

Project Title

For Inpatient Code Blue Activation via Mobile App

Project Lead and Members

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Organisation(s) Involved

Sengkang General Hospital

Healthcare Family Group(s) Involved in this Project

Medical; Nursing: Allied Health

Applicable Specialty or Discipline

Surgical Intensive Care, Respiratory, Specialty Nursing, Clinical Governance and Quality, Process Transformation and Improvement

Project Period

Start date: Not Available

Completed date: Not Available

Aim(s)

To achieve $\leq 30s$ (*activation time) to activate code blue teams within an inpatient setting.

Background

See poster appended/ below

Methods

See poster appended/ below

Results

See poster appended/ below

Conclusion

See poster appended/ below

Project Category

Technology

Product Development: Proof of Concept

Care & Process Redesign

Quality Improvement: Design Thinking

Keywords

Code Blue Activation Mobile Application

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For Inpatient Code Blue Activation via Mobile App

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Background of the problem

Survival in a cardiac arrest is time-sensitive, and is reduced by 7-10% for each minute of delay¹. The Code Blue activation process involves an Activator, SGH Call Centre and code blue response teams. The Activator triggers the code blue team by conveying details of the code blue to the Call Centre via telephone. This is followed by the Call Centre Agent (CCA) sending out a SMS to code blue team to travel towards the location requiring specialized assistance.

The Joint Commission International (JCI) standard requires advanced life support to be rendered within 5 minutes. While median activation process is currently at 1.5 minutes, a maximum of up to 8 minutes has been recorded. Thus an error proofed and sustainable process is required for an expanding Outram campus.

Mission Statement

To achieve ≤30s (*activation time) to activate code blue teams within an inpatient setting.

* Activation time is measured from the point the alert is sent from the Activator to the same being received by the code blue team.

Analysis of problem

Code Blue activation process (Figure 1) consist of time to SMS broadcast and response time. The time to SMS broadcast (1) Manual and (2) Fragmented, resulting in large process variance for a mission-critical service. This process is susceptible to communication issues due to human error, such as long conversations between activator and the CCA, incorrect/ insufficient information conveyed and delays in SMS broadcast. Thus the intent is to digitize and automate the activation process to remove human errors.

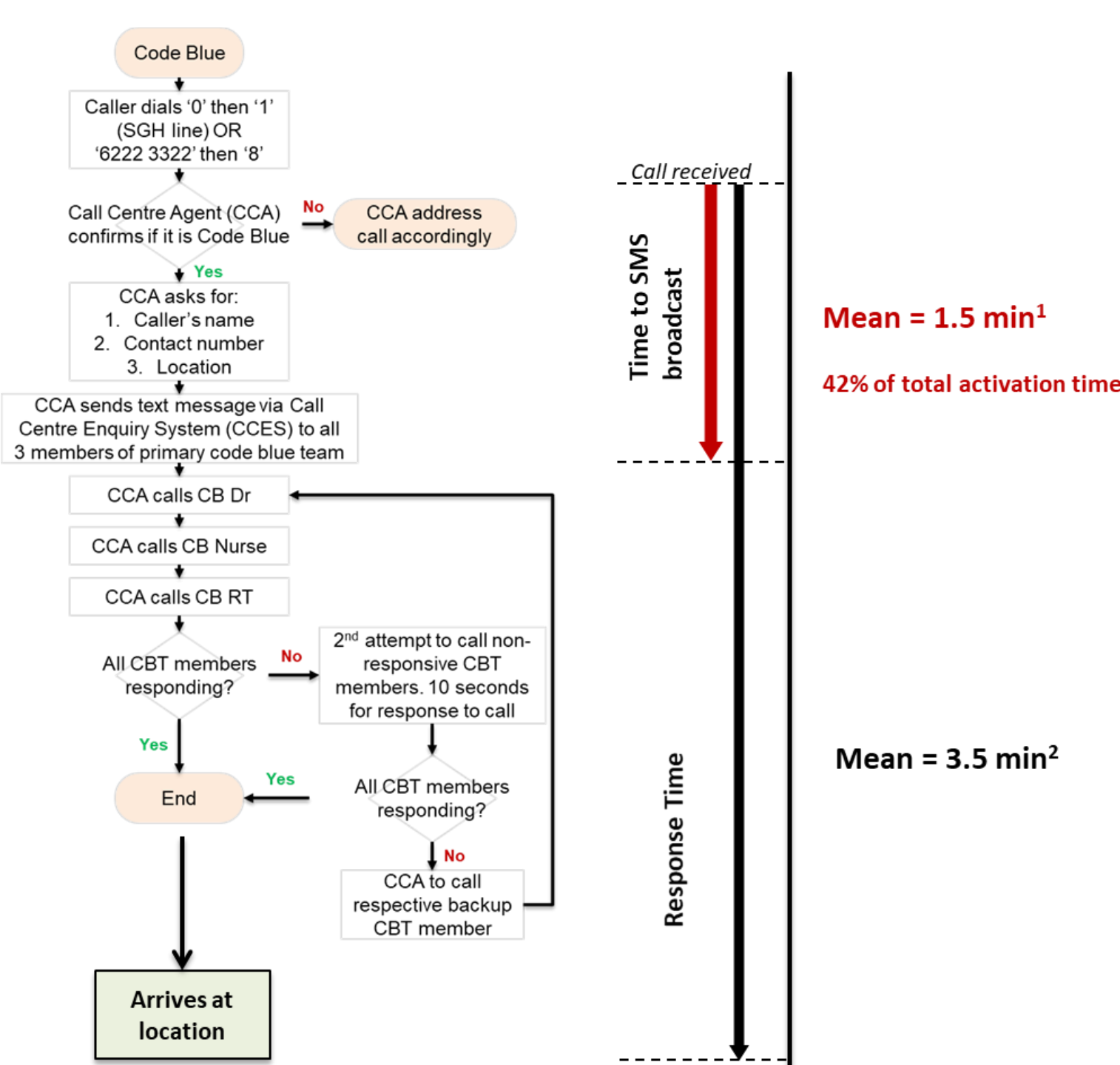


Figure 1: Code Blue activation process

By gathering user feedback through development of a proof-of-value (POV), an enhanced application meeting the user requirements to support mobile code blue activation could be developed in the long run to improve code blue patient outcomes and coverage through time savings and error proofing the activation process through digitalization.

Interventions / Initiatives

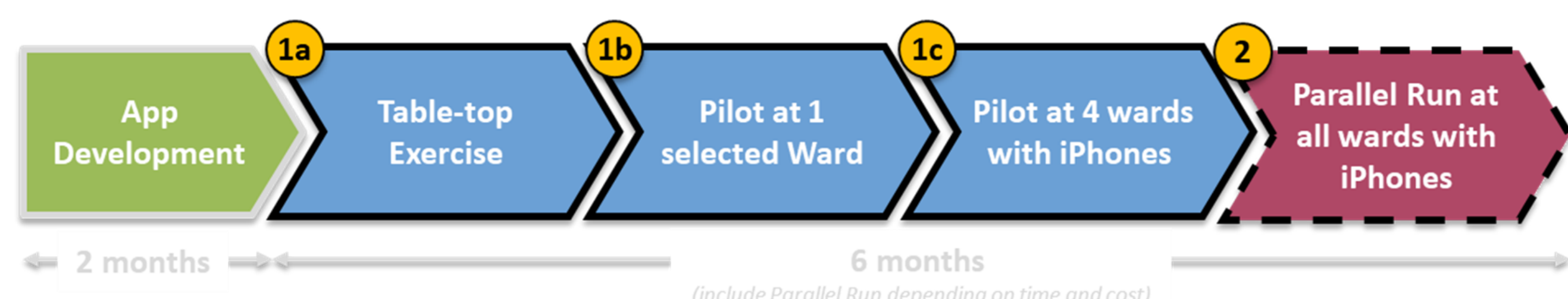


Figure 2: Planned phases for app testing

The team planned to conduct the testing over a period of 6 months as shown in Figure 2. The application was continuously refined based on feedbacks received from Phase 1a and 1b. It was used in Phase 1c as part of the annual in-situ training conducted to assess the staff involved on their expertise. Phase 2 was eventually not embarked upon as the team obtained sufficient user feedback to understand the requirements for a full-scale app, while meeting the mission statement objective.

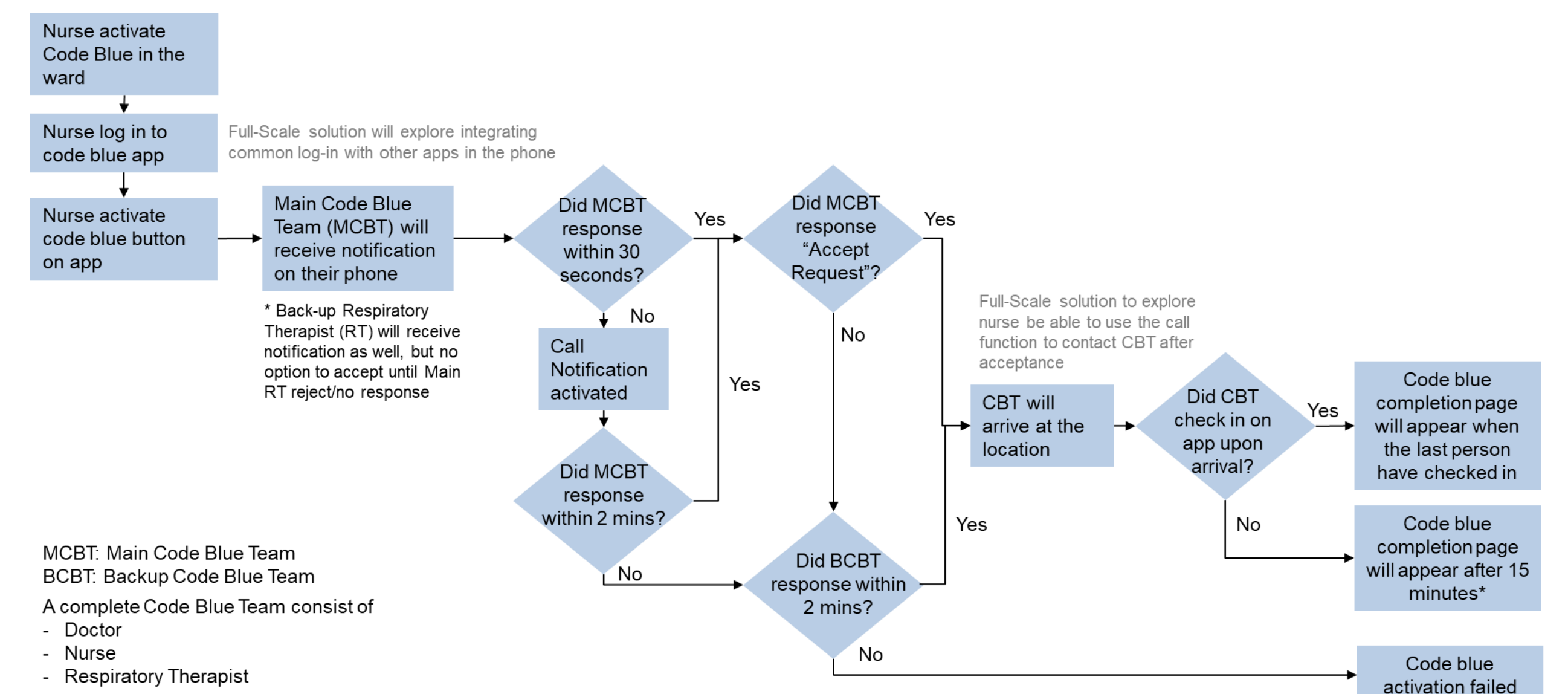


Figure 3: Code Blue activation process via phone application

The following Code Blue activation process (Figure 3) illustrated the final workflow that the application was built among after feedback gathered from the various phases. The phone application reside in staff work phone and connected to an in-house network. Key features of the application include:

- Activation via a press and hold button (Figure 4A)
- App notification and response via accept request (Figure 4B)
- App dashboard displaying response time and auto activation to back-up within 2 minutes or upon rejection (Figure 4C)
- Completion page after all members within the Code Blue team has responded (Figure 4D)

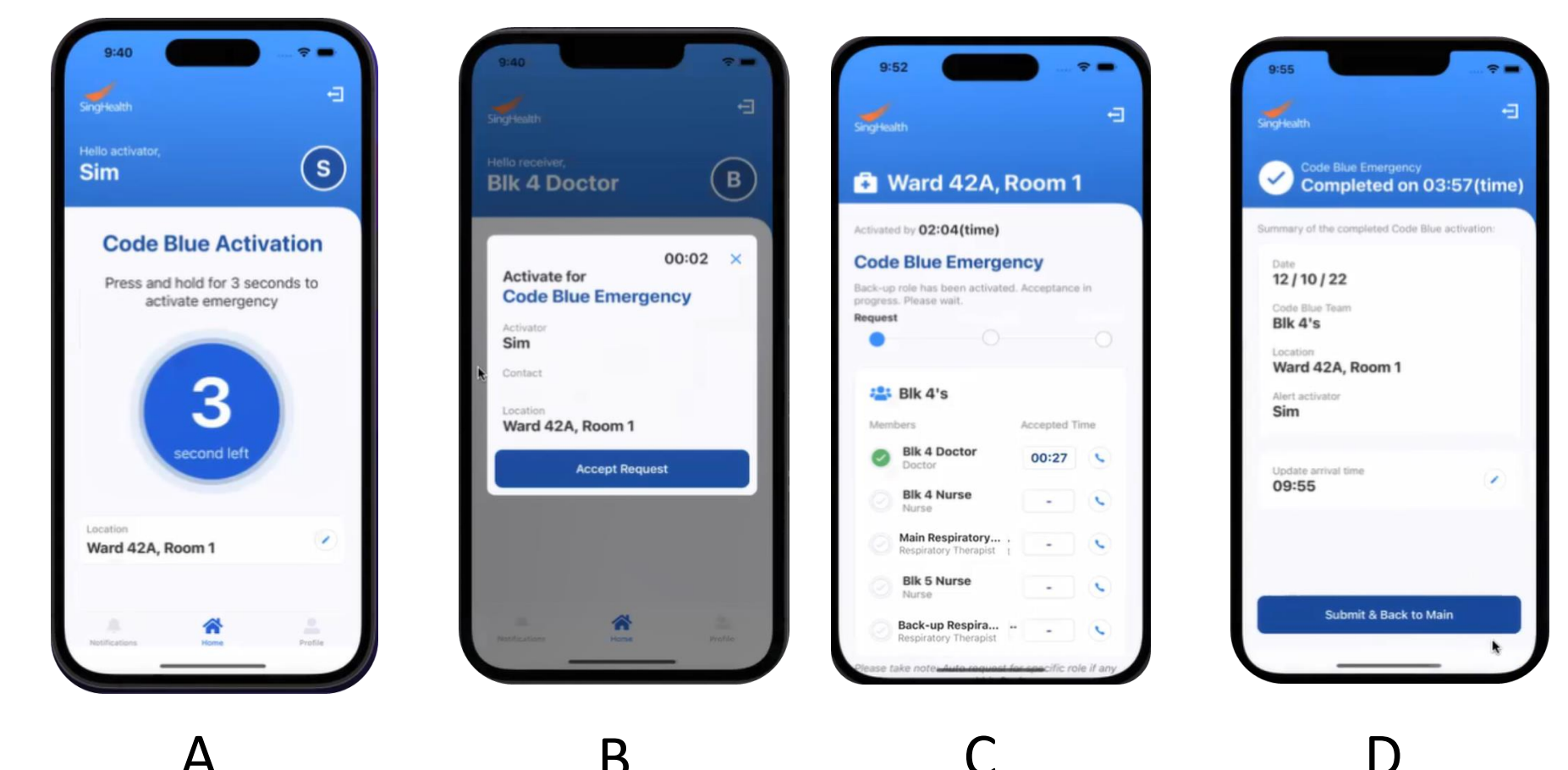


Figure 4: Code Blue Mobile Application

Results

Across the simulation runs conducted from Phase 1a -1c, there were a total of 32 activations to the main Code Blue team,

- 4 (12.5%) cases did not manage to receive the activation, mainly due to network issues
- 28 (87.5%) cases that receive the activation, reflect time between emergency start time and receiver alert time is within 0 seconds

The team also reviewed 12 activation samples on the time taken between receiver alerted time to acceptance time and noted that they range between 16 seconds to 1 minute 44 seconds. One of the main reasons for the variation is the password requirements on the staff work phones. Staff involved in the simulation runs felt that the App is easy to use, while providing fast activation and increased visibility.

With the POC results, the team concluded that it is possible to achieve ≤30s to activate code blue teams via mobile application within an inpatient setting if there is no network issue in the location. However for this app to be functional as the primary mode of communication between the inpatient areas and the Code Blue Team, a list of full scale solution requirements will need to be present.

Sustainability Plans

The team will review the list of full scale application requirements (Figure 5) with the relevant personnel in the organization to work towards the development of the application.

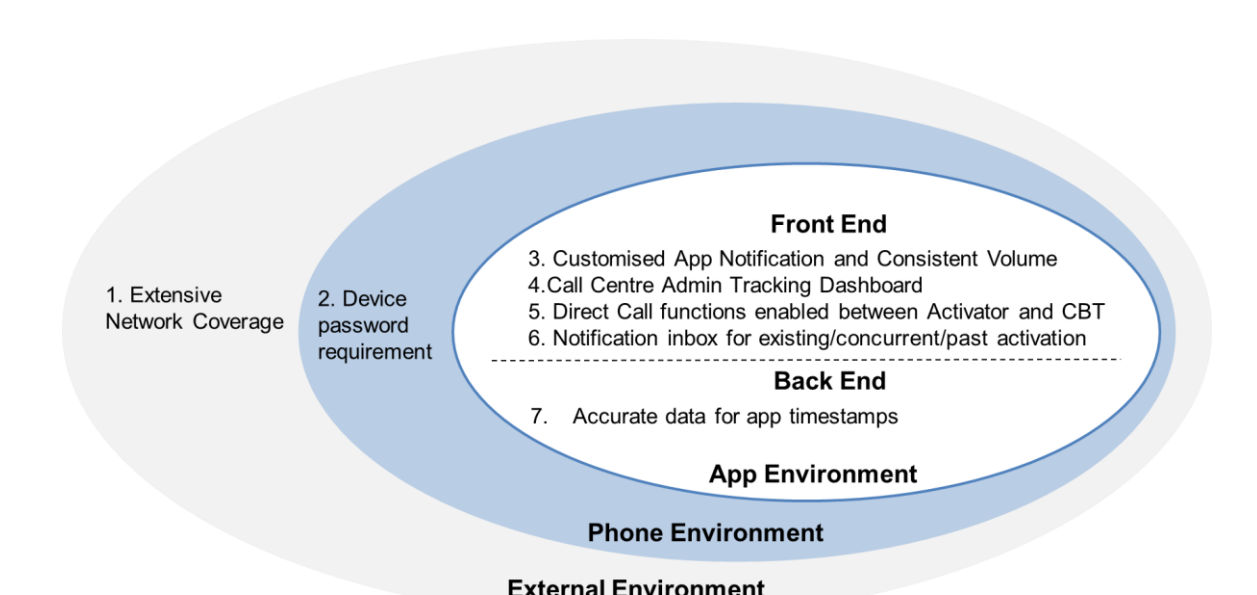


Figure 5: Full scale solution requirement