

**HOSPITAL QUALITY INSTITUTE  
VANGUARD AWARD  
2016**

**1. COVER PAGE**

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**Title:** Massive Transfusion in a Community Hospital

**Focus:** Patient Safety, Quality Improvement, with added benefit of positive Patient Experience

**Executive Leader Statement by John Robertson, MD, Cardiovascular Surgeon and Chair Transfusion Committee:**

The difference between life and death when a patient starts to hemorrhage is dependent on the hospital's ability to rapidly and appropriately replace the blood loss. The existence of a Massive Transfusion Protocol (MTP) that immediately triggers automatic responses housewide is critical to saving the life threatened. Our MTP, created in 2012 with a major revision in 2015, has been responsible for saving many lives, including 13 post-delivery OB hemorrhage patients (100% OB lives saved). Perhaps there is nothing more gratifying than the knowledge that those new mothers survived their near-fatal experience due to the coordinated efforts of everyone involved in the MTP process. It is my belief that our MTP is a powerful example of a patient safety, quality improvement endeavor and I fully support this application for the Vanguard Award.

**2. EXECUTIVE SUMMARY**

Saint John's Health Center is a 266-bed Community Hospital that does not have a Trauma Service. Our patient population includes a wide range of diverse clinical diagnoses, including the chronically ill elderly, patients with conditions resulting in gastrointestinal bleeding, and many oncology patients. Our Obstetric patients are frequently termed Advanced Maternal Age, age 35 and older. These patients are, by definition, much more likely to have a post-delivery hemorrhage due to uterine atoni. From 2008-2011, we had 77 patients experience massive hemorrhaging resulting in a 32% mortality rate. The newest version of the MTP has very detailed role delineation for the direct participants, resulting in increased knowledge, collaboration, communication, efficiencies, and patient/family satisfaction. Many patients and their families have thanked us for saving their life or their loved one; this is especially true when the life saved is a new mother. Our MTP has had a

significant impact on our ability to save lives. From 2012 through June 30, 2016, there have been 52 MTP events with a success rate of 92.7%; 7.31% mortality rate. Our MTP is easily replicable to other hospitals and the Providence Health System Blood Bank Committee is interested in learning more about our processes.

### **3. BACKGROUND AND RELEVANCE**

From 2008-2011, there were a total of 77 patients who required massive transfusions with an associated mortality rate of 32%. Determining that this mortality rate was unacceptable, the MTP was created based on Trauma Medicine literature which defines massive transfusion as the replacement of one entire blood volume or greater than 10 units PRBCs within 24 hours. It is not enough to subject a patient's body to vast amounts of blood product without understanding the science behind massive transfusions and determine the appropriate combination of products and when they should be administered. Death cannot be avoided if the Lethal Triad of acidosis, coagulopathy, and hypothermia is not controlled. The Blood Bank-assembled packs of products representing a 1:1 ratio of Red Cells to Plasma and alternating packs of platelets delivered every 30 minutes for the duration of the MTP is critical to a successful outcome. The MTP was and still is written in an Affinity Diagram format with each column depicting explicit roles/duties for specific participants. Many meetings took place in 2012 to finalize the blood replacement content (Massive Transfusion Packs), the accompanying automatic blood draws at precise time intervals and the process to define the tasks of each participant: physician leader; nurses; house supervisor; OR Front Desk; Blood Bank (BB); and Hematology.

### **4. DESCRIBE THE EFFORT**

The MTP was designed to focus the entire hospital on the one patient who needed the intensive attention at that time. To that end, Surgery, the Catheterization Lab, and the Emergency Department were put in suspension with the exception of surgeries in progress and any STEMI (ST [segment] Elevated Myocardial Infarction) patient arrival. While this worked quite well for the MTP patient (we were saving lives), it put a hardship on the other departments who had to halt all activity until the lead MTP physician released the rest of the hospital, which was taking too much time. In order to redefine the severity of a MTP, a sub-protocol was developed, called a SuperStat. The process was exactly the same for a MTP except the other departments were not put on hold. Throughout 2013-2014, while the MTP continued to save lives, it was evident that we could do a much better job with the processes involved. We conducted a detailed debrief after each MTP with all participants, including a representative from Quality Improvement, and a Root Cause Analysis (RCA) was also done to identify areas that were confusing and lacking clear communication and direction. It was apparent that many participants, especially responding physicians were unclear regarding their role and what was expected of them. Communication to the Blood Bank/Chemistry was inconsistent and the Transporters (Runners who obtain the blood) often did not know the identification of the MTP patient and would arrive at the BB to get blood for the "patient who is bleeding".

In 2015, we deleted the SuperStat as it became too confusing to determine when it should be used and we spent 8 months with an interdisciplinary team reworking the entire protocol to more clearly define roles and separated the MTP into 4 sections: OR DAYS (0630-2230 M-F); OR NIGHTS (2230-0630 and Weekends); Days Outside OR (0630-2230 M-F); and Nights/Weekends Outside OR (2230-0630). The Interdisciplinary Team involved was composed of physicians from the ED, surgery, anesthesia, laboratory/pathology, and Laborist; RNs from L&D, ED, surgery, a Cardiothoracic Clinical Nurse Specialist (CNS); House Supervisors (nurses), Ethicist, and Quality Improvement. Input was gathered from all hospital departments and the revised MTP is now even more detailed regarding role

delineation; the creation of “Super Users” (the heart team and RRT - Rapid Response Team) and education was expanded to increased numbers of staff and physicians (especially the Hospitalists, Laborists in OB, Anesthesiologists, and the ED). The Super Users provide a pool of people that are extremely proficient and comfortable in the MTP setting, just like the Code Blue Team is similarly proficient during a cardiopulmonary arrest event.

Some of the major revisions to the MTP process are:

- 1) Much greater focus on individual MTP participant role rather than the department role.
- 2) Outside of the OR, call the RRT immediately when the patient is decompensating for an initial consult and then call a Code Blue to obtain physician and team support.
- 3) The physician leader determines the need for MTP and notifies the charge nurse or circulating nurse if in the OR. Within 15 minutes of MTP start, the interventional need is determined by the physician (i.e. Surgery, Catheterization Lab, Endoscopy Suite) and the ability to release other departments from being on-hold is decided.
- 4) Increased knowledge, awareness, and involvement of the Blood Bank and Chemistry Lab staff regarding their important role during a MTP including entering orders directly into the Blood Bank and Chemistry electronic software (HCLL and Sunquest), and sending 4U Packed Cells immediately to the patient.

These pre-determined quick decisions at the beginning of a MTP saves time, eliminates role confusion, and allows the hospital to maintain normal safe patient care while still providing optimal resources to the MTP patient.

Additionally, the revision team made sure that the dynamics of the hospital were analyzed: ED and anesthesia availability; staffing in Catheterization Lab including the on-call team; impact of being a STEMI Center; Primary Stroke Center as of July 2016; integration of the Epic electronic medical record; and the interface with the electronic systems in Blood Bank and Chemistry. The core roles of the MTP changed to be more specific for Surgery (OR) versus outside of the OR as we realized that the needs of departments varied and that the time of day (i.e. nights or weekends) required a different algorithm to account for reduced resource availability. In October 2015, the interdisciplinary team members who were core MTP participants started to use the revised MTP template to assess the need for any additional process steps that needed to occur. There is much more detail involved than what is included in the MTP diagrams, such as where do the runners stand so they can be found quickly. The final revised MTP was shared with physicians and hospital staff and became the new standard in 2016. It is uploaded to this application.

## **5. DESCRIBE THE RESULTS OF THE EFFORT**

The MTP is a major success. There have been 52 MTP events since the beginning of 2012 through June 30, 2016. Three (3) patients expired during the MTP resuscitation efforts; 11 patients expired either because the family wished to stop the efforts or the patient died within ten days of the successful MTP due to the patient’s overall disease state. Using a denominator of 41 patients, the lives saved is 92.7%; this includes the 13 post-delivery hemorrhage patients. There have been 5 MTP events in 2016 to date, all were successful. Additionally, we were able to obtain Trapid transfusers” (equipment that rapidly pumps the blood) and a MTP Cart (much like a Code Blue Cart) for L&D and the ED. Previously, only the OR had these vital pieces of equipment and time was lost as someone had to retrieve them from the OR.

## **6. DISCUSS SIGNIFICANCE OF RESULTS**

The MTP has definitely had a significant impact on our ability to prevent patient death due to uncontrolled hemorrhage. There has also been a very positive impact on our staff and physicians who participate in the MTP; they are much more comfortable, confident, and

response times are faster. This statement is offered by core team members who know firsthand that everyone is working together smoothly, without wasted effort. There is recognized increased collaboration and comradery between departments and a better understanding of everyone's critical role in the many processes involved. In particular, the Blood Bank/Chemistry staff and the Transporters (Runners) have a much better understanding of what is happening to the patient and why their role is so critical to a successful outcome.

There is also an increased awareness of the nurses at the bedside to recognize signs and symptoms of impending need for a MTP, especially for GI bleed patients. They call for RRT assist much sooner than previously. One MTP core team member notes that the initial hemoglobin of these patients has been 6.0 rather than the previous levels of 4.0 or 5.0. The extremely tight MTP processes combined with ongoing assessment and education has provided us with a powerful tool that saves lives.

## **7. DESCRIBE SUSTAINABILITY AND SCALING**

The MTP is designed so that anyone who has never participated can follow the steps and know that the MTP expert Super Users are present to help. The High Reliability tool of Brief/Execute/Debrief is used after every MTP to determine if everything and everyone needed was present (brief), were the steps followed as detailed in the protocol (execute), and what needs to improve (debrief). A Grand Rounds presentation was held that was open to all staff and physicians to reinforce the revisions made to the MTP algorithms.

Continuous education efforts include:

- Physician training consisting of three hours of combined didactic and hands-on simulation conducted in the OR.
- Mock MTP has been done in the OR and L&D and will be conducted at least annually.
- MTP overview is presented at New Employee Orientation.
- MTP is part of the Annual Competencies for the Super Users.
- The Laboratory conducts quarterly Mock MTP drills.
- MTP is part of the nursing Skills Lab in 2016 for L&D.

The Massive Transfusion Protocol can be replicated at any ministry and has been shared with the Providence Health System Blood Bank Committee and the members are interested in learning more.

## **8. DESCRIBE KEY LESSONS LEARNED AND ADVICE FOR OTHERS**

After 4 years of using the MTP we have learned that:

- a clearly defined, very detailed description of every role is critical, including the many details not included in the MTP diagrams, i.e who stands where, forms needed during MTP to track action and delivery of blood products, who is the recorder, etc.
- the physician leader must be well-trained and be able and willing to make the necessary intervention decision within 15 minutes.
- everyone should understand at least some of the science behind why the blood replacement and lab draws are structured as they are.
- have the proper equipment present, i.e. rapid transfuser and well-stocked MTP Cart.
- initial didactic training with associated Mock drills is essential.
- open communication using the read-back tool and clarifying questions is required.
- MTP is a huge team effort, every role is critical and everyone is to be appreciated

The best advice to offer is not assume that you can cut corners, delete steps, or let a physician unfamiliar with the protocol take command of the situation. Use of the High Reliability tones, behaviors, and tools is strongly encouraged.