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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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## Introduction

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:

- 1. Speed:** Average Code Blue Team (CBT) response time exceeded 5 minutes
- 2. Capabilities:** Limited in terms of 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.

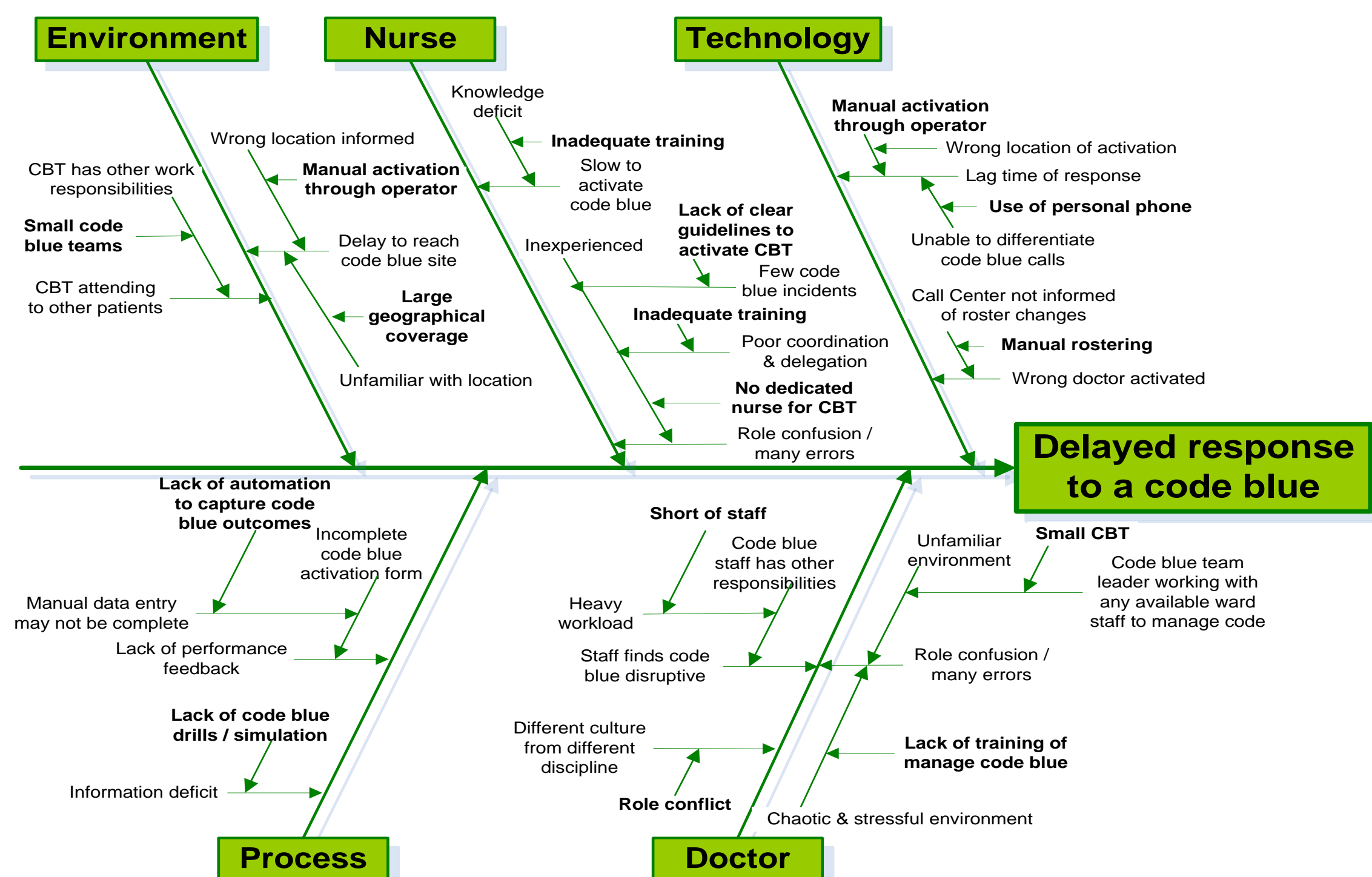
## Aim

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

## Methodology

- 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.

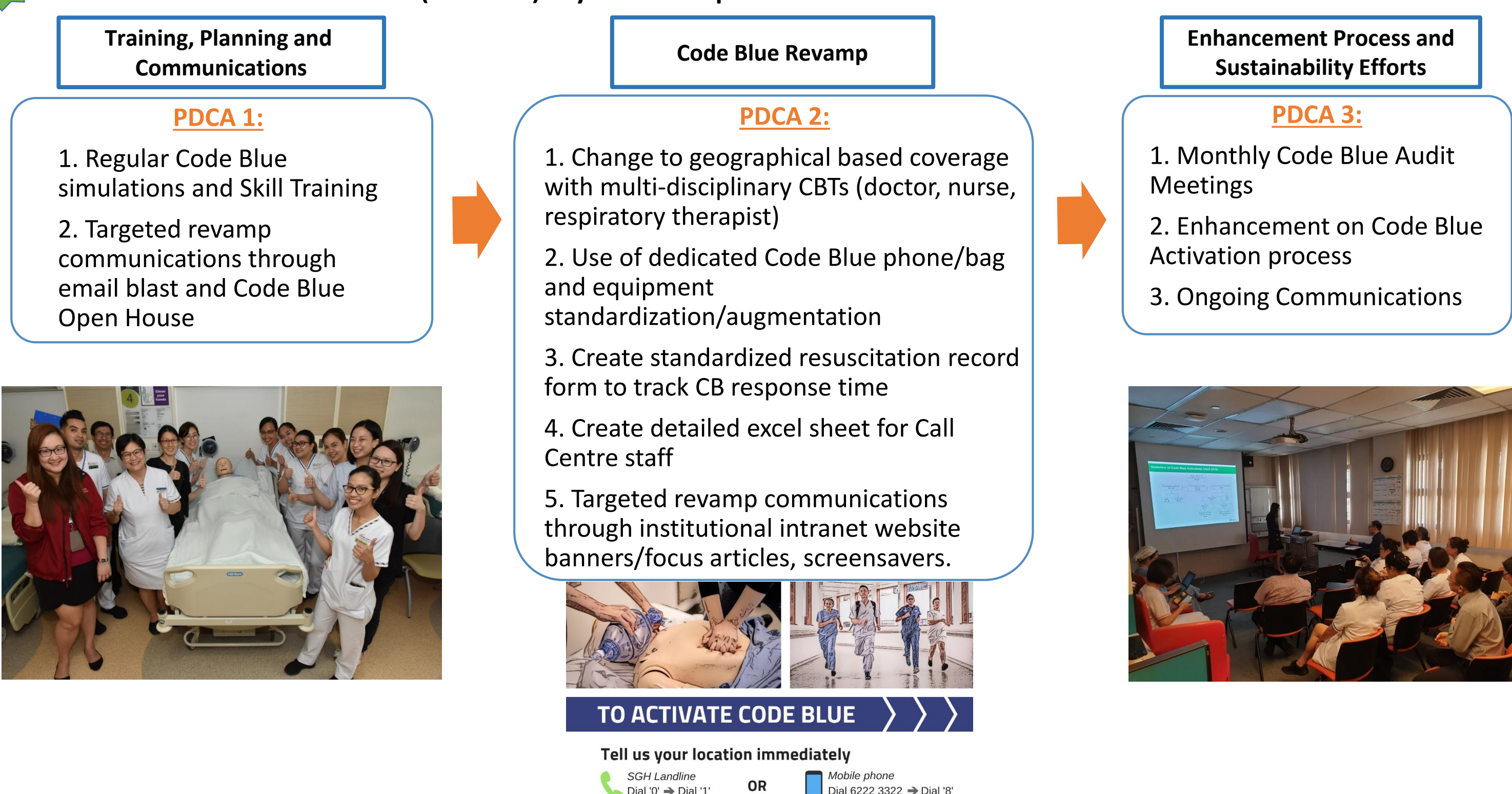
- 2 Root cause analysis:** Utilising cause-effect analysis, observing Code Blue practices and obtaining feedback from Code Blue Teams (CBTs), root causes of delays in response time were identified.



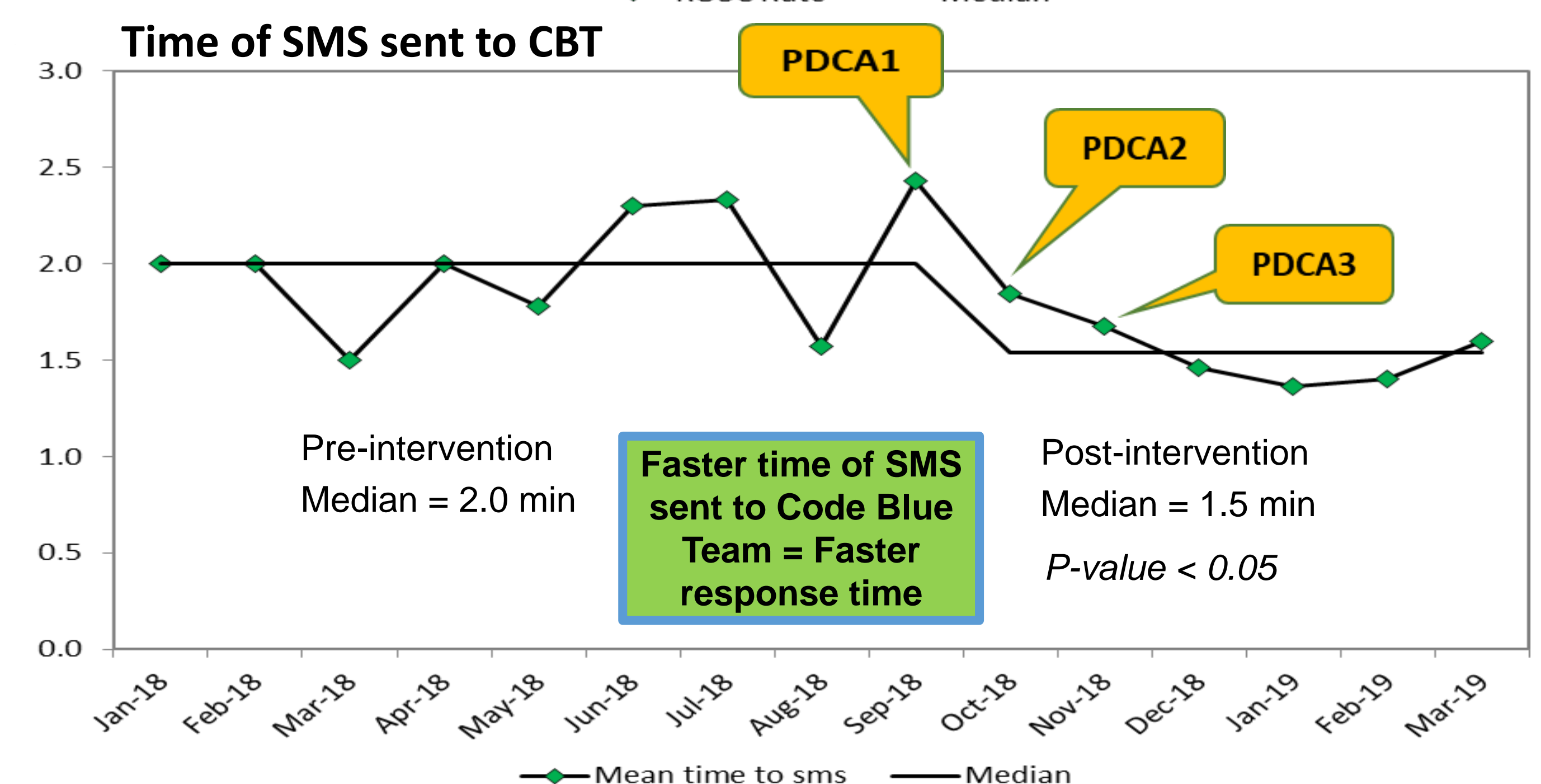
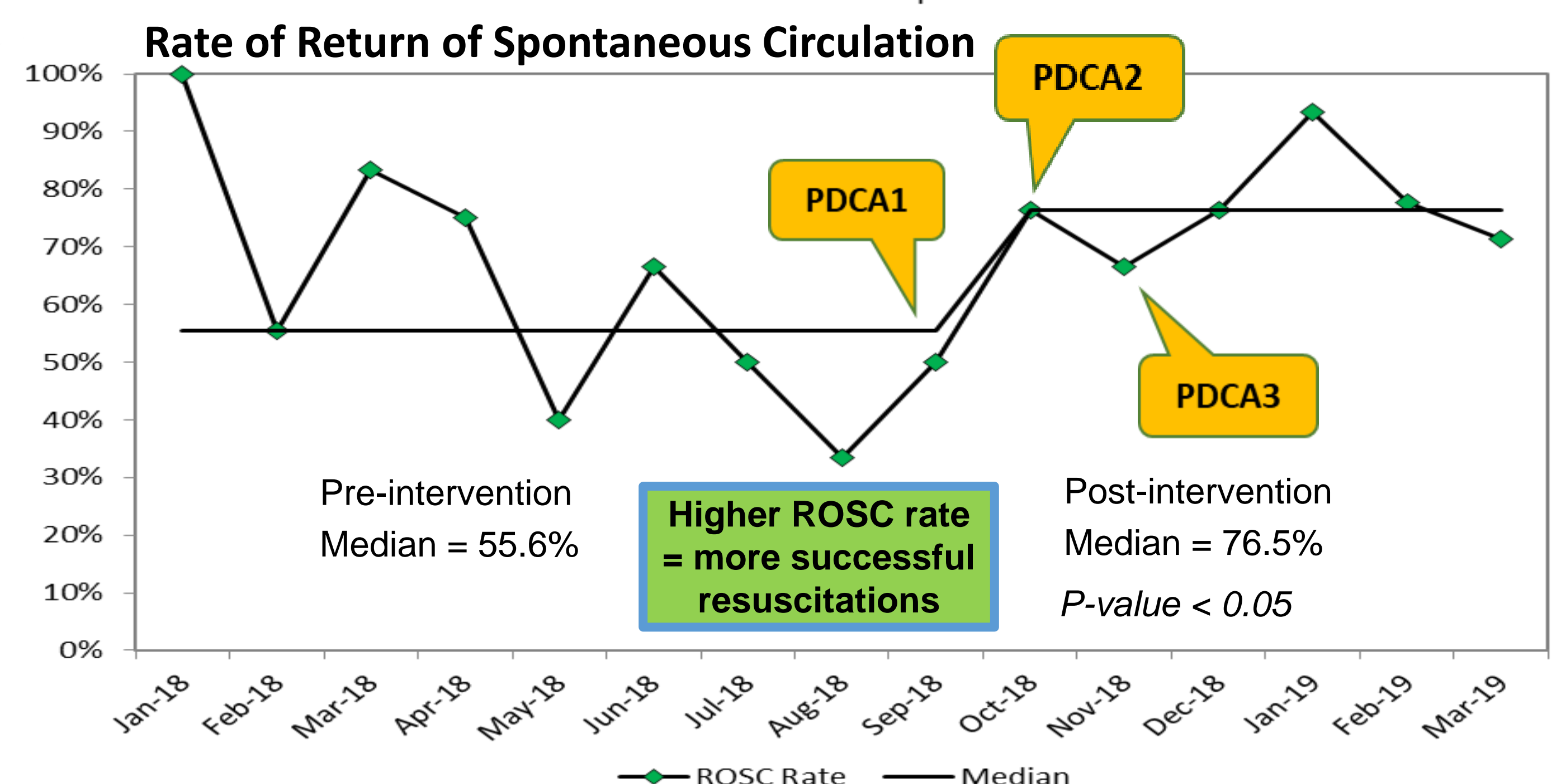
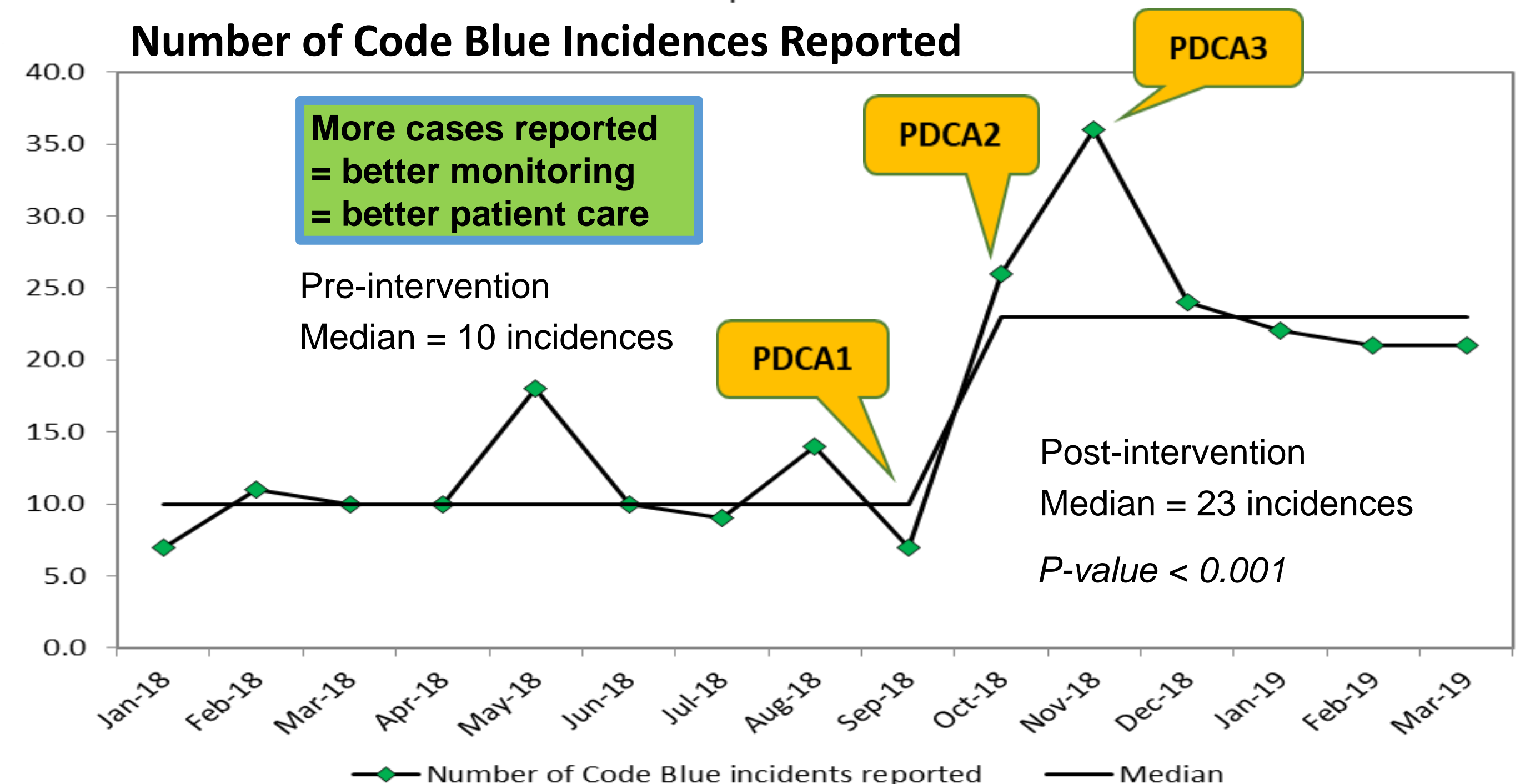
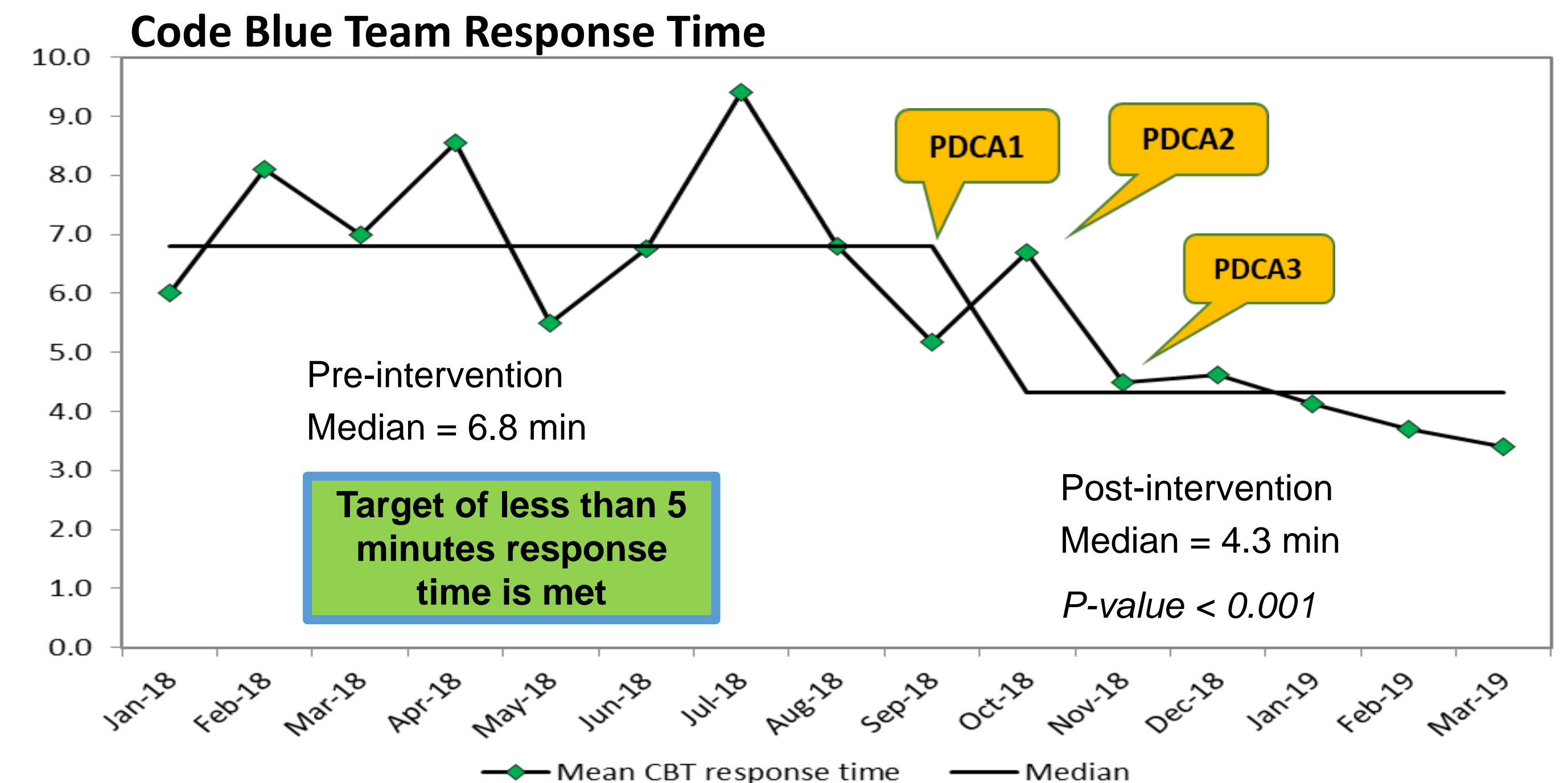
- 3 Final solutions:** Driver diagram and decision matrix diagram were used to develop the final solutions.

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 into 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, infonet 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	Yes	Yes	Yes	✓, PDCA 3
To enhance infrastructure to allow for automation of Code Blue activation	To create electronic Code Blue documentation Implement the automatic Code Blue button from clinical areas to Call Centre	No	Yes	No	✗
		No	No	No	✗

- 4 3 Plan-Do-Check-Act (PDCA) cycles implemented.**



## Results



## Conclusion

- ✓ We achieved our aim of improving **Code Blue response time in SGH to less than 5 minutes** within 6 months of implementation.
- ✓ 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:

- Neumar et al. American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Circulation 201500