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14th PAN ARAB TRANSFUSION MEDICINE CONFERENCE QATAR 2024

Inspiring Transfusion Excellence Across Arab Nations

Management of Massive Hemorrhage in Transfusion Services in the Eastern Mediterranean Region

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DISCLOSURE STATEMENT

I make the following declaration in relation to this CPD Activity :

- This complies with the Ministry of Public Health in Qatar Department of Healthcare Professions MoPH-DHP accreditation standards.
- There is NO Conflict of Interest.
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INTRODUCTION

- Traumatic hemorrhagic shock is the most common cause of preventable death after injury
  - Worldwide: ~5 million preventable deaths, mostly in young adults
- Mortality
  - 20% at 24hrs post-injury
  - 20-25% (adults), 50% (children) at 30 days
- A quarter of patients already have coagulopathy before the first unit of blood
- Mortality is increased by 5% for each minute delay in transfusion after activation of MT protocol

Meyer DE, et al. J Trauma Acute Care Surg 2017;83:19–24 , Yazer MH. Transfusion. 2018 Nov;58(11):2744-6

SUCCESSFUL MANAGEMENT

Effective coordination

Multidisciplinary communication

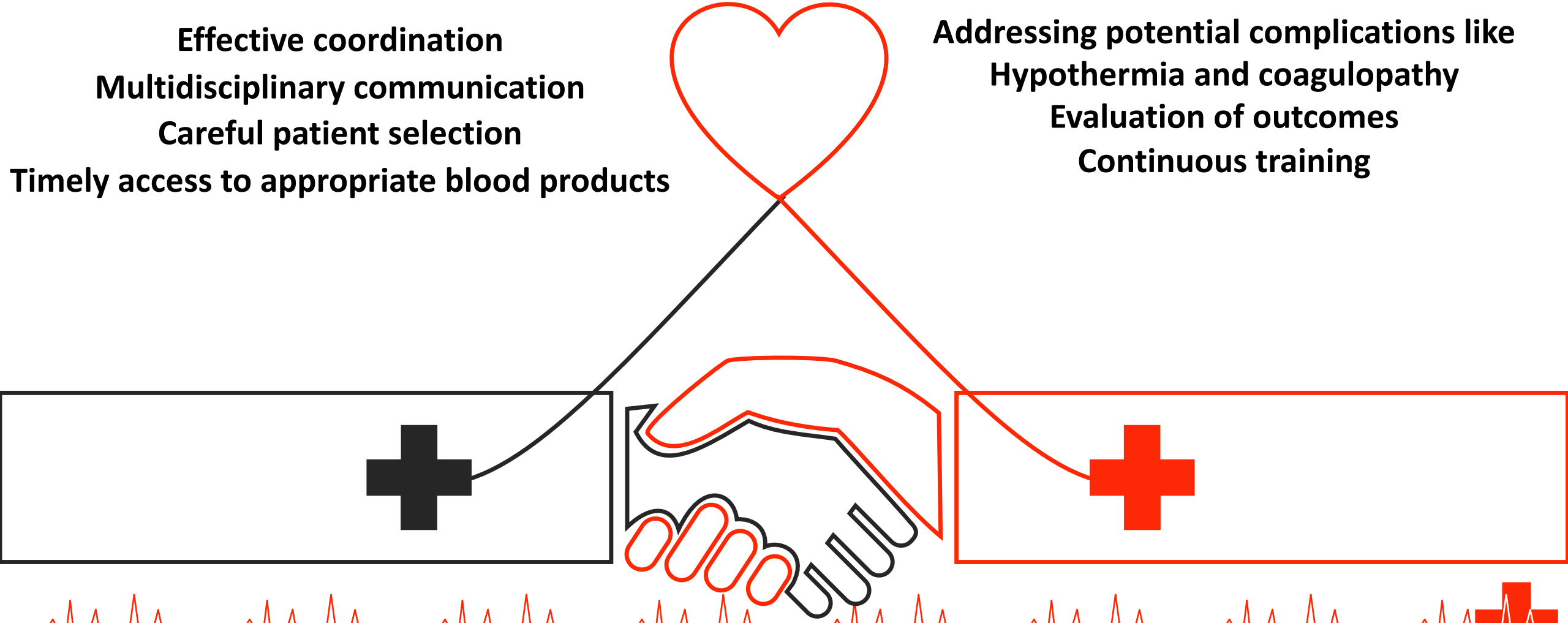
Careful patient selection

Timely access to appropriate blood products

Addressing potential complications like Hypothermia and coagulopathy

Evaluation of outcomes

Continuous training

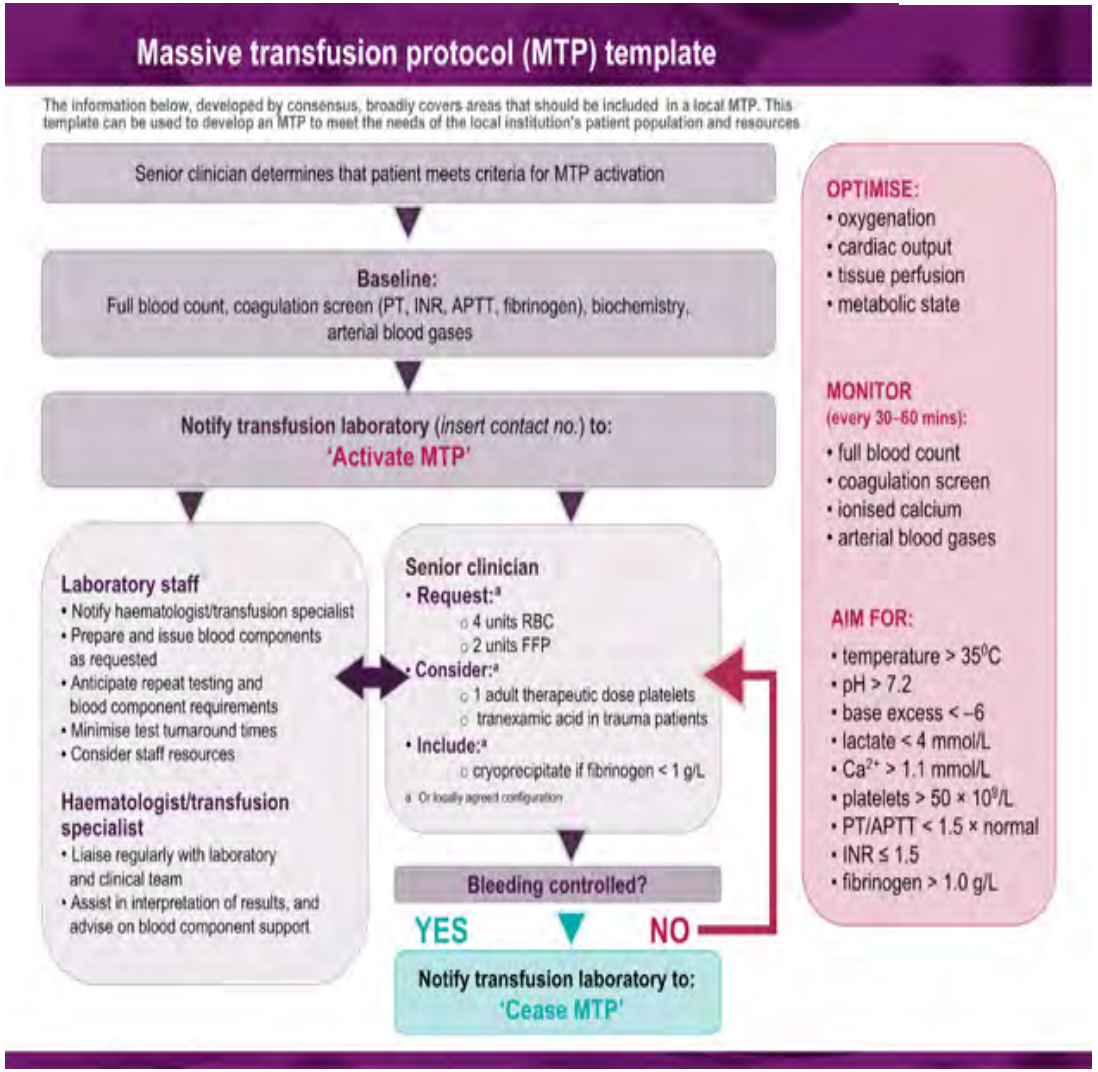


MT PROTOCOLS

- Have become widely used in the initial resuscitation
- Issuing of blood products in packs
  - Standardized & efficient
  - Facilitates ordering, processing & transportation of blood components
  - Improved communications
  - Early introduction of PLTs and Plasma

> Other components

- Hypothermia and acidosis control
- Pharmacological agents
- Laboratory monitoring
- Surgical interventions



Treml AB, et al. Anesth Analg 2017;124:277-81, Holcomb JB et al. Ann Surg 2008;248:447-58, Holcomb JB et.al JAMA 2015;313:471-82

RBC:PLASMA:PLATELETS

Most centers deliver fixed amounts of blood products and target a RBC-to-plasma ratio of 1:1

- Has been championed by many in the trauma community since the early-mid 2000's
- Based on retrospective studies involving military combat casualties
- Minimizes clotting factor dilution and third spacing
- Improved outcomes and survival in traumatically injured patients
  - ? Survivorship bias as well as other sources of bias

Treml AB, et al. Anesth Analg 2017;124:277-81 , Holcomb JB et al. Ann Surg 2008;248:447-58 , Holcomb JB et.al JAMA 2015;313:471-82

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Vox Sanguinis ISBT International Society of Blood Transfusion

ORIGINAL ARTICLE

Management of massive haemorrhage in transfusion medicine services in the Middle East and North Africa

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OBJECTIVES

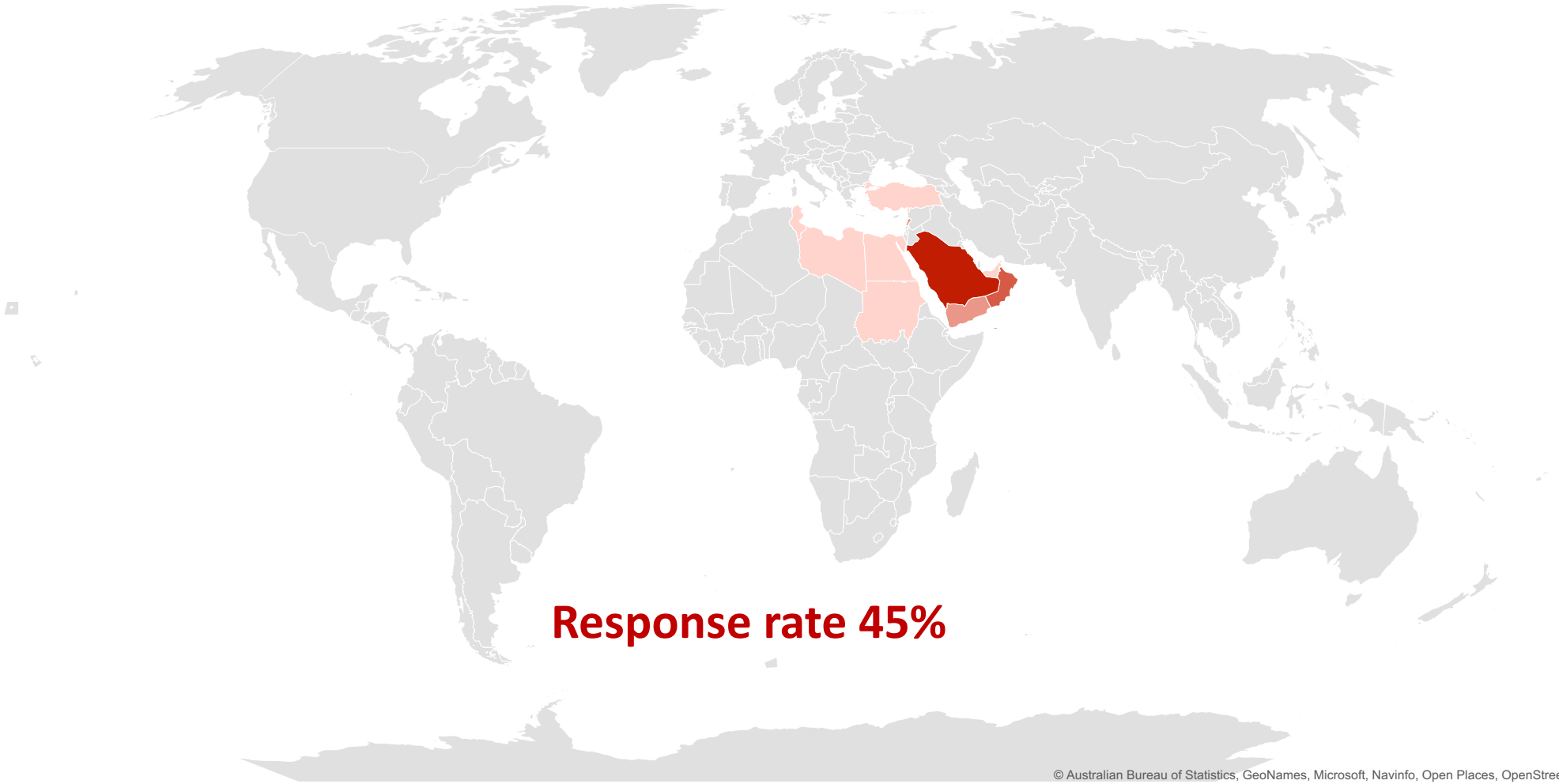
- To explore various aspects of massive transfusion protocols currently in use in the region:
  - Indications
  - Blood product ratio
  - Strategies for provision
  - Monitoring of patients
  - Challenges faced
  - Potential areas for improvement

- Targeted invitation to medical directors or designates of hospital-based blood banks & transfusion services in the region

METHODS

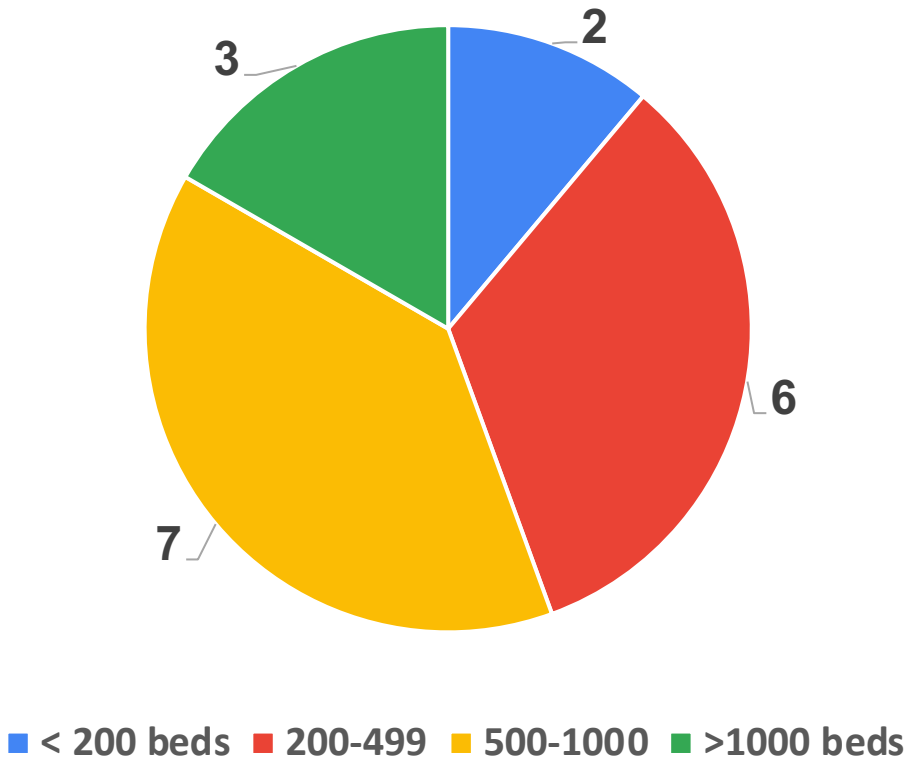
- Ethical approval was obtained from the Ethics Committee, College of Medicine & Health Sciences, Sultan Qaboos University (MREC# 3120/2023)
- Survey design & pilot among the research team members (8x)
- A list of medical directors (or designates) working in hospital-based transfusion services was made.
  - Participants were allowed to include one more participant from their center if needed (e.g from other specialties).
- Invitation and survey distribution by email- October 1st 2023
- Three reminders

RESULTS

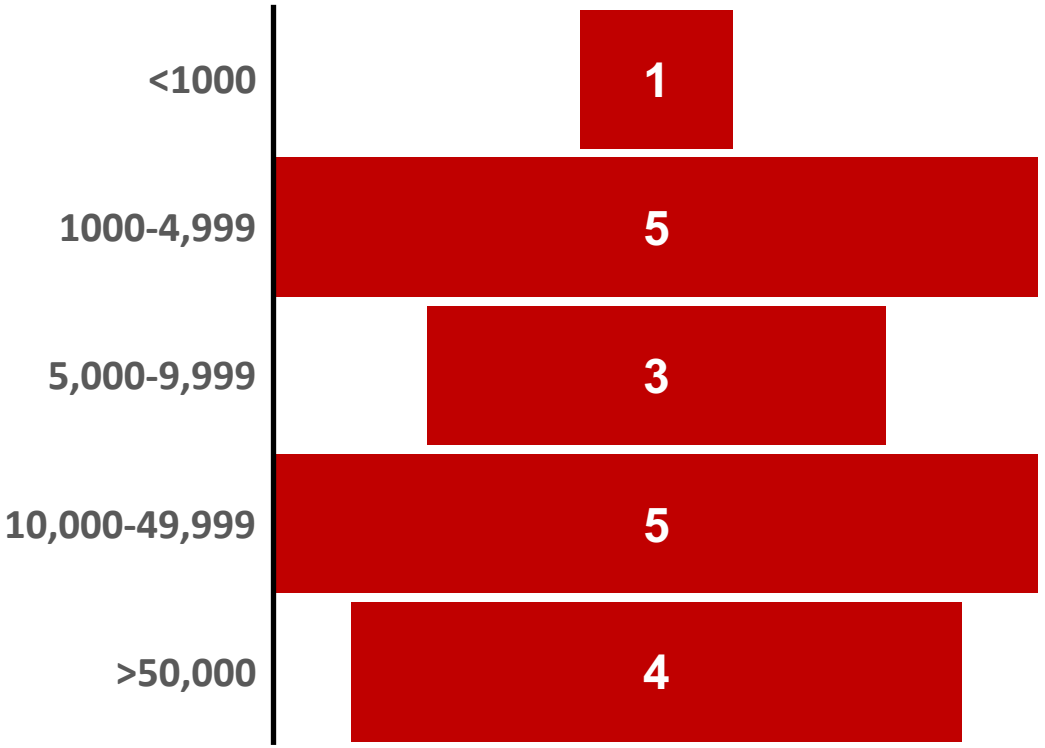


KSA=4
Oman =3
Yemen=2
Lebanon=2
UAE=1
Libya=1
Turkey=1
Bahrain=1
Tunisia=1
Egypt=1
Sudan=1

DEMOGRAPHICS



Number of beds



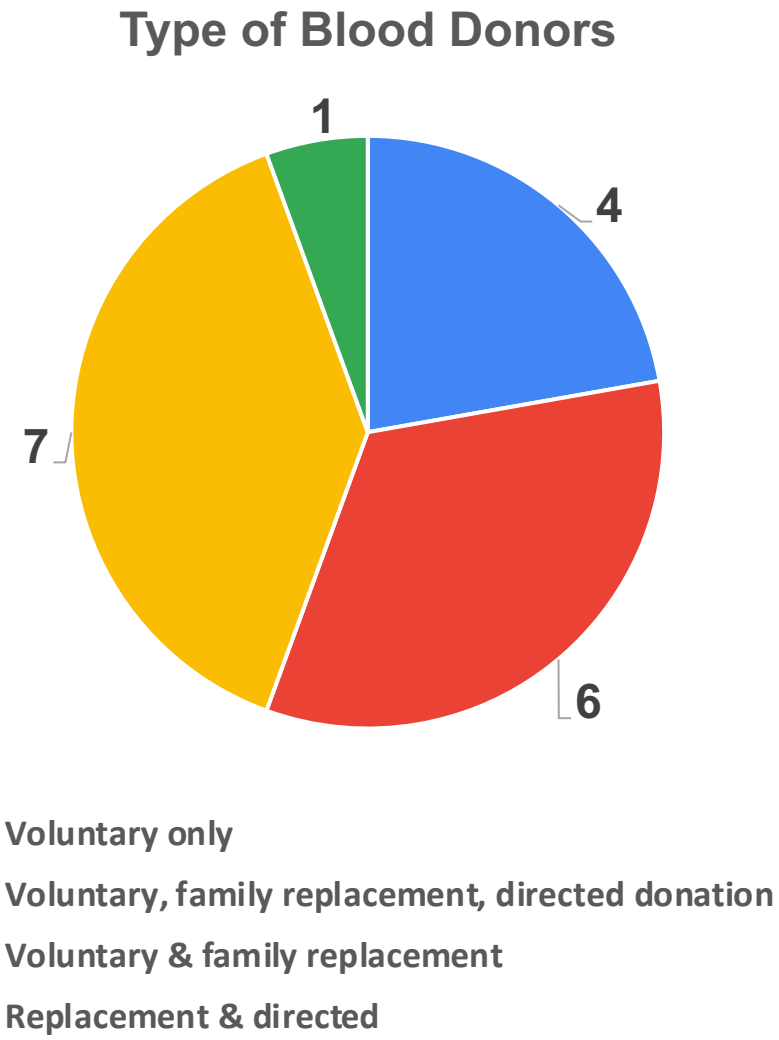
Number of RBCs issued per year

DEMOGRAPHICS

- Most hospitals (14/18) treat patients of all age groups
- All treat trauma patients

- 16 hospitals receive blood donors
- Most hospitals accept more than one type of donors

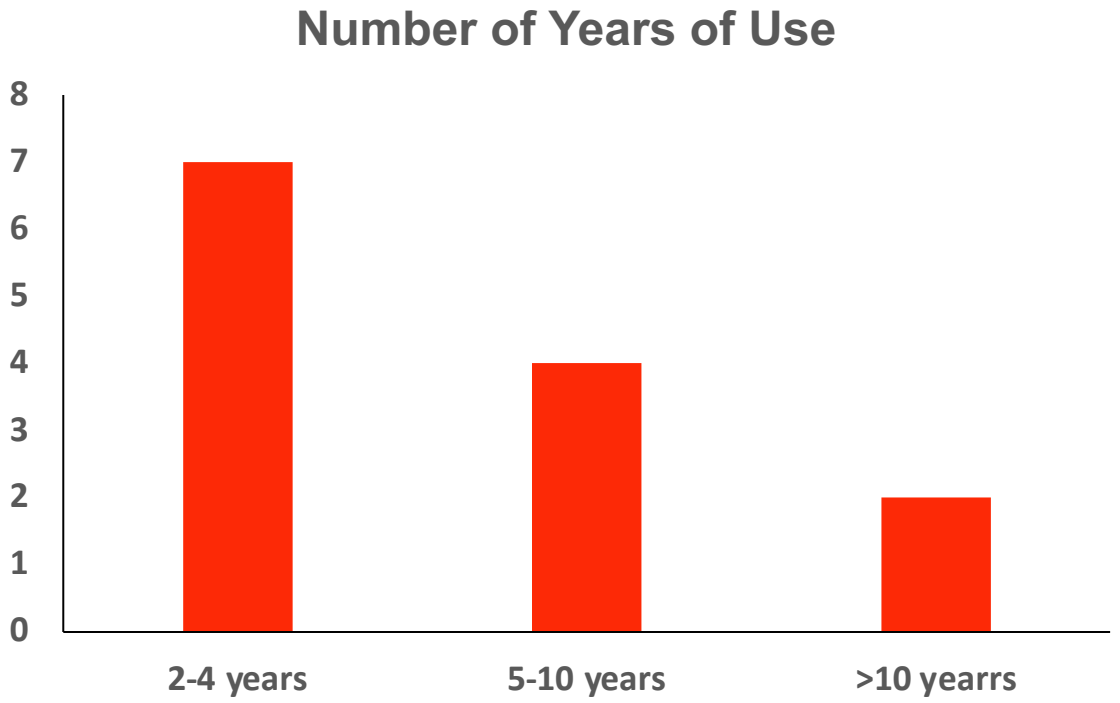
11/18 have other sources of blood
(e.g national blood banks, private blood banks, other governmental blood banks, Red Cross)



MASSIVE TRANSFUSION PROTOCOLS

- 13 (72%) of hospitals have a MT protocol
  - 10: general protocol
  - 3: One protocol that address each indication specifically

- Owner of the protocol
  - Blood bank=6 *
  - Blood transfusion committee=5
  - Emergency department=1
  - Anesthesia=1



One center had their protocol approved by the blood transfusion committee

ADULT-DEFINITIONS

Definition of MT in Adult Patients	N. of sites
Replacement of ≥ 10 RBC units in 24 hours (1 TBV)	10
Replacement of ≥ 50% of total blood volume in 3 hr	8
Excessive bleeding regardless of volume	6
Transfusion of ≥ 3 RBC units during any 1 hr period in the first 24 hr after hospital arrival	4
Transfusion of ≥ 5 RBC units in 4 hr	3
Others	4

11 sites use more than one definition (range 2-5)

Others

1- Replacement of 50% blood volume in 4 hrs

2-Transfusion of 4 RBC units within 1 hrs and anticipated need for more

3- Blood loss at a rate of 150 ml/min or more

4- ABC score for trauma more than 2 points

5- Risk assessment tool scores like Shock Index (SI), Assessment of Blood Consumption (ABC) score and Revised Assessment of Bleeding and Transfusion (RABT)

6- Bleeding which leads to a HR >110 beats/min &/or SBP <90 mmHg

Lin, Victor S., et al. *Critical Care* 27.1 (2023): 265.

PEDIATRIC-DEFINITIONS

8 hospitals includes pediatric patients in the MT protocol

Definition of MT in Pediatric Patients	N. of sites
Replacement of >50% of patient's TBV by blood products within 3 hours	6
RBC transfusion exceeds 10% TBV /min	3
> 40 ml/kg in 24 hrs	3
Others	3

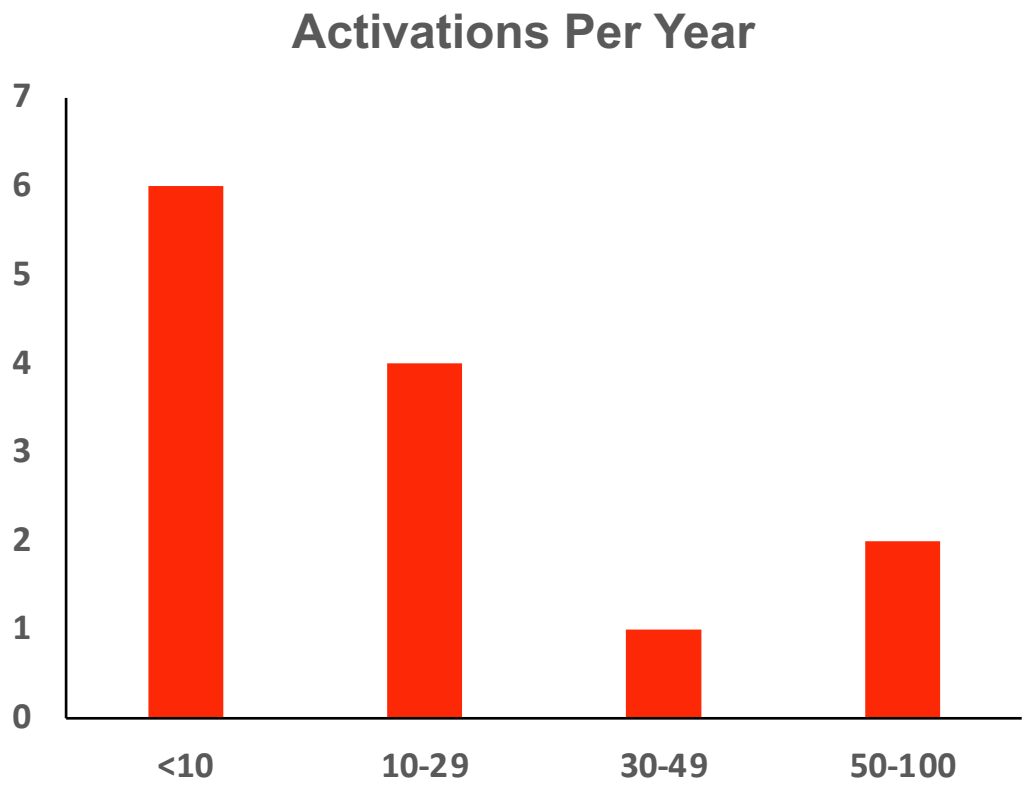
3 sites use more than one definition

Others

1. Excessive bleeding
2. Blood loss of 40 ml/kg in 3 hr
3. Loss of one blood volume of 80 ml/kg in 24 hrs
4. Blood loss at a rate of 2–3 ml/kg/min
5. Hemodynamic changes compatible with hypovolemia accompanying evidence or suspicion of serious hemorrhage

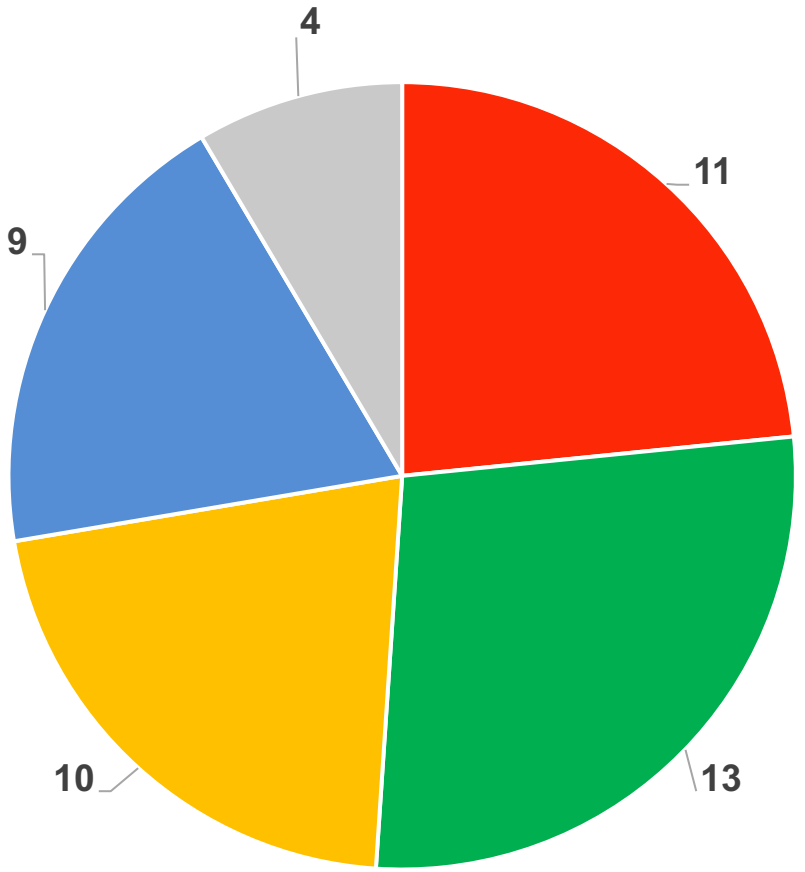
PROTOCOL ACTIVATION

- Anesthesia =12
- Emergency =12
- Trauma team=10
- Cardiac surgery=8
- Internal Medicine=4
- Hematology =2
- Obstetrics =2
- Others =7 (any specialty, ICU, Surgery, Cathlab)



CLINICAL SENARIOS

- Obstetric emergencies (e.g., postpartum hemorrhage)
- Intraoperative bleeding during major surgery
- Blunt trauma with significant blood loss (e.g., car accidents)
- Penetrating trauma (e.g., gun shots)



Others: GI Bleed, ECMO Bleed, Cathlab, Perioperative cardiac bleeding

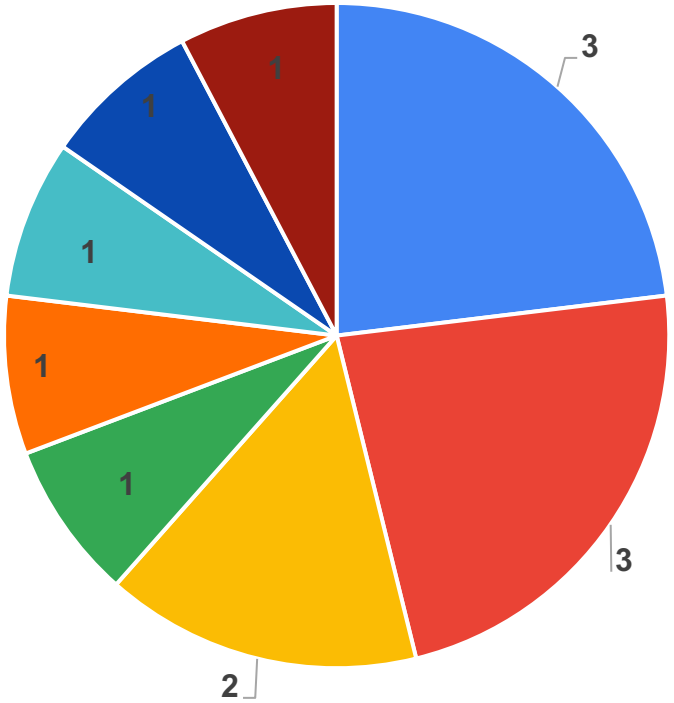
PROTOCOL ACTIVITATION

- Activation
  - Phone notification=12
  - Paging system =3
  - Hospital information system =1
  - Overhead announcement=1
- Components used
  - 1:1:1 ratio =9
  - 2:1:1 ratio=2
  - Individualized=2
  - Whole blood=2

Six hospitals are considering the implementation of whole blood in the future

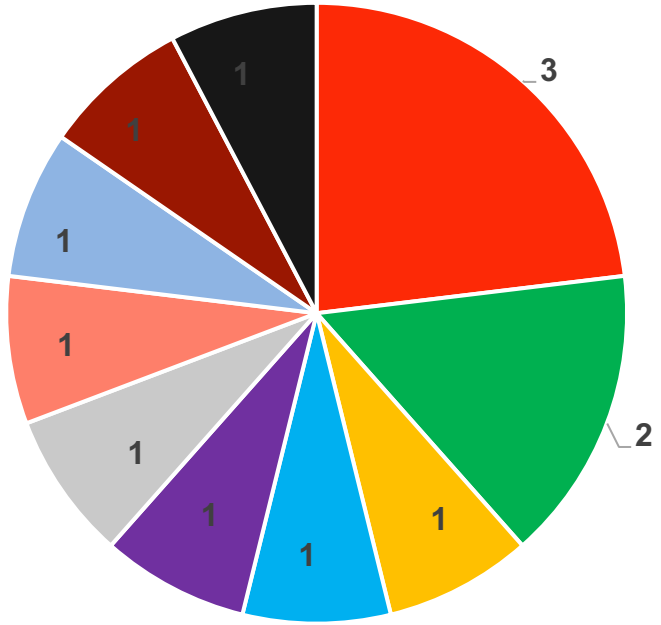
FIRST ROUND

RBCs



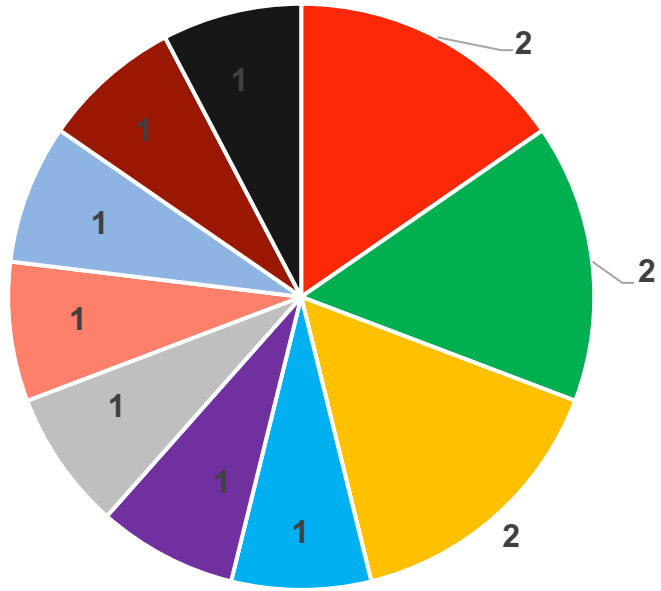
- 4 O neg
- 4 O pos or neg (neg for females of child bearing age or children)
- 4 group specific
- 4 O neg or group specific
- 4 O pos or O neg or group specific
- 5 O or group specific
- 6 group specific
- 1 O neg, 6 group specific

Platelets



- Pooled PLT
- 4 RDP
- One aphresis
- Poold or aphresis
- 4 RDP or 1 apheresis any group
- 5 RDP
- 6 RDP
- None
- 1 dose of platelets (aphresis or 5 WB)
- adult dose (Not specificed)

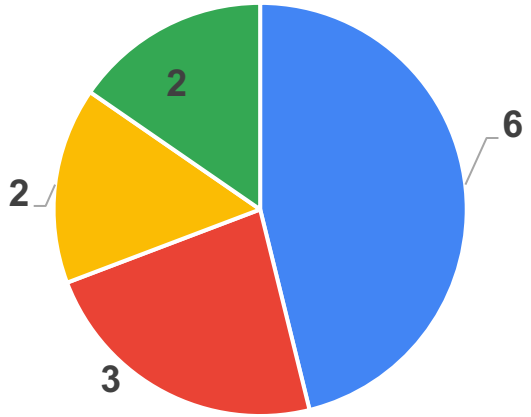
Plasma



- 4 AB
- 4 group specific
- 4 AB, or A
- 2 AB
- 2 AB or A
- 4 AB, or A or group specific
- 5 group specific or AB
- 1 AB, 6 group specific
- 6 blood group not specificed
- 4 blood group not specificed

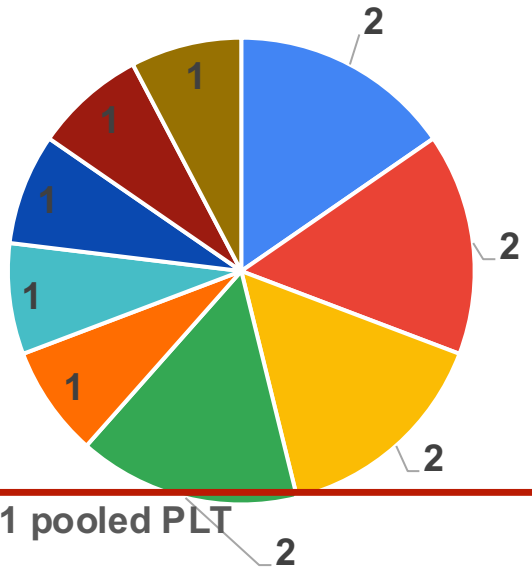
SECOND ROUND

Red cells



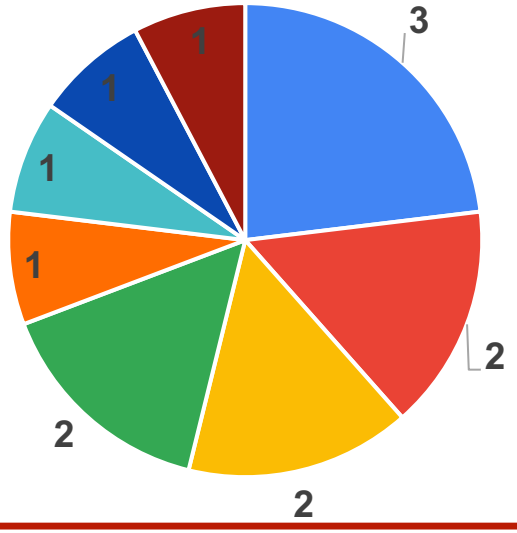
- 4 group compatible
- 6 group specific
- 4 group specific or O
- 4, BG not specified

Platelets



- 1 pooled PLT
- 4 RDP
- 6 RDP
- None
- 1 apheresis
- Pooled or aphresis
- 4 RDP or 1 apheresis
- 1 dose of platelets (aphresis or 5 WB) any group
- adult dose (Not specificed)

Plasma



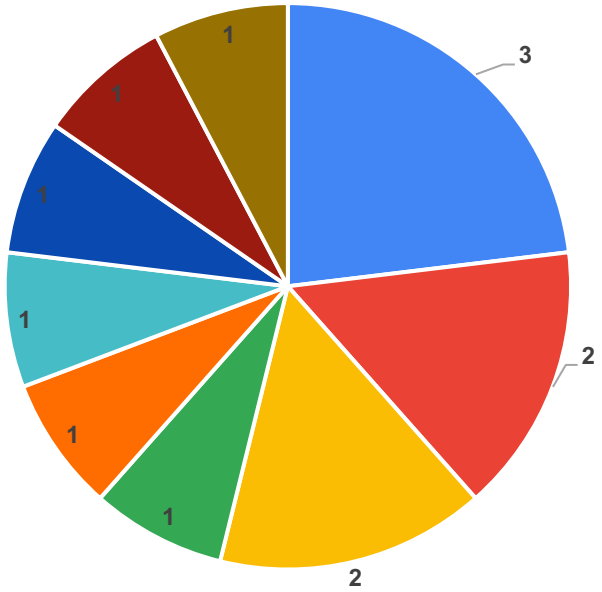
- 4 group specific
- 4 AB or A
- 4 AB or A or group specific
- 6 U group not specified
- 3 group specific or AB
- 2 group specific or A
- 2 AB
- not mentioned

THIRD ROUND

Red Cells

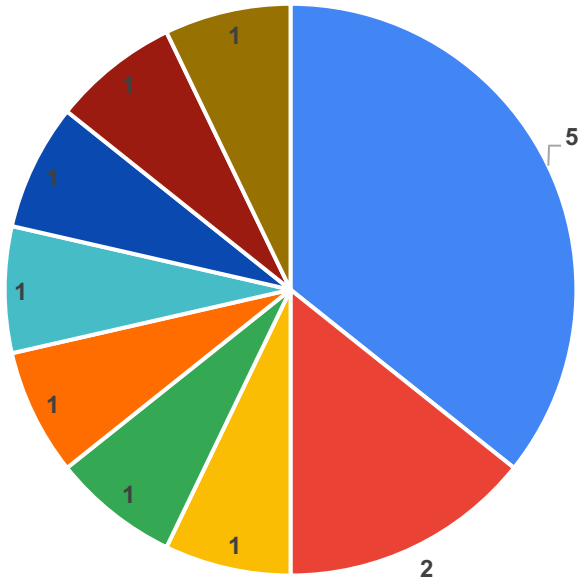
- 4 group specific
- 4 group specific, or O
- 6 U group specific
- According to condition
- Based on lab results
- As requested
- 4 units, group not specified

Platelets



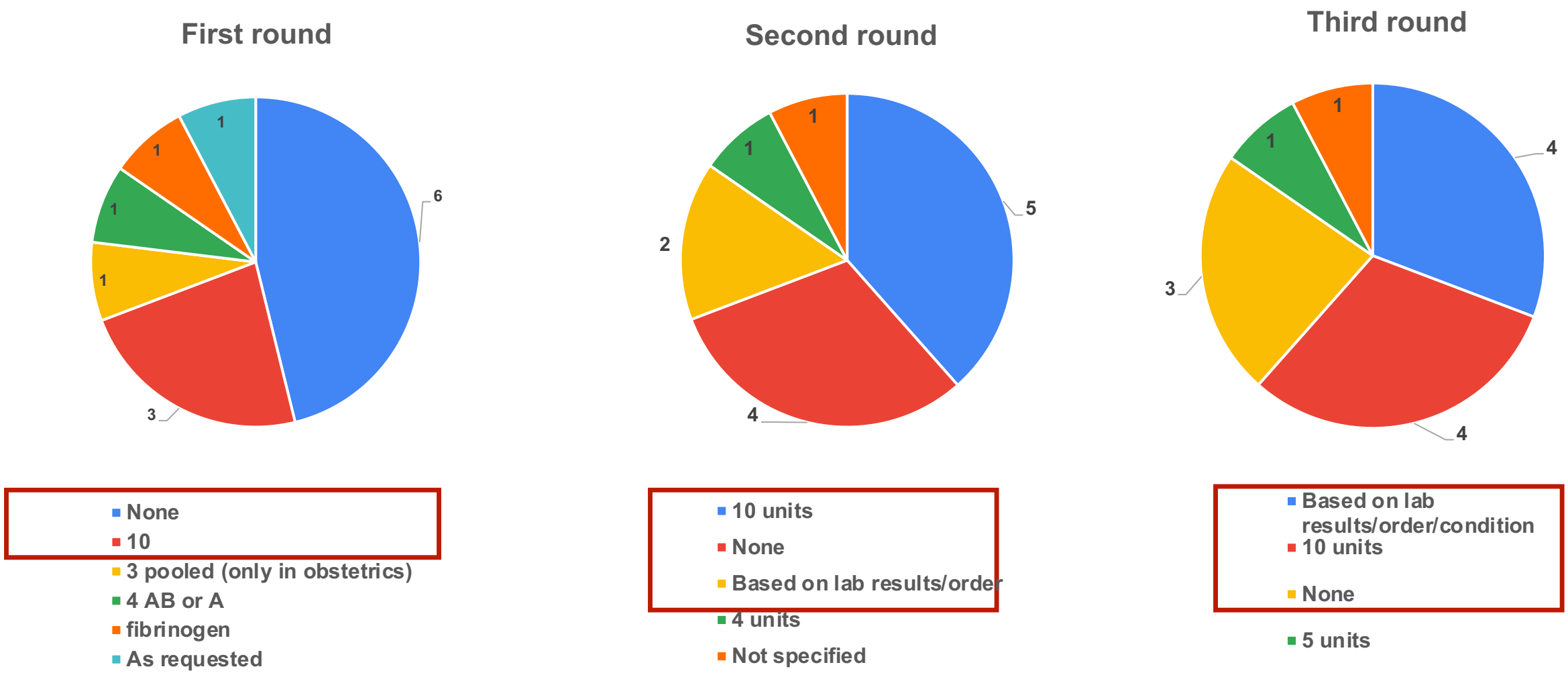
- 1 pooled
- 1 dose
- 4 RDP
- 1 aphresis or pooled
- According to condition
- 4 RDP or 1 apheresis
- 6 RDP
- No plt
- adult dose (Not specificed)

Plasma



- 4 group specific
- 4 AB or A
- 2 AB
- 3 group specific or AB
- 2 group specific or A
- 4 AB or A or group specific
- 6 units
- According to condition
- 4 U not specified

CRYOPRECIPITATE



MASSIVE TRANSFUSION PROTOCOL

- Pharmacological agents
  - Tranexamic acid =10
  - Fibrinogen concentrates =4
  - rFVIIa=4
  - PCC=1

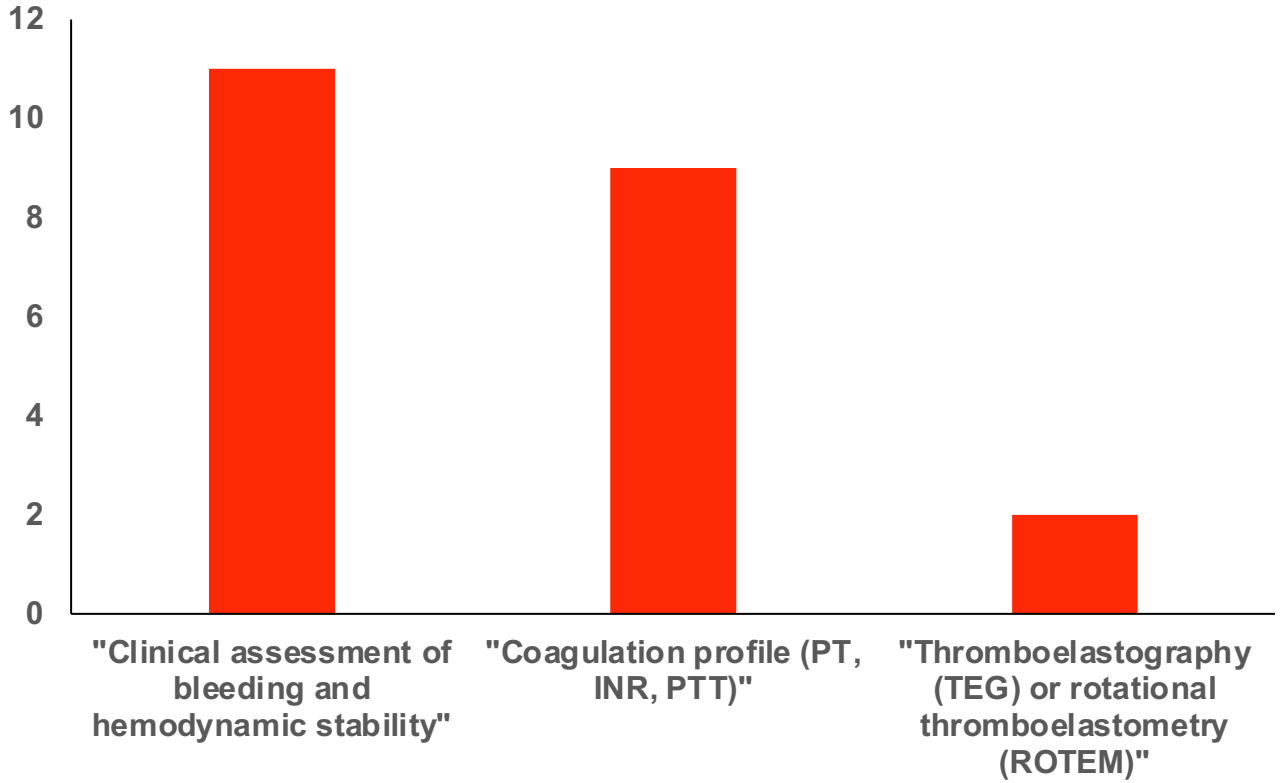
- Obstetric MT protocol=8
  - Earlier provision of cryoprecipitate or fibrinogen
  - To aim for higher fibrinogen level
  - One center replaces plasma with cryo if fibrinogen level is low

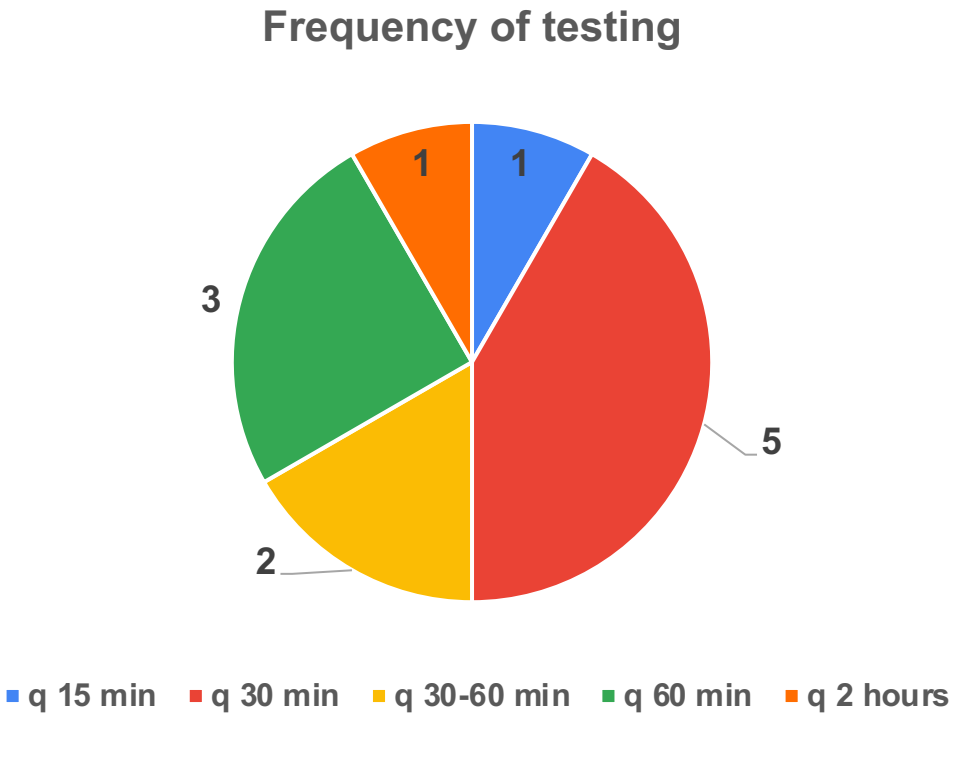
EXPEDITED TRANSFUSIONS

- Does your hospital have satellite fridges with un-crossmatched group O RBCs for immediate provision in cases of massive hemorrhage
  - No =10
  - Yes, in emergency department=2
  - Yes, in emergency department, OT, ICU, labour ward=1

- None of the sites maintain an inventory of pre-thawed plasma
- One site keeps a stock of liquid plasma for massive hemorrhage activations (for a maximum of 5 days)

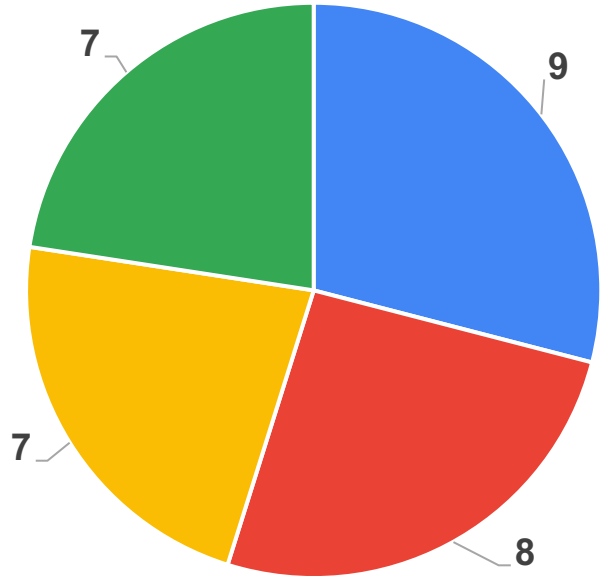
LABORATORY MONITORING





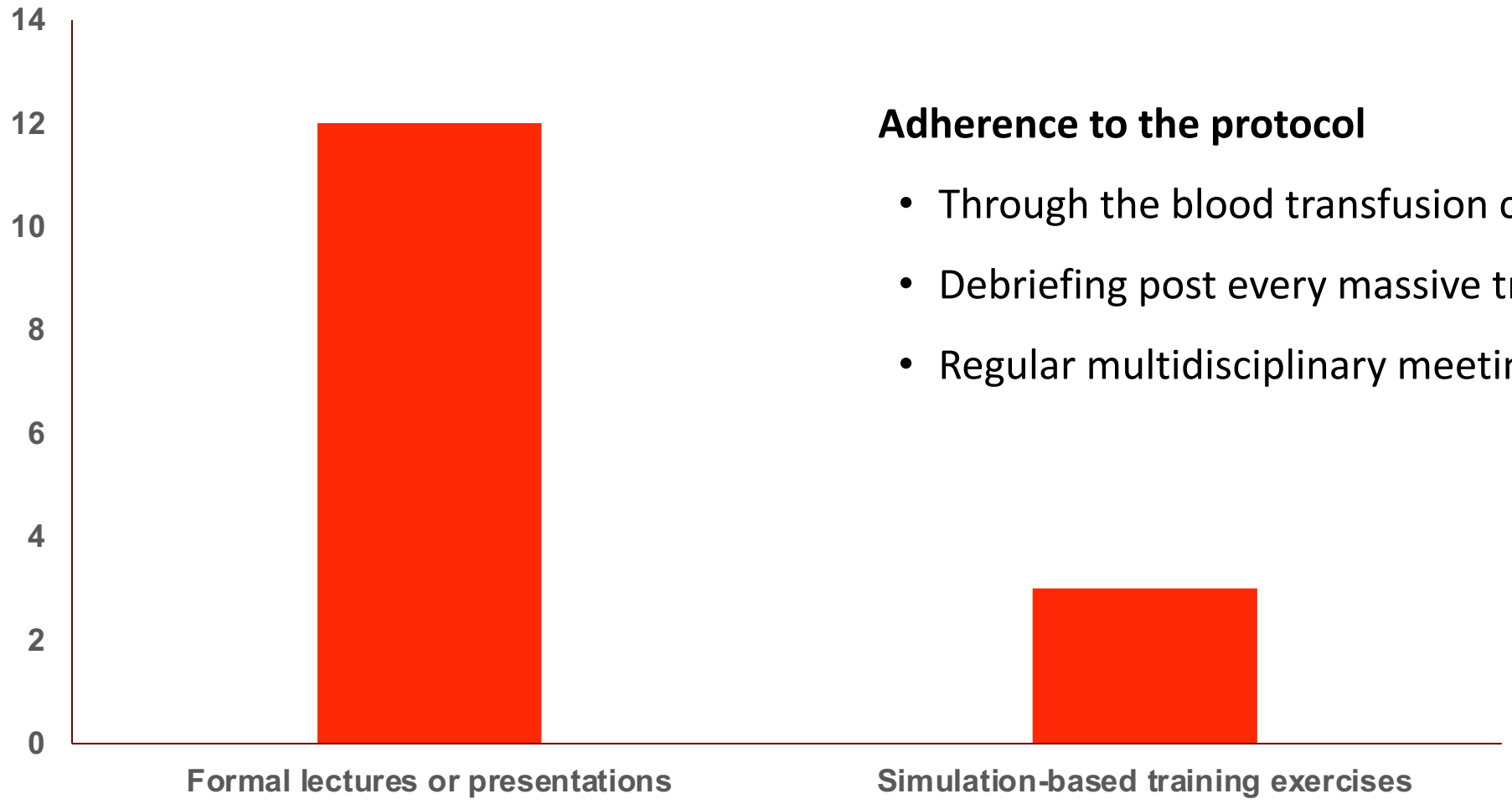
Frequency is specified in the MT protocol of 10/13 hospitals

SUSTAINING INVENTORY



- Regularly assess and monitor blood product levels
- Allocate a stock of blood component for emergency use
- Establish collaboration with neighboring blood banks for emergency blood supply
- Maintain a call list of walk-in donors for emergency use

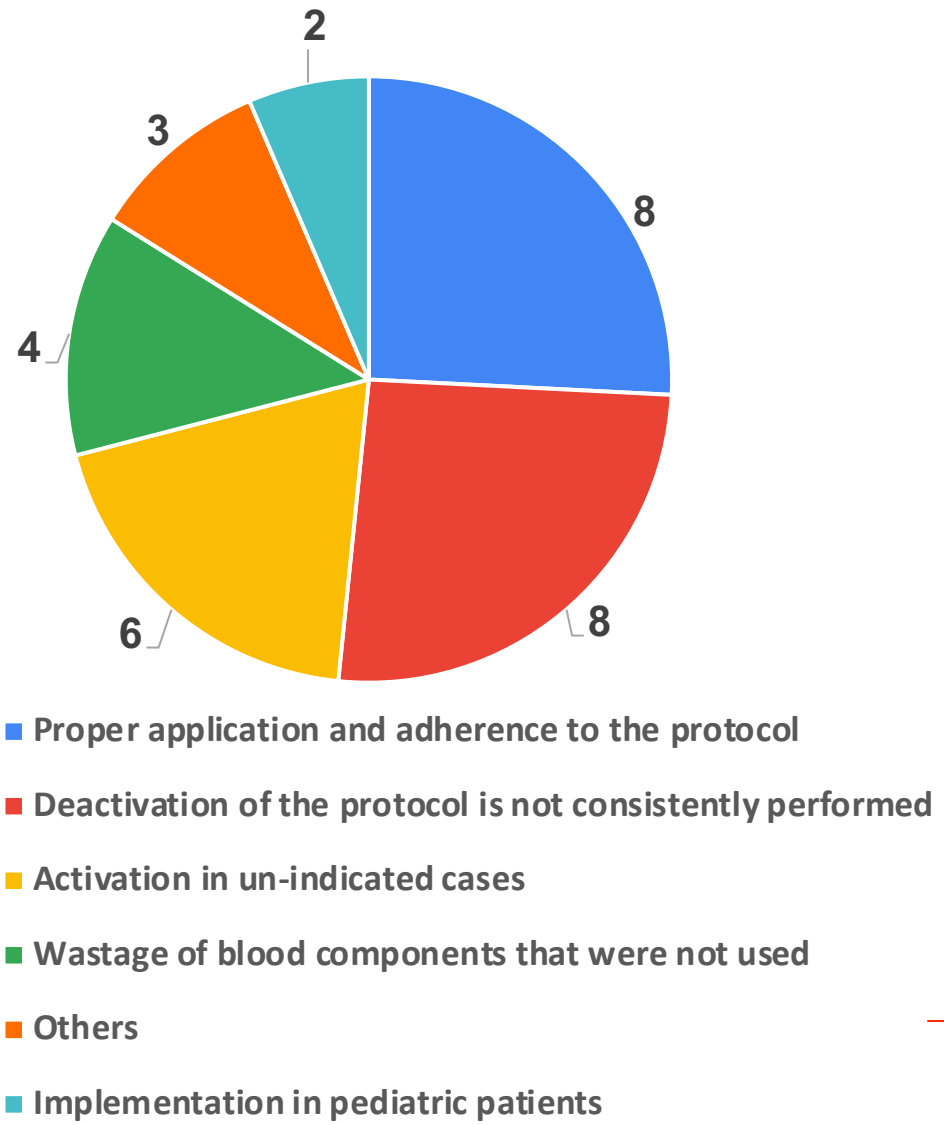
EDUCATION & TRAINING



Adherence to the protocol

- Through the blood transfusion committee: 9
- Debriefing post every massive transfusion: 4
- Regular multidisciplinary meetings: 1

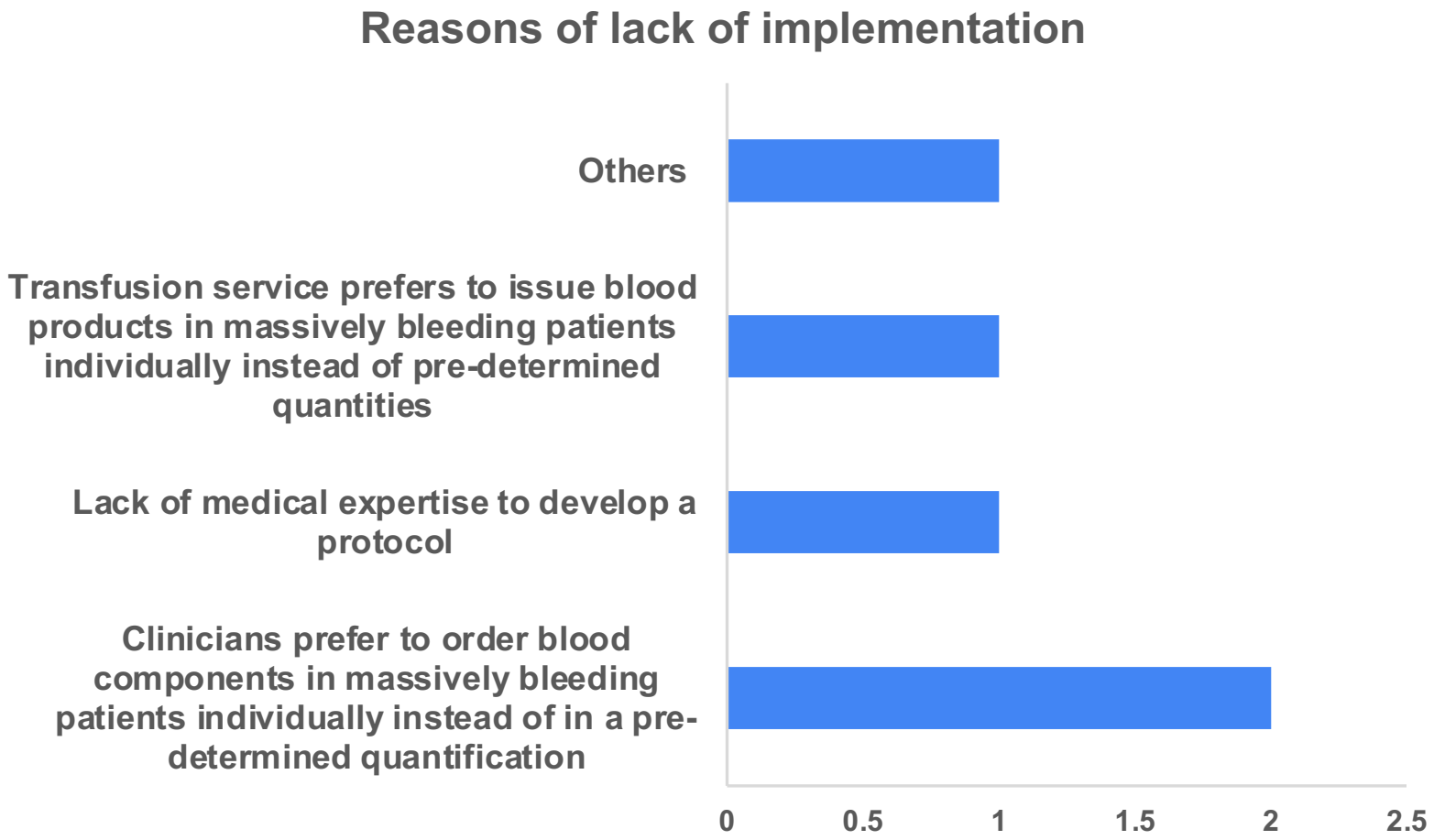
CHALLENGES IN IMPLEMENTATION



Other challenges

- Proper communication between staff & stakeholders
- Deviation from protocol by physicians
- Cryoprecipitate being transfused in inappropriate dose

HOSPITALS WITHOUT MTP



Managements included

- Use of whole blood or red cells (based on availability)
- 1:1:1 but without a formal protocol
- Individualized transfusion

Others: “No collaboration between the hospital and the transfusion service”

NEEDS

- Standardized MTP
- Addressing pediatric transfusion
- Locally developed rather than acquired protocols that are based on Military experience
- Sharing of experiences and best solutions among hospitals in the region
- Customizable templates for MTP
- Regional guidelines & protocols
- Free pocket software
- Frequent conferences and training courses

CONCLUSIONS

- Multiple definitions for adult & pediatric massive transfusion in use in the region
- Great heterogenicity in the components of the MT packs
- Timing of laboratory monitoring & use of adjuvant agents is heterogenous
- Challenges in implementation in some hospitals
- Challenges in implementation in pediatric patients
- Challenges in application (communication, end-user adherence)
- There is interest in implementation of whole blood
- Need of share of experiences & specific education events

FUTURE PERSPECTIVE

- There is a need for a unified definition for adult & pediatric massive hemorrhage
- Unified MT protocol with pre-determined ratios & frequencies of laboratory monitoring
  - Input from all stakeholders (e.g anesthesia, obstetrics, pediatrics, trauma, etc)
- Guidance for implementation in different settings & in pediatrics
- Need to explore the utility of the use of whole blood
- Future multi-disciplinary congress on MT
  - Involvement of other societies
  - Sharing of implementation experiences

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- Other survey participants
- ATMF

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