Memorial Hospital

Massive Transfusion Protocol (MTP)

A. Principle

The purpose of this protocol is to provide a standard for efficient and effective patient management including procurement and delivery of blood products for those patients that meet the criteria for massive transfusion. Hypovolemic shock can lead to widespread cellular dysfunction and organ damage. The combination of acidosis, hypothermia and coagulopathy may occur simultaneously and each must be managed for effective resuscitation. The use of this protocol alerts clinicians and laboratory staff to provide extraordinary support for the emergency and serves to standardize laboratory monitoring to aid clinicians in crisis situations.

A patient requiring massive transfusion is any patient who is hemodynamically unstable as determined by the monitoring physician, and whose blood loss is so severe and rapid that it exceeds compensatory mechanisms. Aggressive blood product support is required to manage the patient and may require replacement of at least one blood volume.

B. Specimen Collection and Preparation

N/A

C. Equipment

a. Golden Hour Blood Transporter
b. TICS Coolant inserts
c. Transport Coolers
d. Helmer QuickThaw
e. 37^{o}C Water bath

D. Supplies

a. Genesis Timestrip® Blood Temp 10 strips

E. Reagents

N/A

F. Quality Control

a. Quality control will be performed on all blood bank transporters annually.

G. Safety

Refer to Chemical Hygiene and Blood Borne Pathogen Plan for Memorial Hospital Laboratory.

H. General Policies

1) Criteria for activation of the massive transfusion protocol: Patient at risk for uncontrolled hemorrhage.
   a) Patients requiring > 4 units of PRBCs within the first hour of resuscitation
   b) Patients requiring replacement of 50% of total blood volume (5-6 units of PRBCs) within 3 hours

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c) Patients with high likelihood of requiring total transfusion of > 10 units of PRBCs within the first 12 hours of resuscitation
d) Patients with blood loss exceeding 150 ml/min

2) Type specific units should be given whenever possible.
3) Patient care area is responsible for ordering GTS as soon as it is known that MTP will be activated.
4) If there is no history on a patient, O Negative PRBCs and AB plasma should be given.
5) *In the event of O Negative PRBC shortage, O Positive PRBCs will be given for patients who are:*
   a) Female ≥ 50 years old
   b) Male
6) Any ABO/Rh platelet type will be given.
7) Two ABO/Rh types must be completed on patient to issue type specific units.
8) If there is an ABO/Rh discrepancy on patient's sample due to transfusion, continue to give type O red cell units and AB plasma.
9) The patient care area is responsible for sending a runner to the blood bank to pick up transporters and platelets and/or cryo.
10) Attempts should be made to give AB platelets when patient type is unknown, or ABO specific. If more than two out of group platelets are transfused in 24 hours, notify blood bank supervisor.

I. Procedure

1) A clinical team member will notify the blood bank that a MTP (massive transfusion protocol) has been activated.
2) Technologist receiving the call should record patient's name, medical record number, date of birth, location, caller's first name, extension to call when transporter is ready and the name of the physician activating the MTP on *BBF 19.0-Massive Transfusion Notification Form* in the appropriate locations. (See Appendix A for example)
3) Patient care area should be ordering products as they need them in sets. If orders are not in the LIS when needed, tech should enter product orders as needed to fulfill packages.
   a. NOTE: Downtime forms are acceptable as a means of ordering, however, the patient's sample MUST conform to blood bank labeling policies.
4) The package contents are as follows:
   a. Package #1- 4 PRBC, 4 FFP, 1 Plt
   b. Package #2- 4 PRBC, 4 FFP, 1 Plt
   c. Package #3- 4 PRBC, 4 FFP, 20 Cryo
   d. Package #4- 4 PRBC, 4 FFP, 1 Plt
   e. Package #5- 4 PRBC, 4 FFP, 10 Cryo
   f. Package #6- 4 PRBC, 4 FFP, 1 Plt
5) Technologist will check blood bank laboratory information system (LIS) for history on patient.
   a. If patient has a history of an antibody, go to step 6.
   b. If patient has no history, go to step 7.
   c. If patient has only one ABO/Rh type and no current sample, go to step 8.
   d. If patient has two ABO/Rh types and a current sample, go to step 10.

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6) If at any point in this procedure tech determines that patient has an antibody, notify patient's attending physician immediately and notify pathology as soon as possible if patient has been transfused any blood that has not been antigen typed for offending antigen.
    a. Attending physician should make the decision to continue with the MTP process or not, noting that antigen negative units may not be available.
    b. It may be necessary to have the pathologist speak with the attending.
    c. If MTP is continued, order STAT antigen negative units and proceed with preparation of packages.
    d. Refer back to step 5b, 5c or 5d above, to determine the packages to prepare.
    e. When antigen negative units are available, those should be used in MTP process as needed.

7) <u>Patient with no history</u>

a. Prepare 1st package
    i. Make sure to save segments from all PRBCs issued.
    ii. Prepare enough transporters as outlined in SOP *BBMBT 2.0 -Transport of Blood Product in Blood Bank Transporters* procedure to accommodate 4 PRBCs and 4 FFP.
    iii. Prepare appropriate 4 AB FFP as outlined SOP *BBBP 6.0-Preparation of Thawed Frozen Blood Products.*
        1. NOTE: Thawing of plasma products will takes about 20-30 minutes so plasma products may be released to patient care unit after the rest of the package is already sent.
    iv. Prepare emergency release form with patient's information <u>(See step 12 for detailed instructions)</u>
    v. Retrieve 4 O Negative PRBC units from the refrigerator and attach "Uncrossmatched Blood" stickers to all units as well as blood temp indicator stickers to each unit as described in SOP *BBMBT 1.0-Use of Genesis Timestrip® Blood Temp 10*
    vi. Retrieve 1 platelet of any type and attach "Uncrossmatched Blood" sticker to unit.
    vii. When FFP are thawed, attach "Uncrossmatched Blood" sticker to each unit.
    viii. Issue 4 PRBCs, 1 platelet, and 4 FFP, when available, in blood bank LIS. (<u>see step 10 for detailed instructions</u>)
    ix. Place 4 PRBCs and 4 FFPs in transporter(s) as available.
    x. Indicate on form the date and time the transporter was packed, for tracking purposes.
    xi. Notify patient care area that transporter(s) and platelet are ready.
    xii. Make sure to include Emergency release form with first package transporter(s).
        1. NOTE-We must have physician's signature ASAP for all emergency released products.
    xiii. Mark a ☑ on Massive Transfusion Notification Form that release form was included.
    xiv. Make sure patient information and transporters' expiration are on transporter(s) and compare printed information from runner with

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information on transporter(s) before releasing transporter(s) and platelet to runner.

xv. Mark with a ☑ on the Massive Transfusion Notification Form after PRBCs and platelet (and FFP if ready) in the first package have been picked up.

xvi. As soon as any part of a package is picked up, preparation of the next package should begin.

b. Prepare 2nd-6th packages

i. Repeat steps above until patient ABO/Rh and screen samples are received.

ii. Once GTS (and ABOC or ABOV if necessary) is complete, switch to group/type specific products using electronic crossmatch if eligible.

iii. Packages 3 and 5 require the use of Cryo rather than the platelet.

1. Prepare Cryo according to "Preparation of Thawed Frozen Blood Products".
2. Cryo should not be placed in transporters.
3. Prepare and issue cryo as you would plasma outlined below.

c. Packages 7-infinite

i. Should a MTP go beyond the 6th package, the order will start again at the first package and cycle through the 6th.

ii. Add additional Notification forms as necessary and indicate on form patient identifiers and that this is "1 of 2" pages, etc.

d. PRBCs in a package will almost always be issued before the plasma due to thawing time. Because of this, there should never be more than one package of PRBCs ahead of plasma products.

i. Ex. If tech has issued The PRBCs and platelets for packages 1 and 2, but has not issued any plasma products yet, tech should wait to prepare and issue package #3 of PRBCs until plasma for package #1 is issued.

e. If a MTP goes beyond package 3, blood bank supervisor should be notified immediately for inventory management.

8) <u>Patient has one ABO/Rh type and no current sample</u>

a. Follow instructions from step 7 until a current sample can be obtained and completed.

9) <u>Patient has two previous ABO/Rh types and no current sample</u>

a. Follow instructions from step 7 until a current sample can be obtained and completed.

10) <u>Patient has two ABO/Rh types and a current sample</u>

a. Follow instructions from step 5 using type specific/crossmatched units.
b. Emergency release form is not required.
c. "Uncrossmatched Blood" sticker is not necessary.
d. Units can be electronically crossmatched if eligible.

11) <u>Issue of Product</u>

a. From the main desktop, choose the **BBK Unit desktop**.
b. Choose **Single** on the right menu bar.
c. Choose **Issue** on the right menu bar.
d. Select **Emergency - Issue Units.**
e. Patient name:

i. Type patient name
ii. Select correct patient by comparing all information available (i.e. medical record number, date of birth, etc.)
iii. Select correct admission
iv. Error message will appear indicating no crossmatched or assigned product for this patient. Choose **CLOSE.**

f. Retrieve an appropriate product from the storage unit.
g. Scan the unit number barcode into the appropriate field.
    i. Based on the historical type of the patient, if any, an error message may indicate that unit and patient types do not match but are compatible.
    ii. Choose **OK**.
h. In the **SPEC** field:
    i. Press F9 to determine if a current specimen is available.
    ii. Choose appropriate specimen, if available.
    iii. If no specimen available, press enter to order a new specimen.
    NOTE: GTS should be ordered as part of the MTP order package in MCare.
i. Issuing information will default based on log in.
j. Press enter key to **messenger field** and enter exact location transporter is going.
k. Press enter key and delete default location and press **F9** to search for location. Click on location that transporter is going.
    i. Choose **H.OR** for any OR
    ii. Choose **H.ER** for any ER
l. At the **Unit Acceptable** prompt, ensure that the unit appearance is acceptable and type **Y**. (See the "Visual Assessment Guide" binder for reference).
m. At the **Filter Issued** prompt, type **N** that a filter was not issued.
n. At the **Unit Issue Comments** prompt, type the transporter and/or cooler number that the unit(s) were issued into.
o. Click **Save** to file.
    i. Appropriate unit testing will be reflexed by the computer system.
    ii. Refer to *BBMBT 3.0- Ordering Blood Bank Tests in the Meditech System* to add additional testing.
p. Attach a blood temperature indicator to any red blood cell units per *BBMBT 1.0- Use of Genesis Timestrip Blood Temp 10*
q. Print a product label and attach to correct unit:
    i. From the main desktop, choose the **BBK Unit desktop**
    ii. Choose **Print Cards** from the right menu bar.
    iii. Choose **Crossmatch Cards**.
    iv. Scan unit number.
    v. Click OK.
    vi. Select desired printer (LABBBP03) and click OK.
r. Second laboratory staff member will verify the following:
    i. Product requested
    ii. Patient name and ID number
    iii. Unit number
    iv. Patient and unit blood type
    v. Unit expiration date

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s. If laboratory staff is unavailable for second check:
    i. Hand the unit with the attached crossmatch tag to the nursing personnel.
    ii. Nursing personnel will read the following information while blood bank personnel compares to patient documentation and issue/transfusion document. All information must match exactly.
        1. Patient name
        2. Patient medical record number
        3. Patient blood type, if available
        4. Compatibility of product, if appropriate
        5. Product type (ex. Red cells, plasma, platelets)
        6. Unit number
        7. Unit blood type
        8. Unit expiration date
t. Second check should be documented on transfusion form next to issuing tech's employee number.

12) <u>Completion of Blood Bank Emergency Consent</u>

a. Record patient identifying information
    i. Patient's Name
    ii. Patient M#
    iii. DOB, if known
b. Indicate the emergency situation by checking the appropriate box.
c. Transport the completed form with the blood product.
d. Request that the person picking up the form either bring back the signed form with them, or that someone tube the yellow part to the blood bank with the physician's signature ASAP.
    i. If physician is unable to sign, an authorized designee and a witness may sign on the physician's behalf.
        1. Ordering physician must sign the form as soon as available.
e. Submit to department pathologist for review.

13) <u>Returning Transporters</u>

a. Transporters and units should be returned according to *BBMBT 2.0-Transport of Blood Product in Blood Bank Transporters* and *BBBP 11.0-Returning Issued Blood and Blood Products to Blood Bank* procedures.
b. Plasma, cryoprecipitate and platelets ***<u>cannot</u>*** be returned to inventory.
    i. If they are returned from the patient care area, they must be quarantined and left to be returned to supplier.
    ii. Return product in computer and place in quarantine electronic location. Place on quarantine shelf(ves) and make note in communication log to return to supplier.
c. Make sure to put cooler liners into freezer ASAP after return to make sure that they can be re-used should the MTP go for many cycles.
d. If the patient care area requests more units because the current transporter is going to expire, prepare a new transporter with units and have them return the old one when they pick up the new one.

14) <u>Discontinuation of MTP</u>

a. Patient care area will notify blood bank of discontinuation of MTP.

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b. Record name of individual notifying blood bank of discontinuation on Massive Transfusion Notification Form.
c. Stop preparing packages.
d. Any packages packed but not issued, return to inventory, including platelets, thawed plasma and cryo, as acceptable having never left the blood bank.
e. Note the expiration date/time of any thawed plasma and cryo in communication log.
f. All PRBC units issued by **emergency release** should be crossmatched.
    i. If the patient has a negative antibody screen, units can be immediate spin crossmatched.
    ii. If patient has a positive antibody screen or past history of an antibody, units should be crossmatched using indirect antiglobulin test (IAT).
g. All forms should be placed in supervisor's box for review following event.

15) <u>Notes for procedure</u>

a. Blood bank will not be responsible for keeping track of transporter expiration times and calling patient care area when close to expiration; however, the packed time should be noted and we should make an effort to retrieve products that could be returned to inventory if workload and time permits.
b. Inventory should be closely monitored during MTP. Order products as necessary; using STAT as necessary to get products here as quickly as possible.
c. If additional personnel help is needed, blood bank supervisor should be contacted through the week and on-call supervisor should be contacted on the weekend to get additional staff.
d. There should be no delays in getting blood products ready for patient. If orders are not in the system, tech should order what is needed in order to prepare packages; however, do not begin thawing more plasma or cryo then is necessary for the current package. If it is not used, it cannot be returned to inventory.
e. Make sure that Emergency Release form with physician's signature is returned to the blood bank within 24 hours of the event. If it is not returned within 24 hours, notify supervisor for further instruction.

J. Attachments

a. Flowchart A-Patient with Incomplete Testing
b. Flowchart B-Patient with current ABO/Rh and Screen
c. Appendix A-Example of Massive Transfusion Notification Form

K. References

1. AABB. *Standards for Blood Banks and Transfusion Services*. Bethsda, MD: AABB, current edition.
2. AABB. "Technical Manual." Bethesda: AABB, 2011. 748-749.
3. Carlson, Mary, Sherri Veurink-Balicki, Scott Evans, Debi Foote, Lorna Spiekerman, Carol Sharfer. *Massive Transfusion Guideline*. 01 2 2010.

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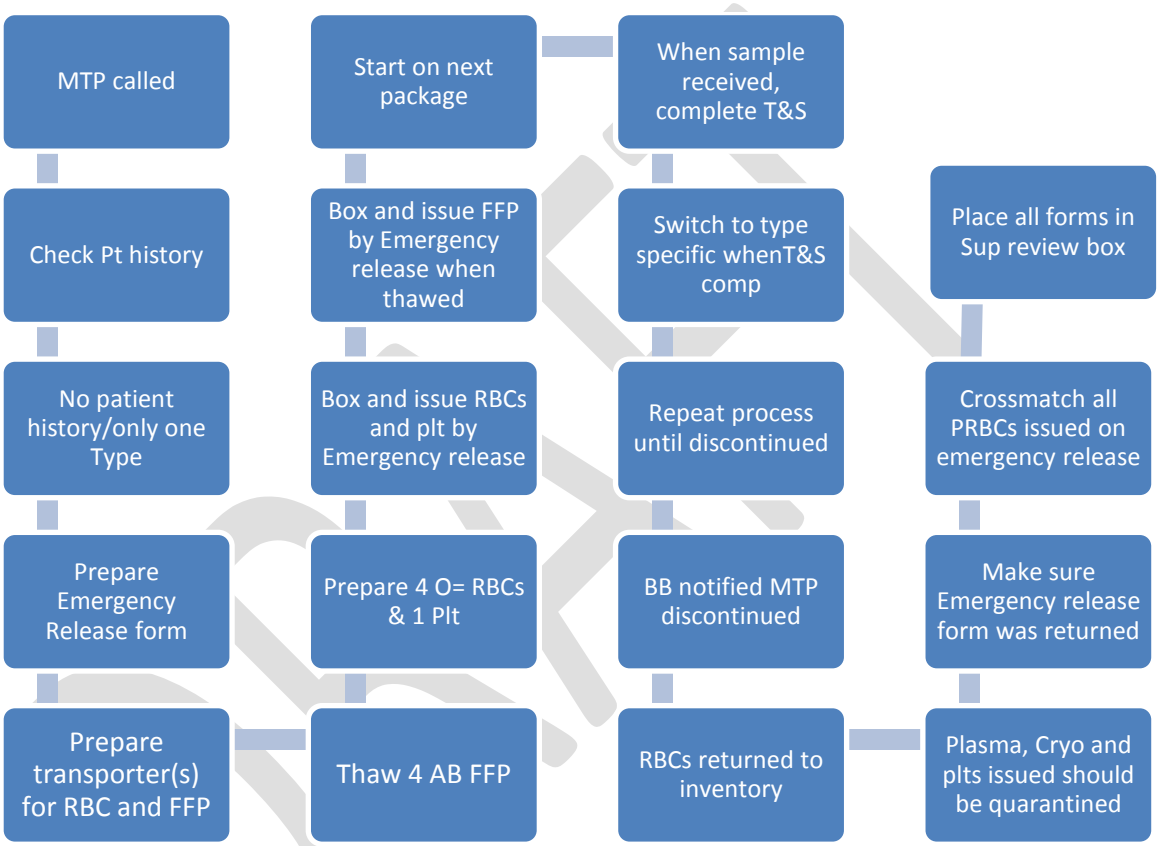
Process Flow-Patient with any of the following:

1) **No history**
2) **Only one (1) ABO/Rh type and current screen**
3) **Only one (1) ABO/Rh type and no current screen**
4) **Two (2) ABO/Rh types and no current screen**
5) **Incomplete workup**
6) **Discrepant ABO/Rh type currently**
7) **Discrepant ABO/Rh type between current sample and historical type**



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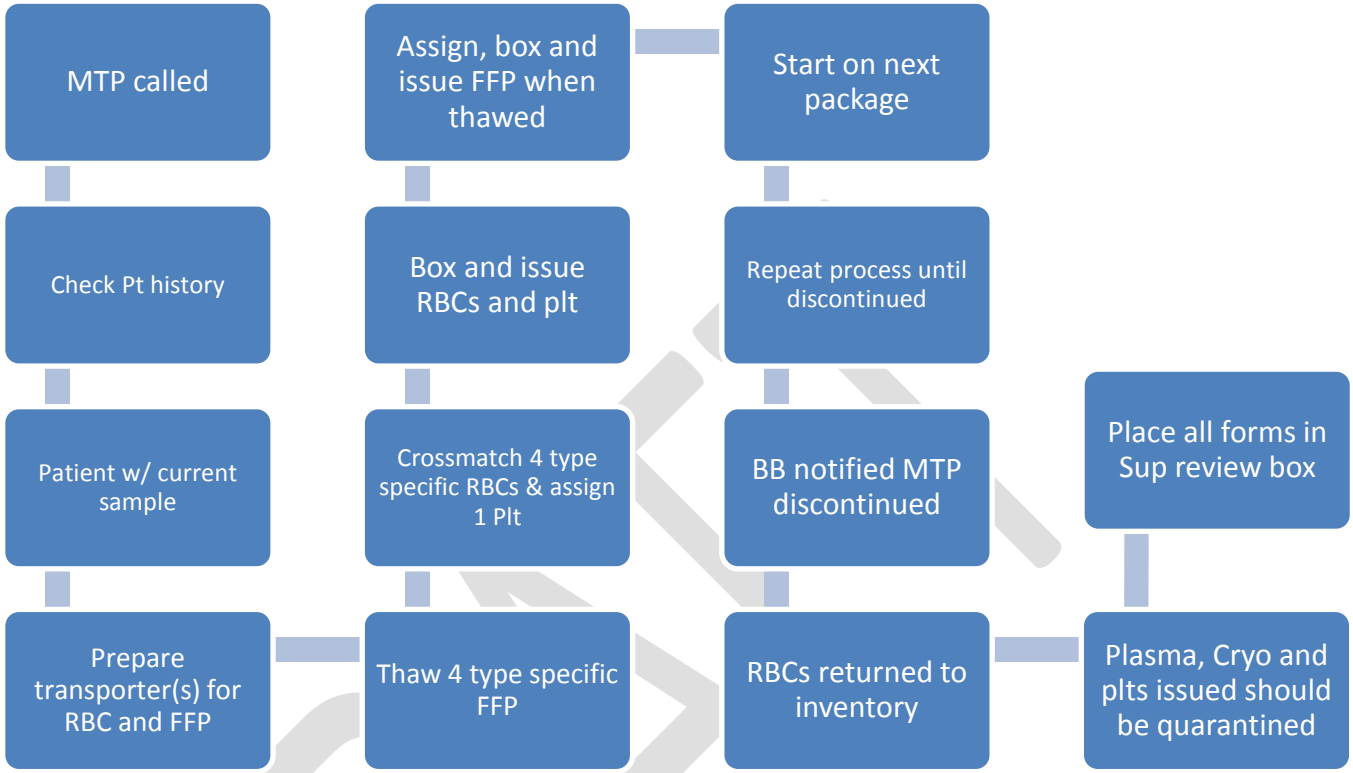
Process Flow- Patient with current T&S



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Appendix A: Example of Massive Transfusion Notification Form

Memorial Hospital
Belleville, IL 62226

Massive Transfusion Notification Form-Example

Notification

A verbal order to initiate the Massive Transfusion Protocol (MTP) has been received for the following patient:

Patient Name Williams, JoBo **DOB** 2/13/34

Medical Record # M002564897 (M) or F **Patient Location:** ER

Name of person calling to activate MTP, Date/time: Jennifer 1/12/15 0245 Callback # 5402

Physician who activated MTP: Edward Bolesta

Name of person who notified BB of discontinuation of MTP, Date/time: Sally RN 1/12/15 0345

Package #1			
☑	4 PRBCs	☑	Picked up
☑	4 FFP	☑	Picked up
☑	1 Platelet	☑	Picked up
☑	Emergency release form (if applicable)		
☑	Date/time RBCs packed 1/12/15 0300		
	Date/time to return 1/12/15 1300		

Package #2			
☑	4 PRBCs	☑	Picked up
☐	4 FFP	☐	Picked up
☑	1 Platelet	☑	Picked up
☑	Date/time RBCs packed 1/12/15 0330		
	Date/time to return 1/12/15 1330		

Package #3			
☐	4 PRBCs	☐	Picked up
☐	4 FFP	☐	Picked up
☐	4 Pooled Cryo (or 20 units)	☐	Picked up
☐	Date/time RBCs packed		
	Date/time to return		

Package #4			
☐	4 PRBCs	☐	Picked up
☐	4 FFP	☐	Picked up
☐	1 Platelet	☐	Picked up
☐	Date/time RBCs packed		
	Date/time to return		

Package #5			
☐	4 PRBCs	☐	Picked up
☐	4 FFP	☐	Picked up
☐	2 Pooled Cryo (or 10 units)	☐	Picked up
☐	Date/time RBCs packed		
	Date/time to return		

Package #6			
☐	4 PRBCs	☐	Picked up
☐	4 FFP	☐	Picked up
☐	1 Platelet	☐	Picked up
☐	Date/time RBCs packed		
	Date/time to return		

BBF 19.0 v1

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PROCEDURE AND FORM CHANGE CONTROL

Title: Massive Transfusion Protocol (MTP)										
Written		Validated		Path Review		Review		Effective		Reason for Revision
Date	By	Date	By	Date	By	Date	By	Date	By	
1/8/15	JLH									
Revised										

Location of any copy(s) of the procedure:

Out of use:

Date:_____By:_____Reason:_____

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