



## Cardioversion Across the Miles

### When Life is Measured in Hours . . . Spacelabs Makes Every Second Count

How long do you shock a newborn's heart? Just long enough. But, precisely how much is that?

The Children's Hospital specialist who could answer that question was at home in bed miles away, while the neonatologist on duty at midnight struggled with a decision that might affect a baby's entire life. The child's birth had been uneventful and the worrisome atrial flutter unexpected. But now, fragile and just hours-old, the infant lay in the neonatal intensive care unit (NICU). His heart raced as fast as the care team scrambled to arrange an intervention that might prevent a lifelong problem . . . and almost as fast as crucial cardiac data pulsed in near real-time over a virtual network to the specialist's home PC.

#### **Bringing the Bedside to Physicians at Home**

"Spacelabs brought the immediacy of the hospital's neonatal ICU right to my home office, and as the specialist on-call, I was able to virtually direct an immediate electrical cardioversion without even taking time to get dressed," says Dr. David Burton, MD, Pediatric Cardiologist and Electrophysiologist at Children's Hospital and Clinics of Minnesota (CHCM). After logging in through the internet to the hospital's innovative Spacelabs Vital Signs Viewer, Dr. Burton watched as waveforms developed into a concerning picture of the baby's health in near real time.

Not only was the child's heart racing at approximately 240 beats per minute, but the irregular arterial contractions on the EKG compounded the problem. At the same time, Spacelabs' unique simultaneous data view brought a more global story of the baby's condition into focus by making available a full range of patient physiologic monitor data, including blood pressure, pulse and more. "It's as if I were transported right to the NICU to work alongside the neonatologist," the highly trained specialist says. "The data was that fast and complete."

Noting that arterial flutter is rare in newborns, Dr. Burton explains that most physicians lack the experience and perspective to manage such cases with full clinical confidence. "I have been specifically trained for such interventions in the juvenile population. And for this patient, valuable time would have been wasted driving to the hospital, resulting in potentially dangerous delays."

Once online, Dr. Burton directed the neonatologist on precisely the amount of energy to deliver in the treatment and watched second-by-second as the heart data converted to normal and the vital signs improved. If the conversion had been unsuccessful, the doctor would have been able to continue to manage the case. And without Spacelabs technology in place, the outcome might have been different.

### **Not an Isolated Case**

In another recent CHCM case Spacelabs enabled similar benefits. An older child was recovering from heart surgery in the ICU, and again his heart launched into a dangerous arrhythmia. As the expert eyes behind the intervention, Dr. Burton directed a similar cardioversion, helping the ICU physician work beyond his area of expertise. “With a young, post-op heart patient experience counts, and there is no luxury of time,” he explains.

Delivering a range of additional benefits only imagined a few short years ago, Spacelabs technology also enables virtual cardiac consultations, transporting experts from around the world to the patient’s virtual bedside to weigh in as waveforms and other physiological data unfold. For greater perspective, the system also enables a retrospective synchronized review of trends, alarms, 12-leads and other bedside data. Information can be viewed directly from the Spacelabs monitor for up to a 72-hour period.

“And not to be overlooked is the benefit of helping doctors get a good night’s sleep,” notes the dedicated physician. “By enabling on-call cardiac specialists to remain at home during the evening hours, they can arrive at the hospital the next morning rested, alert and ready to handle a full caseload. Because of its reputation for high quality cardiac care, the hospital routinely draws patients from as far away as Western Wisconsin, Northern Minnesota and North and South Dakota. For us, every day is a busy day.”

### **A Highly Regarded Hospital**

One of the nation’s oldest children’s hospitals, CHCM was founded in 1924 and is the only Minnesota hospital catering exclusively to children’s health needs. It comprises two hospital locations, one in Minneapolis and the other in St. Paul as well as a wide range of affiliated outpatient clinics. CHCM is consistently rated one of the nation’s top children’s hospitals by the American Hospital Association, and this year *U.S. News and World Report* selected it as the Best Children’s Hospital for Cardiology and Heart Surgery. CHCM is one of the few specialized children’s facilities that offer a cardiac center, which is staffed by highly trained and dedicated specialists who interpret more than 10,000 echocardiograms and 9,000 EKGs annually. “Leveraging advanced technology for the benefit of patient care is an important part of our philosophy,” notes Allan Palmer, Implementation Specialist for the hospital, who plays a key ongoing role in implementation and management of the Spacelabs system and other advanced technologies.

### **A Successful Longterm Relationship**

Palmer notes that CHCM’s highly successful relationship with Spacelabs dates back more than a decade. In 2003, the hospital introduced the Spacelabs telemetry system. By YEAR, it was using the company’s

physiological bedside and spot check monitors. In 2006, embarking on an initiative to upgrade these monitors, the hospital conducted an in-depth search of five competing vendors. “These included major manufacturers and several innovative smaller companies,” says Palmer.

“Unanimously, we decided to expand our relationship with Spacelabs and upgrade to the company’s latest technology, replacing all monitors hospital-(ENTERPRISE??) wide over a three-year period,” Palmer continued. This decision was made with an eye towards adding enterprise-wide cardiac data viewing, to be followed by offsite communications technology in the near future. These would all, of course, come from the same vendor. In 2010, the hospital added the enterprise-wide capability with IT infrastructure, centralized on the Minneapolis campus. In 2013, it extended the system to support today’s anywhere, anytime viewing on any PC or tablet with remote access to the hospital network.

As technology races forward, the Spacelabs system has helped CHCM physicians keep pace. “Whenever I am on call, I now take my iPad everywhere,” notes Dr. Burton. “With data access over 3G connectivity, I do not even have to be in internet range to view Spacelabs data.”

### **Supported by Existing IT Infrastructure**

From an IT perspective, with a number of well-known vendors competing in this space, why did the hospital select the Spacelabs system? According to Allan Palmer, “The short answer is all other vendors required stand alone proprietary networks. By contract, Spacelabs software runs on our hospital backbone, minimizing costs, maintenance and allowing us complete control over the system and data. This provides true data ownership. Spacelabs’ standards-based, open architecture can be interfaced with other hospital IT systems going forward to keep us connected in this increasingly IT-driven healthcare world.”

As a result, he notes, to view data, the system requires only a single log-in to the hospital network itself, not to the Spacelabs system. Competing technologies require two protected entry points, taking up valuable time during an emergency log-in.” Moreover, he explains that the remote Spacelabs user is interacting directly with the data source itself, the Spacelabs monitor at the bedside—one reason the full range of monitor information is easily and rapidly viewable. Other systems rely on middleware or intermediary servers, creating unnecessary IT complexities, costs and performance lags—not to mention a more restricted patient view.

Working in a close partnership with the Spacelabs dedicated team, the hospital customized its implementation to meet its specific clinical and IT goals. “Actually, no one in the country uses Spacelabs technology quite like we do. We virtually designed our own system, and we own it in every way,” Palmer says enthusiastically. “Spacelabs has been a great partner for us.” The hospital also is extremely pleased with Spacelabs’ unique, standard unlimited user license. He notes that this both saves on budget as well as ensures system entry for all users when a crisis occurs.

## **Enabling Remote Reporting**

Perhaps surprisingly, the original goal for implementing the remote data access was to enable physicians to review and sign off on the hospital's required daily patient reports from any location. Today, to facilitate this reporting onsite, technologists save events in the Spacelabs reporting tool. Cardiology specialists like Dr. Burton use the Vital Signs Viewer remotely to review these snapshots and surrounding patient clinical data and finalize the report. In the past, doctors were required to make a special trip to the hospital to complete this process.

"Interestingly enough, the byproduct of having this remote reporting capability is our remarkable ability to have specialists direct procedures remotely," notes Palmer. "We are light years ahead of where we were 10 years ago."

The Vital Signs Viewer is part of the Space Labs Clinical Access application suite, designed to enhance the efficiency, functionality and flow of clinical cardiac and related information. Employed in more than # sites worldwide, Clinical Access comprises four integrated software modules. Individually, each adds specific, advanced functionality to Spacelabs' state-of-the-art physiologic monitors. Collectively, they create a virtual cardiology department without walls, allowing clinicians to work not only clinically but also administratively almost anywhere and anytime desired.

The integrated system saves clinicians time with a broad range of efficiencies including the remote work environment. Its simultaneous, global views of vital signs and 12-lead EKG data puts cardiac events in a broader clinical context to promote enhanced physician decision making. The system provides data connectivity to a wide range of complementary healthcare IT systems and supports data communications and storage, minimizing the risk of human transcription error and data loss.

## **An Advanced Four-Component System**

In addition to Vital Signs Viewer supporting remote access of clinical and administrative data, Clinical Access also includes Smart Disclosure. This innovative application enables a full range of informative views of patient data, from arrhythmias to alarms, with all concurrent physiologic data automatically displayed. With a single click, physicians can see the event in its full clinical context, helping to draw cause and affect relationships and drive treatment decisions.

Custom Trends supports automatic collection of all vital signs and peripheral device data, as well as the creation of customized flowsheets, graphs and more based on user specifications. It supports comments and produces detailed shift and summary reports.

Completing the suite, Spacelabs Print Manager turns the patient monitor into printer-enabled devices, outputting waveforms in hardcopy on standard printers without costly thermal strip paper. The module also supports printing of trend, calculation and 12-lead reports and stores print jobs for future reference.

### **Technology-Forward and Poised for the Future**

According to Allan Palmer, Spacelabs has always been on tap to help the hospital support the system and adapt it to their changing needs. Currently CHCM has implemented all of Spacelabs' most advanced offerings and is confident in Spacelabs' commitment to keep its offerings in the forefront of technology .

"Virtually management of cardiac interventions is certainly on the leading edge," Dr. Burton comments. "No one would have imagined this even a few years ago. We are the only hospital in the state to take advantage of the technology that enables this, and we capitalized on it almost immediately."

Both equally dedicated, innovative and poised to make the most of whatever the future of technology brings-- the renowned children's hospital and Spacelabs are clearly an excellent match.