



**MONITORING MTP( MASSIVE TRANSFUSION PROTOCOL)**  
**TO IMPROVE SURVIVAL AND**  
**DECREASE OVERALL USAGE OF BLOOD COMPONENTS**

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# Anticipated Clinical Situations for Massive Transfusions

## Surgery

- Complex cardiovascular surgeries (repair of aortic aneurysms)
- Liver transplant
- Resection of major tumors
- Severe burns

## Medicine

- GI-bleeding
- Warfarin overdose
- Hemophiliacs

## Trauma

- Perforating wounds of chest, abdomen
- Pelvic fractures
- Crush injuries involving thighs

## Obstetrics

- Antepartum hemorrhage
- Postpartum hemorrhage
- Ruptured ectopic pregnancy
- Septic labour

**‘Era of major injury & heroic surgery’**

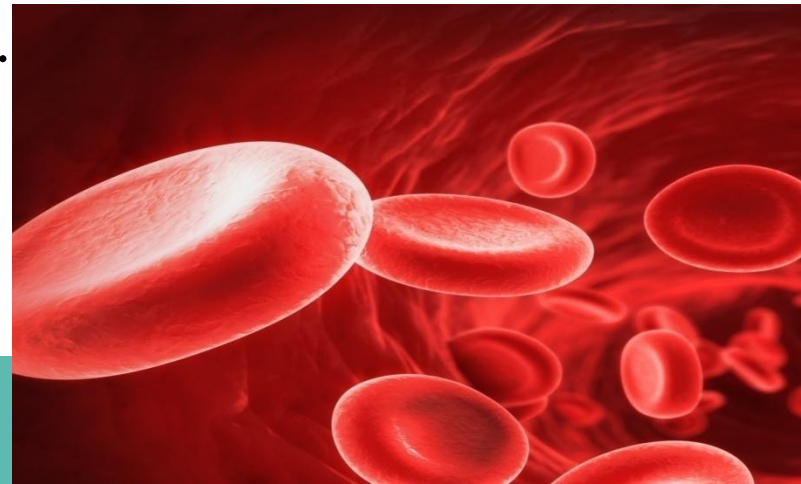
## Neonates

- Exchange TX
- ECMO
- Cardiopulmonary bypass surgery

# INTRODUCTION

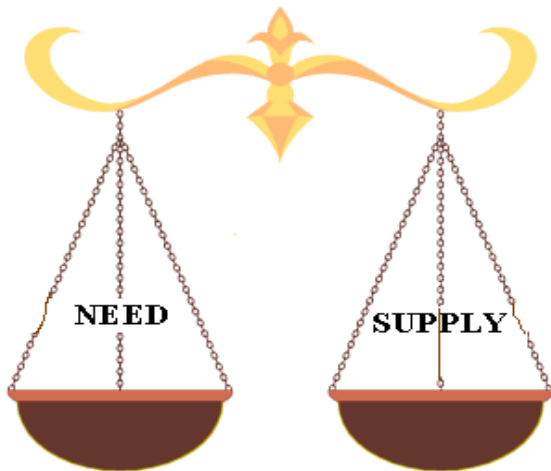
Massive transfusion is defined as -

- Replacement of one blood volume within 24 hours
- >10 units of blood or > 20 units of PRBCs within 24 hr
- Transfusion > 4 RBC units in 1 hr
- Replacement of 50% of blood volume in 3 hrs
- A rate of blood loss >150ml/hr
- All these definitions are meant to identify patients going into a state of hypovolaemic shock due to hemorrhage.



**REMEMBER...**

***THE DECISION FOR MASSIVE  
BLOOD TRANSFUSION SHOULD  
ALWAYS BE A BALANCE  
BETWEEN***



# INTRODUCTION

- The strategy for treating massive hemorrhage has changed in recent years and most medical centers with high-level trauma services have adopted a MTP.
- *6.7.4.5 Massive transfusion (Paragraph rewritten and last paragraph added) In cases of Massive Transfusion (amount of blood equal to or greater than recipient's total blood volume transfused within 24 hours) a fresh blood sample, collected after active bleeding is controlled, is used for crossmatching for issue of blood for subsequent transfusion. Component therapy shall be actively considered in these cases. Every Blood centre shall evolve a massive transfusion protocol in consultation with clinicians.*  
-NABH Standards for BB 3<sup>rd</sup> Edition

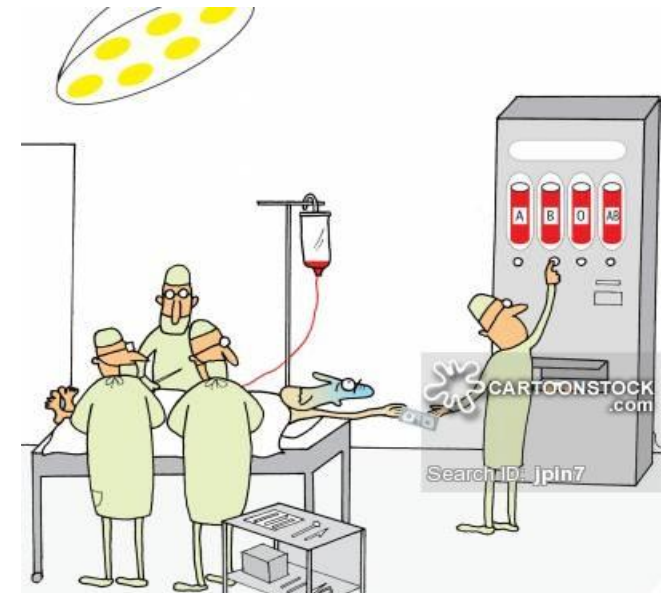
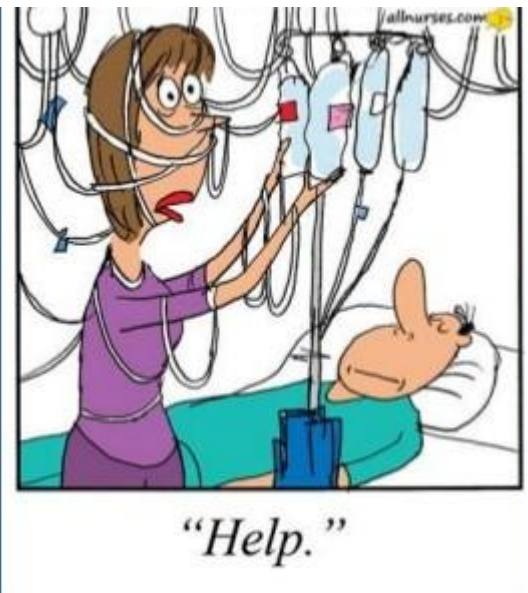
# INTRODUCTION

- *Blood Issuance and Transfusion QCP.11.10*
- *The director of the blood transfusion services provides policies and procedures to guide acceptable practices for blood and component transfusion.*
- *QCP.11.10.1 There are defined processes for checking blood out of the blood bank before transfusion.*
- *QCP.11.10.2 Specific policies and practices are required before and during blood administration.*
- ***-Joint Commission International  
Accreditation Standards for Hospitals, 5th Edition***

# Aim



- The main aim of this case study was to monitor MTP and improve survival by providing blood products to hemodynamically unstable trauma patients in an immediate and sustained manner.





# Differences between MTP and emergency release

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## MTP:

- Products to be issued are **FIXED**
- You **CANNOT** change the order or **customize it**
- **CALL** the blood bank to let them know **MTP is being activated**
- **CALL** the blood bank to **de-activate MTP** so they stop preparing products (and wasting what you don't use)

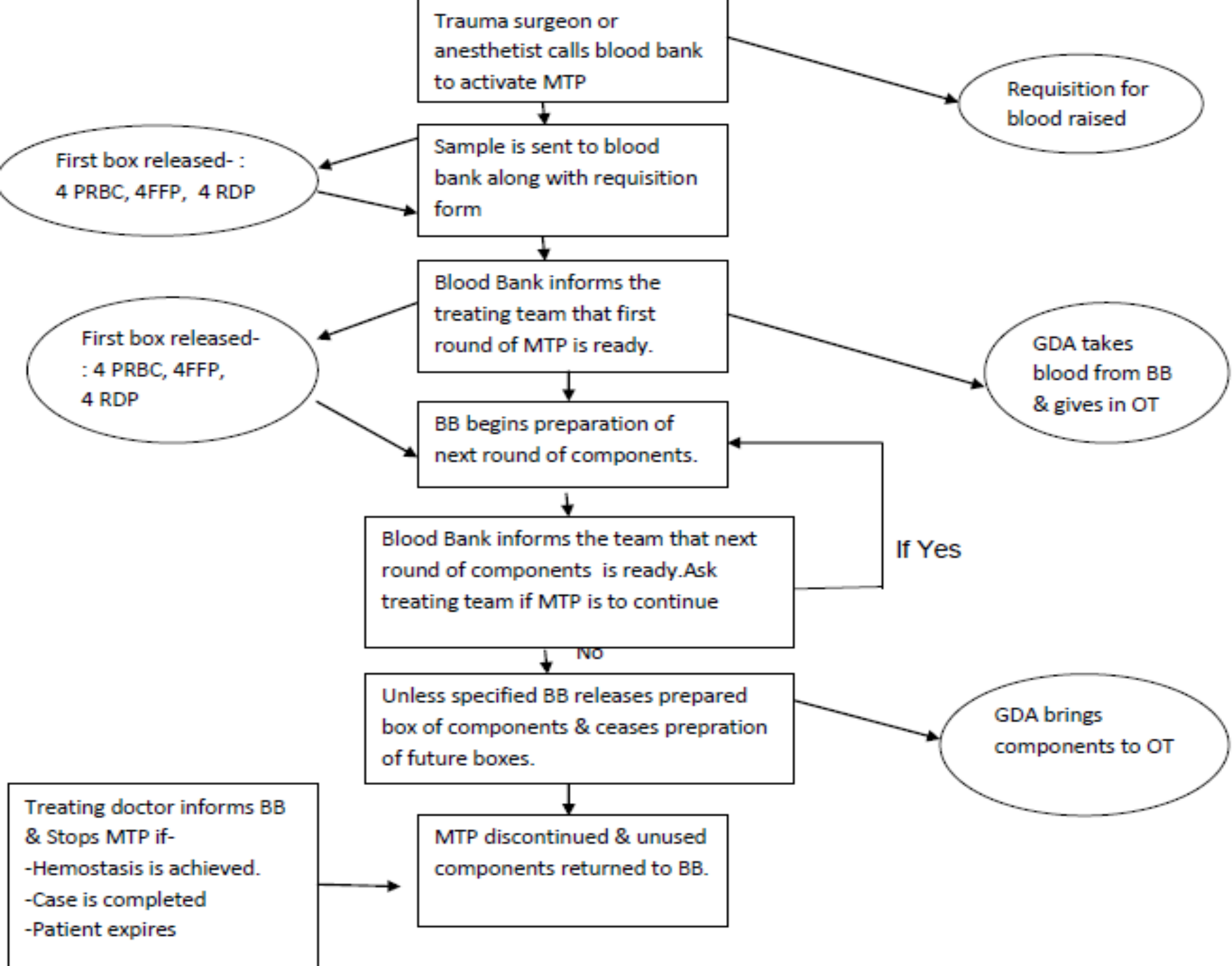






# Results

- We found that MTP was activated **8 times for 8 trauma cases** and was successfully deactivated later.
- A total of **231 units of blood components were transfused with a mean of 28 blood components** for each patient and a ratio of **1:1:1** for red cell, fresh frozen plasma and platelet respectively.
- All the 8 cases achieved hemostasis and were hemodynamically stable at the time MTP was deactivated.
- 24hr mortality was **0%**.



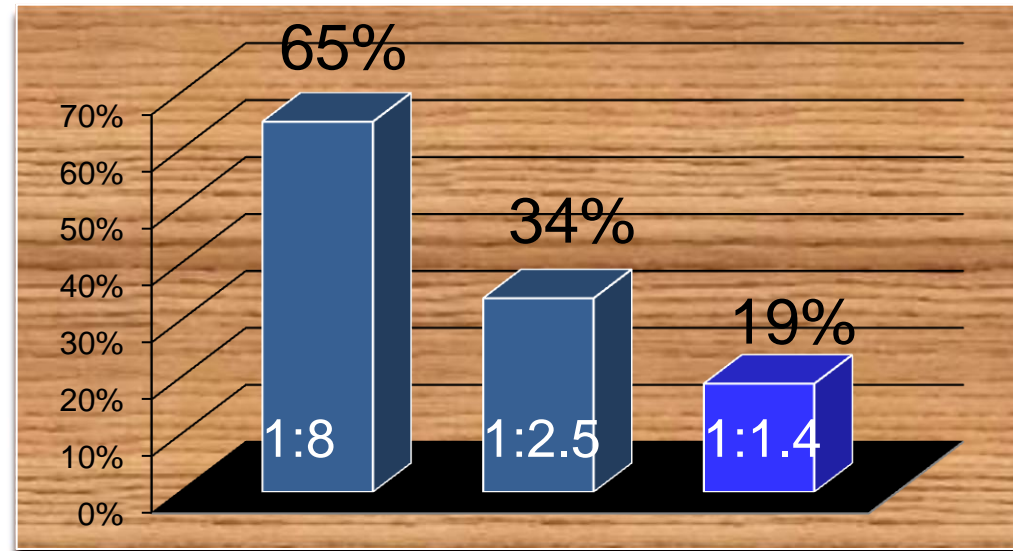
# WHY 1:1:1???



**“Choice, Not Chance Determines Outcome”**

## Mortality Vs FFP/RBC ratio

- The administration of RBC:plasma:platelets at 1:1:1 ratio was first proposed by the **US military and subsequently supported by military and then civilian studies.**



Ratio of blood products transfused affects mortality in patients receiving massive transfusions.

Mimics whole blood proportions

**Whole blood out → whole blood in**

Any attempt to increase the concentration of one component would lead to dilution of the other two.



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## New evidence in trauma resuscitation - is 1:1:1 the answer?

[Timothy E Miller](#)<sup>1</sup>[Author information](#) ▶ [Article notes](#) ▶ [Copyright and License information](#) ▶This article has been [cited by](#) other articles in PMC.

### Abstract

Go to: 

Traumatic injury is a common problem, with over five million worldwide deaths from trauma per year. An estimated 10 to 20% of these deaths are potentially preventable with better control of bleeding. Damage control resuscitation involves early delivery of plasma and platelets as a primary resuscitation approach to minimize trauma-induced coagulopathy. Plasma, red blood cell and platelet ratios of 1:1:1 appear to be the best substitution for fresh whole blood; however, the current literature consists only of survivor bias-prone observational studies.

**Keywords:** Trauma, Resuscitation, Transfusion, Red blood cells, Plasma, Platelets, Massive transfusion protocol, Blood product ratio, Survivor bias

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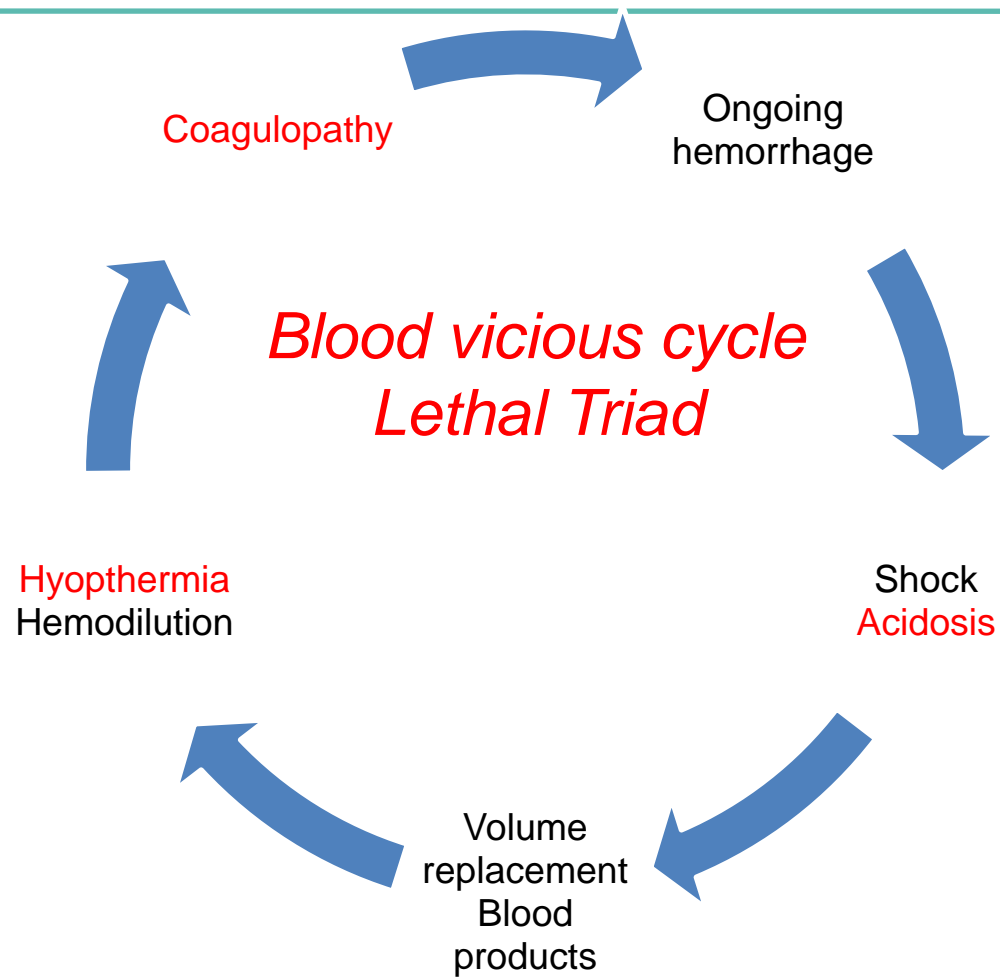
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[Curr Opin Crit Care. 2016][Transfusion practices in trauma.](#)  
[Indian J Anaesth. 2014][Prevalence of survivor bias in observational studies on fresh frozen plasma: erythrocyte ratios in trauma](#) [Anesthesiology. 2012][Current management of massive hemorrhage in trauma.](#)  
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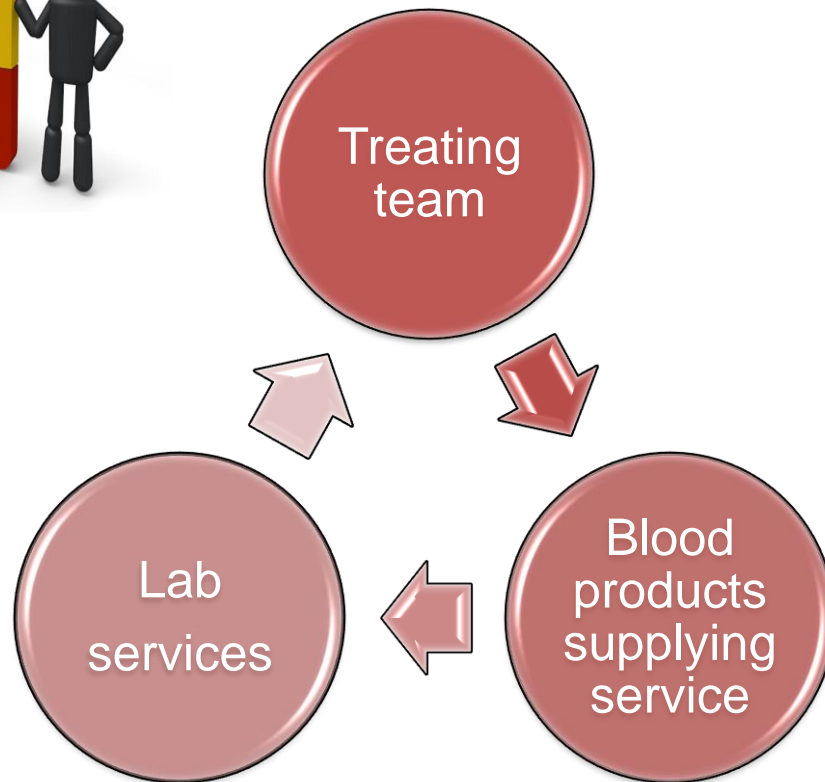


- Two major guidelines are available for MTP:
  1. The European guidelines by the Task Force for Advanced Bleeding Care in Trauma and
  2. The Trauma Quality Improvement Program (TQIP) recommendations from the American College of Surgeons
  
- In patients in which blood component transfusions was done in 1:1:1 ratio they achieved earlier hemostasis and had less mortality due to extensive blood loss (Internal/External hemorrhage) in 24 hrs.





# Massive bleeding management



A multidisciplinary team, including specialists from the

- Emergency medicine,
  - Trauma,
  - Critical care,
  - Transfusion medicine,
  - Nursing,
  - Pathology and
  - Anesthesia departments
- should be involved in creation, activation & implementation of MTP

# Bedside Component Administration

## Large Bore Needles

- For rapid infusions



## Pressure Infusion Device

- For Rapid flow



## Blood Warmer

- Warm fluids & blood components to 37°C
- Rapid flow



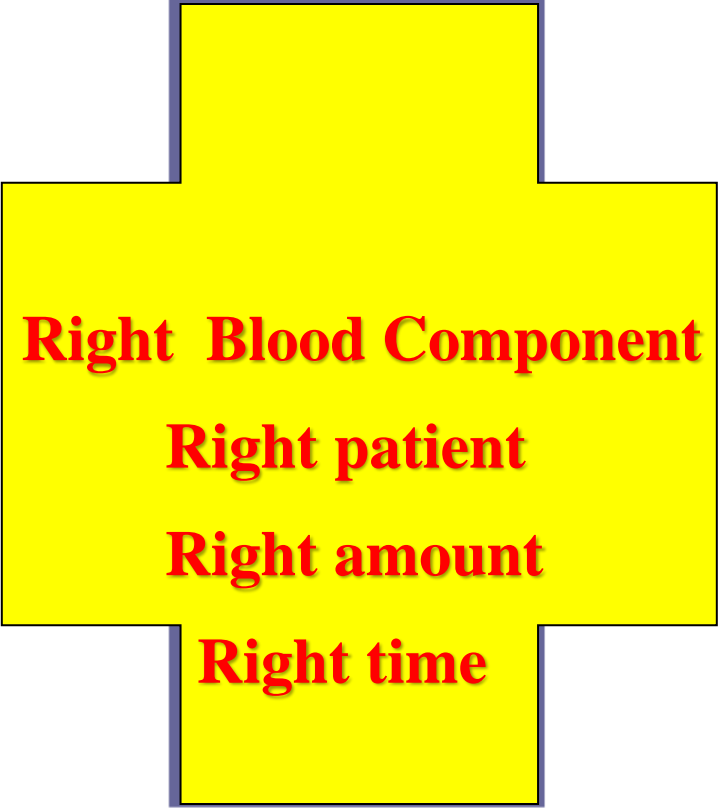


# Conclusions

- All Hospitals should formulate MTPs suited to your needs and resources.
- Facilitates release of predefined blood components in an immediate and sustained manner
- Decrease overall usage and wastage of blood components
- Improve survival
- Better coordination
- Review/Feedback/Mock drills



**Blood  
Saves  
Lives**



**Right Blood Component**  
**Right patient**  
**Right amount**  
**Right time**

**Thank you...**