

Project Title

PillBot – Autonomous Medication Delivery and Dispensing Robot

Project Lead and Members

Project Lead(s): Ms Alicia Lin Jiawen, Senior Pharmacist

Project Members:

- Mr Freddy Tang Hung Mook, Senior Pharmacist
- Mr Daryl Toh Wei Cheng, Assistant Manager Operations (Pharmacy)
- Mr Tiew Jia Quan, Executive Operations (Pharmacy)
- Mr Benesisto John Winston Aguilar, Senior Pharmacy Technician
- Ms Lim Hong Yee, (Advisor) Director Pharmacy
- Mr Low Chee Wee, (Advisor) Deputy Director Operations (Pharmacy)
- Ms Chong Yi San, (Advisor) Principal Pharmacist
- Ms Lim Woan Chyi, (Advisor) Principal Pharmacist

Organisation(s) Involved

Tan Tock Seng Hospital

Healthcare Family Group(s) Involved in this Project

Pharmacy

Applicable Specialty or Discipline

Pharmacy Operations

Project Period

Start date: 11 October 2021

Completed date: 14 November 2021

Aim(s)

- To minimise unnecessary time spent travelling between locations, donning in and out of PPE and
- To reduce the frequency for Emergency Pharmacy (EP) staff to enter high risk areas to perform face to face medication counselling and dispensing.

Background

See poster appended/ below

Methods

See poster appended/ below

Results

See poster appended/ below

Lessons Learnt

The project team learnt that the key to implement change is to actively engage and listen to the end users as they interact directly with the PillBot. The project team learnt that user acceptance is a key factor to the success and continuation of the project and hence, there should be an accessible and safe avenue for users to provide feedback and the project team need to take these feedbacks seriously for review and analysis.

Conclusion

With the success of the PillBot project, the project team had planned to adopt, modify and expand the PillBot solution to other Pharmacy sections with different use cases. The pharmacy project team had also reached out to collaborate with stakeholders from the TTSH Emergency Department and Nursing Department to share about the PillBot project. The scope of the PillBot project was further expanded through the collaboration. Both the team had developed new procedures and workflow to tap on the existing PillBot to help nurses stationed in ODF to transport items such as documents and prescriptions from ODF to EP. The PillBot project evaluation was also

shared with TTSH's Digital Innovation Track (Robotics) Committee consisting of various operations departments leaders in TTSH. In fact, TTSH Nursing and Inpatient Operations Department had reviewed and taken inspiration from the PillBot solution and are currently looking into a similar robotic solution to help offload nurse's duties tapping on a robotic solution to perform a variety of tasks ranging from delivery of item such as food to patients in the TTSH inpatient wards.

Additional Information

On top of the sustained high BAU workload due to the on-going pandemic, the project team also faced countless challenges and setbacks throughout the PillBot innovation journey. The project team still managed to complete the innovation journey as the team is clear on our mission – to promote a safer work environment and to optimise EP's dispensing process via PillBot. This is also only possible with strong support from TTSH Pharmacy senior management and a team of collaborative EP ground staff.

The implementation of PillBot is a small yet significant step towards transforming the current model of care with the aid of robotics. This care transformation enables pharmacists and Health Care Providers (HCPs) to better utilise their time on patient fronting activities and offload non-patient fronting activities or administration tasks to robotics or automation.

Project Category

Technology

Medtech, Robotics

Keywords

Medication Delivery, Robot, Staff Safety

Name and Email of Project Contact Person(s)

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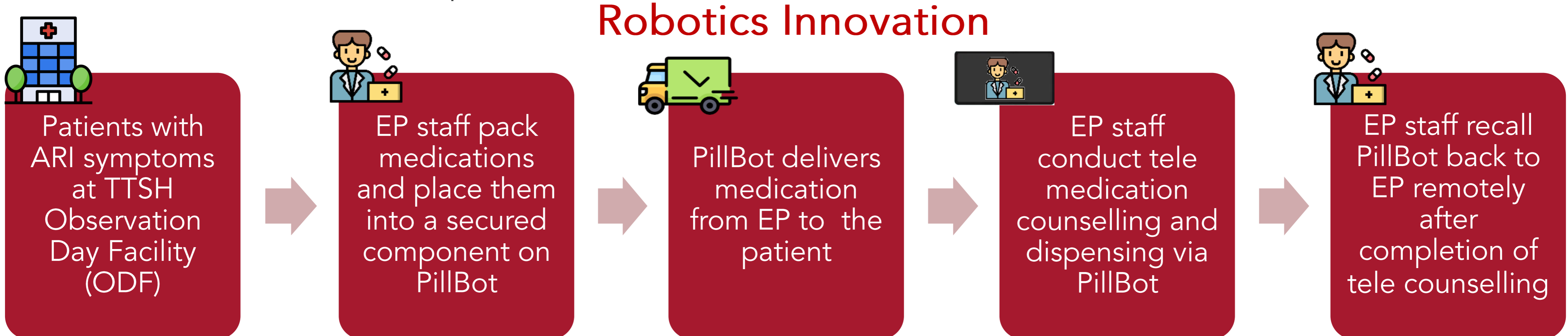
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Project Summary

As Covid-19 community cases increases, TTSH Emergency Pharmacy (EP) staff are subjected to higher risk of infection as they are required to perform face to face medication counselling and dispensing to patients with Acute Respiratory Infections (ARI) symptoms. It is also time consuming for staff to don in and out of (PPE) and to travel between pharmacy and to the patient's location.

PillBot project was conceptualised to minimize the unnecessary time spent traveling between locations, donning in and out of PPE and to reduce the frequency for EP staff to enter high risk areas to perform face to face medication counselling and dispensing.



PillBot



Original PillBot (TEMI robot)



PillBot modified with a 3D printed storage box for medication delivery and transportation

End Users Experience

Patient (N=12)

89% of all the respondents rated "very good" (4* out of 5*) or "excellent" (5* out of 5*) for

1. Medication delivery experience via PillBot
2. Quality of video and volume
3. Overall experience

Staff (N=7)

The unanimously feedback from all EP staff showed that

1. EP Staff would like to utilise PillBot in their day to day work post trial
2. PillBot is user friendly
3. PillBot had improved overall productivity

Results of Trial

During the trial from 11th October 2021 to 14th November 2021

- PillBot had achieved 83% success rate with 221 successful trips out of 266 total trips.
- A successful trip is defined as the completion of both transportation of medications from EP to patients in ODF and the completion of tele-counselling.

Effects of Change

1. Up to **110** mins of time savings per day

2. Up to **\$10,950** cost savings per year

3. **Reduced** risk of staff infections to Covid-19

With the success of the trial and the benefits of PillBot, PillBot has been integrated into EP's Business As Usual (BAU) workflow since November 2021.