

## **Project Title**

To Improve the Code Blue (cardiac arrest) Response Time to less than 5 minutes within 6 months in Singapore General Hospital (SGH)

## **Project Lead and Members**

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Project members:

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- A/P Ng Shin Yi
- Ms Patricia Yong Yueh Li
- Dr Leong Kah-Lai Carrie
- Dr Tien Jong-Chie Claudia
- Ms Norazlina Binte Shaikh Ibrahim Mattar
- Dr Tan Hui Li
- Ms Lee Chin Hian
- Ms Lee Mei Bao Jasmine
- Ms Lau Yoke Yen
- Ms Lim Hwee Ling
- Ms Yap Chew Theng
- Ms Kamsiah Bte Jaafar
- Dr Poh Juliana
- Ms Muqtasidatum Binte Mustaffa
- Mr Shashi S/O Chandra Segaram
- Dr Loh Xingyuan Julian Kenrick
- Ms Teo Wei-Shan, Constance
- Ms Tan Yin Yin, Adele
- Ms Nanayakara Selina James
- Ms Hong Xiaowen
- Mr Quek Bak Siang

- Ms Elisabeth Angelina
- Ms Ong Wee Fen
- Ms Ulina Santoso
- Mr Ching Yi Hao Edgerton

### **Organisation(s) Involved**

Singapore General Hospital

### **Healthcare Family Group Involved in this Project**

Healthcare Administration, Allied Health, Medical, Nursing

### **Project Period**

Start date: 1<sup>st</sup> October 2018

Completed date: 21<sup>st</sup> March 2019

### **Aims**

To improve the Code Blue (cardiac arrest) response time to less than 5 minutes within 6 months in Singapore General Hospital (SGH).

### **Background**

See poster appended / below

### **Methods**

See poster appended / below

### **Results**

See poster appended / below

### **Lessons Learnt**

Strong leadership, collaborative approaches adapted through active monitoring and evaluation, as well as commitment and support from all clinical and non-clinical

stakeholders were key to the successful execution of Code Blue improvement initiatives.

## **Conclusion**

See poster appended / below

## **Additional Information**

- 2020 National Healthcare Innovation and Productivity (HIP) Best Practice Medal – Care Redesign

Teamwork, skill trainings and strong communication is important at the different checkpoints of the project. The commitment of all members and support from clinical staff on the new Code Blue roles and responsibilities facilitated the smooth execution of the Code Blue improvement initiatives. The revamped Code Blue model will be adopted for new Campus buildings at the Outram Campus.

## **Project Category**

Care & Process Redesign, Quality Improvement, Workflow Redesign, Training & Education, Learning Theories, Methodologies & Framework, Simulated Training

## **Keywords**

Code Blue, Cardiac Arrest, Resuscitation, Response Time

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# To Improve the Code Blue (cardiac arrest) Response Time to less than 5 minutes within 6 months in Singapore General Hospital (SGH)

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## Background

Survival of patients with cardiac arrest is time-sensitive. The chance of successful resuscitation is reduced by 7% to 10% for each minute delay<sup>1</sup>. Code Blue is the emergency response code for cardiac arrests. The 2017 Joint Commission International (JCI) audit identified areas of improvement for Code Blue processes including:

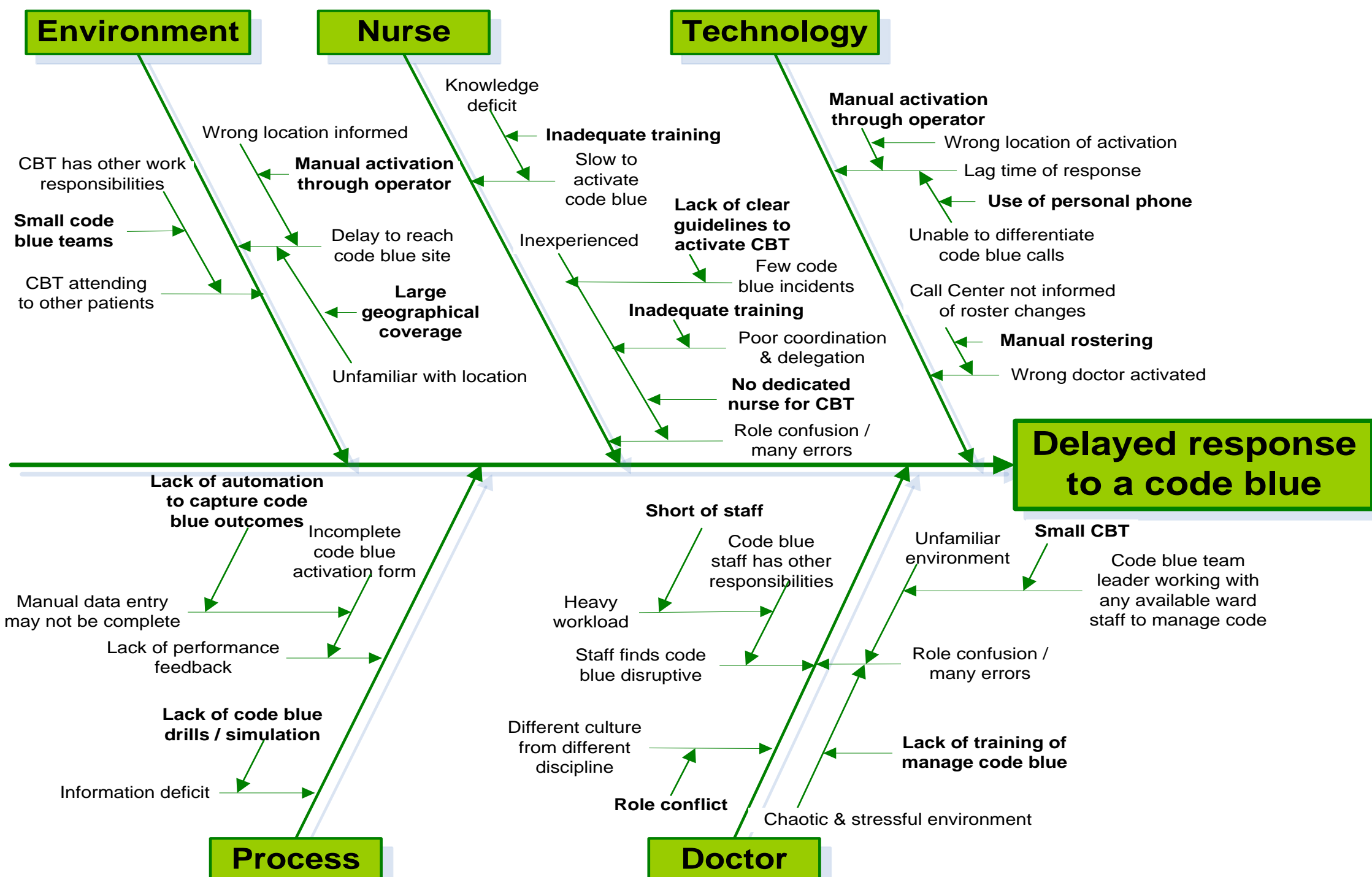
- Speed:** Average Code Blue Team (CBT) response time was more than 5 minutes
- Capabilities:** Limited manpower, skill sets and equipment

Commissioned by Chairman Medical Board and Intensive Care Unit Committee, a multidisciplinary Code Blue Workgroup was formed to improve the quality and efficiency of Code Blue processes.

## Analysis

**1 Scope:** Audit data from Jan to Dec 2017 showed that majority of Code Blue resuscitations occurred in Inpatient wards (76.8%) and Specialist Outpatient Clinics/Centres (14.6%). The project was scoped to focus on SGH main buildings.

**2 Root cause analysis:** Utilising cause-effect analysis, observing Code Blue practices and obtaining feedback from Code Blue Teams (CBTs), root causes of delays in response time were identified.



**3 Final solutions:** Driver diagram and decision matrix diagram were used to develop the final solutions.

Primary drivers	Change ideas	Can be implemented in 6mth?	Budget available?	Workgroup can do it?	Implement?
To provide adequate Code Blue training	Provide dedicated Code Blue training to doctors' residency and nurses' training programme	Yes	Yes	Yes	✓, PDCA 1
To raise awareness on Code Blue processes (activations and response)	Code Blue simulations / full run Targeted communication: via roll call, screensavers, infopedia news, Open House	Yes	Yes	Yes	✓, PDCA 1
To provide fastest route for Code Blue team to reach Code Blue site	Change to geographical-based coverage	Yes	Yes	Yes	✓, PDCA 2
To provide effective activation devices for Code Blue team	Change from the use of personal handphones to dedicated Code Blue phones	Yes	Yes	Yes	✓, PDCA 2
To improve Code Blue composition	To include ICU-trained nurse in CBT To include respiratory therapist in CBT	Yes	Yes	Yes	✓, PDCA 2
To improve Code Blue activation processes	Create detailed area specific coverage in excel sheet for Call Centre staff Enhancement in template in Call Centre Computerized Electronic System Train hospital staff on effective communication for Code Blue activations	Yes	Yes	Yes	✓, PDCA 3
To provide feedback mechanism on Code Blue team's performance	Monthly Code Blue audit Enhancement of hardcopy Code Blue documentation To create electronic Code Blue documentation	Yes	Yes	Yes	✓, PDCA 3
To enhance infrastructure to allow for automation of Code Blue activation	Implement the automatic Code Blue button from clinical areas to Call Centre	No	Yes	No	X
		No	No	No	X

## Interventions / Initiatives

**1** 3 Plan-Do-Check-Act (PDCA) cycles implemented.

### Training, Planning and Communications

- PDCA 1:**
- Regular Code Blue simulations and Skills Training
  - Targeted revamp communications through email blast and Code Blue Open House



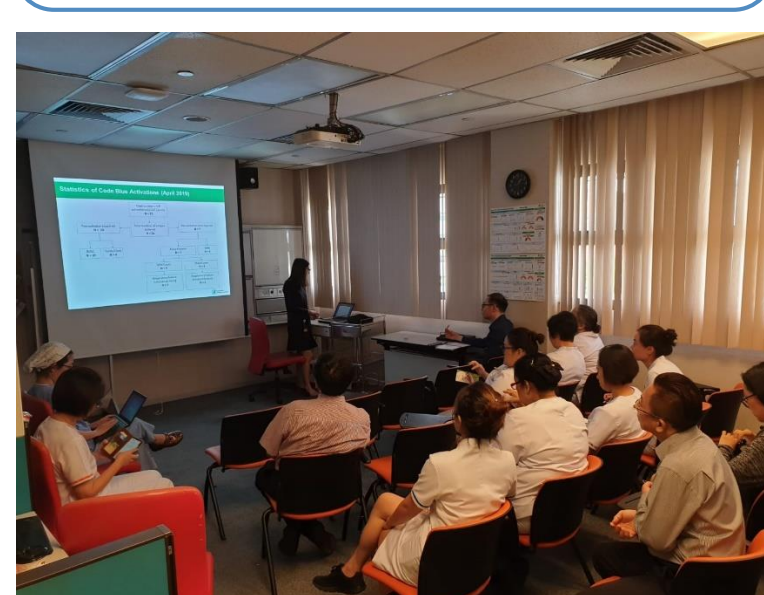
### Code Blue Revamp

- PDCA 2:**
- Change to geographical-based coverage with multi-disciplinary CBTs (doctor, nurse, respiratory therapist)
  - Use of dedicated Code Blue phone/bag and equipment standardisation/augmentation
  - Create standardised resuscitation record form to track CB response time
  - Create detailed excel sheet for Call Centre staff
  - Targeted revamp communications through institutional intranet website banners/focus articles, screensavers.



### Enhancement Process and Sustainability Efforts

- PDCA 3:**
- Monthly Code Blue Audit Meetings
  - Enhancement on Code Blue Activation process
  - Ongoing Communications

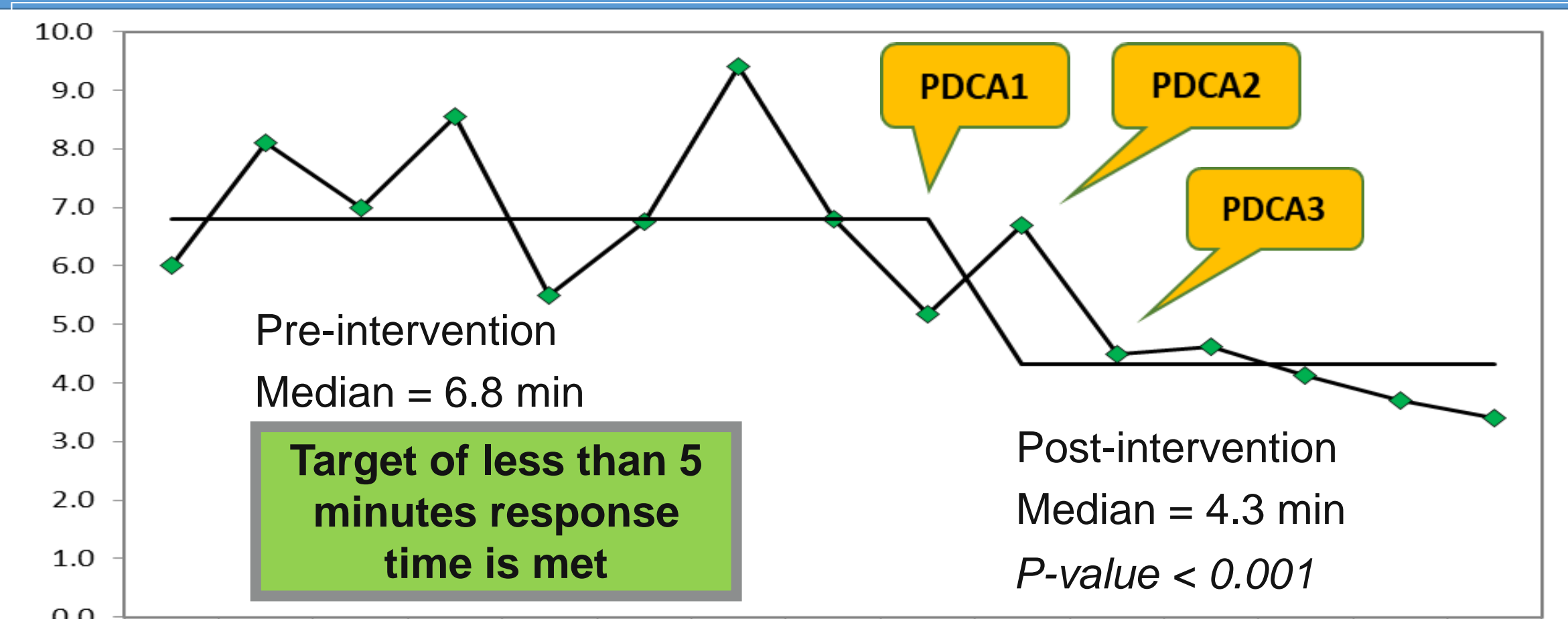


## Mission Statement

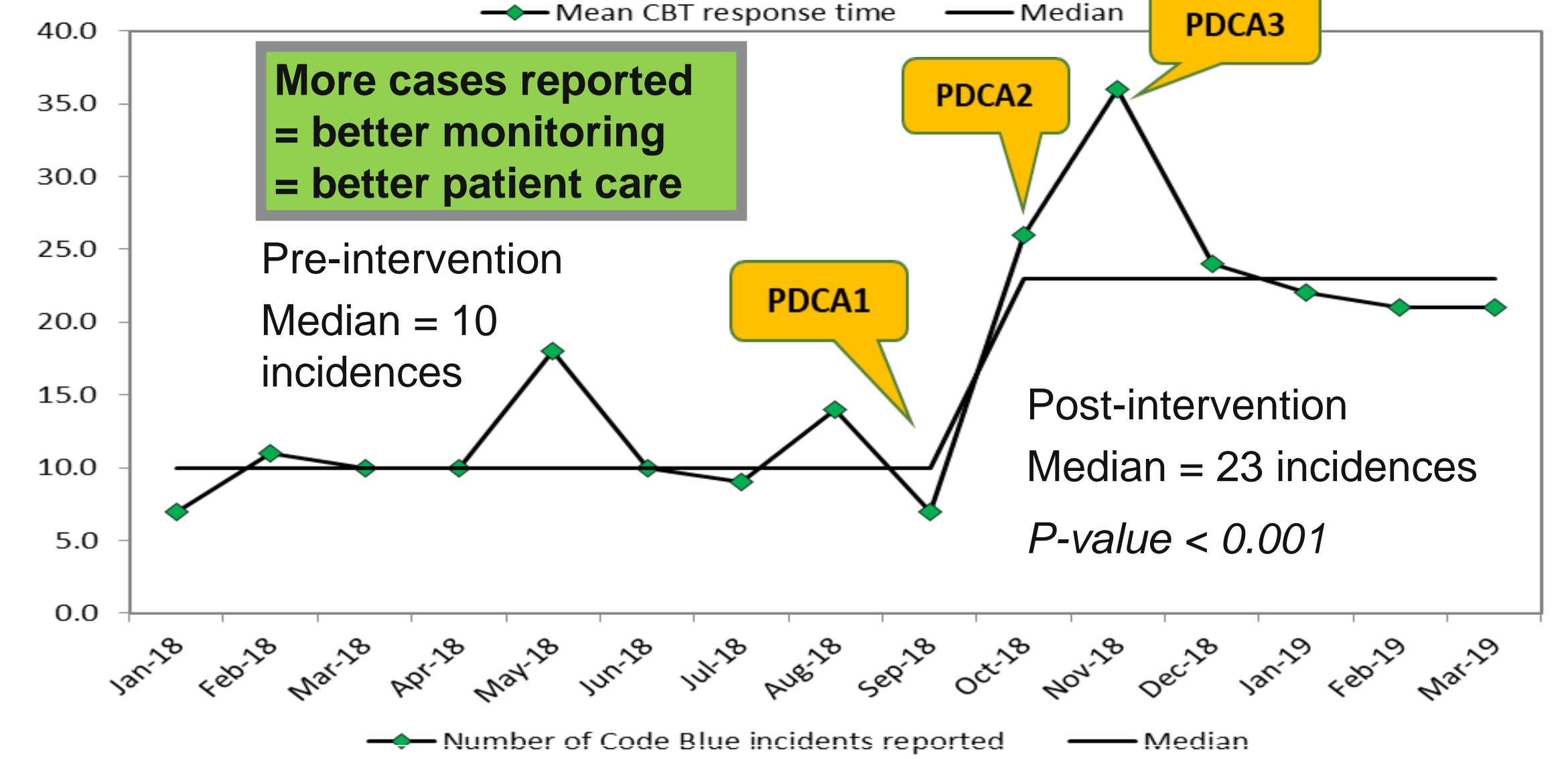
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## Results

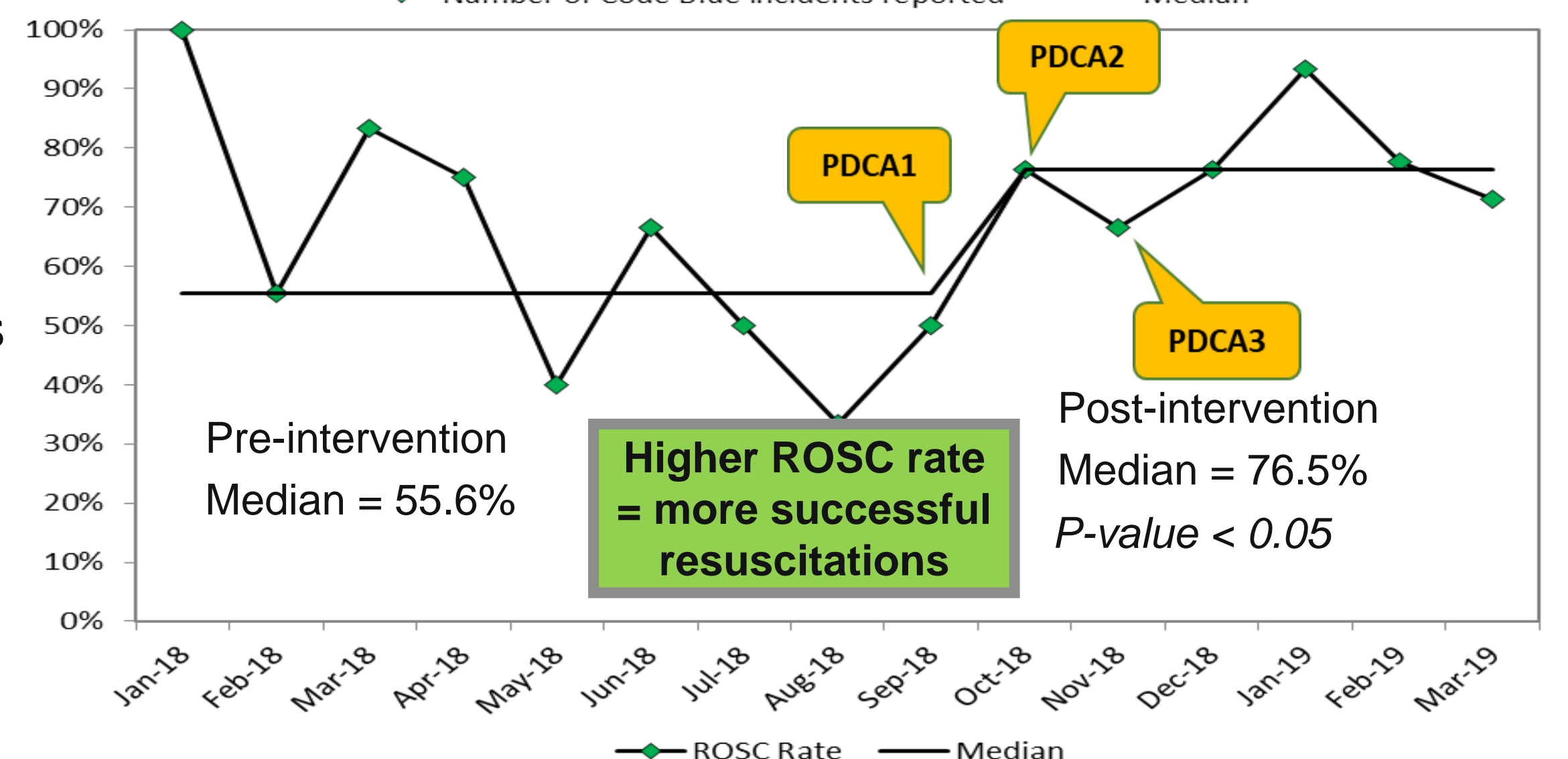
### Code Blue Team Response Time



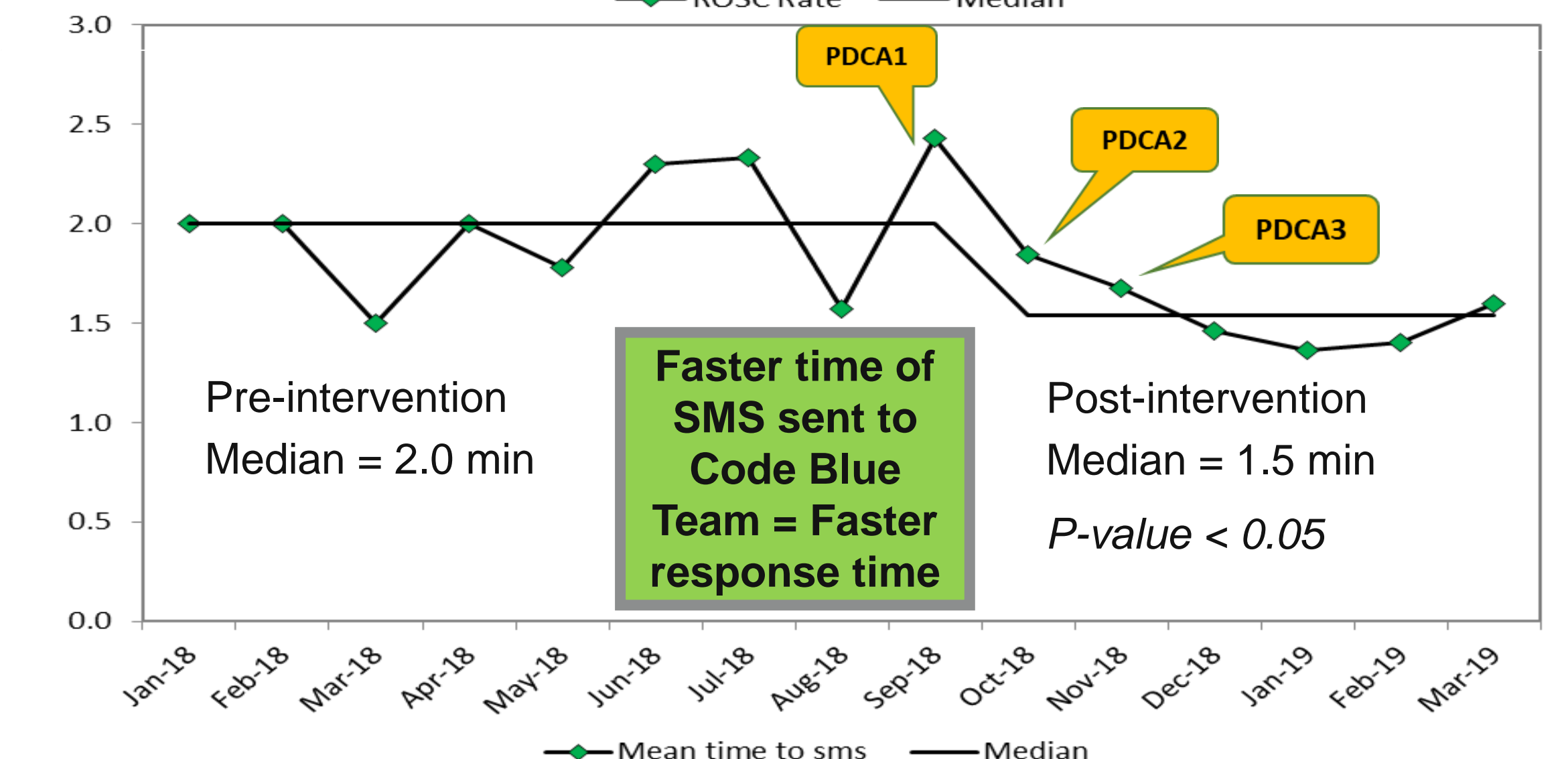
### Number of Code Blue Incidences Reported



### Rate of Return of Spontaneous Circulation



### Time of SMS sent to CBT



## Sustainability Plans

- ✓ We achieved our aim of improving Code Blue response time in SGH to less than 5 minutes within 6 months of implementation. Monthly Code Blue audits with ongoing communications are held to continually enhance the Code Blue processes.
- ✓ This has helped to **develop and strengthen** a passionate and committed workforce to **deliver efficient and quality patient care**.
- ✓ The **revamped Code Blue model** will be adopted for new buildings in Outram Campus.
- ✓ **Strong leadership, collaborative approaches adapted through active monitoring and evaluation, and commitment and support** from all clinical and non-clinical stakeholders were key to the **successful execution of Code Blue improvement initiatives**.

### References:

1. Neumar et al. American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation 2015;132:528-776.