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—Doug Colburn, Chief Information Officer

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A case study from Siemens: The Nebraska Heart Institute Heart Hospital

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At Siemens, we see a way to deliver outcomes that result from truly efficient workflow. Outcomes that improve your bottom line. Outcomes that lead to a level of care that feels exceptional to the patient and the care provider. It's what we're doing, right now, across the entire healthcare continuum. This case study is just one example of the value of integrating medical technology, IT, management consulting, and services—in a way that only Siemens can.

// We believe that by keeping patients at the center of the process everything else will fall into place. //



—Sheryl Dodds, R.N., M.S.,
Chief Executive Officer

Proven Outcomes in Information Technology

Time is Muscle

The Nebraska Heart Institute (NHI), located in Lincoln, Nebraska, was created in 1987 to develop both a comprehensive range of cardiac services as well as the ability to provide care to extended communities across the region, including Iowa, Kansas, and Nebraska. The Institute has fostered an expansive referral network, one that contributes to more than 60 percent of patient visits to Lincoln facilities from outside the area.

NHI's growth caused bed capacity issues for area providers, which forced physicians to struggle to provide service in a timely manner. Believing "time is muscle," NHI physicians quickly recognized that referring cardiac patients into a tertiary facility wasn't a viable alternative solution due to bed capacity issues.

Out of this desire to deliver quality care when patients need it was born the Nebraska Heart Institute Heart Hospital (NHH). Construction design began on the 90,000 square foot Hospital site, which sits on a 20-acre campus, in January 2002 and was completed in May 2003. Today, the Heart Hospital includes over 30 physicians and more than 200 additional staff members, including nurses, technicians, and support. Inpatient and outpatient services are offered, including invasive and noninvasive diagnostics, interventional treatments, electrophysiology, and surgical procedures. NHI, with its seven clinic office locations, remains the



admitting practice to the Heart Hospital. NHI also visits 40 community-based hospital outpatient facilities.

The Heart Hospital's mission is a true reflection of the original objective, "to ensure patient access to quality healthcare, superior outcomes, and a place where patients do come first." As of December 2003, the Heart Hospital has performed over 304 open-heart procedures, 175 vascular surgical procedures, and 358 diagnostic catheterizations as well as discharged over 1,300 patients.

Choosing a Partner: Med Meets IT

The Heart Hospital's vision is to "establish itself as a public leader by way of innovation, originality, and the imagination to influence and shape the future of healthcare." Initially, senior



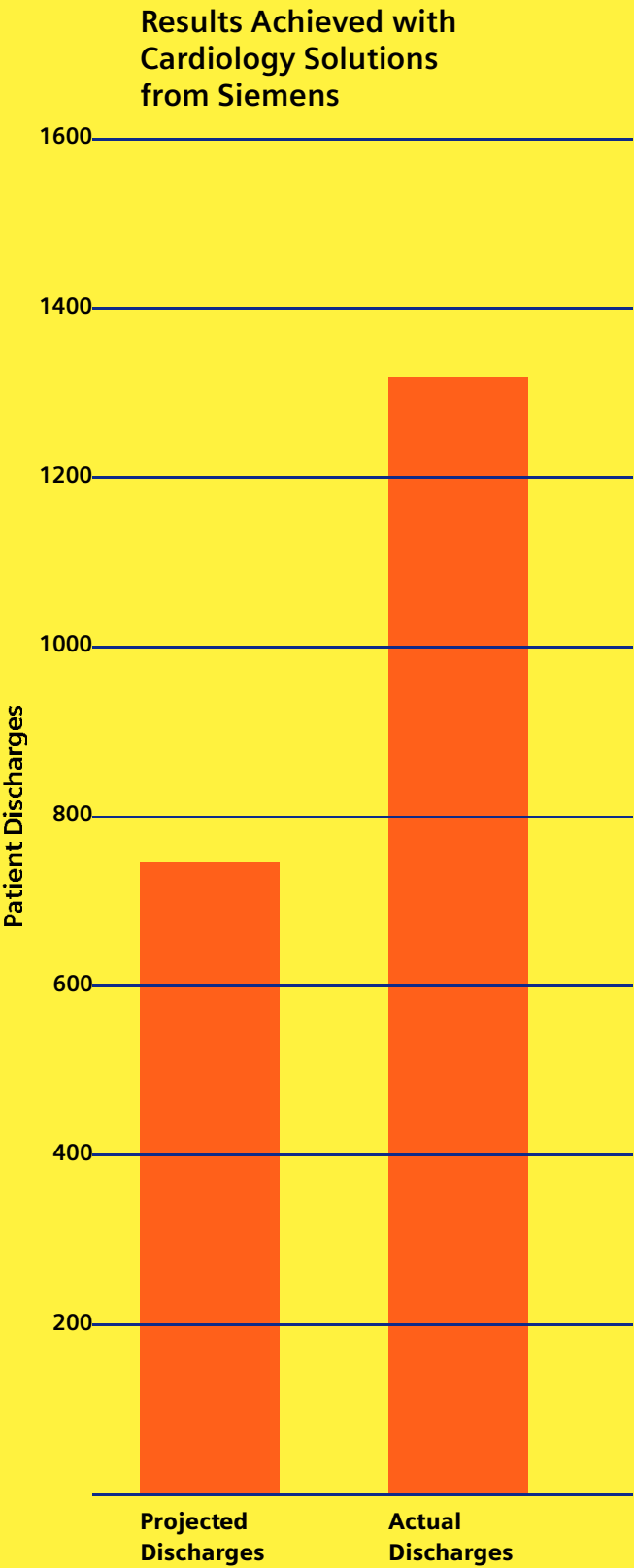
executives believed to do so they needed to create an IT infrastructure that supported the Electronic Health Record (EHR). The vendor selection process began in February 2002 with GE being the lead choice, and Philips and Siemens following respectively.

During the proposal process, Siemens clearly articulated its unique ability to combine medical equipment and IT. Siemens dedication to developing true partnerships with its customers to support them in delivering high quality care with the assistance of state of the art technology was clear. Siemens innovative view of the future of healthcare resonated for the Heart Hospital's management team. "Determined to keep people at the center of the process, our vision expanded beyond the EHR to the all-digital hospital," said Sheryl Dodds, R.N., M.S., Chief Executive Officer.

In the end, Siemens beat out both GE and Philips and was selected as the Heart Hospital's vendor of choice in May 2002. "Together with Siemens, we are committed to the fact that our strategic, IT, and clinical plans are completely aligned and understood by all employees, right from the hiring process," said Doug Colburn, Chief Information Officer. "Because Siemens understands our need to focus on team-based service, we knew they could support our unique care delivery model today and in the future."

Changing the Face of Healthcare

NHH's focus is progressive in that processes and infrastructure are totally designed to enhance the human element of care. For example, patients are greeted upon arrival by their personal case manager, who remains involved in their treatment throughout their visit until discharge. All inpatient and outpatient beds are pre-assigned and leveled to the needs of the individual and their family — all appropriate services from registration to assessment to bedside education are administered there. "Patients come first at the Heart Hospital," said Sandra Vogeler, R.N., Chief Operations Officer. "Our clinical outcomes are key. We believe that by keeping service delivery as consistent as possible, we can minimize the number of faces



At the end of December 2003, 766 discharges were projected. Actual discharges were 1,321 with the same number of staff that was originally projected, due to the combination of integrated software, hardware, and networking technologies from Siemens and NHH's processes, procedures, and clinical staff.

and handoffs a family must experience, thereby improving patient satisfaction and quality of care."

To help the Heart Hospital achieve its vision of being a leading integrated digital hospital, Siemens ensured that the EHR would be made available from all computers, which equates to nearly every room in the facility. Accessible from each of these workstations would not only be patient data, but all the integrated clinical images, physiologic waveforms, and procedural data collected at the point of care. Single sign on to all medical and business applications is available via Smartcard technology.

The close partnership between Siemens and NHH extended through a thorough up-front analysis of the Heart Hospital's workflow as well

into INVISION. This integration is supported by Siemens joint venture with Draeger Medical.

"In the old days, nurses would visit four to five patients in a row then need to chart for them later based on memory. With ChartAssist, vital signs charting is done automatically at the bedside, requiring much less time for nurses," said Janet Huenink, Nursing Services Team Leader. "Because nurses no longer need to search for and gather information from multiple sources, they can spend more time with patients and their families." Using the powerful interdisciplinary clinical tools of INVISION and ChartAssist, the nursing team is able to gain efficiencies not found in the paper-based workflow environment.

Recently, a critical clinical event with a

Proven Outcomes

as system design and implementation. In addition to three Siemens Axiom Artis catheterization labs with Sensis hemodynamic monitoring systems, the Heart Hospital rolled out the INVISION® product suite as well as Soarian® Clinical Access and Soarian Cardiology. "Our networking infrastructure was built from the ground up to provide highly reliable access to voice and data services. Networking design was centered on a single network that was virtually sub-divided into services such as business data, clinical data, imaging, patient monitoring, and voice," said Mr. Colburn.

Enabling Critical Care at the Bedside

To support the Heart Hospital's continuous care approach, each patient room is equipped to enable critical care delivery. To ensure anytime, anywhere access to critical care information, providers use ChartAssist®, which automatically collects data from bedside devices, such as patient monitors and ventilators, creating an electronic patient flowsheet and integrating it

patient occurred approximately an hour before the end of a particular nurse's shift, which can serve as an example of how the system impacts employee satisfaction. In her previous position at another provider, she estimated she would have had at least two hours of work to do after the end of her shift to document the patient status. With INVISION and ChartAssist's documentation tools, however, she was able to complete the patient chart and go home on time.

Unparalleled Integration

Siemens solutions are impacting more than just the critical care workflow for the Heart Hospital. Soarian Cardiology is empowering cardiologists to make faster, more informed decisions in the cath labs and access comprehensive real-time patient information at the bedside. NHH's cardiac care team uses Soarian Cardiology in the cath labs to document clinical and administrative exam details as they occur. Data from the Sensis hemodynamic

system passes automatically during procedures, eliminating the need for dual data entry. Further, data is seamlessly transferred from Soarian Cardiology to the Sensis system and to the cath imaging solutions, resulting in a closed-loop workflow process in the cath lab.

Efficiencies result from reductions in the time and error associated with manual quality reporting processes. "Soarian Cardiology expedites report turnaround time to mere minutes. In a traditional health system, this same process could take hours or even days. The system also ensures that our workflow processes remain collaborative. The staff works holistically on the physician signoff," said Ms. Vogeler.

Because of the integration of Siemens software and technologies, physicians can review and signoff on the report immediately after a procedure is completed. Communications can be sent to the referring physician as well. Then, the physician can meet with the patient and family in their room, bringing up the cath study and any images on the Soarian Cardiology workstation to show them what occurred. On-demand information access is a powerful education and bedside teaching tool that supports Nebraska Heart's progressive care model. Physicians can readily show images such as stenosis and position of the stent during the procedure. Because information is available on demand, quality of care and patient satisfaction can be improved.

The Bottom Line

The value that Siemens solutions deliver is return on investment through measurable workflow improvements that support a team-based culture. "Our financial performance since May 2003 has exceeded our expectations," said Robin Pedersen, Chief Financial Officer. "We attribute this to a unique combination of people, processes, and Siemens technology and software." This fact is particularly impressive given that the organization is a specialty hospital, recently opened in May of 2003, predominantly serving the Medicare and Medicaid population.

The Heart Hospital's unique care delivery model, including integration of Siemens software, hardware, and networking technologies has produced results such as:

- When the system came live, the Heart Hospital was nearly **paperless**.
- The proforma indicated a projected length of stay of 4.3 days. Through December 2003, The Heart Hospital's actual average length of stay was **2.5 days**.
- At the end of December 2003, 766 discharges were projected. Actual discharges were **1,321** with the same number of staff that was originally projected, a clear indication of productivity exceeding expectations.
- Patient satisfaction levels are high with over **97%** indicating they would return.

Future

In conjunction with the Heart Hospital's senior management team, a multidisciplinary group of IT professionals, physicians, nurses, and clinicians continues to examine the impact of Siemens solutions on clinical efficiency, patient and user satisfaction, and cost-effectiveness. New technologies will be implemented based on how they integrate into the existing system and will require straightforward roles-based views and compliance with Health Insurance Portability and Accountability Act (HIPAA) regulations. Current plans for Phase II include integrating echocardiography information into Soarian Cardiology.

Return on investment will remain tantamount. "We believe that by keeping patients at the center of the process everything else will fall into place," said Ms. Dodds. For more information on how Siemens solutions like those at work at NHH can be customized to meet your organization's needs, contact your Siemens account representative.

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