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Implementation of the Massive Hemorrhage Protocol at South Bruce Grey Health Centre

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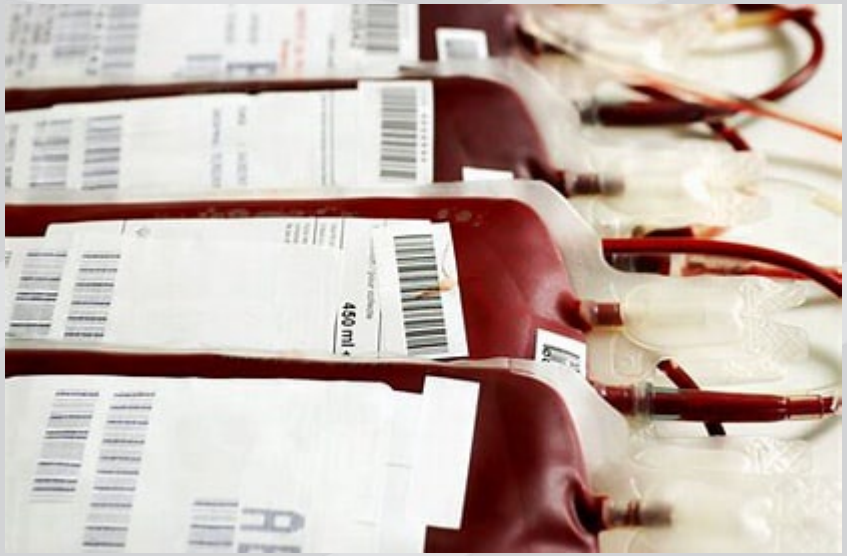
March 2025



QUALITY HEALTH CARE – CLOSE TO HOME

Organizational Overview

South Bruce Grey Health Centre (SBGHC) is a four sited organization located in rural midwestern Ontario with 3 sites in Bruce County and one in Grey County.

Each site provides Lab services of varying scope and depth:

Kincardine and Walkerton: Staffed with a combination of Phlebotomists, Medical Laboratory Technicians and Technologists with around the clock coverage for Lab testing needs.

Chesley and Durham offer a mixture of on-site Lab presence and nurse driven Point of Care testing when Lab is not on site.

Each site stocks O Neg RBCs and one adult dose of PCC and Fibrinogen (one additional dose in Walkerton)

SBGHC Labs are members of the IHLP Laboratory Partnership.

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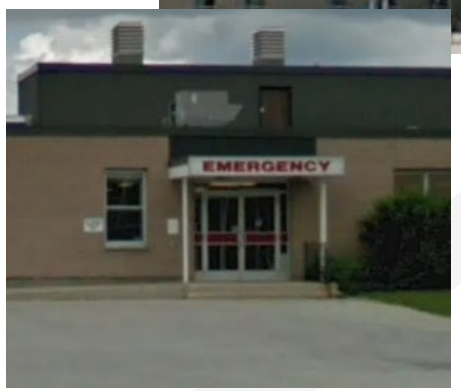
Organizational Overview/Services Provided

SBGHC Sites: Chesley, Durham, Kincardine and Walkerton



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Former State

Before implementing the Code Transfusion, SBGHC utilized two separate policies relating to trauma/massive bleeds.

1. Massive Transfusion- Laboratory policy

2. Post Partum and Ante/Intrapartum Policy - Obstetrical policy

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Current State

- One organizational policy outlining the Code Transfusion protocol and treatment response (policy is tailored to on-site testing/blood products available on site and within the organization)
- Annual Mock Codes and training for all involved staff
- All four sites stock: 2 or 4 O Negative PRBC, 1 or 2 adult dose of PCC, 1 or 2 adult dose of Fibrinogen.
- Addition of Fibrinogen to testing menu at Walkerton site

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How did we get here?

- Project commenced summer 2020: development of scope of policy and project outline
- Grand Rounds to engage staff/physicians
- Consultation with local EMS/OPP
- Consultation with neighboring facilities to optimize blood product utilization/conservation
- Review of Blood Product supply and testing menu
- Review and Approval of Policy
- Staff Training and Education

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Policy/Algorithms Overview

Policy Overview: EM- C16 Code Transfusion

Contents Include:

- Background Information
- Activation Considerations
- Departmental Responsibilities (Nursing, Lab, Registration)
- Treatment Cascade
- Quality Improvement Plan

SBGHC Goals for this policy:

- Deliver personnel and resources to the patient as quickly as possible
- Standardize the approach to the unstable hemorrhaging patient
- Coordinate response between physicians, nursing, lab and EMS/OPP

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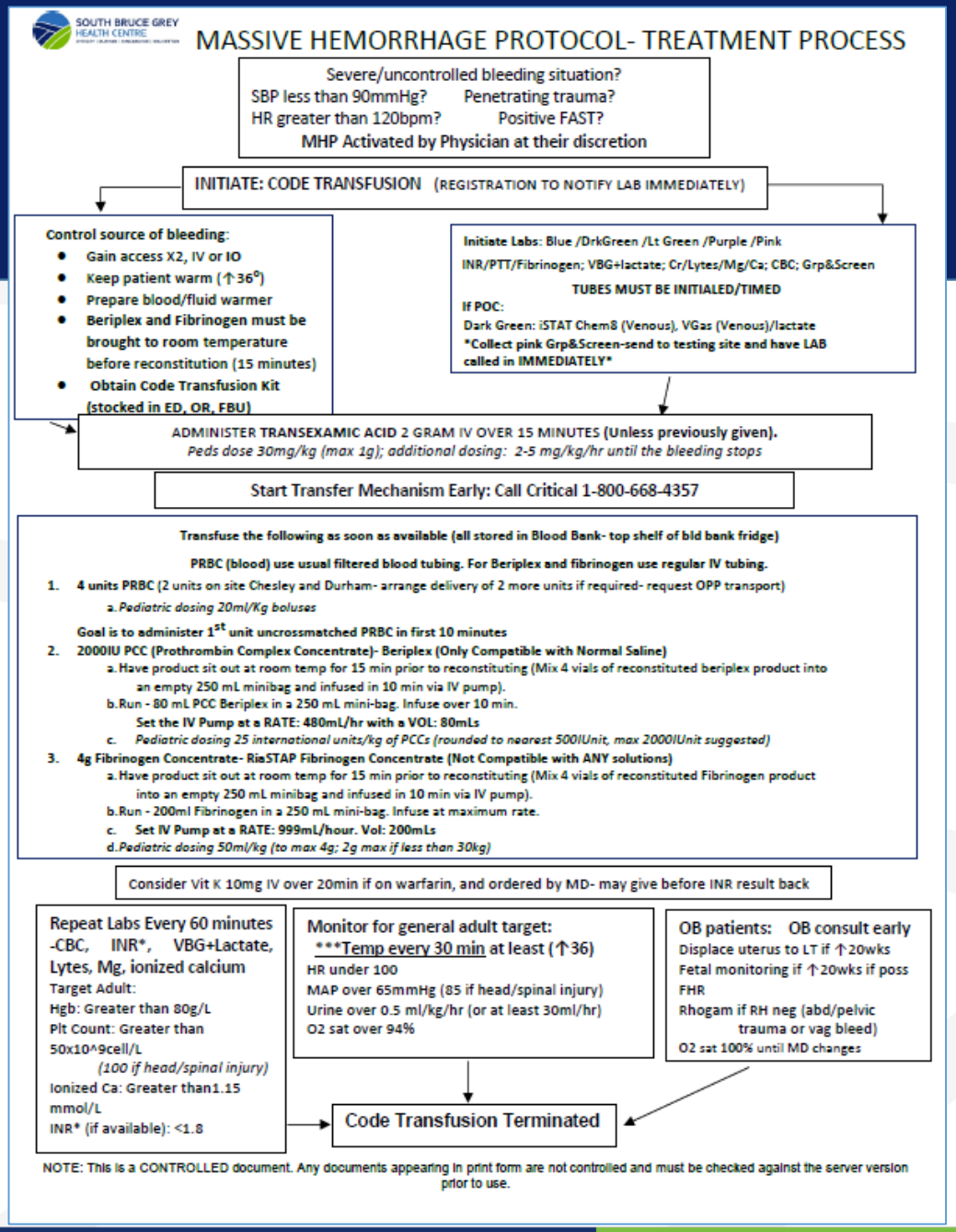

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MASSIVE HEMORRHAGE PROTOCOL- TREATMENT PROCESS

Severe/uncontrolled bleeding situation?
SBP less than 90mmHg? Penetrating trauma?
HR greater than 120bpm? Positive FAST?
MHP Activated by Physician at their discretion

INITIATE: CODE TRANSFUSION (REGISTRATION TO NOTIFY LAB IMMEDIATELY)

Control source of bleeding:
- Gain access X2, IV or IO
- Keep patient warm (↑36°)
- Prepare blood/fluid warmer
- Beriplex and Fibrinogen must be brought to room temperature before reconstitution (15 minutes)
- Obtain Code Transfusion Kit (stocked in ED, OR, FBU)

Initiate Labs: Blue /DrkGreen /Lt Green /Purple /Pink
INR/PTT/Fibrinogen; VBG+lactate; Cr/Lytes/Mg/Ca; CBC; Grp&Screen
TUBES MUST BE INITIALED/TIMED
If POC:
Dark Green: iSTAT Chem8 (Venous), VGas (Venous)/lactate
Collect pink Grp&Screen-send to testing site and have LAB called in IMMEDIATELY

ADMINISTER TRANSEXAMIC ACID 2 GRAM IV OVER 15 MINUTES (Unless previously given).
Peds dose 30mg/kg (max 1g); additional dosing: 2-5 mg/kg/hr until the bleeding stops

Start Transfer Mechanism Early: Call Critical 1-800-668-4357

Transfuse the following as soon as available (all stored in Blood Bank- top shelf of bld bank fridge)

PRBC (blood) use usual filtered blood tubing. For Beriplex and fibrinogen use regular IV tubing.

1. **4 units PRBC** (2 units on site Chesley and Durham- arrange delivery of 2 more units if required- request OPP transport)
   a. *Pediatric dosing 20ml/Kg boluses*

   Goal is to administer 1st unit uncrossmatched PRBC in first 10 minutes
2. **2000IU PCC (Prothrombin Complex Concentrate)- Beriplex (Only Compatible with Normal Saline)**
   a. Have product sit out at room temp for 15 min prior to reconstituting (Mix 4 vials of reconstituted beriplex product into an empty 250 mL minibag and infused in 10 min via IV pump).
   b. Run - 80 mL PCC Beriplex in a 250 mL mini-bag. Infuse over 10 min.
      Set the IV Pump at a RATE: 480mL/hr with a VOL: 80mLs
   c. *Pediatric dosing 25 international units/kg of PCCs (rounded to nearest 500IUnit, max 2000IUnit suggested)*
3. **4g Fibrinogen Concentrate- RiaSTAP Fibrinogen Concentrate (Not Compatible with ANY solutions)**
   a. Have product sit out at room temp for 15 min prior to reconstituting (Mix 4 vials of reconstituted Fibrinogen product into an empty 250 mL minibag and infused in 10 min via IV pump).
   b. Run - 200ml Fibrinogen in a 250 mL mini-bag. Infuse at maximum rate.
   c. **Set IV Pump at a RATE: 999mL/hour. Vol: 200mLs**
   d. *Pediatric dosing 50ml/kg (to max 4g; 2g max if less than 30kg)*

Consider Vit K 10mg IV over 20min if on warfarin, and ordered by MD- may give before INR result back

Repeat Labs Every 60 minutes
-CBC, INR*, VBG+Lactate, Lytes, Mg, ionized calcium
Target Adult:
Hgb: Greater than 80g/L
Plt Count: Greater than 50x10^9cell/L
(100 if head/spinal injury)
Ionized Ca: Greater than1.15 mmol/L
INR* (if available): <1.8

Monitor for general adult target:
***Temp every 30 min at least (↑36)
HR under 100
MAP over 65mmHg (85 if head/spinal injury)
Urine over 0.5 ml/kg/hr (or at least 30ml/hr)
O2 sat over 94%

OB patients: OB consult early
Displace uterus to LT if ↑20wks
Fetal monitoring if ↑20wks if poss FHR
Rhogam if RH neg (abd/pelvic trauma or vag bleed)
O2 sat 100% until MD changes

Code Transfusion Terminated

NOTE: This is a CONTROLLED document. Any documents appearing in print form are not controlled and must be checked against the server version prior to use.

The Massive Hemorrhage Protocol - Treatment Process and Reconstitution and Administration guidelines are posted in each Emergency Department, in addition to the Family Birthing Unit and Operating Room.

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Departmental Responsibilities- Nursing

1. Initiate a Code Transfusion (once activated by Physician)

- If Registration on-site, they are to be notified to call ‘Code Transfusion’.
  If Registration not on-site:
  1. Dial ‘5555’.
  2. Announce ‘Code Transfusion’ overhead.
  3. Call SBGHC-Walkerton switchboard; announce Code Transfusion and site affected.
  4. If after hours, instruct Registration to initiate Fan-Out List.
  5. Refer to EM-C16 Code Transfusion Appendix 1 Massive Hemorrhage Protocol Nursing

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Departmental Responsibilities- Registration

1. If on-site, announce ‘Code Transfusion’ overhead.
2. If on-site AND after-hours, announce ‘Code Transfusion’ overhead, call Laboratory staff member on-call **and** initiate Laboratory and Nursing fan out to secure 1 additional Laboratory technologist, or technician if MLT not available and 1 additional RN, RPN if no RN available
3. If off-site, call Laboratory staff member on-call, if not already done, **and** initiate Nursing fan out to secure 1 additional RN, RPN if no RN available at the site of the event.

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Departmental Responsibilities- Laboratory

Refer to OTRAN0301 MHP – SBGHC; this policy includes:

- Scope
- Testing Targets
- Specimen Type for all baseline/ongoing testing
- Procedure/Blood Product Packing configurations
- Blood Group Recommendations/Substitutions
- Termination Criteria/Follow up Steps
- Blood Inventory Management

Note: Lab staff will facilitate timely shipment of blood/blood products to satellite sites, if needed, utilizing OPP/Police services if available, or STAT via taxi courier

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Training of Staff/Mock Codes

- Mock Codes occur annually, in alignment with Emergency Preparedness/Code Training
- E-learning assigned annually to Registration, Nursing, Lab staff
- Code Debrief forms for feedback from staff (for use after any mock code drill/real event by any staff member)
- Training exercises utilizing Fibrinogen and PCC products (reconstitution)
- Code Transfusion kits are stored in each Emergency Room, Family Birthing Unit and OR that contain all supplies required for reconstitution and administration.
- It is Nursing responsibility to ensure expiry checks and stocking of the kits occurs.

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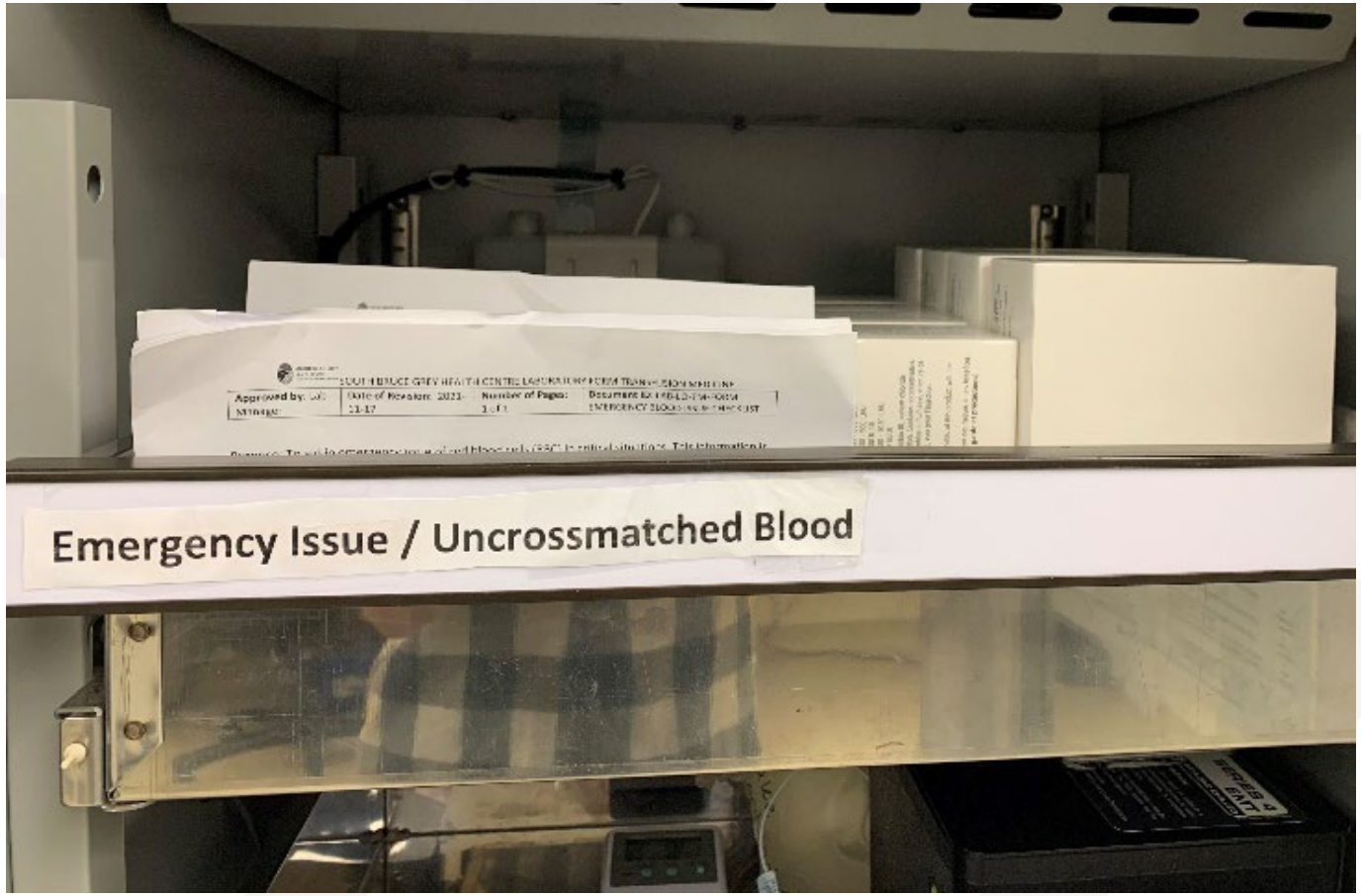
Standardization of Transfusion Medicine Dept



- Blood Product changes at all sites
- Standardization of product location in fridge
- Designated MHP crate
- Required forms attached to products

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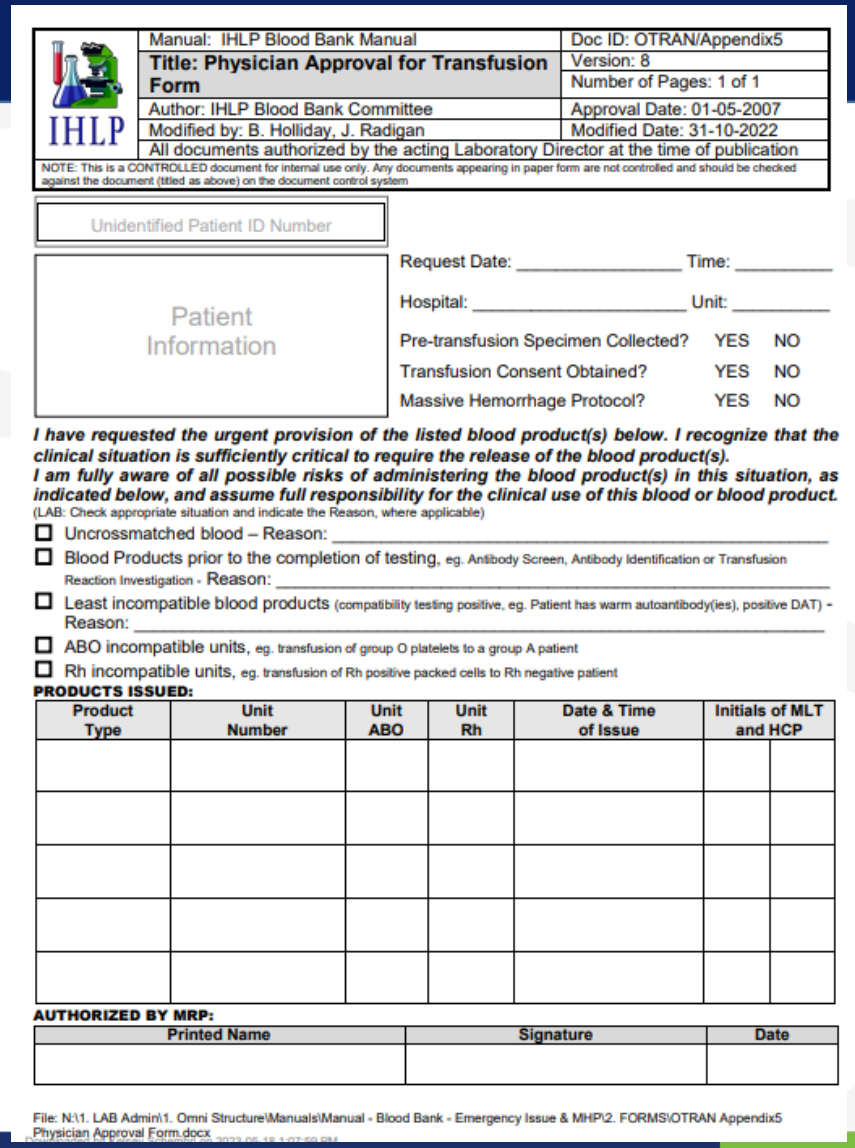
Physician Approval Form



IHLP	Manual: IHLP Blood Bank Manual	Doc ID: OTRAN/Appendix5
	Title: Physician Approval for Transfusion Form	Version: 8 Number of Pages: 1 of 1
	Author: IHLP Blood Bank Committee	Approval Date: 01-05-2007
	Modified by: B. Holliday, J. Radigan	Modified Date: 31-10-2022
	All documents authorized by the acting Laboratory Director at the time of publication	

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Unidentified Patient ID Number

Patient Information

Request Date: _____ Time: _____

Hospital: _____ Unit: _____

Pre-transfusion Specimen Collected? YES NO

Transfusion Consent Obtained? YES NO

Massive Hemorrhage Protocol? YES NO

I have requested the urgent provision of the listed blood product(s) below. I recognize that the clinical situation is sufficiently critical to require the release of the blood product(s).
I am fully aware of all possible risks of administering the blood product(s) in this situation, as indicated below, and assume full responsibility for the clinical use of this blood or blood product.
(LAB: Check appropriate situation and indicate the Reason, where applicable)

- ☐ Uncrossmatched blood – Reason: _____
- ☐ Blood Products prior to the completion of testing, eg. Antibody Screen, Antibody Identification or Transfusion Reaction Investigation - Reason: _____
- ☐ Least incompatible blood products (compatibility testing positive, eg. Patient has warm autoantibody(ies), positive DAT) - Reason: _____
- ☐ ABO incompatible units, eg. transfusion of group O platelets to a group A patient
- ☐ Rh incompatible units, eg. transfusion of Rh positive packed cells to Rh negative patient

PRODUCTS ISSUED:

Product Type	Unit Number	Unit ABO	Unit Rh	Date & Time of Issue	Initials of MLT and HCP	

AUTHORIZED BY MRP:

Printed Name	Signature	Date

File: N:\1. LAB Admin\1. Omni Structure\Manuals\Manual - Blood Bank - Emergency Issue & MHP\2. FORMS\OTRAN Appendix5 Physician Approval Form.docx

- Blank copies will be stored with the units on the Massive Hemorrhage Protocol shelf in the Transfusion Medicine Fridge
- This form is required for RBC units and Platelets, not for Fibrinogen and PCC (Pro-thrombin complex concentrate)
- Once complete, two copies are made, one for the patient's chart and the other for the Laboratory

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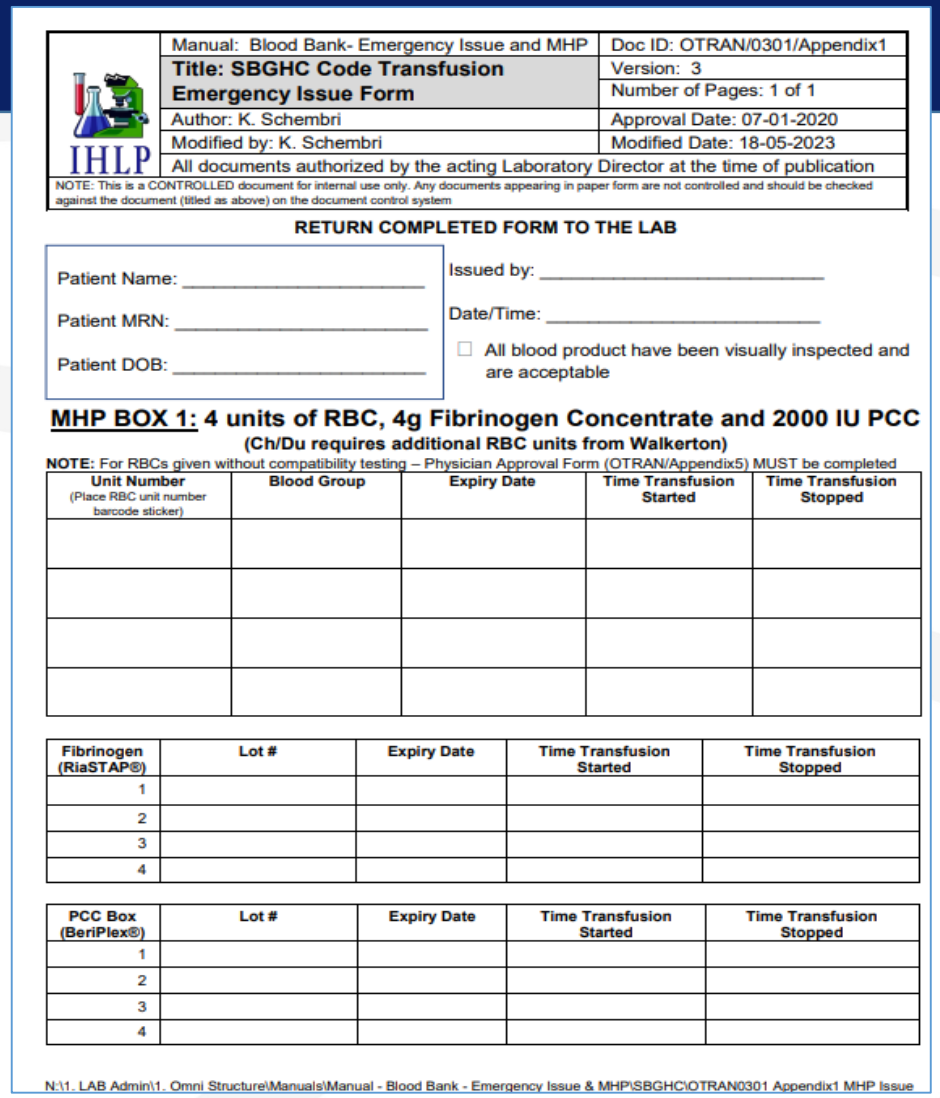
MHP/Code Transfusion Dispense Sheet



IHLP	Manual: Blood Bank- Emergency Issue and MHP	Doc ID: OTRAN/0301/Appendix1
	Title: SBGHC Code Transfusion Emergency Issue Form	Version: 3 Number of Pages: 1 of 1
	Author: K. Schembri	Approval Date: 07-01-2020
	Modified by: K. Schembri	Modified Date: 18-05-2023
	All documents authorized by the acting Laboratory Director at the time of publication	

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RETURN COMPLETED FORM TO THE LAB

Patient Name: _____

Patient MRN: _____

Patient DOB: _____

Issued by: _____

Date/Time: _____

☐ All blood product have been visually inspected and are acceptable

MHP BOX 1: 4 units of RBC, 4g Fibrinogen Concentrate and 2000 IU PCC

(Ch/Du requires additional RBC units from Walkerton)

NOTE: For RBCs given without compatibility testing – Physician Approval Form (OTRAN/Appendix5) MUST be completed

Unit Number (Place RBC unit number barcode sticker)	Blood Group	Expiry Date	Time Transfusion Started	Time Transfusion Stopped

Fibrinogen (RiaSTAP®)	Lot #	Expiry Date	Time Transfusion Started	Time Transfusion Stopped
1				
2				
3				
4				

PCC Box (BeriPlex®)	Lot #	Expiry Date	Time Transfusion Started	Time Transfusion Stopped
1				
2				
3				
4				

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- Form is pre-filled by Lab staff and on the shelf with the Code Transfusion blood and blood products
- Utilized to document dispense/assign/transfusion times during real time events (LIS updated post event)

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Challenges with Implementation

1. Participation in policy development from physicians and nursing staff
2. Scheduling of Mock Codes given high census/acuity/organizational operations

Solutions:

1. With the addition of the Code Transfusion to the Emergency Preparedness Committee- feedback from nursing/lab/physicians is captured to when policy is under review. Additionally, utilizing the Code Debrief feedback form also allows for real time feedback from staff after the event.
2. Building Mock Codes into the Annual Calendar ensures awareness from nursing and management and allows collaboration to schedule and execute mock drills.

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Education and Monitoring

MHP Scorecard and presentation to Patient Safety Committee; utilizing incident reporting program to document all MHP events, including ongoing CQI

Improvements Implemented as direct result of outcome/feedback since go-live:

1. Development and Presentation of Code Transfusion Scorecard (utilizing metrics recommended from ORBCoN) which are presented at the Patient Safety Committee
2. Addition of Reconstitution/Administration of Blood Products to Corporate Orientation
3. Code Transfusion Kits distributed to ED/OB/OR; all supplies readily available to nursing.
4. Implementation of order sets (as applicable by site- referenced in treatment cascade)

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Successes of Implementation

- The right products and resources were readily available, including additional staff
- Debrief process has been followed with productive feedback
- Timely, coordinated response with clear role expectations
- Patients receiving timely care

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References

- *A regional massive hemorrhage protocol developed through a modified Delphi technique*. (2019). CMAJ Open. https://transfusionontario.org/wp-content/uploads/2020/06/A-regional-massive-hemorrhage-protocol_CMAJOpen_2019-1.pdf

- *ORBCoN Provincial Massive Hemorrhage Toolkit*. (2020, July 1). ORBCON. https://transfusionontario.org/wp-content/uploads/2021/04/OntarioMHP_2021.pdf

- For a full review of the Provincial Massive Hemorrhage Protocol Quality Metrics portal, visit OntarioMHP_2021.pdf (transfusionontario.org)

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Questions?

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