

## Project Title

Reducing Rate of Blood Transfusion for Patients Undergoing Orthopaedic Surgery at SGH

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## Organisation(s) Involved

Singapore General Hospital

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

Medical

## Applicable Specialty or Discipline

Othopaedic

## Aim(s)

- To improve Nil Blood Transfusion rate in patients undergoing TKR surgeries from 98.1% to 100% in 6 months.
- To improve Nil 30 Day Blood Transfusion rate in patients undergoing THR surgeries from 81% to 90% and Spinal Fusion surgeries from 87% to 90% in 6 months.

## Background

See poster appended/ below

## **Methods**

See poster appended/ below

## **Results**

See poster appended/ below

## **Conclusion**

See poster appended/ below

## **Additional Information**

Singapore Healthcare Management (SHM) Congress 2022 – Merit Prize (Risk Management category)

## **Project Category**

Care & Process Redesign

Quality Improvement, Workflow Redesign, Clinical Practice Improvement, Value Based Care, Safe Care, Patient Satisfaction, Risk Management, Preventive Approach

## **Keywords**

Value Driven Care, Blood Transfusion, Total Knee Replacement, Total Hip Replacement, Spinal Fusion, Surgical Blood Loss

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# Reducing rate of blood transfusion for patients undergoing orthopaedic surgery at SGH



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## Introduction

The Singapore Ministry of Health started the Value Driven Care (VDC) monitoring and analysis for elective orthopaedic surgeries such as Total Knee Replacement (TKR), Total Hip Replacement (THR) and Spinal Fusion surgeries. One of the indicators monitored is the Nil Blood Transfusion rate in which cases with blood transfusion would 'fail' the indicator. The team identified blood transfusion as one of the areas for improvement.

## Mission Statement

- To improve Nil Blood Transfusion rate in patients undergoing TKR surgeries from 98.1% to 100% in 6 months.
- To improve Nil 30-Day Blood Transfusion rate in patients undergoing THR surgeries from 81% to 90% and Spinal Fusion surgeries from 87% to 90% in 6 months.

## Analysis of Problem

Data analysis and case review were conducted by CGQ for the cases with blood transfusion to identify significant causes of blood transfusion.

The following were identified as areas for improvement to prevent unnecessary blood transfusion:

### 1. Haemoglobin (Hb) upon/before admission to determine the severity of anemia

- Significant percentage of patients presented with anemia upon/before admission; 52.9% - 73.3% (n=9 to 42) patients with sub-optimal Hb level.
- Example below shows TKR with 42 patients with sub-optimal Hb:

Patients With Blood Transfusions (TKR) for Jul '18 – Jun '19				
Severity of Anaemia	Male		Female	
	No. of cases	%	No. of cases	%
Moderate/Severe Anaemia	3	5.1	22	37.3
Mild Anaemia	5	8.5	12	20.3
No Anaemia	2	3.4	15	25.4
<b>Grand Total</b>	<b>10</b>	<b>16.9</b>	<b>49</b>	<b>83.1</b>

### 2. Indications for transfusion

- Most transfusions occurred in the post-op phase.
- 1 patient was admitted early for blood transfusion before operation.
- Many patients were transfused with only 1 pint RBC (n=95 for TKR, THR and Spinal Fusion), a few of them only had a minor drop in Hb after operation or their last Hb before the transfusion was >8 g/dL.
- E.g. for TKR, 45 patients were transfused with 1 pint:

OTO Conditions	Phase	No. of units transfused	No. of cases	Proportion (out of 59 cases)
Total Knee Replacement	Pre-op	1	1	1.7%
	Intra-op	1	2	3.4%
		3	1	1.7%
	Post-op	1	42	71.2%
2		14	23.7%	
	4	1	1.7%	

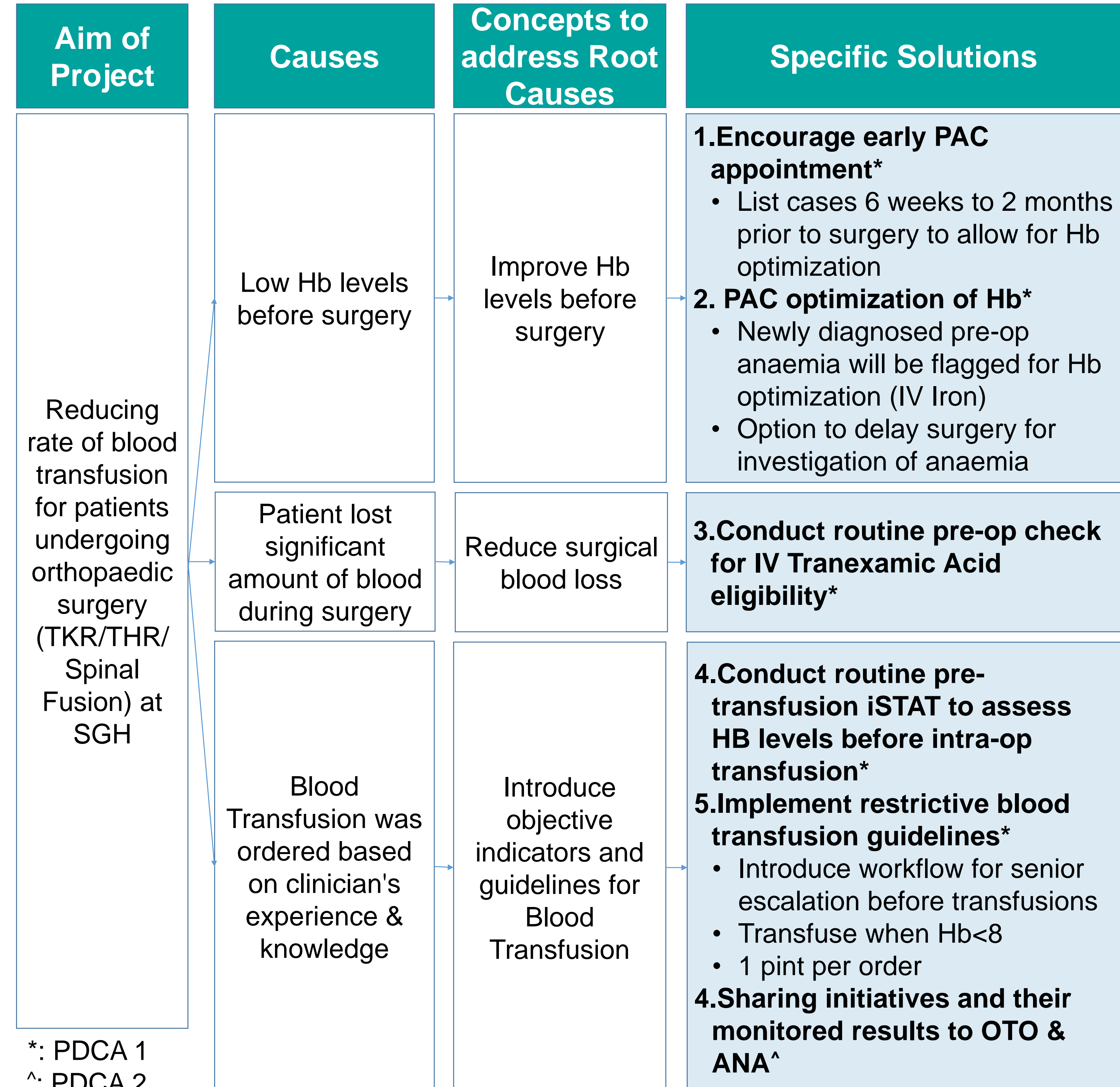
### 3. Perioperative blood management

- High amount of blood loss during operation resulting in a drop in Hb levels despite having optimal Hb upon/before admission.
- E.g. THR

Hb pre-upon admission (g/dL)	Intra-op RBC Transfused	Hb before post-op transfusion (g/dL)	Post-op RBC Transfused	Total RBC Transfused (Index)	Estimated Blood Loss (ml)
13.0	2	8.3	1	3	1700 ml

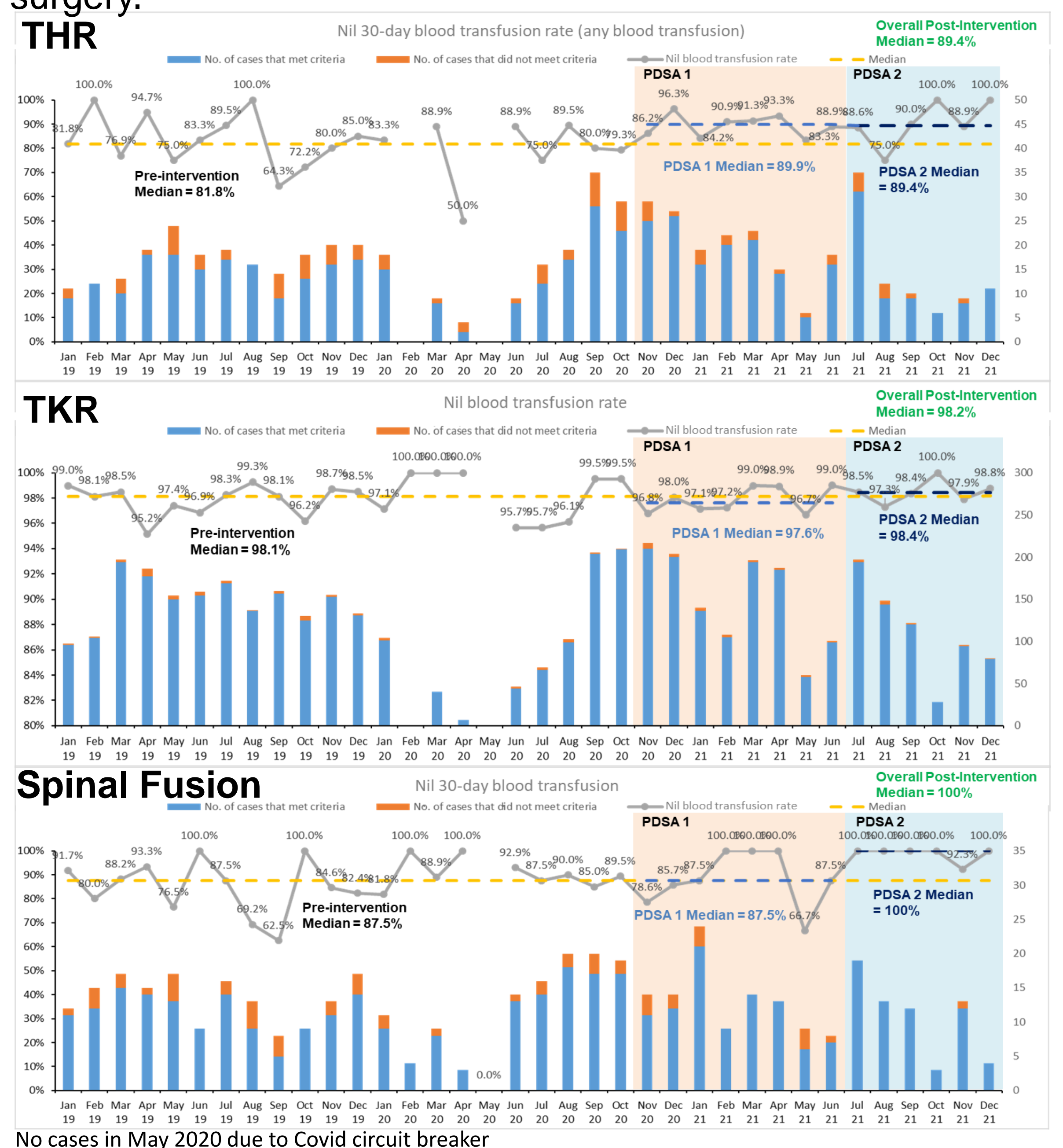
Shah, A., Palmer, A.J.R. and Klein, A.A. (2020), Strategies to minimize intraoperative blood loss during major surgery. Br J Surg, 107: e26-e38. doi:10.1002/bjs.11393

## Interventions / Initiatives



## Results

There has been overall improvement in performance for all conditions (the performance has improved from 81.8% pre-intervention to 89.4% post intervention for THR, 98.1% to 98.4% for TKR and 87.5% to 100% for Spinal Fusion respectively). Project goal has been met for patients undergoing Spinal Fusion surgery.



## Conclusion

By improving Hb levels before surgery, reducing surgical blood loss and introducing objective blood transfusion indicators and guidelines, the team reduced the rate of blood transfusions in patients undergoing orthopedic surgery. The performance will continue to be monitored via automated dashboards. Patient blood management protocol has been uploaded in the department infonet and implemented in the department.