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Wireless Ward System Allows Nurses to Record and Retrieve Data Instantly at Patients' Bedside

January 31, 2002

With 'Beside Florence', nurses are able to electronically record notes and vital parameters such as a blood pressure and temperature right at the bed of a patient. With no need to re-enter written text at a workstation, the wireless technology is helping to ensure more complete and accurate medical records.

 [policlinico_agostino_gemelli.doc](#) (455 KB / 1 min. @ 28.8 Kbps)



Situation

The Policlinico Agostino Gemelli is the university hospital of the Faculty of Medicine of Cattolica del Sacro Cuore University in Rome. It is one of the largest and most important medical institutions in Italy, treating more than 70,000 in-patients each year.

Like many healthcare organizations, the 2,000-bed Policlinico Gemelli has come to rely on ward and hospital information systems where staff can electronically input and retrieve medical records and clinical data. All 2,400 of Policlinico Gemelli's nurses have access to a system called Florence, so-named by the nurses after Florence Nightingale, the 19th-century English nurse who was the founder of trained nursing as a profession for women. The system is used to record nurses' notes, patient interviews, and vital parameters such as a patient's temperature, blood pressure, heart frequency, etc. It is also used for bed management, ward agendas, and interaction with other hospital services such as requests for x-rays or diagnostic exams.

Nurses typically record medical data and take notes at a patient's bedside using a pen and paper. They then transcribe the information into Florence at a computer terminal located



Company Profile:
[Policlinico Agostino Gemelli](#) , the university hospital of Cattolica del Sacro Cuore University, is one of Italy's most respected medical centers. The 2,000-bed hospital cares for 70,000 in-patients annually.

Situation:
 'Florence,' the sprawling hospital's electronic medical record system, requires nurses to input their handwritten clinical notes at a shared workstation on the ward. The process duplicates efforts, pulls staff from patient care, and opens the door to transcription errors and misplaced or incomplete information.

Solution:
 Bedside Florence, a wireless solution on Pocket PCs, tightly integrates with the nurses' desktop operating system. Hospital staff can input and retrieve patient data, in real time, at bedside—enhancing the effectiveness use of staff time and the accuracy and completeness of the medical records.

Microsoft Products, Technologies, and Services Used:

- [Microsoft Windows 2000](#)
- [Microsoft SQL Server 2000](#)
- [Microsoft Visual Basic](#)

Partner:



somewhere on the ward. It is not unusual to see a queue of nurses waiting for a ward's lone computer to become available before accessing Florence to enter their data.

There is also always a risk of errors and misplaced data when transcribing information from paper, says Vincenzo Musumeci, associate professor of internal medicine at Policlinico Gemelli. "The need to duplicate work is the main reason why medical records are generally not complete. We needed a way to not only reduce paperwork but, more importantly, reduce duplication."

Solution

Healthcare is a mobile and information-intensive sector, and installing and wiring workstations throughout a hospital is expensive and disruptive. Recognizing these facts, Policlinico Gemelli decided to trial the use of end-to-end wireless software solutions—starting with Florence.

Beside Florence puts the power of a desktop PC in a hand-held Compaq iPAQ, giving nursing staff constant access to several million patient records. And it allows them to complete their bedside tasks without having to re-enter the data at a workstation.

The mobile ward system is tightly integrated to the nurse's desktop operating system, connected by a wireless Local Area Network (LAN) to an access point located on the ward. This allows staff to roam around the ward while still maintaining their connection to the system. "The nurses are connected always," says Prof. Musumeci. "They can make requests and see all data of any patient, and they can send and download from the enterprise server in real-time."

Beside Florence was initiated in February 2001 by Prof. Musumeci with the support of Compaq and assistance from GESI, an information systems integrator specializing in the healthcare market.

GESI collaborates with Policlinico Gemelli in the design, development and validation of many of its advanced applications, including Florence. A number of Unix and Microsoft® Windows® 2000-based systems run through GESI's Distributed Healthcare Environment (DHE) middleware platform which makes all clinical, organizational and management information available when and where necessary to all applications.

The wireless Bedside Florence was developed using Microsoft Visual Basic® for Windows CE and it operates on a PocketPC running on a Microsoft SQL Server™ database. It is based on a complete Web environment running Microsoft Windows 2000 and SQL Server 2000, connected with the DHE middleware for interaction with the rest of the hospital information system.

"The development of Bedside Florence was very easy," says Prof. Musumeci. "Microsoft is very generous with its information. I tried also to develop it on other platforms but it was more complicated and there's not a lot of information available for developers."

Benefits

With Bedside Florence, many of the tasks once done by nurses using a pen and paper are now handled more efficiently with a mobile device. The easy-to-use system gives nurses the freedom and flexibility to connect remotely to the hospital network anytime, anywhere. And removing the need to duplicate data entry ensures more accurate and more complete medical records.

"The nurses are more motivated to insert the data because the system is very simple," says Prof. Musumeci. "A nurse takes a patient's temperature or blood pressure and just taps it into the iPAQ."

Because patient information is updated in real time, Bedside Florence also assists doctors on their rounds of a ward. "I like to be able to see what's happening in a ward before I go down to visit it," says Prof. Musumeci. "All data should be computerized so I can read the notes and see the tests beforehand, so I have an idea of what to expect when I visit a patient."

While medical professionals are sometimes resistant to information technology, they are among the biggest proponents of wireless systems such as Bedside Florence. Wireless technology disrupts established medical practice patterns far less than any other information system, and it is in fact very much an extension of how nurses and doctors naturally work.

With the pilot project delivering positive results, Giuseppe Mobilia, vice-director of the hospital and university, Giovanni Scavino, director of technical services at Policlinico Gemelli, and Andrea Cambieri, medical director, are looking to expand Beside Florence

throughout the hospital's 80 wards, and assigning an iPAQ individually to all nurses who need it for their duties.

There is also a desire to bring more applications—from a drug database to the food menu—directly to the patient's bedside without having to further hard-wire the hospital.

"Today, medicine is all about accessing information," says Prof. Musumeci. "With a mobile device you can have information at the bed of the patient. If you think of something at the bedside, you don't have to go down the hall to a computer to consult something, maybe forgetting something by the time you get there. With wireless technology you get the answer immediately."

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