

# THE COMPUTERWORLD HONORS PROGRAM

## CASE STUDY



LOCATION:  
*Denver, Colorado,  
United States*

YEAR:  
*2006*

STATUS:  
*Laureate*

CATEGORY:  
*Medicine*

NOMINATING COMPANY:  
*Siemens Information +  
Communications Networks Inc*

### ORGANIZATION:

Denver Health & Hospital Authority

### PROJECT NAME:

IT as a Change Agent in the Transformation of Healthcare

### Summary

For the past nine years, Denver Health & Hospital Authority has partnered with Siemens Medical Solutions to further its mission as a “safety net” city-wide hospital system. The partnership has proved mutually beneficial, as Denver Health has engaged Siemens support for numerous clinical and financial information technology (IT) projects, which have resulted in insights that Siemens can apply at other healthcare institutions. Through training and support services and a hosted delivery model, Siemens has allowed Denver Health IT staff to focus on core business activities surrounding patient care, and to expand their capabilities and effectiveness. National healthcare organizations such as the Agency for Healthcare Research and Quality (AHRQ) are now looking to Denver Health as an example of successful healthcare transformation, fully supported by integrated IT systems.

### Introductory Overview

An integrated, efficient and comprehensive community healthcare system, Denver Health is Colorado’s primary safety net institution. In the last 10 years, they have provided more than \$1.4 billion in care for the uninsured. Of that total, \$285 million was provided in 2004, constituting 42 percent of all unsponsored care provided in metropolitan Denver and nearly 30 percent in the state.

Since 1996, Denver Health’s primary IT partner has been Siemens Medical Solutions. At that time, the two organizations signed a 10-year long-term partnership agreement that has since been extended to 2010. Denver Health’s vision was for fully integrated healthcare information systems that would “talk” to each other electronically. They have achieved this vision using IT products such as Siemens INVISION®, Enterprise Access Directory, Lifetime Clinical Record® clinical data repository, Pharmacy, Radiology, Computerized Physician Order Entry (CPOE), Medical Records Imaging, Electronic Clinical Dashboard, rules and interface engines, and SIGNATURE® Patient Management/Patient Accounting. Denver Health is a Remote Computing Option (RCO) client of Siemens Information Systems Center (ISC) data center for many of its core applications as well as services, including the help desk. Other Siemens solutions, such as an identity management solution and imaging modalities are installed.



# THE COMPUTERWORLD HONORS PROGRAM

## CASE STUDY

**ORGANIZATION:**

*Denver Health &  
Hospital Authority*

**PROJECT NAME:**

*IT as a Change Agent in the  
Transformation of Healthcare*

**LOCATION:**

*Denver, Colorado, United States*

**YEAR:**

*2006*

**STATUS:**

*Laureate*

**CATEGORY:**

*Medicine*

**NOMINATING COMPANY:**

*Siemens Information +  
Communications Networks Inc*

Denver Health was not interested in a “best-of-breed” approach to IT, due to the cost of integration and the fragmented view of the patient record that “best-of-breed” forces upon unsuspecting physicians (with multiple user IDs and passwords, and different data sources and user interfaces). These separate views for every application would not efficiently provide their physicians with the information they need, and would increase the learning curve and barriers to clinical system adoption. Most importantly, Denver Health was interested in building a strategic partnership with a single IT provider who understood their need for “one look and feel” across their systems, and who would keep Denver Health’s best interests in mind.

### Benefits

Denver Health brought Siemens into the IT planning process right from the beginning, so that objectives could be shared and achieved. This partnership has allowed Denver Health to work directly with Siemens development to build new functions into systems that are later incorporated into the model products. This process reduces the ongoing support cost while providing additional product features for other Siemens customers.

Denver Health is a National Showcase Site for Siemens, and one of only two showcase sites that are public hospitals. They have hosted many site visits over the years, providing potential and current Siemens customers with valuable information on the implementation, support and maintenance of Siemens products, while gaining insight into other ways to leverage applications. They have also worked with Siemens during the years after implementing core systems, to ensure that they are fully leveraged and that the workflows associated with the application’s use are efficient and effective.

Siemens also helps Denver Health with its business processes: there are more than 400 IT applications in-house, and Siemens shows Denver Health how to use their products to meet business needs, finding the “hidden” capabilities that have helped save millions of dollars in efficiencies. For example, integrating advanced registration rules via the Siemens Rules Engine with Siemens INVISION registration product streamlines registrations and helps to ensure that good data is flowing to the back-end accounting systems, reducing cost and increasing staff effectiveness.

As Denver Health needs new IT products and applications, they look to Siemens first, to determine if they can provide the function needed with the full integration that is required. For example, when Denver Health purchased a Human Resources, Financial and Purchasing system from Lawson Software, Siemens provided implementation service for the Lawson product, ISC. This saved Denver Health from having to hire 3-4 additional IT resources to maintain and support the system. Siemens also integrated the Lawson application into the Siemens data warehouse for enhanced reporting. Leveraging Siemens’ industry connections in this way has been very helpful, by reducing cost while working with a vendor who understands a hospital’s business.

### Professional Services Support & Training

In addition to purchasing Siemens products, Denver Health has a long-term Professional Services consulting agreement with the company to maintain, upgrade and install their information technology. They rely on Siemens for 16,000-22,000 professional service hours annually, allowing them to temporarily augment the existing staff without excessive operating costs. This is a benefit of the relationship, as Denver Health can “buy” skill sets they don’t want to train for



# THE COMPUTERWORLD HONORS PROGRAM

## CASE STUDY

**ORGANIZATION:**  
*Denver Health &  
Hospital Authority*

**PROJECT NAME:**  
*IT as a Change Agent in the  
Transformation of Healthcare*

**LOCATION:**  
*Denver, Colorado, United States*

**YEAR:**  
*2006*

**STATUS:**  
*Laureate*

**CATEGORY:**  
*Medicine*

**NOMINATING COMPANY:**  
*Siemens Information +  
Communications Networks Inc*

internally, provide extensive support for technology “go-lives” and one-off projects, fill critical positions on short notice with product-knowledgeable professionals, and test for new IT positions (to provide justification for funding a new hire).

This is an excellent use of knowledgeable contract staff, because healthcare IT requires so many special skill sets that it can be difficult to recruit full-time personnel, especially in the application area. Siemens helps Denver Health fill in the gaps with a rare blend of analytical skills and strong clinical background.

### The Importance of Technology

#### A Hosted Model

Through the hosted delivery model, Denver Health has been able to:

- Achieve a level of complexity and system sophistication that they couldn't economically achieve on their own. Denver Health has high availability, capacity, performance and security, based on Siemens' significant ISC infrastructure investments and 30+ years of experience.
- Achieve 24 x 7 access to patient and financial data critical to decision-making.
- Receive the latest software releases and quickly take advantage of leading-edge capabilities.
- Predictably plan the IT budget.

#### Milestone Clinical Projects

In 1996, Denver Health implemented a clinical document imaging system (which was upgraded in 1999). Currently, this system has a complete electronic record including more than 3 million patients and more than 40 million documents, and serves as Denver Health's legal medical record. A new Siemens application is now in the pilot stage and will be live enterprise-wide in the fourth quarter of 2006, replacing the current Siemens medical records system and providing a standard Web front end and additional end-user functionality to their clinicians. The new system also provides more options for integration with other third-party systems, pulling additional information into the centralized record and eliminating small departmental “shadow” files.

In 1999, Denver Health introduced Electronic Medical Records, including the clinical data repository (which holds each patient's Lifetime Clinical Record) and a rules-based engine that provides clinical alerts and reminders. Physicians can graph lab results, view radiology reports, trend blood pressure, and other key indicators. With the ability to present real data to their patients in the exam room during clinical visits, Denver Health physicians are making strides in enforcing the treatment process, discussing the gaps and planning alternative treatment approaches.

In 2004, INVISION Computerized Physician Order Entry (CPOE) went live in the ICU and step-down units, and subsequently went live in most areas of the hospital. CPOE provides full integration with ancillary systems, and advanced rules and order sets to help streamline the ordering function. Coupled with a physician portal (Siemens Dashboard) and a smartcard-based single sign-on solution, the system provides access to everything a physician needs from one centralized screen. By pushing results and alerts directly to the provider portal, they will reduce the amount of time required to find patient results, and escalate results that fall outside established parameters. Abnormal results are now being pushed to cell phones and/or PDAs to



# THE COMPUTERWORLD HONORS PROGRAM

## CASE STUDY

**ORGANIZATION:**  
*Denver Health &  
Hospital Authority*

**PROJECT NAME:**  
*IT as a Change Agent in the  
Transformation of Healthcare*

**LOCATION:**  
*Denver, Colorado, United States*

**YEAR:**  
*2006*

**STATUS:**  
*Laureate*

**CATEGORY:**  
*Medicine*

**NOMINATING COMPANY:**  
*Siemens Information +  
Communications Networks Inc*

provide an “anywhere” escalation response component to the delivery of care.

### Milestone Financial Projects

In 2005, Denver Health engaged Siemens services to review the Patient Accounting workflow and application implementation. A project team from Siemens and Denver Health Patient Accounting and IT worked together to maximize reimbursement through enhancements to workflows and changes to the applications. Furthermore, a division of roles and responsibilities was completed to document and train roles in affected departments to ensure retention of the changes being made.

This project was broken into three-month phases in order to realize benefits as early in the project as possible. Phase 1 of the Patient Financial Services (PFS) project produced the following ROI results:

- Reduced accounts receivable (A/R) days from 64 to 59, valued at \$1 million per day reduction annually
- Reduced bad debt file by 198,811 accounts, valued at \$71 million in reduced bad debt reserves
- Automated commercial logics, leaving vacant three full-time positions valued at \$100,000
- Automated financial class pay logic, valued at \$8 million
- Automated inpatient write-off of late charges, for 15% full-time position savings
- Automated process for submitting bad debt to collection agency, for 25% full-time position savings
- Corrected application setup issues, reducing the time needed to clear error logs and correct transactions
- Reduced error reports from 30 pages to 1 page per day
- Provided cross-training and education to 30+ employees

### eHealth

Since late 1999, Denver Health has increasingly turned its attention to eHealth solutions (defined as portals, transactions and documents) to serve as the “glue” that holds the systems together and makes data consistently available as a real-time tool for clinical diagnosis, treatment, education and follow-up.

Implementation of eHealth technology at Denver Health has addressed the most pressing needs, and the investment has produced demonstrable return on investment, including:

- Increased quality of clinical care due to ease of access to medical documentation
- Increased levels of patient and physician satisfaction
- Decreased turnaround time for completion of medical records
- Decrease in number of chart deficiencies and delinquencies
- More successful and streamlined regulatory reviews
- Greater ability to attract qualified staff (not only clinical, but such hard-to-find personnel as coders)



# THE COMPUTERWORLD HONORS PROGRAM

## CASE STUDY

**ORGANIZATION:**  
*Denver Health &  
Hospital Authority*

**PROJECT NAME:**  
*IT as a Change Agent in the  
Transformation of Healthcare*

**LOCATION:**  
*Denver, Colorado, United States*

**YEAR:**  
*2006*

**STATUS:**  
*Laureate*

**CATEGORY:**  
*Medicine*

**NOMINATING COMPANY:**  
*Siemens Information +  
Communications Networks Inc*

- New opportunities to redeploy, if not reduce, FTEs
- Consistent access to patient eligibility information and options prior to completion of a registration
- Enhanced ability to obtain appropriate reimbursement in a timely manner.

### Behavioral Health

The Behavioral Health department identified patient intake, case management, medical record management and patient accounting as the key processes that needed to be addressed. The objectives of the project were to respond to payor requirements, streamline operational workflow, and optimize and integrate information technology systems by eliminating redundant systems, integrating complementary systems, and taking full advantage of existing applications.

Siemens assisted Denver Health in determining redesign efforts, optimizing and integrating technology, establishing metrics, and monitoring progress. As a result, they were able to:

- Increase the availability of appointments from 69 percent to 88 percent
- Reduce the number of charge delays from 273 to 12 per month
- Reduce the number of registrations with missing information from more than 100 to 5 per month
- Reduce clerical employee turnover from 100 percent to 12 percent in one year
- Reduce the number of clerical registration staff from 9 FTEs to 5 FTEs.

### Three-Way Collaboration

Beginning in 2002, Denver Health and Siemens collaborated with the Centers for Disease Control (CDC) in a major study on the impact of computerized clinical decision support systems and guided Web-based documentation on tuberculosis (TB) screening and prevention. Denver Health served as the first test site for validating CDC clinical guidelines because it serves many populations at high risk for TB, and it was already equipped with several key technologies from Siemens.

Denver Health physicians increased ordering of the rule-associated laboratory test when an alert was displayed (39 percent at baseline vs. 51 percent during post-intervention). They concluded that providers will adhere to alerts and will use this information to improve patient care.

### Originality

In 2004, Denver Health received a grant from the Agency for Healthcare Research and Quality to provide leadership in the transformation of the U.S. healthcare system. The project was dubbed "Getting It Right," and incorporated IT among the tools in that transformation. A board of cross-industry experts, including Siemens personnel, was put together by our CEO and Medical Director.

After the initial proposal phase was completed in October 2004, AHRQ awarded Denver Health additional funding to implement the plan, which calls for radically redesigning healthcare processes, eliminating system waste, and medical errors, and questioning traditional medical practices and workflows. This second phase is now underway and is showing progress with



# THE COMPUTERWORLD HONORS PROGRAM

## CASE STUDY

**ORGANIZATION:**  
*Denver Health &  
Hospital Authority*

**PROJECT NAME:**  
*IT as a Change Agent in the  
Transformation of Healthcare*

**LOCATION:**  
*Denver, Colorado, United States*

**YEAR:**  
*2006*

**STATUS:**  
*Laureate*

**CATEGORY:**  
*Medicine*

**NOMINATING COMPANY:**  
*Siemens Information +  
Communications Networks Inc*

30-40 “lean” projects in the works, in which operating room flow, supply cost and delivery, and once-traditional workflows are all being streamlined, enhancing patient flow and improving patient care. While the overall project will likely take 3-5 years, immediate changes are beginning to take shape as the organizational culture at Denver Health is shifting toward this new way of thinking.

### Success

Strong vendor partnerships can achieve real business impact if the relationship provides value for both parties. Denver Health’s partnership with Siemens continues to evolve as IT is increasingly becoming a change agent within administrative and clinical departments across the enterprise. This partnership has been instrumental in making Denver Health a leader in technology innovation, and a model for hospitals across the country.

While no vendor is a perfect partner, Denver Health believes that the key to any partnership is the appropriate management of the relationship. Their executive staff, including the CEO, Department Directors, and IT Senior Management, works hand-in-hand with their counterparts at Siemens to ensure communication and reduce misunderstandings. They meet with Siemens senior leadership at least twice a year and make course corrections as necessary. It is in both their interests to ensure the partnership remains strong for years to come.

### Difficulty

Many times, the biggest challenge in implementing complex IT solutions is gaining buy-in and acceptance from clinical staff, which may or may not be familiar and/or comfortable with computer technology. If the benefit of using the technology is not readily apparent to clinicians, there could be strong resistance from throughout the organization. By maintaining a strong partnership and constant communication with Siemens, Denver Health has been able to provide the necessary ongoing training to the end users of the IT systems that have been implemented.