

From the Sponsor

Workflow Solutions with Healthcare IT

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Summary

Objective: To discuss trends in information technology (IT) for the future of healthcare.

Method: To report from the viewpoint of a global healthcare IT enterprise.

Results: Healthcare IT consists of far more than electronic storage of information and automation of existing manual processes. It is the linchpin in an effective care process. Systems are available today that coordinate the complex processes across healthcare enterprises – providing alerts and reminders that can help healthcare providers not only operate more effectively but protect patient safety. The next revolution in healthcare information technology – personalized, evidence-based medicine, with information technology at the hub – is on the horizon.

Conclusions: Although the healthcare industry has lagged behind many other industries in the adoption of sophisticated IT systems, perhaps no other industry can benefit as much from its use. Medical informatics subject matter experts must continue to advocate and support IT adoption for both the effects of process improvement and cost containment and for its potential to impact care outcomes.

Keywords

Information technology, healthcare, personalized medicine, evidence-based medicine, workflow

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The Future of Healthcare Is IT

At what a crossroads we in the healthcare industry find ourselves! And, what an extraordinary time to be in healthcare and, in particular, to be in the medical informatics industry. For, others – in the industry and in government – have come to the realization that we have long known – information technology has the power to transform healthcare. Although healthcare has lagged well behind other industries such as financing and manufacturing in terms of leveraging technology, clearly the issues and trends faced globally will help to drive change.

For all of the advances in medical technology – and we at Siemens Medical Solutions are proud to be at the forefront of these innovations – without coordination and without the right information available anywhere, any time, the result is inefficient, costly, and sometimes the absolutely wrong care for the patient. The most important lever to alter this situation, is the use of healthcare information technology: interoperable electronic records, electronic prescribing, clinical decision support, rules engines, and workflow-based systems, which are all a critical part of the solution. The reality of today is, however, that despite our digital age, most physicians put down their laptops and pick up paper charts when they walk into a patient's room.

Megatrends that Shape Healthcare

Global trends have a tremendous impact on healthcare – what is needed and how it is delivered. Our world population is increasing at a staggering rate. According to the median projection of the UN's Population Division, the current world population of 6.6 billion will grow by 1.3 billion in 2025, and 2.5 billion in 2050. And, with the population both aging (by 2050, there will be more people over the age of 60 than under the age of 14) and living longer, the demand and strain on healthcare systems will be unprecedented. The fact that we have conquered some many previously fatal diseases and that we are able to live longer and with a better quality of life with certain health conditions is a testament to innovations in medicine.

The challenge then becomes how to provide high quality care for increasing numbers of people and to do so cost effectively and efficiently. According to PricewaterhouseCoopers (PWC), healthcare spending is expected to triple to \$10 trillion by 2020 – comprising 20% of the U.S.'s GDP and 16% of the EU GDP. Governments, payers, and consumer-driven organizations are also placing tremendous pressure on the system to develop means to control costs and improve the quality of care. National Health Information Infrastructure initiatives are now found in almost

every developed nation. Some cover only certain aspects of healthcare, like the prevention of diseases using IT-based screening programs; some others have a more comprehensive approach – like the telematics infrastructure to be built in Germany. To give one example, in Scotland the NHS (National Health Service) decided to implement a diabetic retinopathy screening for all patients as an efficient process. Before, the country had too few ophthalmologists to perform the annually recommended exams of all diabetics – resulting in long waiting lists. Now, having implemented a screening process developed by Siemens, 300,000 patients can be examined annually at 73 locations. The images then are reported and quality assured in five regional centers. This allows the ophthalmologists to see only those patients that really require treatment. The Scottish Ministry of Health expects not only to do away with the waiting lists, but to reduce costs based on economies of scale.

The Electronic Patient Record – Moving Beyond the Electronic

Of course workflows optimized in this way must not only be implemented in screening programs, but throughout the entire healthcare system - from prevention, diagnosis, and treatment to rehabilitation and care. Only a comprehensive view improves overall efficiency and engages individuals. The Electronic Patient Record (EPR) or Electronic Medical Record is, informatics experts agree, at the core of creating effective, safe, and efficient healthcare systems worldwide. It is an accepted fact that inefficient care is often the result of inadequate information. At its least damaging, this can mean delayed treatment or redundant tests – inefficient

and costly. An EPR that is truly complete, transportable, and accessible across myriad healthcare settings and boundaries will do much to solve that. But, it is also time for the concept to move beyond simple automation or replacement of paper records – an electronic file cabinet should not be our goal. The EPR must be a dynamic device that is at the foundation – but not the end point – for coordination of care through sophisticated, workflow-driven systems that promote quality and effective care. Initial successes have been realized, for example, in Scandinavia. Several countries pursued the idea of the EPR to optimize clinical workflows. In Norway, for instance, more than 80% of patients already have an EPR. In Sweden, the regions have agreed on the content of a summary EPR.

Lack of information and lack of coordinated care has far reaching and serious impacts, resulting in needless mistakes, injuries, loss of life, and staggering economic costs. In 2000, the landmark study ‘To Err Is Human: Building a Safer Health System’ [1] brought the issue of medical errors and the impact on lives into world focus. Despite the worldwide outrage and subsequent advances, there is still more to be done. In fact, seven years later, the World Health Organization (WHO) estimates that one in ten patients is affected by some type of preventable medical mistake and identified nine solutions to improve the situation. Of the nine solutions, four are directly related to information technology.

“To Err is Human” also brought into focus the fact that many errors, such as medication-based mistakes like adverse drug events due to allergies or drug interactions could be prevented if the right information is available at the right time. The report, and others like it, spurred the adoption of healthcare IT systems that manage the medication

process and insure compliance with the five ‘rights’ of medication administration (right patient, medication, dose, route, time). Systems such as those that provide bar code monitoring for medication administration can have instant and positive effects.

The results speak for themselves: By introducing Computerized Physician Order Entry (CPOE) systems – IT-supported prescription and dispensing systems – the number of hospital prescription errors dropped significantly – e.g., by 73% in Södersjukhuset, a hospital near Stockholm. The time from medication prescription to dispensing was likewise substantially shortened, e.g., by 96% at Kingsbrook Jewish Medical Center in New York. This means that the same nurse present during the prescription could be still on duty and thus could verify the patient was taking the appropriate medication.

The Workflow Solution

Patient safety issues are not limited to medication errors. Another example is Infection Control, particularly with antibiotic-resistant organisms, such as MRSA (methicillin-resistant *Staphylococcus aureus*), which present a true hazard to patient safety and cost healthcare organizations thousands of dollars for what are often preventable extended stays and care. Workflow-based IT systems deployed in hospitals can provide alerts by identifying patients who have had previous MRSA-positive testing and who present a risk to others unless isolated. One study conducted by a Siemens customer documented that – without IT – 25% of patients who should have gone into isolation beds were missed.

Implementation of a workflow-based IT system can provide early detection

of patients with such infections and triggers precaution and isolation protocols to prevent additional patient and staff exposure. But, there is more to workflow than the simple automation of existing processes. At its basic deployment, an IT system that utilizes a workflow engine will eliminate costly inefficiencies and embed a protocol of patient safety checks and balances across complex healthcare processes.

But, the vision of IT-enabled healthcare is even more revolutionary. The first phase is simple capture of information electronically; the second is a system that captures and analyzes workflow to improve processes. And: It will also identify and accumulate knowledge about the most effective processes, allowing a healthcare organization to effect changes that impact both cost and quality. Essentially, the system creates a learning engine that enables the identification and development of best practices.

Now, the medical industry is on the verge of the next phase of IT systems that capture and analyze knowledge to enable the most efficient and clinically effective care – patient-centric, personalized healthcare.

The Advent of Personalized Healthcare

This is not a vision of the far-distant future – with advanced IT and medical technology innovation, the elements are all in place to improve care. Inefficient and incorrect care does not help the patient, and it also costs the healthcare system a tremendous amount of money.

If physicians can accurately diagnose and characterize a patient's disease long before it impacts the patient's quality of life, and treat the disease with precision and limited side effects, there will be significant savings to the healthcare system, and immeasurable benefits to the patient. Modern medicine is based in the ability to diagnose and understand diseases and to appropriately treat them.

Imagine that the IT system can be leveraged to actually create knowledge – changing standards of care and actually creating protocols that are unique to the individual patient. All of the information available in a patient's electronic record, captured over a lifetime, together with the images and test results, genetic history, and analysis of medical knowledge data bases, can help to predict – and possibly prevent – a disease before it occurs. And, if a disease does develop, it can be treated more rapidly and with better outcomes. This is not intended to replace the physician as diagnostician and care provider, but it is simply not possible for the human mind to absorb and manage the vast, ever-growing body of clinical knowledge. Complementing and supporting the clinician, IT systems are designed to collect and analyze huge amounts of data and convert it into useful information.

This ability will become even more important if we take a look at the rapidly emerging field of molecular medicine. With in-vitro and in-vivo diagnostic tools, we now have the means to diagnose at a molecular level. And, only an advanced IT system can connect all of the data into useful information. Given that disease is unique in each

patient, then treatment is unique to the individual. It will be information technology that helps providers discern the unique characteristics of the individual and the unique characteristics of a disease as it manifests in an individual. There is nothing more discouraging and more costly than treatment that is ineffective. Therefore, the goal with IT systems must be to enable medicine to achieve patient pre-disposition-tailored medicine, patient-specific, real-time diagnosis and treatment. Such evidence-based medicine, will, in turn, make possible our common goals of cost-effectiveness and quality outcomes.

Through the mining of medical, clinical, and image information, the correlation of this to both workflows and outcomes enabled by analysis and knowledge, and the identification of new and improved, *personalized* means of care, healthcare will be fundamentally changed. As medical informatics experts, it is up to us to transform the use of healthcare information technology into a powerful medical tool. This is the vision we should all share. It is our goal and, together, we will achieve it.

Reference

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