Uppsala University Hospital has become one of Sweden’s oldest and most respected institutions by not resting on its laurels, embracing information and communications technologies wherever possible to improve service quality. The university was able to build on the success of its secure, reliable and integrated Cisco Medical-Grade Network infrastructure to take advantage of wireless data and video across the campus and prepare for IP telephony. With high availability, faster services and increased access to data, the university has created a state-of-the-art environment for clinicians and researchers alike, providing information where and when staff need it.

Business Challenges
Sweden’s health and medical services are organised into a nationwide programme that gives each person access and the right to the best available care. As one of the fastest growing counties in Sweden, Uppsala County aims to deliver the highest quality healthcare it can to the people it serves – one third of the Swedish population. Its 1,400-bed Uppsala University Hospital, Sweden’s (and Scandinavia’s) oldest, is one of the country’s most complete regional hospitals and its 50 clinics serve two million people in central Sweden. With a strong reputation for science and learning, the University Hospital also conducts a wide range of research and education programmes.

Although its first department was established as early as 1708, the hospital does not rest on its laurels. Quite the contrary. It is characteristic of the hospital to always look for new innovative solutions. It makes the best use of new technology, new scientific findings and new ways of working in order to solve medical problems and to continuously improve the way it takes care of its patients.

For example, an ageing population requiring more specialised care is placing an increasing strain on resources at a time when healthcare costs are being scrutinised more closely than ever before. Studies have also shown that 25 to 30 per cent of healthcare staff time is spent on searching and handling information. By integrating wireless technologies, Uppsala’s Cisco Medical-Grade Network infrastructure does this more efficiently and effectively to improve patient care, provide greater security and increase access to data, so that caregivers can dispense the highest quality healthcare possible, when and where it is required.

“Cisco was the only supplier that could offer us components that matched our requirements for cost efficiency and security.”

Britt Ehrs
Project Manager
Computer Journal Project
Uppsala County
Solution

In the Swedish medical care system, patients visit their GP at local primary centres. A patient administration system makes a record of each consultation and follow-up. Eventually, the whole treatment process produces a paper ‘journal’ which medical staff refer to during the various stages of the care process.

Uppsala County has decided to update this entire process to make it more efficient, aiming to replace such paper-based systems – known to be inefficient, costly, and error-prone – with electronic patient records. Many healthcare organisations have already introduced electronic systems, or are planning to do so, in order to provide better quality information and communication at the point of care.

Electronic patient records are highly confidential. A number of clinicians might require access to them at different stages of the patient’s treatment. They can store a variety of file formats, including text, images, and video. Network access must therefore be flexible – covering remote and wireless options – high speed, and extremely secure.

To meet this need, one of Sweden’s largest wireless networks is being built at Uppsala University Hospital, using Cisco Aironet technology to support patient administration and journal handling so that more comprehensive versions of a patient’s journal can be called up electronically, wherever that patient is being treated.

Staff will be able to examine a patient’s X-rays, ECG and other results, simply by logging into the system. Old paper-based journals will be scanned and stored in the same system. External drug information will also be available alongside journal notes, dictated and stored digitally as sound files.

“We even hope that the rapid progress being made with this technological development will also make it possible for doctors and nurses to dictate information with automatic transcription, rather than typing it in,” says Britt Ehrs, Project Manager for Uppsala County’s Computer Journal Project.

The hospital’s new Cisco wireless network brings true mobility to the existing Cisco Medical-Grade Network infrastructure. It makes the journal accessible whenever and wherever it is needed. For instance, during patient meetings information from the journal can be projected on the wall so that everyone in the nursing team sees the same graphs and data in the front of them as they discuss specific treatments.

Uppsala University Hospital is experimenting with remote access to the journal system using small, handheld computers. These devices are currently being used to read medicine lists and to register patient data such as body temperature, pulse and blood pressure.

Effective security is also critical to the new system, which is now protected in several ways. Firewalls, antivirus software and encryption defend against external threats, such as viruses, worms and Trojans.

“An independent third party has tested our system security,” says Mats Arbman, Uppsala University Hospital’s Computer Engineer. “They were not able to break into it.”

A computer-based journal is much more secure than its paper-based equivalent, the content of which cannot be replaced or read by someone who is not authorised to see it. The new system logs the identity of each person who reads the journal and records which staff are able to access it further as part of the patient’s follow-up care process. For example, laboratory results and more general information is readily available to staff although more sensitive, say psychiatric data, or the journal records of a celebrity or politician, are heavily protected.

“It would not have been possible to fully replace paper-based journals without wireless technology. Thanks to this technology we are able to capture information at the spot where nursing is done, without involving any intermediate paper notes.”

Mats Arbman
Computer Engineer
Uppsala University Hospital
Business Results

According to Uppsala University Hospital’s Mats Arbman, the decision to use Cisco equipment for the journal project was never in doubt: “Cisco was the only supplier that could offer us components that matched our requirements for cost efficiency and security. Our entire computer infrastructure is based on Cisco equipment. It would have been wrong not to continue with Cisco, when its products had worked so well for us in the past.”

Wireless technology also provides staff with the option of working wherever and whenever they need to, accessing information where and when it is convenient. The new paperless patient’s journal can also constantly be updated and accessible throughout the whole care process – all the way to the patient’s bed – by using mobile devices attached to wireless networks.

“It would not have been possible to fully replace paper-based journals without wireless technology,” says Britt Ehrs. “Thanks to this technology we are able to capture information at the spot where nursing is done, without involving any intermediate paper notes.”

But Uppsala’s Cisco Medical-Grade Network approach not only intelligently distributes information to improve worker efficiency and patient care, it is also resilient and responsive to support a 24x7 environment that holds lives in the balance. Later in 2006, when the journal system is fully implemented, healthcare in Uppsala County will be able to rely on uniform administrative routines, which satisfy high levels of quality and security. Although security threats are being reviewed continually, the new electronic journal – supported by wireless technology – should also improve patient security in several ways.

“When emergencies are admitted to hospital, all relevant information regarding the patient is immediately available. The nursing team can see which sort of medication the patients are taking and how sensitive they are to a certain medicine.

For a university hospital with such a respected research pedigree, Uppsala teams also have a lot to gain from using computer-based journals, with fast access providing a window on to a much larger world of potentially valuable clinical data. For example, a few keystrokes can identify individuals – say, 50 smoking women with high blood pressure – for particular studies.

In the future patients themselves might also be able to securely access their own journal through the Internet. Uppsala’s wireless network may also support a transition to IP telephony, which will allow voice calls to be made at a fraction of the cost of conventional telephony.

“From the start, Cisco has fully co-operated in this project by supporting us and Uppsala to build a solution which fulfils our goals. Cisco also delivered products on time. This proved to be a critical success factor in a project of this scale.”

Gustav Boström
Managing Director
SYSteam Nät
Technology Blueprint

The County’s new journal system software is based on Cambio Healthcare Systems’ Cosmic (Compliant Open Solutions for Modern Integrated Care) software suite of eight service modules which cover all parts of a healthcare organisation: resource planning, everyday administration, clinical care support (case notes, medication, referrals and tests), incident reporting, statistics and occupational medicine.

Also based in Uppsala, systems integrator SYSteam Näät tested, delivered and implemented the University Hospital’s new wireless infrastructure. The quality of its work won SYSteam the Cisco Mobility Partner of the Year title.

“From the start, Cisco has fully co-operated in this project by supporting us and Uppsala to build a solution which fulfils our goals,” says SYSteam Näät’s Managing Director, Gustav Boström. “Cisco also delivered products on time. This proved to be a critical success factor in a project of this scale.”

SYSteam Näät installed 500 Cisco Aironet 1100 Series access points on the hospital’s campus. These are connected to 30 Cisco 3560 Series Switches, which not only transmit data but also deliver power to the access points.

“Cisco Aironet 1100s were chosen because they were the first access point to support 802.11g, at that time a new standard which enables communication at the rate of 54 Mbps,” says Gustav Boström.

The switches are connected to Cisco Secure Access Control Server (ACS), which centralises security management.