Real-time patient tracking reaps rewards

The award-winning implementation of CADI RFID technology by Tan Tock Seng Hospital, Singapore, resulted in improved patient care and resource utilisation. How did this project result in benefits of such significance?

National Healthcare Group (NHG) is a leading public healthcare cluster in Singapore. NHG consists of four hospitals, one international medical centre, one national centre, nine NHG polyclinics, three specialty institutes, four business divisions. It has staff strength of 11,000 and S$1 billion in annual revenues.

Established in 1844, Tan Tock Seng Hospital (TTSH) is one of the general hospitals within the group that provides high-quality, holistic healthcare services. The hospital is equipped with state-of-the-art facilities and medical equipment, as well as the latest communication and information technology tools. The Hospital champions the development of geriatric medicine, infectious disease management, rehabilitation medicine, respiratory medicine, rheumatology, and allergy & immunology in Singapore.

TTSH has a patient-centric mission, aspiring to being the best to serve, care and heal with cost-effective healthcare. The hospital’s management realised that there were areas of operation where manual processes could be automated to reduce unnecessary waiting times. In 2005, TTSH explored technology options to achieve the following objectives.

- To better manage limited bed spaces and provide real-time status of ward capacity to the Emergency Department (ED), Bed Management Unit (BMU) and wards
- To reduce the time taken to locate an average of four patients per day who are not in bed/out of the ward
- To improve on Care Coordination ratings as part of the Patient Satisfaction Survey by 5%

Challenges

Being the second largest acute care general hospital in Singapore, with wards across 13 stories and services in three separate buildings, tracking patient whereabouts was quite challenging.

Allocation of 1,200 hospital beds had been complex, as patients could choose between “A”, “B1”, “B2” or “C” class wards. BMU used to go through 17 steps for each bed allocation, manually handling confirmation of bed availability and bed-related enquiries. Such confirmation and enquiries were done by telephone conversations between ED, BMU and the wards, and was identified as one of the causes for the long waiting time of 2.1 hours for admissions from ED.

RFID Technology driven Solution

In January 2006, TTSH engaged Cadi Scientific to deliver a solution to overcome these challenges. CADI’s expertise in wireless sensing and RFID technology became the foundation for a comprehensive solution. RFID technology, with its ability to provide data reading without direct line of sight and with multiple simultaneous readings, allows real-time tracking of patients during their stay within the hospital. The event-based data triggering capability of the CADI SmartSense system optimised the hospital’s patient flow process for effective bed management.

Every patient admitted to hospital will be tagged with an RFID tag. This tag along with the mesh of receivers allowed real-time tracking of the patient. A web-enabled centralised information dashboard allowed staff around the hospital to monitor all patients’ locations and bed status in real time.

Automated event-driven alert and notification capability enables wards, the housekeeping department, BMU and ED to be notified with minimal human intervention.

Jacob Lonsdale
Managing Editor
Campden Publishing

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RFID improves healthcare efficiency

TTSH presented a report on the deployment of this system at the Hospital Management Asia 2006 conference, and received the HMA2006 award for Technical Service Improvement for the project. The system has been in operation since 2006, since when more than 100,000 patients have been tagged with the CADI RFID tag.

Benefits of SmartSense that TTSH highlighted include:

- Nursing teams on wards are now able to anticipate and better manage their workload.
- Ward staff and family members have clear visibility of patient’s location, enhancing patient safety.
- The system has greatly reduced the telephone calls between wards, ED and BMU.
- Nurses now do not have to manually logon to the system to actualise patient discharge and transfer as these are now automated.
- With an up-to-date overview of patient’s current location, bed status information and more accurate actual admission/transfer/discharge time, the system has effectively eliminated double booking by BMU.
- The system has effectively reduced workloads, improved management of limited resources, such as beds and housekeepers, and made processes transparent [see Table 1].
- With real-time updates of bed availability and faster bed allocations, the system has helped to reduce patient waiting times, improve patient satisfaction and care coordination ratings by more than 5%.

Why CADI RFID?

Cadi Scientific focuses on providing healthcare RFID solutions with clinical vital signs for enhancing patient care and improving operational efficiency. As a manufacturer of medical devices, CADI works to the highest standards of quality in compliance with the requirements set out by the ISO13485 quality system. The CADI SmartSense Wireless Temperature Monitoring System has obtained the CE certification as a class IIA medical device, confirming that it is safe for use in the stringent healthcare environment.

CADI’s unique, integrated RFID with sensing technology allows hospitals to extend their wireless applications from patient location tracking to wireless patient temperature monitoring, right patient identification, safe medication, etc, through the use of just one RFID tag.

Please visit www.cadi.com.sg for more information.

Table 1: Manpower savings of the TTSH project

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Activities</th>
<th>Average time spent (mins)</th>
<th>Estimated no. of cases for 10 “C” class wards/year</th>
<th>Projected manpower savings/ year (based on 160 hrs worked per month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To better manage utilisation of limited resources</td>
<td>Eliminating Double Bookings&lt;sup&gt;1&lt;/sup&gt;</td>
<td>20 mins</td>
<td>1,040</td>
<td>2 man months</td>
</tr>
<tr>
<td></td>
<td>Reducing phone communications between wards, ED and BMU&lt;sup&gt;2&lt;/sup&gt;</td>
<td>3 mins</td>
<td>20,800</td>
<td>6.5 man months</td>
</tr>
<tr>
<td>To facilitate patient location tracking at wards</td>
<td>Locating patients whereabouts&lt;sup&gt;3&lt;/sup&gt;</td>
<td>2 mins</td>
<td>14,600</td>
<td>3 man months</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>11.5 man months</td>
</tr>
</tbody>
</table>

<sup>1</sup>An average of two double bookings per week per ward, ie, 1,040 per year for ten wards in phase 1.
<sup>2</sup>An average of eight phone calls are made per ward per day, ie, 20,800 per year for ten wards in phase 1.
<sup>3</sup>An average of four cases per ward per day, ie, 14,600 per year for ten wards in phase 1.