

Patients with massive bleeding require resuscitation with appropriate blood components. At SUNY Upstate, we have a Massive Transfusion Protocol to ensure that these patients receive the right components in a standardized process. This process has been established at our Downtown Campus for over 6 years and the same process has now been established at our Community Campus. The educational PowerPoint presentation is attached.

Thank you.

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# **Massive Transfusion Protocol**

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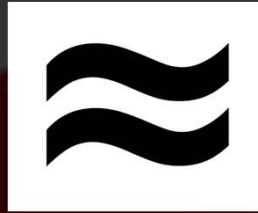
# Introduction

- This presentation is intended to instruct care providers on the basic principles of the Massive Transfusion Protocol (MTP)
- These tenets are based on current literature as well as the lessons learned at Upstate University Hospital since instituting the MTP
- Topics to be covered will include basic definitions, medical indications, proper initiation, administration, documentation, and termination of the MTP

# MTP – Definition

- 🔴 The MTP is a protocol designed to provide blood products in the correct ratio to replace whole blood in a patient who is undergoing massive blood loss
- 🔴 The purpose of this protocol is to provide optimal patient care with a minimum of confusion or delay





- 🔴 MTP should be thought of similar to a resuscitation code order
- 🔴 Both initiate a whole series of orders and treatments
- 🔴 Both involve mobilization of a team of providers
- 🔴 Both are potentially life-saving in patients who need them
- 🔴 Both are unnecessary for the majority of patients

# Massive Transfusion Protocol

- 🔴 Used to provide transfusion of blood components during major hemorrhage to maintain hemostasis
- 🔴 A formula-driven model
  - Reconstitute whole blood from blood components in the patient
  - Whole blood is  $\sim 5:5:1$  (RBC:plasma:platelet units)
  - For MTP resuscitation, we supply blood products in approximately a 6:6:1 ratio
  - Best patient outcomes are seen with resuscitation using between 1:1 and 2:1 RBC:plasma ratio

# When to use MTP

Numerous definitions in literature/guidelines of “massive bleeding”

- Transfusion of  $\geq 10$  u RBC in 24 hrs
- Transfusion of half of blood volume in 3 hours
- On-going blood loss 150 mL/min

Anytime bleeding is on-going and brisk such that:

- There is a high risk of rapid morbidity/mortality
- Blood products are required to be transfused at such a rapid rate that testing-directed transfusions and cross-matching are precluded

# Why: Dilutional Coagulopathy

- Patient with on-going, brisk bleeding
- ↓
- Replacing whole blood with transfusion of only RBC and crystalloid/colloid
- ↓
- Dilution of platelets and coagulation factors
- +
- On-going consumption of platelets and coag factors due to on-going bleeding
- ↓
- Resulting microvascular bleeding (oozing)
- Playing “catch-up” harder than staying ahead
- Patients have improved short-term and long-term outcomes if dilution is avoided





# Who is Involved: MTP Participants

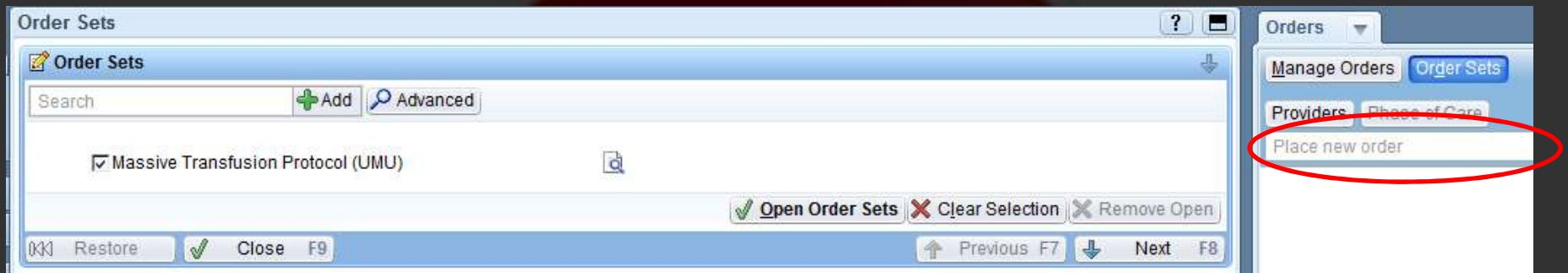
- The MTP requires participation by numerous groups including Physicians, Nurses, Lab Technologists, and Support Staff
- Physicians and Nurses – identification of patient requiring MTP, placing of order into Epic, communication with Blood Bank via phone, collection of blood type specimen, administration of blood products and medications, documentation of MTP details in Epic
- Lab Technologists – prepare blood components, pack coolers with proper ratios, perform blood typing testing and initial compatibility testing, order additional products from ARC to maintain sufficient inventory
- Support Staff – Transport coolers of blood components, blood specimens

# How to Initiate an MTP

## Initiation

- Patient requiring MTP identified
- MTP order entered in Epic

# Epic ordering



- 🔴 Search for “MTP” in the search box
- 🔴 Any providers able to sign orders in Epic are able to enter and sign the MTP orders
- 🔴 Nurses are able to enter the orders as long as an authorized provider is identified (similar to entry of a “verbal” order)

# Epic ordering

The screenshot displays the Epic Ordering interface. At the top, the 'Order Sets' tab is active, showing a search bar and a list of order sets. The 'Massive Transfusion Protocol (UMU)' is selected. Below this, the 'Orders' tab is active, showing the 'Massive Transfusion Protocol (UMU)' order set. The 'Prepare Blood Products' section is expanded, and the 'MTP INITIATE AND WAIVER' section is highlighted with a red oval. This section includes the following items:

- ☒ MTP Initiate Orders
- ☒ Initiate Massive Transfusion Protocol
- ☒ Uncrossmatched Waiver

The 'Uncrossmatched Waiver' item is further detailed with a paragraph of text: 'The clinical staff of the patient designated on this order warrants activation of a massive transfusion protocol and the issue of red blood cell units that are uncross-matched. Transfusion of uncross-matched blood is not without risk as the trauma surgeon or anesthesiologist attending (or designee), I have taken responsibility for any complications associated with the transfusion of red blood cells prior to the completion of the pre-transfusion compatibility testing as normally required by established transfusion medicine regulatory standards.'

Below the 'MTP INITIATE AND WAIVER' section, there are two other sections:

- ☐ Adult MTP Prepare Blood Products (for Adults and Pediatric Patients greater than 25 kg)
- ☐ Peds MTP Prepare Blood Products (for Pediatric Patients less than 25 kg)

At the bottom, there is an 'Additional SmartSet Orders' section with an 'Add Order' button. The interface also includes a 'Close' button and navigation buttons for 'Previous' and 'Next'.

 The MTP order set includes the MTP initiation order and uncrossmatched waiver

# Epic ordering

The screenshot displays the Epic Order Sets interface. At the top, the 'Order Sets' tab is active, showing a search bar, '+ Add' button, and 'Advanced' search options. Below this, the 'Massive Transfusion Protocol (UMU)' is selected. The 'Suggestions' section shows 'Angiography Surgery Vascular IP Post-Op'. A note states: 'Right click on an Order Set to add to favorites.' Buttons for 'Open Order Sets', 'Clear Selection', and 'Remove Open' are visible.

The 'Orders' tab is also shown, with a 'Clear All Orders' button. Under 'Order Sets', 'Manage User Order Sets' is expanded, and 'Massive Transfusion Protocol (UMU)' is selected. An 'Add Order' button is present. The 'Prepare Blood Products' section is expanded, showing 'MTP INITIATE AND WAIVER' with '1 of 1 selected'. Under this, 'MTP Initiate Orders' is checked, and 'Initiate Massive Transfusion Protocol' and 'Uncrossmatched Waiver' are also checked. A detailed waiver text is provided: 'The clinical staff of the patient designated on this order warrants activation of a massive transfusion protocol and the issue of red blood cell units that are uncross-matched. Transfusion of uncross-matched blood is not without risk as the trauma surgeon or anesthesiologist attending (or designee), I have taken responsibility for any complications associated with the transfusion of red blood cells prior to the completion of the pre-transfusion compatibility testing as normally required by established transfusion medicine regulatory standards.'

Below the waiver, two options are listed: 'Adult MTP Prepare Blood Products (for Adults and Pediatric Patients greater than 25 kg)' and 'Peds MTP Prepare Blood Products (for Pediatric Patients less than 25 kg)'. Both are currently unchecked. The 'Additional SmartSet Orders' section is also visible with an 'Add Order' button. A note at the bottom states: 'Click the Add Order button to add an order in this section'. The interface includes navigation buttons at the bottom: 'Close F9', 'Previous F7', and 'Next F8'.

- Adult and larger pediatric patients (> 25kg) will have larger amounts of blood sent

# Epic ordering

The screenshot displays the Epic Order Sets application. At the top, the 'Order Sets' tab is active, showing a search bar, an 'Add' button, and an 'Advanced' search option. Below this, the 'Massive Transfusion Protocol (UMU)' is selected. A 'Suggestions' section shows 'Angiography Surgery Vascular IP Post-Op'. At the bottom of this section are buttons for 'Open Order Sets', 'Clear Selection', and 'Remove Open'. The main area is titled 'Orders' and contains a 'Clear All Orders' button. Under 'Order Sets', 'Manage User Order Sets' is expanded, and 'Massive Transfusion Protocol (UMU)' is selected, with an 'Add Order' button. The 'Prepare Blood Products' section is expanded, showing 'MTP INITIATE AND WAIVER' with '1 of 1 selected'. Under this, 'MTP Initiate Orders' is checked, and 'Initiate Massive Transfusion Protocol' is selected, with a 'Details' link. Below this is the 'Uncrossmatched Waiver' section, which includes a paragraph of text: 'The clinical staff of the patient designated on this order warrants activation of a massive transfusion protocol and the issue of red blood cell units that are uncross-matched. Transfusion of uncross-matched blood is not without risk as the trauma surgeon or anesthesiologist attending (or designee), I have taken responsibility for any complications associated with the transfusion of red blood cells prior to the completion of the pre-transfusion compatibility testing as normally required by established transfusion medicine regulatory standards.' Below this are two sections: 'Adult MTP Prepare Blood Products (for Adults and Pediatric Patients greater than 25 kg)' and 'Peds MTP Prepare Blood Products (for Pediatric Patients less than 25 kg)', both with 'Add Order' buttons. At the bottom, there is an 'Additional SmartSet Orders' section with an 'Add Order' button. The footer contains a 'Close F9' button and 'Previous F7' and 'Next F8' navigation buttons.

Order Sets

Order Sets

Search Add Advanced

Massive Transfusion Protocol (UMU)

Suggestions

Angiography Surgery Vascular IP Post-Op

Right click on an Order Set to add to favorites.

Open Order Sets Clear Selection Remove Open

Orders

Clear All Orders

Order Sets

Manage User Order Sets

Massive Transfusion Protocol (UMU)

Add Order

Prepare Blood Products

MTP INITIATE AND WAIVER 1 of 1 selected

MTP Initiate Orders

Initiate Massive Transfusion Protocol

Details

Uncrossmatched Waiver

The clinical staff of the patient designated on this order warrants activation of a massive transfusion protocol and the issue of red blood cell units that are uncross-matched. Transfusion of uncross-matched blood is not without risk as the trauma surgeon or anesthesiologist attending (or designee), I have taken responsibility for any complications associated with the transfusion of red blood cells prior to the completion of the pre-transfusion compatibility testing as normally required by established transfusion medicine regulatory standards.

Adult MTP Prepare Blood Products (for Adults and Pediatric Patients greater than 25 kg)

Adult MTP Prepare Blood Products

Peds MTP Prepare Blood Products (for Pediatric Patients less than 25 kg)

Peds MTP Prepare Blood Products

Additional SmartSet Orders

Add Order

Click the Add Order button to add an order in this section

Close F9 Previous F7 Next F8

- MTP order allows documentation of the blood products administered



# How to Initiate an MTP

## Initiation

- 🔴 Patient requiring MTP identified
- 🔴 MTP order entered in Epic
- 🔴 A single MTP communicator is identified for coordination with the Blood Bank
- 🔴 The communicator calls the Blood Bank with the patient identification (name, MRN, location, age, sex, authorizing attending physician)

**Epic does NOT alert the Blood Bank that an MTP order has been placed! A phone call must be made to alert the Blood Bank staff to the need for blood products!**

# How to Administer an MTP

## Downtown

- ❶ Blood products are provided in coolers with measured amounts of wet ice
- ❷ 1<sup>st</sup> cooler: 4u RBC, 4u plasma
  - Available almost immediately (<15 minutes)
- ❸ 2<sup>nd</sup> + coolers: 6u RBC, 6u plasma, 1u of apheresis platelets
  - Each available at 30-40 minute intervals
- ❹ Each cooler's contents should be transfused before starting the next cooler's contents



# How to Administer an MTP

## Community

- ❶ Blood products are provided in coolers with frozen freezer packs
- ❷ 1<sup>st</sup> cooler: 4u RBC
  - Available almost immediately (<15 minutes)
- ❸ 2<sup>nd</sup> cooler: 2u RBC, 4u plasma, 1u of apheresis platelets (platelet units are included when they arrive from Downtown or from Red Cross)
  - Available after 30 minutes
- ❹ 3<sup>rd</sup> + coolers: 3u RBC, 3u plasma, 1u of apheresis platelets ever other cooler
  - Each available at 30-40 minute intervals
- ❺ Each cooler's contents should be transfused before starting the next cooler's contents

# How to Administer an MTP

- 🔴 Transfuse blood products to replace blood loss and maintain hemodynamic stability
- 🔴 Give calcium gluconate (1g) with each cooler to prevent hypocalcemia due to the citrate in the blood products
- 🔴 Consider supplementation with cryoprecipitate to replace fibrinogen if there is DIC or extensive tissue trauma
- 🔴 Consider Factor VIIa, Tranexamic acid

# How to Administer an MTP

- 🔴 If additional products are needed, the MTP communicator must let the Blood Bank know of specific needs
  - (E.g. additional platelet units early on if the patient was on Plavix)
- 🔴 If patient moves during the MTP:
  - The MTP communicator must inform the Blood Bank of new location AND
  - All blood products and coolers from present location must be transported with patient to the new location

# How to Terminate an MTP

- 🔴 When the patient no longer requires blood products at a rate requiring the MTP, the Blood Bank should be notified
- 🔴 If a cooler is not picked up within an hour after the last cooler left the Blood Bank, the MTP is assumed to be canceled
- 🔴 After termination, any untransfused blood products should be returned to the Blood Bank (RBC and plasma in the cooler with ice/cold packs, platelets and cryoprecipitate at room temperature)
- 🔴 Documentation of MTP transfusions, infusions, interventions, and outcomes in Epic

# Special Notes

- 🚨 Uncrossmatched, type-specific, or O- blood products can be ordered separately without ordering MTP
- 🚨 A blood sample is required as early as possible in order to provide type-specific blood products and conserve limited blood supplies
- 🚨 Although MTP should only be initiated when a patient requires massive whole blood resuscitation, notification of the Blood Bank of patients potentially requiring MTP may assist with response time if an MTP is ordered

# Special Notes

- 🔴 After the MTP is stopped, additional products can be ordered without re-initiation of MTP
- 🔴 There is a Quality Control review of all MTP utilizations
- 🔴 Other institutions may have a different protocol with the same designation, with different proportions and volumes of blood products, different ordering processes, and different blood product delivery protocols.

# Questions?

Please contact the Blood Bank 464-6701  
(downtown) or 492-5287 (community)  
and ask for the on-call transfusion  
medicine attending physician

