

Exploring the Advantages of Information Accessibility across the Care Continuum

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White Paper

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Healthcare is an incredibly complex industry, and government and healthcare organizations alike recognize the benefits clinical information systems can deliver to patients, medical providers, and the healthcare system itself. The national push for a connected, interoperable system that expedites the exchange of electronic health records between ambulatory and acute-care facilities and consumers will help drive improvements in patient safety, the quality of care delivery, and financial performance across the care continuum. Siemens is already delivering interoperable acute/ambulatory healthcare information systems, and we are working through industry citizenship to help develop standards that will further enable interoperability across care entities with systems of all kinds.

Current Challenges

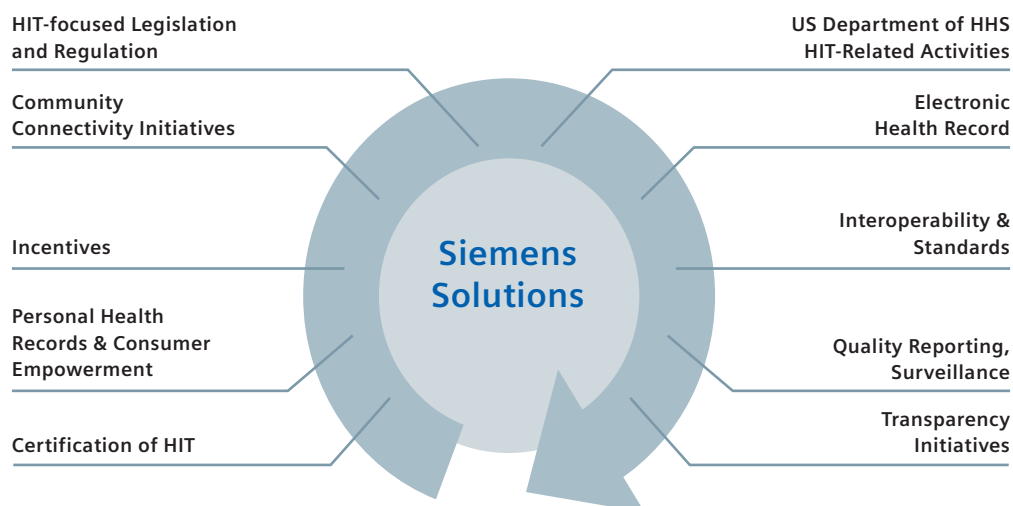
As clinicians continue to face the challenges of using non-interoperable information technology, the management of a person's longitudinal care record remains a critical problem for many healthcare

organizations.¹ This impacts their workflow and productivity and contributes to continued clinician resistance to electronic solutions. Additionally, as patients move between the ambulatory and acute-care environments, physicians lose access to key patient information such as patient history, medications, details of acute-care visits, and discharge summary notes.

The lack of interoperability undermines the usefulness of electronic medical records (EMRs), forcing clinicians to continue to use a variety of paper and electronic systems to enter and retrieve patient information. When combined with the complex nature of the healthcare industry, this fragmented routine of procuring information from both electronic and paper systems provides many opportunities for mistakes. In a study conducted by the Commission on Systemic Interoperability titled, "Ending the Document Game,"² 80 percent of medical errors were caused by miscommunication including:

- missed communication between physicians;
- misinformation in medical records;

Advancing Healthcare through Leadership and Collaboration



- mishandling of patient requests and messages;
- inaccessible records;
- mislabeled specimens;
- misfiled or missing charts;
- inadequate reminder systems.

Further, the often-cited Institute of Medicine report released in 2000³ provided estimates on the number of deaths caused each year from preventable medical errors, with the lack of immediate access to patient healthcare information as the source for one-fifth of these errors⁴. It has also been reported in the *Journal of the American Medical Association* that one of every seven primary care visits is impacted by missing medical information⁵.

Enabling Information Accessibility across the Care Continuum

Siemens interoperable ambulatory and acute solutions give hospitals and healthcare enterprises access to information anytime, anywhere, to anyone authorized across the healthcare continuum. Solutions that facilitate interoperability and health information exchange across organizations are beginning to address the needs of

disparate systems so that they “talk” to one another. The goal being to allow physicians, no matter where they practice, to have full access to all the information they need, when they need it.

Healthcare continues to shift from acute-care environments to the ambulatory setting, increasing the need to share patient information across the care continuum. The typical “silos” of information that exist across acute and ambulatory environments have led to gaps in pertinent patient information that exists within each respective silo. Interoperability can make a significant difference to patients simply by ensuring that all components of the EMR, and data systems supporting the EMR, connect. This gives healthcare providers access to information that helps them make informed clinical decisions at the point of care.

It also means that connectivity and shared information can help decrease:

- the amount of time patients spend filling out forms and repeating the same story to different doctors;
- the wait for getting a copy of a patient’s medical record;
- the duplication of text orders and the potential for prescription errors that can lead to potential drug interactions.

Interoperability in Action: a mock case history

After complaining of chest discomfort, Jane Grafton, an 85-year-old retired teacher, is brought to the Princeton Hospital emergency room by her son who was visiting from out of town. Jane’s first stop in the ER is with triage nurse Sandy Masse, whose top priority is to get Jane’s vital signs, then document the history of Jane’s complaint, her past medical problems, and any current medications and allergies. But Jane’s memory isn’t what it used to be, and when asked by Sandy about her medications during the triage process, she had trouble recalling what she was taking for her heart condition. Jane also said that she had a drug allergy to penicillin – she thinks.

What Jane was confident of was her doctor’s name – Judd Borden, MD. This was great news to Sandy because she knows that Dr. Borden is affiliated with Princeton Hospital and that she has the appropriate security clearance to view his office medical records right from the hospital’s information system. The reason Sandy is able to do this is because Dr. Borden uses the NextGen® EMR, which is interoperable with Princeton Hospital’s information system from Siemens.

Taking advantage of this interoperability, Sandy was able to logon to the Siemens HIS, access Jane’s record, and open Dr. Borden’s NextGen EMR system. And, because the systems are interoperable with Global Session Manager (GSM), Dr. Borden’s NextGen EMR automatically navigates to Jane’s medical record where Sandy is immediately able to review Jane’s current medications, problems, and allergies.

Sandy learns that Jane is indeed allergic to penicillin. Additionally, Jane was recently diagnosed with chronic Atrial Fibrillation for which Dr. Borden has prescribed Digoxin and Coumadin®. Sandy was also able to determine that Jane had an EKG done last month, which was normal, and that she has a hiatal hernia for which Dr. Borden has prescribed Nexium®.

Victoria Spidell, MD, the emergency room physician, orders an EKG for Jane, which she is immediately able to compare with the EKG that she was able to acquire from Dr. Borden’s NextGen EMR. Dr. Spidell also orders lab work, which includes a Digoxin level and a CBC. While the Digoxin level comes back normal, Jane’s WBCs are elevated. Dr. Spidell notes that Jane’s lungs are clear and orders a urine test, which comes back positive for a urinary tract infection.

Because interoperability with Dr. Borden’s NextGen EMR confirmed Jane’s allergy to penicillin, Dr. Spidell prescribes Bactrim as an oral antibiotic treatment.

Key Benefits Realized from Siemens/NextGen Interoperability:

Without interoperability, the staff at Princeton Hospital would have wasted valuable care time trying to establish a clear picture of Jane’s past medical records. They would also likely perform unnecessary tests and be at risk of potential adverse medical events.

In this example, Siemens/NextGen Interoperability has led to:

- increased patient safety;
- increased care quality and efficiency;
- elimination of unnecessary procedures and tests;
- time savings for both the ER and the PCP.

Aging Population %

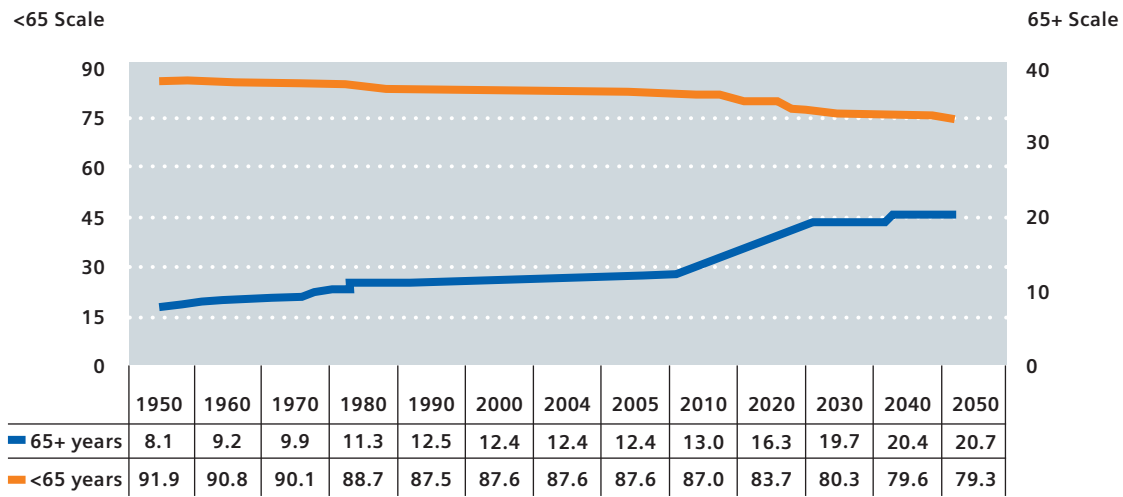


Figure 1. According to the 2006 Center For Disease Control report on health in the United States, all baby boomers will be age 65 and over by 2009. As a result, the population over 65 years will increase from 12.4% to near 20% of the total population between 2005 and 2030. In 1950, the percentage was at 8.1%. In 2005, 87.6% of the population was under the age of 65. This is down from 91.9% in 1950 and, as the population and baby boomers age, this percentage is forecasted to drop to under 80% by 2040.⁶

At each new healthcare encounter, patients retell their medical histories. This is redundant and often introduces error and imprecision, ensuring that no two copies of a patient's medical record are exactly alike. Add to this our growing elderly population (see Figure 1), which now has their children involved in their care, and the arguments for access to information across the healthcare continuum continue to grow.

As such, healthcare and elder care are predicted to become major growth markets in the next decades. This will also come as the result of revolutionary breakthroughs in biotechnologies, information technologies, and nanotechnologies. Overall health awareness is increasing, while simultaneously lifestyle diseases, such as obesity and chronic diseases are on the rise (see Figure 2). With health costs threatening to spiral out of control, it is becoming more important to capture the efficiency potential that healthcare systems can provide.

In particular, the growing demand for healthcare and elder care is a direct consequence of demographic change. Interoperability helps improve the continuity of care when treatment is ongoing and conducted among multiple healthcare providers, a common occurrence with these demographic shifts and an especially important consideration for patients with chronic

conditions, such as obesity.⁵ Complete information for at-risk patients, such as the elderly, benefits quality care and disease management through improved data accuracy. This is because patients with multiple physicians can have their information shared across organizations, eliminating the need to have the patient relay the same information to each provider. This need for access to information is forcing organizations to find approaches that bridge the gaps between acute and ambulatory systems.

The obvious value of interoperability for patients, consumers, and providers is increased communication. Interoperability makes health information more available, following patients as they progress through the various healthcare system settings and care providers. For example, as a patient moves from the acute-care environment back to the ambulatory-care environment, oftentimes the same information is not available to physicians in the ambulatory setting.

Drivers of Interoperability

For many hospitals that have gone to a hospitalist model for providing care coverage for their patients, interoperability provides access to the patient history that would not have otherwise been immediately available. The lack of access to the patient history can impact care

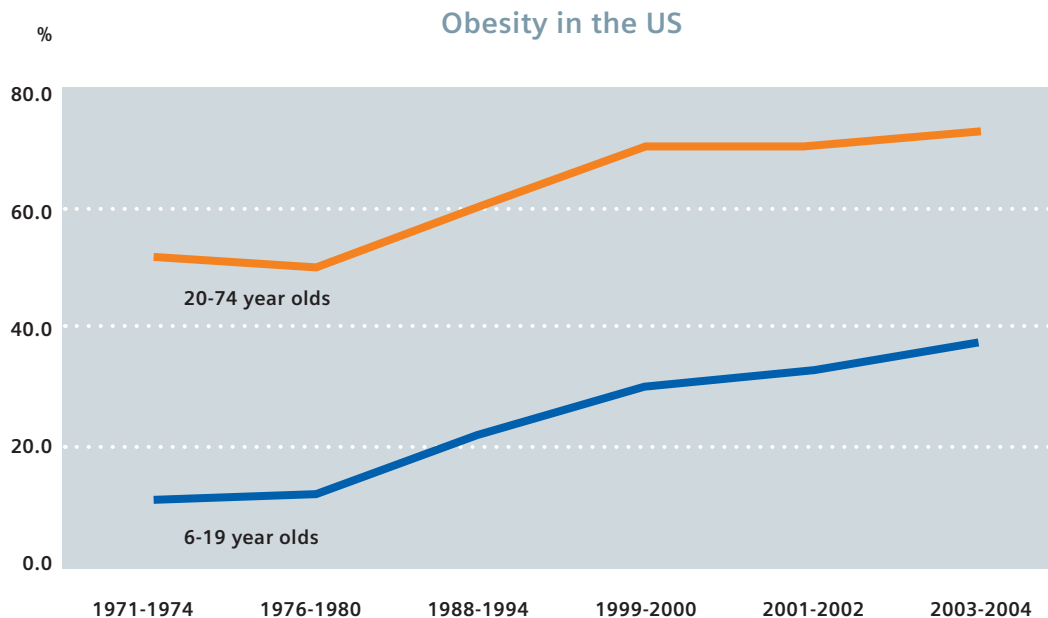


Figure 2. The growing national girth is evident in the rate of obesity in the United States. According to the 2006 Center For Disease Control report on health in the United States, the overweight and obesity rates of people aged 6 to 19 years has risen from 10.1% in 1971 to over 36% in 2003. The situation is far worse in people aged 20 to 74 years where the rate has gone from approximately 48% to 67% in the same period.⁶

quality and the hospitalist's decision-making ability. Historically, organizations have been paid for patient care based on utilization. In the utilization model, outcomes of patient care have a limited role. While organizations are concerned with providing quality care to patients, the utilization model does not effectively support these goals.

We have begun to see the shift to pay-for-performance plans (see Figure 3). Payers are beginning to refuse to pay for care and treatments that result from patient sequelae, such as infections that occur while they are receiving care in the healthcare network. Semantic interoperability will enable physicians to better document efforts to control and check for such infections.

Interoperability in Action: a mock case history

After complaining of abdominal pain, diarrhea that was occasionally bloody, and weight loss, Mack Burns was hospitalized and underwent a colonoscopy procedure. On discharge from Shelby Hospital, Mack was instructed to follow-up with his primary care provider, Abby Dallyn, MD, the following week.

At Mack's appointment, Dr. Dallyn finds that neither a paper nor faxed report of the patient's hospitalization has been sent to the office yet. Fortunately, Dr. Dallyn's office has installed the NextGen EMR, which has an interoperable link to Shelby Hospital's information system from Siemens.

Dr. Dallyn logs on to her NextGen EMR and quickly locates the medical record for Mack. Because Dr. Dallyn is affiliated with Shelby Hospital – and has the requisite security clearance – she can launch directly into its Siemens HIS application. And, because the systems are interoperable with Global Session Manager (GSM), the Siemens

HIS application automatically navigates to Mack's medical record where Dr. Dallyn can view the colonoscopy results from Mack's hospitalization.

Since Dr. Dallyn has quick access, she can rapidly make decisions on a medication regimen and treatment plan. Mack is diagnosed with Crohn's disease and Dr. Dallyn decides to start him on Loperamide and Budesonide.

Key Benefits Realized from Siemens/NextGen Interoperability:

Without interoperability, Dr. Dallyn would have had to call Shelby Hospital, find someone to help her, and wait for that person to locate the information and fax it to her.

In this example, Siemens/NextGen Interoperability led to:

- patient affinity for both hospital and PCP;
- affiliated physician affinity for the hospital;
- increased care quality and efficiency;
- time savings for both hospital and PCP.

Evolution of P4P

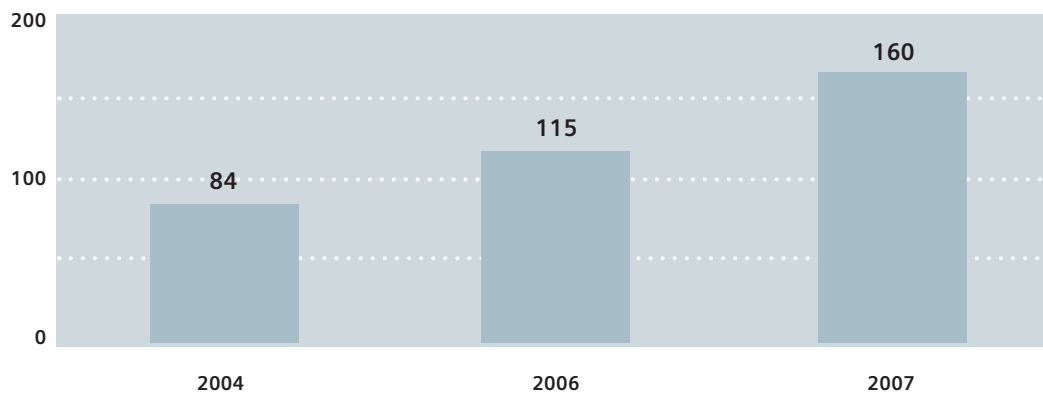


Figure 3. According to a 2004 study conducted by San Francisco-based Med Vantage, there were approximately 84 Pay-for-Performance programs in operation in 2004. That number has steadily grown to over 160 programs in existence today.⁷

Interoperability will position organizations in leadership roles as healthcare models for compensated care delivery change to incorporate quality metrics.

The Financial Impact of Information Access

While there are no actual outcome studies of the savings related to interoperability, various organizations have released reports estimating the value of information exchange. The Center for Information Technology

Leadership, for example, estimated in a report titled “The Value of Healthcare Information Exchange and Interoperability” that the nationwide implementation of technology that provides for interoperability and facilitates the exchange of healthcare information between providers could result in a net savings of \$77.8 billion annually.⁸ In addition, a cost/benefit study published in the *Journal of the American College of Surgeons* in 2007 looked at the financial impact of EMRs on 28 providers in 5 offices at the University of

Interoperability in Action: a mock case history

After completing early morning rounds at the St. Elizabeth’s Hospital, Neil Borton, MD, a family practice physician, is heading to his office to begin a full day of appointments.

Shortly after Dr. Borton leaves the hospital, Aimee Goddard, a floor nurse at St. Elizabeth’s Hospital, checks in on one of Dr. Borton’s patients, Regina Logan. Aimee notes that Regina has taken a slight turn for the worse. Regina’s color wasn’t good, she had gone through a couple liters of oxygen, and she was experiencing shortness of breath. Aimee immediately relays this information to Dr. Borton’s office staff requesting he call with orders.

Upon arrival at his office, Dr. Borton receives the message regarding Regina and reviews her chart in his NextGen EMR. As an affiliated physician of St. Elizabeth’s Hospital, Dr. Borton has the requisite security clearances to access the hospital’s information system from Siemens. With Regina’s chart open, he can launch directly into the hospital’s system and review Regina’s latest lab results and the results of the chest x-ray he ordered during his morning rounds.

Nurse Goddard is not available when Dr. Borton phones back, so he speaks with another floor nurse, Judy Griffin, who is less familiar with Regina’s case. However, this is irrelevant as Dr. Borton has already accessed and reviewed all the available information on Regina’s condition and can deliver his follow-up orders directly to Judy.

Key Benefits Realized from Interoperability:

Without interoperability, Dr. Borton would not have immediate access to the pertinent data required for decision-making. When he phones back to the hospital only to find that the nurse is not immediately available, there would be delays in communicating Regina’s exact condition, her latest lab results, and the results of her chest x-rays. This could result in a delay of Regina’s care, which could prove to have an adverse affect on her recovery and, ultimately, on her prognosis.

In this example, Siemens/NextGen Interoperability has led to:

- increased patient safety;
- quicker delivery of quality care;
- time savings for both floor nurses and the PCP.

Rochester Medical Center. It found the systems produced an annual savings of nearly \$10,000 per provider after costs were recaptured, which took 16 months. More than half the savings came from reducing the number of chart pulls.⁹ The work effort and costs required for acute-care environments to copy and send or fax records to a physician's office, or from the physician's office to acute-care facilities, should translate into savings as well.⁹



Conclusion

As we have seen, enabling information access across the care continuum can have a profound impact on not only quality of care but also a provider's bottom line. As a leader in providing IT solutions to healthcare providers, Siemens will continue to support the national campaign for a connected, interoperable system that expedites the exchange of electronic health records.

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Endnotes

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