A frontrunner in the innovative use of medical technology, Sunderby Hospital in Luleå, Sweden, used the implementation of a new hospital-wide patient monitoring system to introduce a more efficient clinical process. The combination of careful planning and advanced technology helped the hospital to improve patient care and create a better clinical workflow for its staff.

Built in 2000, Sunderby Hospital is the largest of five hospitals in the northern-most region of Sweden – combining two hospitals from Luleå and Boden into one ultramodern 380-bed facility that represents a new approach to community medical care.

"After a ten-year period, you have to start looking at new medical devices because the technology is developing so fast," explains Birgitta Boqvist, who was Nurse Manager at the time of the installation. "This is why we needed to replace our patient monitors."

Sunderby Hospital looked at the patient monitor replacement project as an opportunity to raise the level of care the hospital provided.

The hospital team had a long list of goals for the project. First, they wanted to have one vendor for monitoring and anesthesia devices as much as possible. They sought to increase quality of care and clinical workflow by being able to monitor patients virtually anywhere in the hospital. Because the hospital was part of a highly reliable county-wide information infrastructure, the team was looking for a monitoring system that could use the hospital’s existing Wi-Fi network. A final requirement was that the vendor provide a professional project manager to minimize disruption to patients and staff.

“We were a little nervous about changing the entire patient monitoring system because patients’ lives depended on the monitors,” explains Dr. Åke Jonsson, Anesthesiologist. “But the implementation went much better than we had expected, due to very good planning and the fact that we took things one step at a time.”

For bedside/transport monitoring, Sunderby Hospital chose the Infinity® Acute Care System from Dräger, a hospital-wide solution that includes an Infinity M540 monitor for bedside and transport, and a companion Medical Cockpit® that brings networked patient data to the point of care. The Dräger solution also included the Infinity M300, a patient-worn monitor that uses industry-standard Wi-Fi technology.
To streamline clinical workflow, the Infinity® M540 moves seamlessly from bedside to transport.

MONITORING PATIENTS HOSPITAL-WIDE

“Patients on a single ward may have different acuity levels,” explains Boqvist. “We need to meet the needs of all patients wherever they are. This includes allowing telemetry patients to move freely – within limits – to increase mobility.” Infinity M300 monitors enable this mobility by monitoring patients locally and continually sending vital data to the Infinity CentralStation using the hospital’s existing Wi-Fi network.

For bedside and transport monitoring, the hospital can now quickly deploy an Infinity Acute Care System to any patient, on any ward, wherever needed. As a result, patients don’t have to be relocated to be monitored appropriately or wait for a bed in another ward. Central monitoring begins automatically as soon as patients are admitted, and the nursing staff can see the vital information of each monitored patient at the central station, regardless of their location.

Rather than each department maintaining its own equipment inventory, monitors are now inventoried by the hospital and shared across departments. This enables patients to keep the same monitor throughout their hospital stay – rather than having to change monitors when they change care units or go on transport.
Common hospital monitoring – where everybody has the same system – makes it much easier for us,” says Jussi-Pekka Riikola, CCU Nurse. “If personnel have worked with the monitoring equipment in one department, they can work virtually anywhere because they are familiar with the system. It’s also easier for the biomedical engineering department when we need new accessories, since it’s all the same equipment.”

**MONITORING TECHNOLOGY STREAMLINES WORKFLOW**

Because of Dräger’s Pick and Go® technology, the same M540 monitor can stay with the patient throughout their stay, eliminating the need for a separate transport monitor and saving time spent disconnecting and reconnecting patient cables. The monitor automatically adopts a new monitoring profile customized for each new care area. This streamlines clinical workflow and helps increase patient safety by providing continuous monitoring and data collection.

“The Pick and Go system improves our workflow considerably, says Riikola. “With the new monitoring system, our typical workflow has changed in that we can now retrieve patients directly from the Emergency Room with continuous surveillance at all times and move them directly to the Critical Care Unit (CCU) and have the same monitor the whole time – rather than having to switch to a defibrillator or a separate transport monitor.”
Anna Jakobsson, Anesthesia Nurse, talks about the time savings that result from keeping the patient on the same monitor. “We no longer have to clean the monitor and cables between each patient because we take a new monitor with us from the recovery unit that has already been cleaned – which saves us two to three minutes per patient. On average, I have about four anesthesia patients per day and the entire hospital has 85 surgeries per day.”

Jakobsson describes the advantages of using the new monitoring system in the perioperative environment. “The M540 is very small and convenient to work with. It is easy to undock it from the docking station and to redock it. On the C500 Medical Cockpit, I look at the patient’s parameters, such as blood pressure, ECG, and oxygen saturation. Then I transfer this data to the patient record. We read patient records right in the OR on the C700 for IT. We can also see X-rays and our surgery planning program.”

Another advantage of the new monitoring system is that it is part of a complete workstation together with the Dräger anesthesia machine.

Jakobsson explains, “I feel that the whole workstation is very good, because it’s easy to get an overall view of the patient from the monitor, and the colors and lighting are good. The Primus IE anesthesia machine is very convenient and quiet.”

NEW PROCESS IMPROVES PATIENT SAFETY

According to Jakobsson, patient safety is a primary benefit of the new monitoring system. “Patient safety is a lot better, because you can monitor the patient at all times, during transport, too. There is no interruption – just continuous monitoring.”

Riikola agrees. “Patient safety has improved quite a lot, because all patient data is collected in one place. If something were to happen on transport, you can easily check the data afterward when you have reconnected the patient to the central station. It is also very easy to check data on the monitor, so that has improved things a great deal.”

Riikola explains the importance of this new workflow: “We have had patients whose ST intervals looked abnormal when they came to the CCU, so they were sent to the coronary unit, had a balloon catheter inserted, and their
ST intervals became normal. Then when they returned to the CCU – and we are only talking about a few minutes immediately afterwards – we were able to see from the continuous monitoring that their ST intervals had changed once again. So these patients had to be rushed back to the coronary lab, where they discovered that a vessel had thrombosed very rapidly."

“So it has actually been lifesaving in some cases,” concludes Riikola.

**THE RIGHT INFORMATION, AT THE RIGHT PLACE AND TIME**

Connecting Dräger monitors to the Infinity CentralStation for central monitoring was easy due to the fact that Dräger patient monitors can use the hospital’s existing wired and wireless network.

“The great advantage of Wi-Fi for patient monitoring is that you can have an unbroken chain of patient data from the time the patient enters the hospital until they are no longer in our care,” explains Dr. Jonsson. Because patient monitoring data is integrated with the hospital information system, the monitors automatically receive patient Admit/Discharge/Transfer information from the hospital information system and ECG data is sent to the hospital’s ECG management system.

The Dräger system also provides remote viewing capabilities, which enables Dr. Jonsson to monitor his surgical patients outside of the OR.

“I use PatientWatch to monitor patients during surgery in the theaters where you don’t want people entering the room,” says Dr. Jonsson. “Then it’s excellent to be able to look after the patient from any computer whatsoever. The advantage of PatientWatch in wards is that you can monitor up to four patients at the same time on one screen.”

This remote viewing capability not only improves clinical workflow, but it also improves patient safety through infection control.
STREAMLINED CLINICAL WORKFLOW ADVANCES QUALITY OF CARE

THIRD-PARTY INTEGRATION INCREASES FLEXIBILITY
It was very important to Sunderby Hospital that the patient monitoring system could be integrated with commercial and custom third-party solutions. For example, AeroScout® positioning software is integrated with Infinity M300 patient-worn monitors and Infinity OneNet – the Dräger networking solution that enables patient monitoring data to safely move on the hospital’s existing wired and wireless infrastructure.

Now, if an M300 patient has an alarm event, clinicians are instantly notified of the alarm details and location of the patient monitor within 2 meters (6.56 feet). This facilitates rapid response with appropriate clinical resources should a life-threatening event occur. As a result, patients benefit from increased mobility – without their safety being compromised.

CAREFUL PROJECT MANAGEMENT MINIMIZES DISRUPTION
There is no question that this was a very complex project. However, because of the close working relationship between Dräger and Sunderby Hospital and the expert planning that went into the implementation, migration from old to new systems only took approximately four hours per ward, with minimal patient disruption. Each monitoring system had been preconfigured and tested at the Dräger Customization Center, so it had only to be unwrapped at the bedside, connected, and it worked properly.

“My advice to others who carry out similar upgrade projects is to ensure that you have a good working relationship with the IT and biomedical departments, because this is the key to success,” says Dr. Jonsson. “Together with them, you should have a good relationship with suppliers for discussing various problems. Because nothing is impossible.”
Dr. Åke Jonsson, Anesthesiologist, was a key decision maker in selecting the new patient monitoring system. One of the top priorities was that the monitoring system be able to move data on the hospital’s existing wireless network. Dr. Jonsson explains, “the great advantage of Wi-Fi for patient monitoring is that you can have an unbroken chain of patient data from the time the patient enters the hospital until they are no longer in our care.” With the new monitoring and IT solution, all patient monitoring data is integrated with the hospital information system, so the monitors automatically receive patient Admit/Discharge/Transfer information from the hospital information system and ECG data is sent to the hospital’s ECG management system.

Birgitta Boqvist, Nurse Manager at the time of the installation, explains, “patients on a single ward may have different acuity levels. We need to meet the needs of all patients wherever they are. This includes allowing telemetry patients to move freely – within limits – to increase mobility.” The new bedside/transport monitoring system gives the hospital the freedom to locate patients in whatever ward they will receive the most appropriate care, while the patient-worn monitors support patient mobility, which can speed the healing process.

Jussi-Pekka Riikola, CCU Nurse, feels that the new monitoring system has made a positive contribution to the hospital’s patient care process. According to Riikola, “the Pick and Go system improves our workflow considerably. With the new monitoring system, our typical workflow has changed in that we can now retrieve patients directly from the Emergency Room with continuous surveillance at all times and move them directly to the CCU and have the same monitor the whole time – rather than having to switch to a defibrillator or a separate transport monitor.”

Anna Jakobsson, Anesthesia Nurse cites patient safety and time savings as two benefits of the new monitoring system. Jakobsson explains, “patient safety is a lot better, because you can monitor the patient at all times, during transport, too. There is no interruption – just continuous monitoring.” Because the same monitor stays with the patient, it is no longer necessary to clean the monitor and cables between each patient. “We take a new monitor with us from the recovery unit that has already been cleaned – which saves us two to three minutes per patient.”
About Sunderby Hospital

Located in Luleå, Sweden, Sunderby Hospital offers the latest medical technologies in a unique environment that fosters high quality care for patients and an excellent working environment for the staff. Built in 2000 when two local hospitals were merged, Sunderby Hospital is designed to resemble a village with two main streets connected with paths and footbridges, all in a fully-enclosed facility. Most of the patient rooms in the care units overlook surrounding parklands which include a private lake. The 380-bed hospital houses multiple clinics, 19 operating theatres, a hotel for hospital visitors, and a large children’s area with year-round activities for children of all ages, including street basketball and slopes for sledding.

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