Study on Sengkang General Hospital's (SKH) Real-Time Location System (RTLS) Implementation Journey as the first local public hospital to embark on hospital-wide asset management and infectious disease (ID) contact tracing using RTLS

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Introduction

Our RTLS journey started in 2016 at Alexandra Hospital (AH) campus where the team started gathering use cases through understanding of pain points experienced across both clinical and operational areas. Some of the feedback included:

- Nursing frustrations in locating medical equipment for patient use & time wasted that could have been better used for patient care;
- Porters' time-consuming and manpower-intensive efforts to patrol campus grounds to retrieve wheelchairs;
- Lab staff frustrations to call multiple parties to alert the 'correct' team of patients' critical lab results as they have no visibility of the ED patient's location; and many others.

While RTLS is a well-established solution used widely by many local hospitals, the team wanted to exploit the technology beyond into asset tracking and infectious disease contact tracing.

Aim

To share learnings of RTLS implementation under a new hospital building and extending usage beyond traditional patient tracking

Methodology

In 2016, the team started experimenting via a Proof-of-Concept (POC) understanding use case-technology fit and workflow adjustments. Findings were widely shared through roadshows to help generate awareness and gather feedback for implementation fine-tuning.

Figure 1: RTLS Roadshows conducted in 2016

In 2017, a Project Working Committee (PWC) was formed with four subgroups, focusing on (A) patient workflow, (B) central asset movement, (C) ID contact tracing; and (D) hospital RTLS network infrastructure & coverage.

Results

A. Adjustments to Patient Workflow

New workflows were extensively discussed with the various clinical stakeholders, particularly careful handling between patient hand-offs processes as patient tracking started upstream in Emergency Department (ED). Multiple engagement sessions were conducted to ensure efficient and seamless end-to-end patient movement across the hospital.

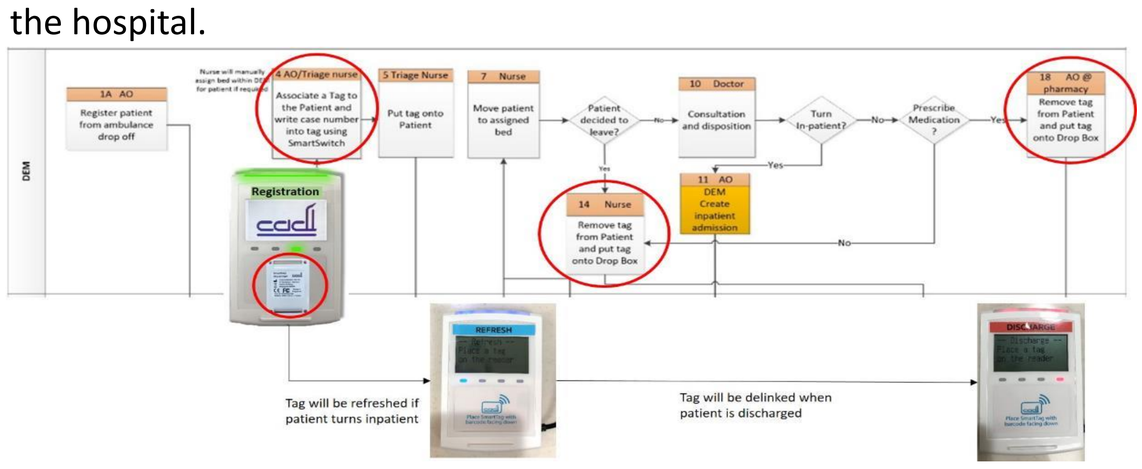

Figure 2: Partial Extract of the ED patient workflow depicting patient tag start and end points of patient tagging using RTLS Smartswitch.

B. Central Asset Movement

A new Ops team, Central Asset Management was setup up to bring selected high-movement assets (e.g. beds, infusion pumps & wheelchairs) under a centralised management using RTLS asset tracking for more efficient equipment utilization & distribution.

C. Infectious Disease Contact Tracing

RTLS staff card was introduced with an enhanced proximity tag-tag communication technology, allowing the clinical teams to significantly reduce the time & effort for contact tracing.

D. Hospital RTLS Network Infrastructure & Coverage

As a new hospital building, there were more infrastructure complexities and planning cum coordination works needed during its installation phase. RTLS zoning was a key document showing the layout plan of RTLS exciters and WiFi APs, which was consistently reworked to ensure alignment across the various use cases. It was also the base document to demonstrate the RTLS accuracy heatmap in each area.

Figure 3: Ward 49 RTLS Zoning & Accuracy Heatmap (from RTLS) that showed more than 80% of detection was within 1m to 3m of its expected zone.

To streamline workflow and operational efficiency, various RTLS interfaces were also implemented.

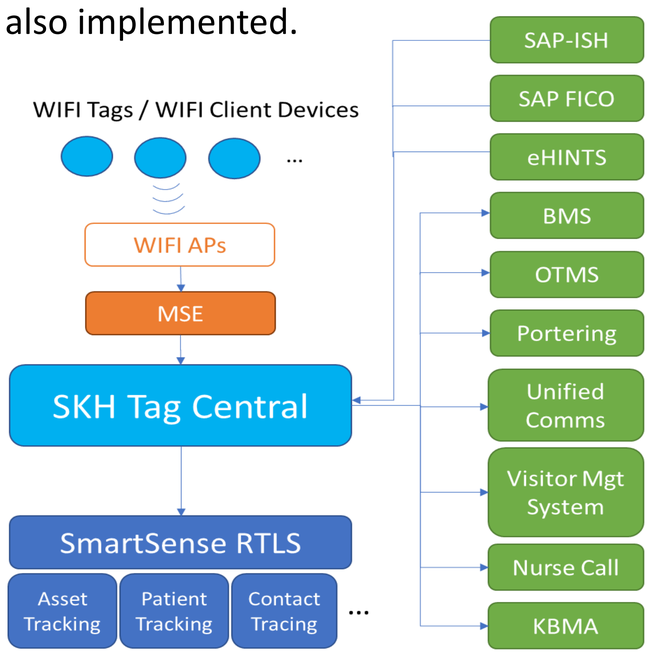

Figure 4: Overview of RTLS Integration

Conclusion

The project is successfully implemented and used across various teams since hospital opening in July 2018. While there were many operational challenges, this was made possible through the collaborative efforts of all parties involved. RTLS is a key technology in SKH with potential for many more use case implementations. It has enabled SKH to achieve real-time end-to-end visibility of the tagged entity's location, thereby gaining the ability to automate processes and provide service insights through location analytics.

More information on this first implementation with Cadi Scientific can be found via this QR code link: