

## **Project Title**

C.H.O.P. – Faster Intervention and Reduced Mortality in Major Trauma

## **Project Lead and Members**

Project lead: Dr Jerry Goo Tiong Thye

Project members: Kang M.L, Sivaraj G, Ong M.W, Lee JW, Sivasubramanian S, Chen X.Y, Lim W.W, Tay D.X.H, Fung M.C.H, Lee D.J.K

## **Organisation(s) Involved**

National University Hospital

## **Healthcare Family Group(s) Involved in this Project**

Medical, Allied Health

## **Applicable Specialty or Discipline**

Haematology, Surgery

## **Project Period**

Start date: March 2018

Completed date: September 2023

## **Aims**

1. Early recognition of severely injured patient
2. Early activation of specialists
3. Early intervention

Initiate definitive intervention within 90 minutes.

## **Background**

KTPH receives an average of 1200 major trauma patients per year, of which ~350 are Tier 1 (severe or critical injury)

- > 90% blunt trauma from road traffic accidents or falls from height
- < 30% present during office hours
- “Golden Hour” for intervention
- Delay in haemostasis leads to a rapid down-spiral into the lethal triad

## Methods

See poster appended/below

## Results

See poster appended/below

## Conclusion

CHOP as the first second-tier trauma activation protocol in Singapore has enabled early intervention and improved overall mortality for major trauma in KTPH via automating communication, prioritising access to resources, and standardising resuscitation care bundles. This is a versatile platform that can be readily adapted by other institutions and be modified to include new evidence-based interventions.

## Project Category

Care & Process Redesign

Value Based Care, Safe Care, Productivity, Cost Saving

## Keywords

Trauma, Road Traffic Accident, Golden Hour, Communication, Patient Safety, Quality Control

## Name and Email of Project Contact Person(s)

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# C.H.O.P. – Faster Intervention and Reduced Mortality in Major Trauma

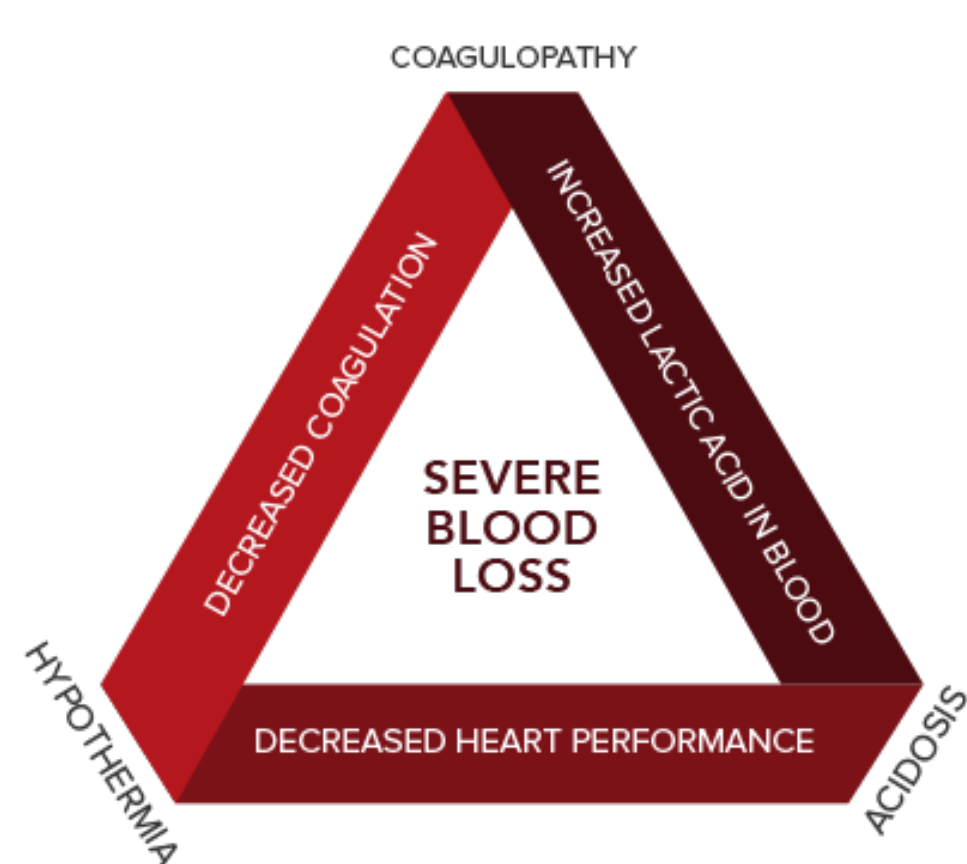
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 Lim W.W.<sup>1</sup>, Tay D.X.H.<sup>1</sup>, Fung M.C.H.<sup>4</sup>, Lee D.J.K.<sup>1</sup>, Goo J.T.T.<sup>1</sup>  
<sup>1</sup>General Surgery, <sup>2</sup>Diagnostic Radiology, <sup>3</sup>Anaesthesia, <sup>4</sup>Acute & Emergency Care  
 Khoo Teck Puat Hospital

## Background

•KTPH receives an average of 1200 major trauma patients per year, of which ~350 are Tier 1 (severe or critical injury)

- > 90% blunt trauma from road traffic accidents or falls from height
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### The Golden Hour



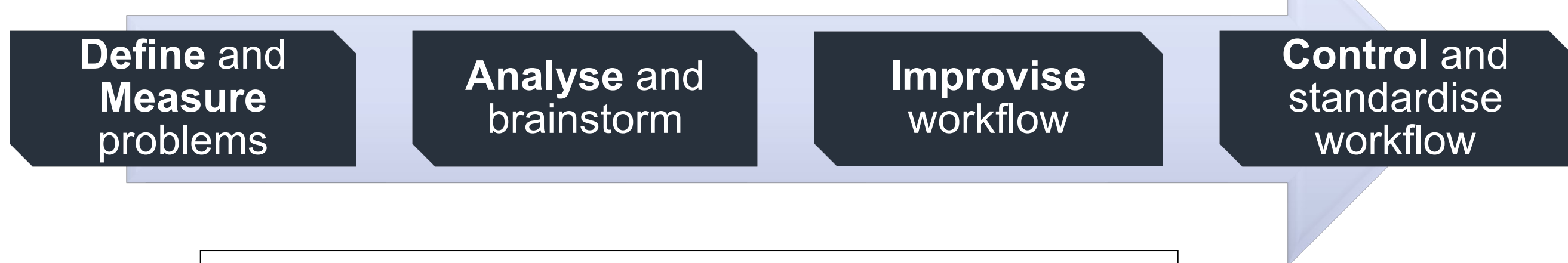
### Key objectives:

1. Early *recognition* of severely injured patient
2. Early *activation* of specialists
3. Early *intervention*

- **Aim:** Initiate *definitive intervention* within 90 minutes

## Methodology

• Lean 6-sigma (DMAIC) approach was adopted:



C.H.O.P. CRITERIA	
≥ 2 criteria	Systolic blood pressure ≤ 90mmHg
	Heart rate ≥ 120bpm
	Penetrating trauma
	Free fluid in abdomen on ultrasound

### CRITICALLY INJURED PATIENT IDENTIFIED

**Automated communication**

- Switchboard calls multidisciplinary specialist team:
- General Surgery
- Anaesthesia
- Interventional Radiology

**Priority Access to Resources**

- Operating theatre (EOT)
- Blood bank
- Radiology

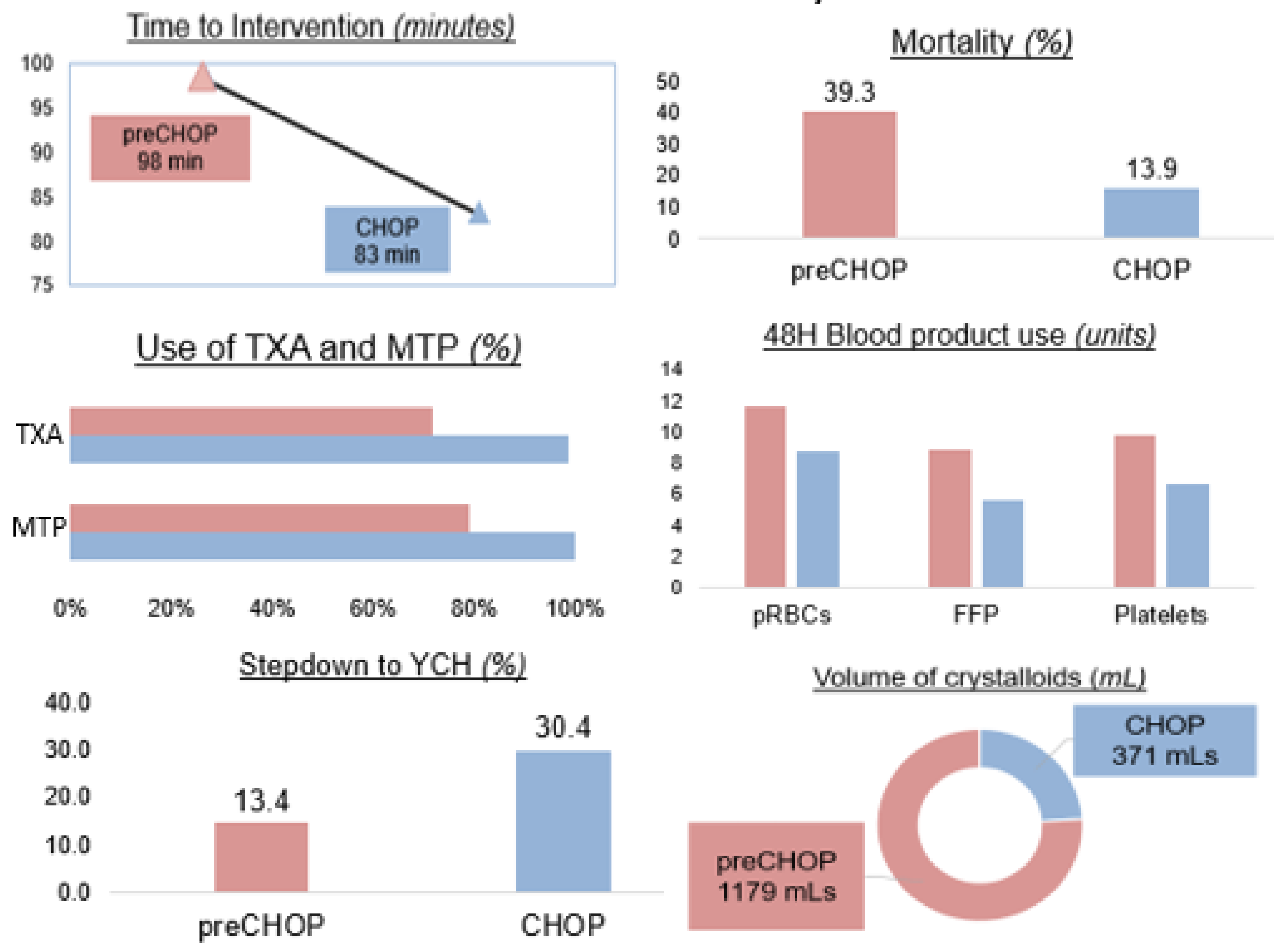
**Standardization of Resuscitation Protocols**

- Warmed blood
- Massive Transfusion Protocol (MTP)
- Tranexamic acid (TXA)

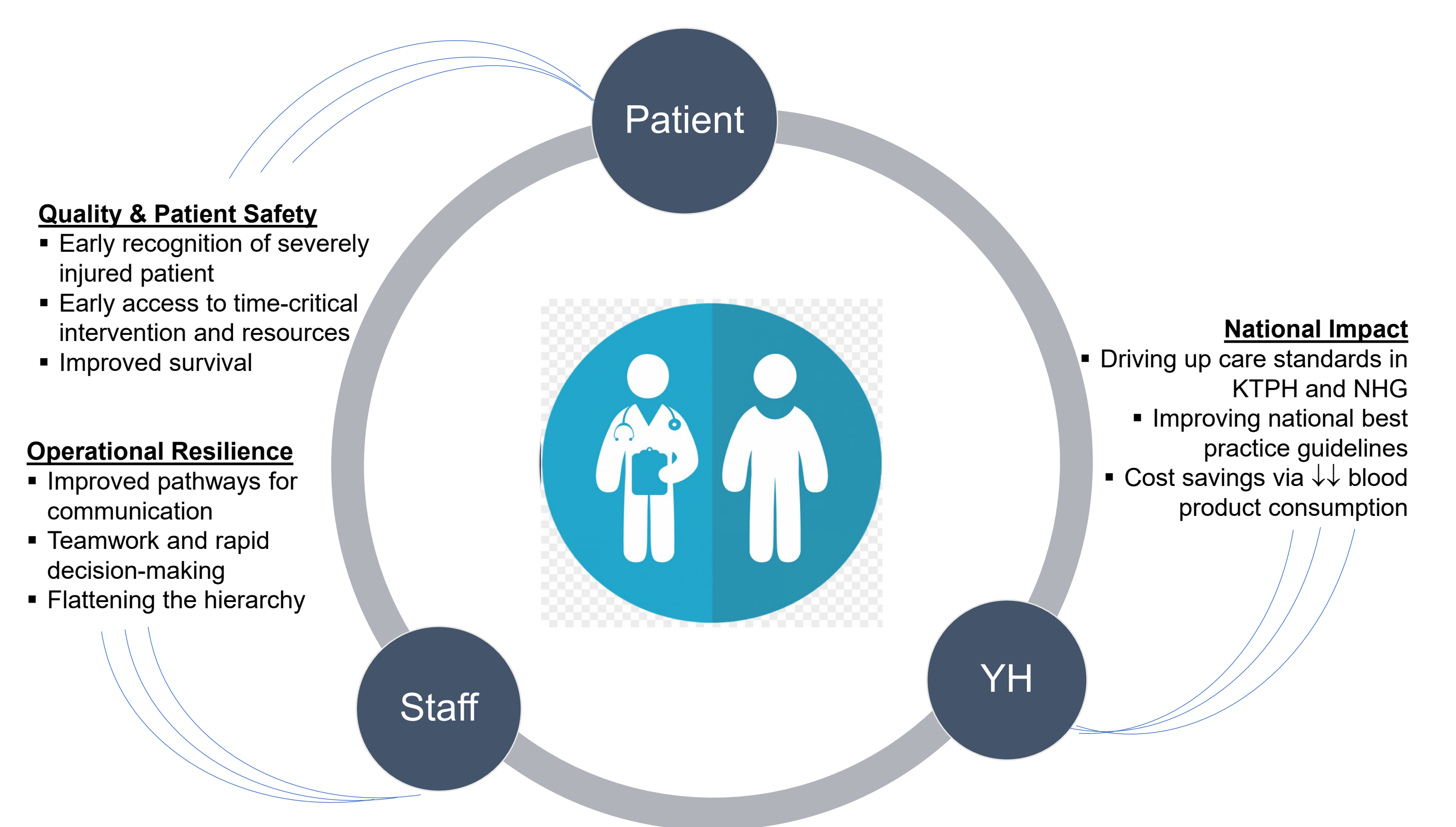
## Results

preCHOP patients: April 2012–December 2017 (N = 89)  
 CHOP patients: March 2018–September 2023 (N = 79)

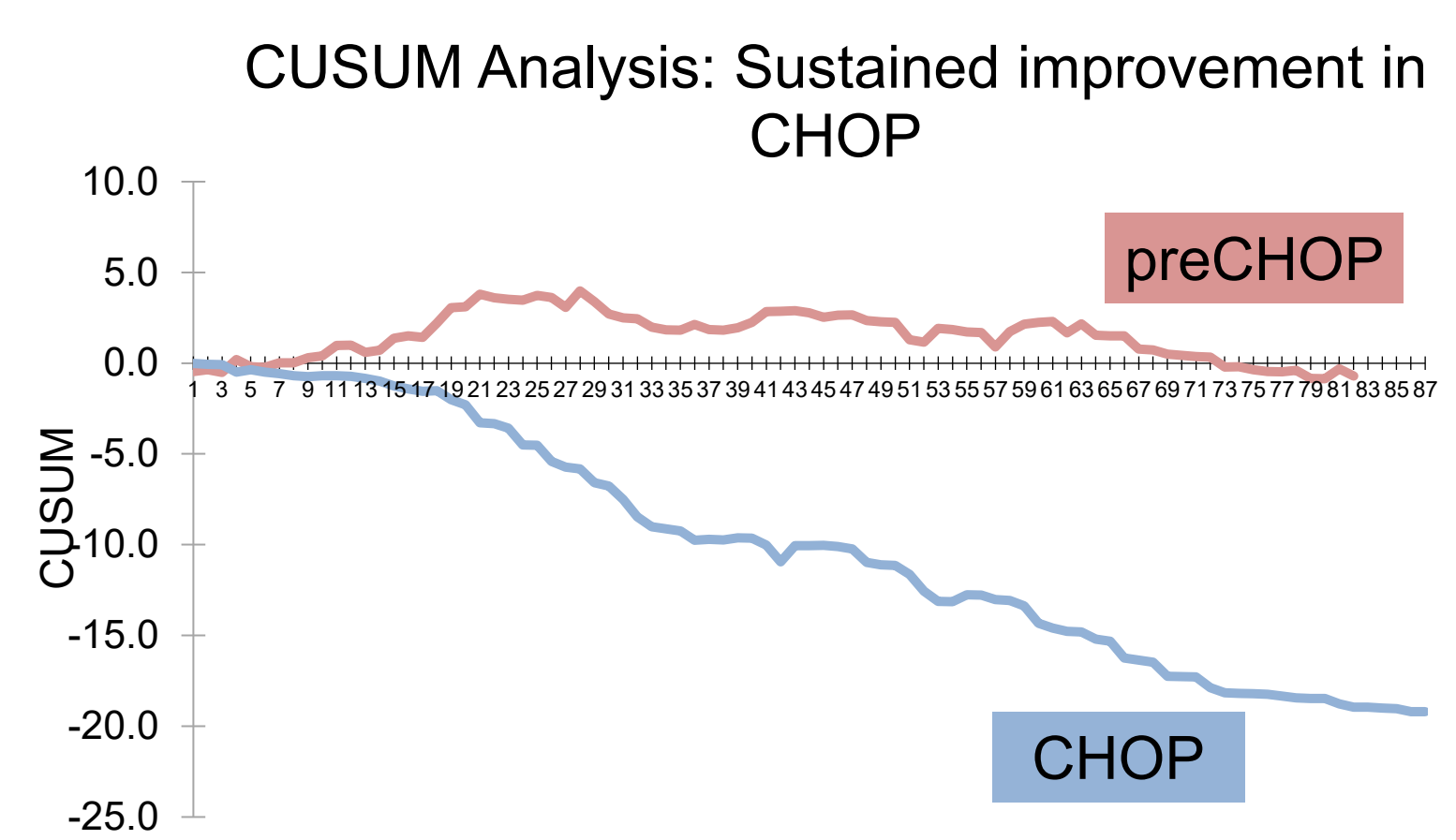
NB: *p* < 0.05 for all featured results.



## Project Impact



## Sustainability & Follow-Up



- The CUSUM graph is used in Quality Control to measure performance of a process or workflow. A continuous downward slope is an indicator of high sustainability and good outcomes.
- CHOP has contributed to high standard of care with mortality <<< expected rate over 5 years despite heterogeneity of polytrauma.
- Constant review of results in the multidisciplinary trauma committee with audits of mortality cases with changes enacted in real time, e.g. use of MOT for combined surgery and embolization in lieu of hybrid OT due to decreased availability in office hours
- Outreach to other local healthcare groups for uptake of CHOP.

## Conclusion

CHOP as the first second-tier trauma activation protocol in Singapore has enabled early intervention and improved overall mortality for major trauma in KTPH via automating communication, prioritising access to resources, and standardising resuscitation care bundles. This is a versatile platform that can be readily adapted by other institutions and be modified to include new evidence-based interventions.