The system enables the children to have a better night's sleep, and also provides nurses with real-time readings of temperature and other vital signs.

By Claire Swedberg

Sept. 11, 2012—Compared with adults, pediatric patients are at greater risk of spiking fevers, and for that reason, hospitals must often record the temperatures of young patients numerous times throughout the night. If the staff uses a handheld thermometer, a child is likely to be awakened every time his or her temperature is taken—plus, that child's fever may have risen dangerously high in the interim. To enable its pediatric patients to have a better night's sleep, and to gain more frequent temperature and vital-sign readings, Hong Kong Union Hospital has installed a radio frequency identification system provided by Singapore RFID company Cadi Scientific. The solution, known as SmartSense, consists of temperature-sensing RFID tags that patients wear on their abdomen, RFID interrogators mounted on walls, and SmartSense software to receive that data, store it for the hospital staff, and issue alerts in the event that a temperature is rising, according to Grace Too, Cadi Scientific Hong Kong's business account manager.

Hong Kong Union Hospital is a 400-bed facility housing a pediatric ward able to accommodate up to 54 patients. When children stay at the medical center for treatment, a nurse utilizes a handheld tympanic (ear) thermometer to monitor each child's temperature. The rate at which this task is performed varies according each patient's particular temperature trends.

With the system in place, says Cheung Ka Ming, Hong Kong Union Hospital's IT system manager, "We hope to achieve not only the goal of enhancing children's rest during their hospitalization, but also allow physicians and nurses to receive real-time alerts and trending of temperature that facilitate prompt treatment and prescription."

A Cadi TSS 800 active ultrahigh-frequency (UHF) RFID sensor, shaped like a disk and measuring approximately 1 inch in width, is applied to a patient's abdomen via medical adhesive tape. Powered by a lithium battery, the sensor measures that individual's temperature every 30 seconds. It then transmits that data, along with the sensor tag's unique ID number, to Cadi SMN 800 interrogators mounted on the walls, which forward that information to the SmartSense Enterprise software residing on the hospital's back-end system. The hospital's own vital-sign monitors are connected to a medical device interface known as a Cadi SmartBridge (SMB) 800, which receives blood-pressure and pulse-rate data from the vital-signs monitor, and links that information with the bar-coded ID number printed on the patient's wristband, which a nurse scans via the SmartBridge's handheld bar-code scanner. The SmartBridge then forwards that data to the network.

The temperature sensors can transmit across a range of 10 to 20 meters (32.8 to 65.6 feet). The hospital installed 27 readers throughout its pediatric ward, in order to provide 100 percent coverage of the area.

With the SmartSense software, a dashboard showing each patient's vital signs can be displayed for the nursing staff on their computer monitors. If a patient's temperature rises beyond the predetermined acceptable level, an alert is displayed on the software dashboard. The system can also send alerts—such as a text or e-mail message—to employees carrying handheld devices.

The technology was deployed in December 2011. At present, says Yue Suk Fan, the pediatric ward's senior nursing officer, the SmartSense System has become an important tool for the nurses. "The system has helped them reduced workload, and has also improved patients' experience," she states. "Nurses felt that the system is easy to use and integrates naturally into their nursing workflow."

Improved patient care that may result from using this technology is a higher priority than a return on investment, Cheung says. "Parents of the pediatric ward patients were very pleased when they saw the new technology we have deployed," he states. In addition to taking more frequent measurements without disturbing the patient, it also reduces the amount of labor for nurses and other personnel. "Doctors can access the digital chart anytime, anywhere," Cheung says, but most importantly, "the patient can rest well now, especially at night."

Cadi Scientific has provided similar solutions to other hospitals as well, including one located in Singapore (see Tan Tock Seng Hospital Uses RFID to Take Patient Temperatures).