likened this opportunity to the race to build green technologies and industries to meet the needs of Global Warming. "So, too," said Dishman, "nations need to start the race to develop 'gray technologies' to address Global Aging, with an innovative spirit and with urgency."

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