 Hôpital St-Boniface Hospital	<b>Title:</b> Massive Hemorrhage Protocol Guideline-SBH		
	<b>Approval:</b> June 29, 2023	<b>Guideline No:</b>	<b>Pages</b> 1-10
	<b>Effective Date:</b> August 28 2023	<b>Section:</b>	
	<b>Revised Date:</b> Replaces Administrative Policy VI-040		

## 1.0 PURPOSE:

- 1.1 To coordinate and mobilize a complex time sensitive response to the need for Massive Transfusions.

## 2.0 DEFINITIONS:

- 2.1 **Transfusion Pack:** The cooler(s) into which the Blood Bank places blood products for the Massive Hemorrhage Protocol (MHP). Refer to Appendix A for details of contents of each Transfusion Pack.
- 2.2 **Specimen Management:** A department within Shared Health Manitoba at St. Boniface Hospital that is responsible for sample accession (i.e. receiving and processing).
- 2.3 **Massive Hemorrhage:** An emergent situation where there is an expected transfusion of 3 or more units of red blood cells within 1-hour, penetrating mechanism, a shock index (HR/SBP) >1, or a positive FAST scan.
- 2.4 **Massive Hemorrhage Documents Package:** Pre-prepared package that includes the following:
  - Request for Release of Massive Hemorrhage Protocol form (RfR)
  - MHP checklist/debrief form
  - Cumulative blood administration records
  - Requisitions for laboratory tests
  - Requisitions for release of blood products
  - MHP stickers
  - Red tags for pneumatic tube inserts.
- 2.5 **Physician:** An Attending Physician or their designate (Resident, House Medical Officer, Physician Assistant, etc.) who has primary responsibility for the direct care of the patient involved in the massive hemorrhage.
- 2.6 **Request for Release of MHP form (Appendix B):** This is a form that must be completed fully with patients' demographics and history to guide the safest selection of red blood cells (RBCs) for that patient. This form must be received by the Blood Bank in order to begin preparing Transfusion Packs. There is also an area to request additional blood products outside of the MHP schedule.
- 2.7 **Transfusion Liaison (TL):** A designated individual appointed by the resuscitation team who is responsible for completing and faxing the RfR of MHP form, confirming Transport is aware of pick up time or delegates blood product pick up to a unit staff member, ensures baseline blood work is drawn and completes the checklist/debrief (Appendix C). Also ensures unused blood products are returned to the Blood Bank in a timely manner to prevent wastage.
- 2.8 **Transfusion Medicine Physician:** The Transfusion Medicine Physician On-Call
- 2.9 **Transfusion 25:** The code 25 call group for MHP, the "Transfusion 25" call group includes: Nursing Supervisor (nights, weekends, statutory holidays), SBH Blood Bank, and Distribution Services (Transport) Dispatcher/Messenger.

2.10 **Unit Staff:** Staff on the patient care unit on which the patient is located

### 3.0 **APPROVED LOCATIONS:**

- 3.1 The MHP can be initiated in the following locations:
- 3.1.1 Emergency Department
  - 3.1.2 Intensive Care Medical-Surgical Unit (ICMS)
  - 3.1.3 Operating Room
  - 3.1.4 Post-Anesthesia Recovery Room (PARR)
  - 3.1.5 Labour Delivery Recovery (LDR)
  - 3.1.6 Intensive Care Cardiac Surgery (ICCS)
  - 3.1.7 Cardiac Catheterization Lab (HCL)
  - 3.1.8 Acute Care Cardiac Unit (ACCU)
- 3.2 Only physicians working in the clinical areas designated in 3.1 can initiate a MHP
- 3.3 A MHP can be initiated on patients 12 years of age or greater in the designated areas during a massive hemorrhage.
- 3.4 If large amounts of blood product are required outside of the approved areas for initiation, staff should active Code Blue (if not already done), and request Emergency Blood products. The next priority would be to transfer patient to an appropriate area (3.1) to manage ongoing MHP interventions

### 4.0 **PROCEDURES:**

#### 4.1 **Initiating the Massive Hemorrhage Protocol:**

- 4.1.1 The MHP is initiated by the physician (2.5) when the criteria for a MHP is identified (2.3).
- 4.1.2 Unit staff will dial "55" on a hospital phone and state "Transfusion 25" and the location. The MHP documents package will then be pulled.
- 4.1.3 The TL will be designated by the team. The TL or designate will retrieve the MHP documents package and complete the RfR.
- 4.1.4 The TL or designate will call the blood bank to ensure fax has been received.
- 4.1.5 The TL will coordinate the MHP order to be entered in the electronic patient record (EPR) by the physician/delegate.
- 4.1.6 The TL or designate will make a copy of the RfR to give to transport when they arrive.
- 4.1.7 Exception for OR for 4.1.2 OR staff will dial 515 on intercom and state "transfusion 25"

#### 4.2 **Transfusion Packs:**

- 4.2.1 Upon receipt via fax of the RfR form, the Blood Bank will begin preparation of the Transfusion Packs. Preparation continues as detailed in the MHP (Appendix A) until the Blood Bank is notified that the protocol is discontinued.
- 4.2.2 When Transport (or designated unit staff) pick up Transfusion Packs they should present the copy of the RfR at the Blood Bank to ensure they take the correct patient cooler(s). This will prevent the wrong cooler being released from the Blood Bank in the event that there concurrent MHPs.
- 4.2.3 The initial transfusion pack consists of:
  - 4.2.3.1 One red cooler with 4 units of RBC, is ready for pick up 15 minutes from the RfR form being received in the Blood Bank.
  - 4.2.3.2 One blue cooler with 1 L of plasma, is ready for pick up 45 minutes from the RfR form being received in the Blood Bank.
- 4.2.4 After the initial transfusion pack has been delivered, subsequent Packs, one blue cooler containing 1L of plasma, 1 red cooler containing 4 units of RBC and 1 dose of platelets tied to one for the coolers, are ready for pick up every 60

minutes from the RfR form being received in the Blood Bank and until discontinuation of the MHP.

- 4.2.5 The time the cooler was opened MUST be written on the attached tag.
- 4.2.6 Unit staff should only open coolers when products are needed
  - Blood products in a cooler with an intact security seal can be transfused to the patient within 8 hours of being released from the blood bank
  - Once a cooler is opened, products must be transfused to the patient (completed within 4 hours) or returned to the blood bank within 60 minutes to prevent wastage of product
- 4.2.7 Platelets must be administered within 60 minutes of issue.
- 4.2.8 Completed Record of Transfusions (ROT) of all blood products administered are to be returned to the Blood Bank as soon as possible after start of transfusion.
- 4.2.9 Unit staff ensures that when coolers are empty or no longer required, that they have been cleaned and returned to the Blood Bank via Transport (see 4.8).
- 4.2.10 Group specific blood is only issued if there is an active Type and Screen and a Second Historical Type and Screen that matches (previous Type and Screen with same blood type) is on record as per CBS policy.
  - 4.2.10.1 Two (2) units of O protocol blood can be accessed with 1 Type and Screen in a stable patient.
  - 4.2.10.2 The 2-unit limit is waived for MHP and transfusions in unstable patients.
  - 4.2.10.3 MHP is not interrupted to run a second Type and Screen.
  - 4.2.10.4 Type and Screen samples received Monday – Friday between 0830 and 1445 take about 45 minutes. Outside of the working hours of the Canadian Blood Services (CBS) satellite lab at St. Boniface Hospital, type and screen samples are sent to the main lab and can take several hours. This can take longer if there are antibodies.
- 4.3 Transportation of Blood Samples
  - 4.3.1 Where the pneumatic system is available, use to forward blood samples (for Type and Screen and/or Chemistry/Hematology), with the red MHP tags facing the exterior of the pneumatic tube carrier.
  - 4.3.2 Where the pneumatic tube system is not available, Transport will transport blood samples to and from the Blood Bank and Lab Services. Blood samples must be handed directly to a laboratory staff person and indicated as part of the MHP.
- 4.4 Transportation of Blood Products:
  - 4.4.1 Refer to 4.2.2.1 for availability for first Transfusion Pack.
  - 4.4.2 Upon receipt of “Transfusion 25” Transport will call the affected unit within 10 minutes to get instructions for the first MHP pick up time. Transport will proceed to the affected unit to retrieve a copy of the completed RfR form. Transport will then proceed directly to the Blood Bank to pick up the initial Transfusion Pack and deliver cooler directly to the unit.
  - 4.4.3 Transport will continue to pick up subsequent Transfusion Packs at 45 minutes from activation time and every 60 minutes from activation time until termination of MHP.
  - 4.4.4 If Transport cannot immediately assist they will clearly communicate this to the patient care unit and indicate how long before they are available to take on transport duties for the MHP. In these scenarios, or if Transport is not able to be contacted, the TL will assign a unit staff (HCA or RN with a copy of the RfR) to pick up the Transfusion Packs from the Blood Bank.
  - 4.4.5 Exception to 4.4.2 – 4.4.4 is MHPs in OR where the OR HCA pickups and delivers all Transfusion Packs
- 4.5 Transferring an active MHP patient to another care area:

- 4.5.1 During a massive hemorrhage, a patient may be transferred to one of the patient care units identified in 3.1.
  - 4.5.1.1 The sending unit will notify the receiving unit of the active MHP.
  - 4.5.1.2 The receiving unit will notify the Blood Bank of the patient's name, the change in location to the receiving unit and whether or not the MHP is to be continued or discontinued upon patient arrival.
  - 4.5.1.3 The receiving unit will notify Transport of patient location change and requirements and if applicable will confirm the next Transfusion Pack pick up time.
- 4.6 Discontinuation of the MHP:
  - 4.6.1 The MHP will be discontinued by Physician order (when the patient has stopped bleeding, the bleeding is controlled, the patient has died or resuscitation efforts have been withdrawn).
  - 4.6.2 The unit staff will inform the Blood Bank and Patient Transport (if used) when the MHP has ended.
- 4.7 After the MHP is complete
  - 4.7.1 If there is any blood product left, unit staff are to return all coolers and blood products to the blood bank as soon as possible.
  - 4.7.2 Return the completed ROTs to the Blood Bank.
  - 4.7.3 Ensure all medication and orders have been recorded in EPR.
  - 4.7.4 Complete checklist and debrief. Return the completed MHP Checklist/Debrief form to the Patient Safety & Quality Office - N2049 via interdepartmental mail services.
- 4.8 Blood coolers are cleaned
  - 4.8.1 Externally by unit staff, before leaving the patient care unit using a facility approved disinfectant (e.g. Oxivir TB wipes).
  - 4.8.2 Internally by the Blood Bank staff.
  - 4.8.3 Heavily soiled coolers will need to be cleaned more thoroughly by housekeeping or by unit staff before being returned to the Blood Bank.
    - 4.8.3.1 Unit staff will contact the housekeeping aide responsible for their clinical area to clean heavily soiled coolers.

## 5.0 REFERENCES:

- 5.1 Callum et al. "A Regional Massive Hemorrhage Protocol Developed Through a Modified Delphi Technique". CMAJ Open 2019.
- 5.2 National Advisory Committee on Blood and Blood Products "Massive Transfusion Conference 2011: Report of the panel". Critical Care 2011.
- 5.3 National Advisory Committee on Blood and Blood Products "NAC Statement on Fibrinogen Concentrate" 2020.
- 5.4 Spahn et al. "The European Guideline on Management of Major Bleeding and Coagulopathy Following Trauma: 5<sup>th</sup> edition" Critical Care 2019.
- 5.5 Trudeau J, Dawe, P, and Shih, A "Canadian Blood Services Clinical Guide to Transfusion: Massive Hemorrhage and Emergency Transfusion"
- 5.6 Cryer et al. [American College of Surgeons Expert Panel] "ACS TQIP. Massive Transfusion in Trauma Guidelines" 2014
- 5.7 McNamara et al. "Four years' experience of a ROTEM guided algorithm for treatment of coagulopathy in obstetric hemorrhage" Anesthesia. 2019.
- 5.8 Collins et. al "Haemostatic management of obstetric hemorrhage" Anaesthesia 2015.

- 5.9 Rourke et al. "*Fibrinogen levels during trauma hemorrhage. Response to replacement therapy and association with patient outcomes*" Journal of thrombosis and hemostasis. 2012.
- 5.10 Scrimp et al. "*Estimation of plasma fibrinogen levels based on hemoglobin, base excess, and ISS upon emergency room admission*" Zcritical Care Open Access. 2013.

## **6.0 RESOURCES:**

- 6.1 St. Boniface Hospital Transfusion Practice Committee - Massive Hemorrhage Protocol Sub Committee
- 6.2 HSC Adult Massive Hemorrhage Protocol – General Management
- 6.3 HSC Adult Massive Hemorrhage Protocol – Management of Bleeding Patient
- 6.4 Massive Hemorrhage Protocol (Appendix A)
- 6.5 Request for Release of Massive Hemorrhage Protocol (RfR) (Appendix B)
- 6.6 Massive Hemorrhage Checklist/Debrief (Appendix C)

## APPENDIX A



Hôpital St-Boniface Hospital

## Massive Hemorrhage Protocol

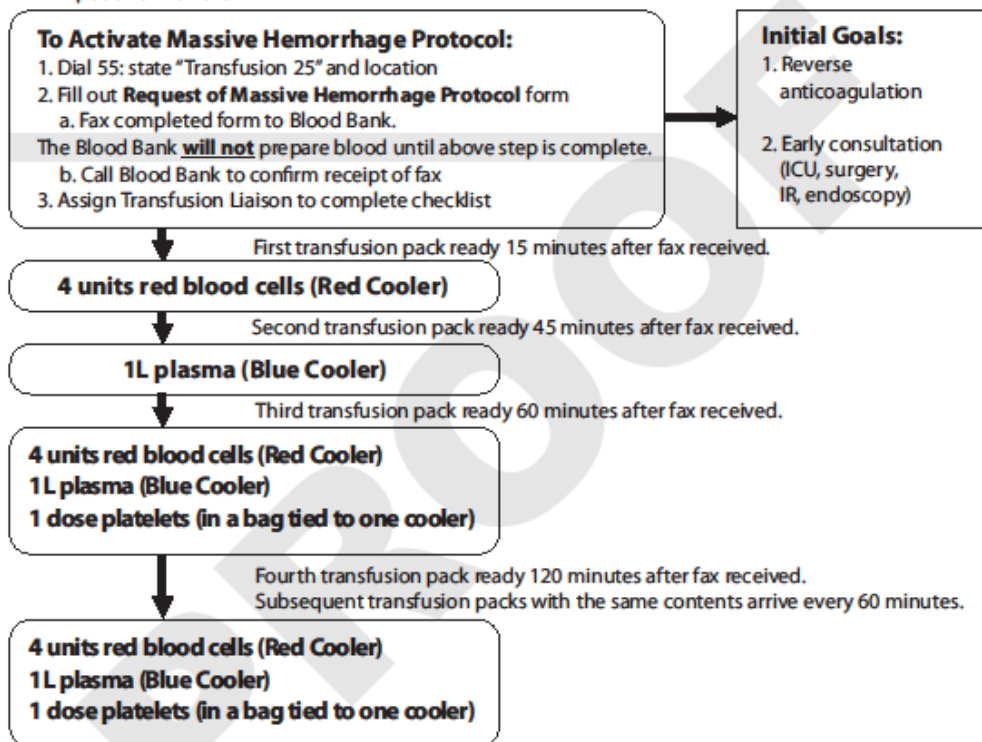
SBH Blood Bank

Phone: 204.237.2470

Fax: 204.237.2494

**Activate Massive Hemorrhage Protocol if:**

- anticipated need for transfusion of 3 or more RBC units in 1 hour with ongoing need
- penetrating mechanism
- shock index <1 (SBP/HR)
- positive FAST exam

**Hemostatic Resuscitation Goals**

<b>Red Cells:</b>	Goal Hgb 70-90 g/L
<b>Platelets:</b>	Goal >50 (>100 if intra-cranial or intra-ocular bleeding), consider transfusion if platelet dysfunction suspected (patient on Plavix, glycoprotein IIb/IIIa inhibitors or post cardiopulmonary bypass)
<b>Plasma:</b>	Goal INR <1.4. Consider additional plasma if patient weight >70kg (appropriate dose 12-15ml/kg)
<b>Fibrinogen:</b>	Goal >1.5g/L (2.0g/L for Obstetric patient). Consider empiric treatment with Fibrinogen for Pre-eclampsia/eclampsia, DIC, placental abruption, AFE, HELLP, uterine rupture
<b>Calcium:</b>	Goal Corrected Calcium <2.1 mmol/L or Ionic Calcium >1.15 mmol/L. Suggest 1g Calcium Chloride via CVL or 2g Calcium Gluconate via peripheral or central IV over 5 minutes
<b>Tranexamic Acid:</b>	Consider early use in trauma patients. 1g bolus followed by 125 mg/hr x 8 hrs

## APPENDIX A




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## Massive Hemorrhage Package Contents

Form Title	Form Number	Quantity
Massive Hemorrhage Protocol Checklist / Debrief	7102-9118-8	1
Canadian Blood Services CM077 Fax notification for Requesting Crossmatched Red Cells/Platelets/Blood Groups	SAP # 220583	1
Canadian Blood Services Request for Pre Transfusion Testing	SAP # 318008	1
Request for Release of Massive Hemorrhage Protocol - SBH	F160-INV-34B	1
Hospital Biochemistry / Hematology Test Requisition	SAP # 351517	4
Cumulative Blood Product Record (CBPR)	SAP # 340712	1
"Massive Hemorrhage" stickers	NSO160B	1 sheet
Red " Massive Hemorrhage" slip for pneumatic tube insert	NSO1620D	5

## APPENDIX B

 Hôpital St Boniface Hospital	<b>Request for Release of Massive Hemorrhage Protocol – SBH</b>		Document # F160-INV-34B
			Version # 02
	Approved By: Darcy Heron <i>(approval on file)</i>	Effective Date 25-MAY-2023	Source Documents: 160-INV-30, 160-INV-32

<b>Ordering Information:</b> Hospital: _____ Clinical Unit: _____ Ordering Physician: _____ Phone # (xxx-xxx-xxxx): _____ <p style="text-align: center;"><b>INCOMPLETE FORMS WILL RESULT IN DELAY OR REJECTION OF REQUEST</b></p>	PHN/PHIN: Last Name: _____ First Name: _____ DOB: _____ Physician / Authorized Prescriber: _____
<b>Criteria for activating the Massive Hemorrhage Protocol: 3 units in 1 hour with anticipated ongoing need, penetrating mechanism, shock index (HR/SBP) &gt; 1, positive FAST scan.</b>	If blood products are no longer required, they must be returned to the blood bank within 60 minutes from time of cooler opening to be returned to circulation or they will be wasted.

**COMPLETE THIS FORM THEN FAX TO SBH  
BLOOD BANK 204-237-2494 TO ACTIVATE MHP**

**MHP**

**PATIENT DETAILS**

Diagnosis (Circle one): Trauma/Post op Bleed/ GI Bleed/ Ruptured Aneurysm/ Obstetrical hemorrhage/ Other \_\_\_\_\_

Estimated age (for unknown patient) \_\_\_\_\_

Known Pregnancy? Y N – If NO, does the patient have Childbearing potential? Y N (choose Y if unsure)

Is the patient receiving anticoagulant medications? Yes (Agent) \_\_\_\_\_ N or Unknown

**BLOOD PRODUCTS IN ADDITION TO MHP COOLER SCHEDULE**

**Only** select below if additional products are required in addition to the predetermined cooler amounts.

Fibrinogen (Fibryga): Dose \_\_\_\_\_

Extra units of RBC's \_\_\_\_\_

Extra Dose(s) of adult platelets \_\_\_\_\_

Extra ml of frozen Plasma \_\_\_\_\_

Other product not listed: \_\_\_\_\_

LAB USE ONLY	
Transporter Name: _____	Issued by (initials): _____
Date: _____ Time: _____	
<b>FOR LAB USE WHEN TRANSPORTED BY PNEUMATIC TUBE SYSTEM</b>	
Red cells: ___# of units: Donor Unit: _____	Order filled by (Initials): _____
<b>FOR CLINICAL SITE USE FOR VERIFICATION</b>	
Complete and return to Facility Blood Bank	
Received by: _____	Date: _____ Time: _____



## APPENDIX C



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**MHP****Massive Hemorrhage Protocol  
Checklist / Debrief**

SBH Blood Bank Phone: 204 – 237 – 2470

SBH Blood Bank Fax: 204- 204-237-2494

**Part 1: Massive Hemorrhage Protocol Details**

Date: _____	Patient MRN #: _____
Activation Time (Time Fax Received): _____	Stop Time: _____
Location: _____	Additional Location(s): _____
Diagnosis / Procedure: _____	

**Part 2: Massive Hemorrhage Protocol Checklist: to be completed by the appointed transfusion liaison**

Process	Description	Time / Notes
1. Activation	To activate MHP: a. Dial "55" state "Transfusion 25" with location b. Complete Request for Release of Massive Hemorrhage Protocol form (ask ordering physician if additional products required The Blood Bank cannot prepare coolers without this form. c. Fax completed form to Blood Bank d. Call Blood Bank to confirm receipt e. Ensure MHP order entered into EPR "Activate MHP – see Cumulative Blood Record for products administered" f. Make copy of form to give to Transport on arrival	Check when complete: <input type="checkbox"/> Dial <input type="checkbox"/> Fax <input type="checkbox"/> Call faxed received at: _____ (activation time) <input type="checkbox"/> <input type="checkbox"/>
2. Baseline Bloodwork	Collect Type & Screen, CBC, INR/PTT, Fibrinogen, Na, K, Cl, HCO <sub>3</sub> , TCO <sub>2</sub> , Glucose, Urea, Crea, Ca) & ABG or VBG.	<input type="checkbox"/> Send with 1 red "Massive Hemorrhage" MHP half sheet insert.
3. Transport – Notification	Transport to call unit within 10 minutes and get instructions on first MHP pick up time. Page Transport if no call back in 10 minutes.  Assign alternate staff member to pick up products if transport not available or will be delayed. (For OR: OR HCA will transport blood products)	1st cooler ready by: _____ (15 minutes from activation) Contact Transport by: _____ (10 minutes from activation time) <input type="checkbox"/>
4. Equipment	Retrieve Bair Hugger/blood warmer/pressure bags.	Platelets should never be given under pressure, via rapid transfuser or warmer.
5. Product Pick Up	Transport picks up copy of faxed <b>Request for Massive Hemorrhage Protocol</b> form from unit Transport to pick up from Blood Bank: - 1st transfusion pack (red cooler) 15 minutes from activation time - 2nd transfusion pack (blue cooler) 45 minutes from activation time - 3rd transfusion pack (red & blue cooler, bag with platelets) 60 minutes from activation time - 4th transfusion pack (red & blue cooler, bag with platelets) 120 minutes from activation time - Subsequent transfusion packs (same contents as 4th) every 60 minutes until termination of MHP	Check and document blood products as per usual blood administration protocols.  Document TIME on DESIGNATED COOLER TAG once opened. Products can be given within 4 hours once cooler opened. Products in a sealed cooler can be given within 8 hours of release from Blood Bank.

**APPENDIX C**

6. Bloodwork	Send repeat bloodwork with red MHP insert. - Every 60 minutes from activation time (CBC, INR, Fibrinogen, ABG or VBG, 2nd Type & Screen if indicated) - Every 120 minutes from activation time (Glucose, Ca, Cl, Urea, Creat, K, Na)	Bloodwork scheduled time:  Bloodwork scheduled time:
7. Termination of MHP	Physician will order termination of MHP when bleeding has become controlled or stopped, patient died or withdrawal of resuscitation. a. Call Blood Bank to stop MHP b. Call Transport to notify that MHP has stopped, provide pick up instructions for empty coolers and any unused blood products for return to Blood Bank c. Complete ROTs and return to Blood Bank d. Ensure all medications administered are documented in EPR or Code Blue Record (if used) e. Ensure MHP order has been entered into EPR f. Prescriber to complete MHP Summary EPR progress note	Termination time:  <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Process	Description	Time / Notes
1. Patient Transfer during MHP	Sending Unit: a. Pack up all unused products into coolers, ensure time cooler opened documented on designated cooler tag. Send with patient. b. Complete ROTs and return to Blood Bank. c. Handover MHP package and this checklist to receiving unit.  Receiving Unit: a. Notify Blood Bank of change in patient location. b. Notify Transport of patient location change and next cooler pick-up. c. Continue MHP and checklist.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

<b>Part 3: Massive Hemorrhage Protocol Team Debrief</b>	
<b>What went well?</b> (consider activation, roles, communication, teamwork, timeliness, documentation, resources)	
<hr/> <hr/> <hr/> <hr/>	
<b>What could have been better?</b> (consider suggestions for changes/improvement)	
<hr/> <hr/> <hr/> <hr/>	
<b>Additional Comments:</b>	
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<b>Unit Representative Completing Form</b>	
Name:	Role / Title:
Contact:	Area / Unit: