

# Optimization of the Ordering and Dispensing of Coagulation Factors

TAP TO GO BACK TO KIOSK MENU

## Introduction/Problem

- Coagulation factors and anticoagulation proteins (factors) had historically been ordered and dispensed through the BIDMC Blood Bank
- It was recognized that admixing products for intravenous infusions outside of a cleanroom environment posed an increased risk for contamination
- Variations in ordering and dispensing of coagulation factors increased the potential for waste, particularly with an increase in volume and utilization

## Aim/Goal

- The goal of transitioning the management of coagulation factors to the Pharmacy Department was to:
  - Optimize and standardize the ordering and dispensing process
  - Promote computerized provider order entry (CPOE) indication directed dosing
  - Ensure regulatory compliance and dose preparation in a USP compliant cleanroom
- A Clinical Review and Approval Process was developed in collaboration with Transfusion Medicine to ensure safe and appropriate utilization of Coagulation Factors

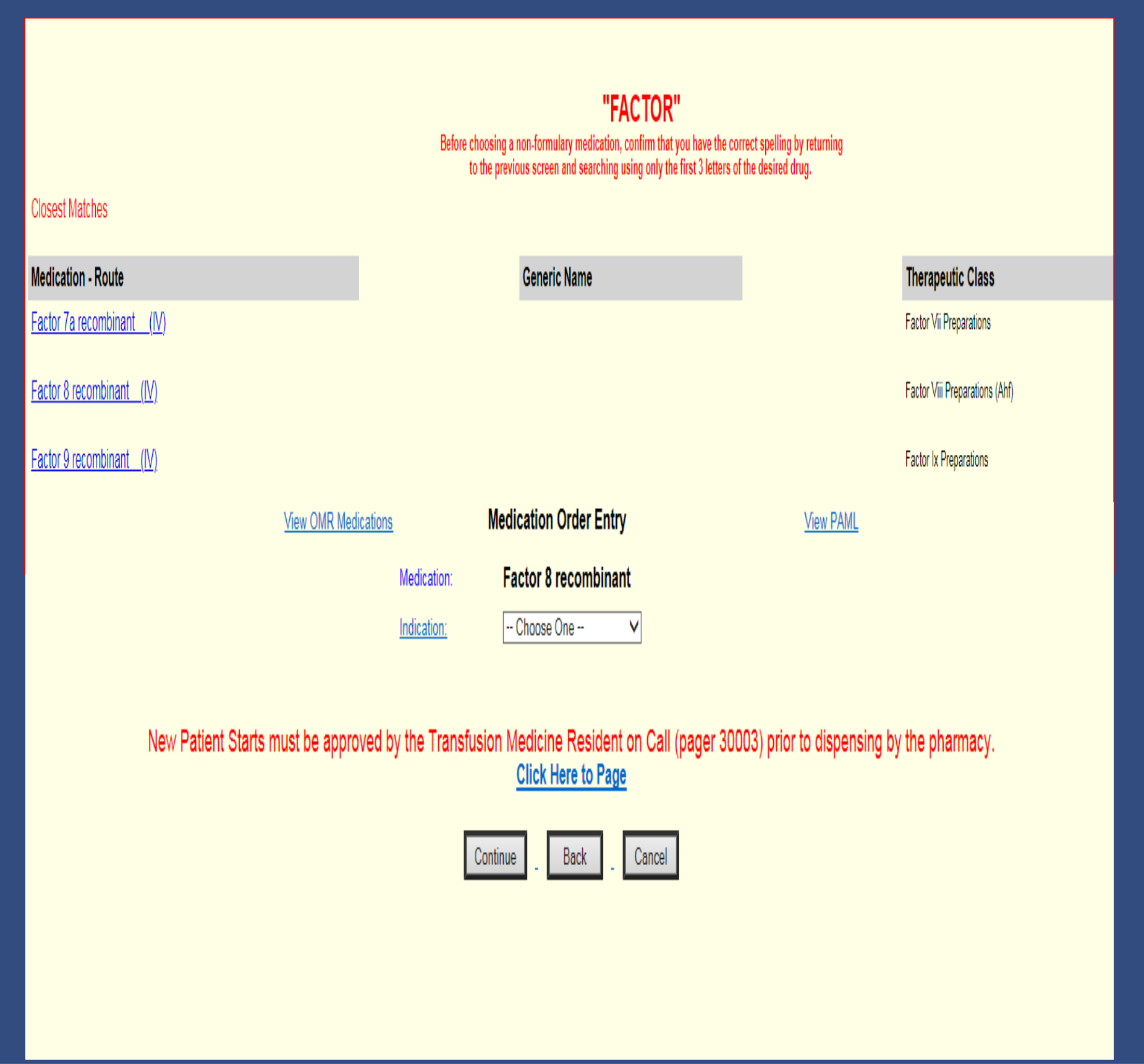
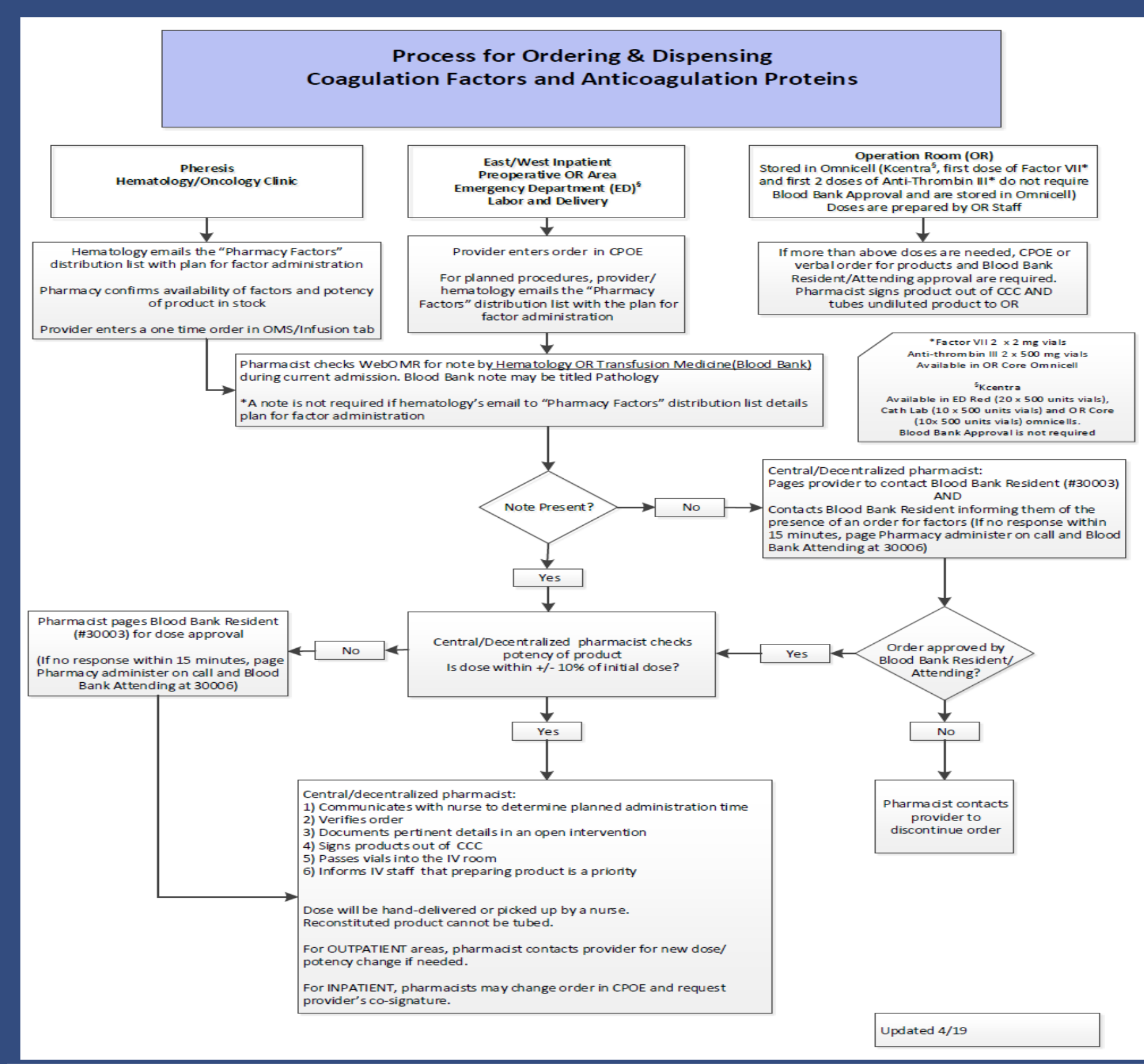
## The Team

- Mary Eche, PharmD, BCPS, BCCCP, CACP; Pharmacy
- Katherine Cunningham, MHA, PharmD, BCPS; Pharmacy
- Sarah Warack, PharmD; Pharmacy
- Wendy Chen, PharmD; Pharmacy
- Denise Arena, RPh; Pharmacy
- Peggy Stephan, MS, RPh; Pharmacy
- Monique Mohammed; Blood Bank
- Kerry O'Brien, MD; Transfusion Medicine
- Barbara Donovan, RN; Nursing
- Transfusion Medicine and Hematology Team
- Pharmacy Purchasing Team
- Pharmacy IS Team

## The Interventions

- A multidisciplinary group was convened to develop a process and timeline for implementing the transition
- Potential barriers and the impact of the practice change were identified
- Intravenous administration guidelines and cleanroom dispensing procedures were developed
- Decision support and a dosing calculator was incorporated within CPOE
- Following dissemination of the new process through Nursing, Pharmacy, Transfusion Medicine, and Hematology meetings, pharmacy took over the responsibility for coagulation factor dispensing in November 2017

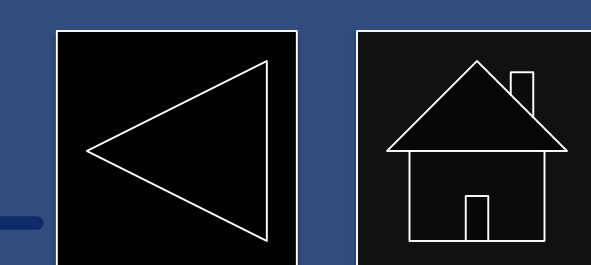
## Results



Workflow improvements included: Development of a Transfusion Medicine approval process, implementation of Clinical Decision Support and CPOE ordering

For more information, contact:

Mary Eche, PharmD, Clinical Coordinator - Critical Care; ieche@bidmc.harvard.edu



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## Results/Progress to Date

**Decision support for Indication Based Dosing**

**Link to Factor Guideline**

**Automatic dose calculator**

**IV DRUG ADMINISTRATION GUIDELINE**  
**Recombinant Factor VIII/Anti-Hemophilic Factor (Hexilate®)**  
pH= 6

**Therapeutic category:** Coagulation Factor

**FDA approved Indications:**

- On demand treatment and control of bleeding episodes in adults and children with hemophilia A
- Perioperative management of bleeding in adults and children with hemophilia A
- Routine prophylaxis to reduce the frequency of bleeding episodes in children with hemophilia A and to reduce the risk of joint damage in children without pre-existing joint damage.
- Routine prophylaxis to reduce the frequency of bleeding episodes in adults with hemophilia A

**Limitations of use:** Not indicated for the treatment of Von Willebrand disease

**Dose Adjustment:** Higher factor VIII clearance may occur in children (4.4–16 years). Dose adjustment may be needed. Dose selection for an elderly patient should be individualized.

**IV PUSH/ INTERMITTENT INFUSION**

**Administration:** Administer over 5 minutes. Adapt the rate of administration for the response of each individual patient. Determine the pulse rate before and during administration. If there is significant increase in pulse rate, reduce the rate of administration or temporarily halt the infusion allowing the symptoms to disappear promptly. See also NPM 1200-18: [Administration of Intravenous Factor Preparations and other Coagulation Disorder Therapies](#)

**Dosing:**

- Dosage and duration of treatment with recombinant factor VIII depend on the severity of the factor VIII deficiency, the location and extent of bleeding, and the patient's clinical condition, age and recovery of factor VIII
- Dose administered should be titrated to the patient's clinical response. Patients may vary in their pharmacokinetic and clinical response to recombinant factor VIII. Although doses can be estimated by the equations below, it is highly recommended that, whenever possible, appropriate laboratory tests, including serial factor VIII activity assays should be performed

**Dose (units) = body weight (kg) x desired factor VIII increase (IU/dL or % of normal) x 0.5 (IU/kg per IU/dL)**

**Dosing for On-Demand Treatment and Control of Bleeding Episodes**

Type of bleeding episodes	Factor VIII Level required (IU/dL or % of normal)	Dose (IU/kg)	Frequency of Doses (hours)	Duration of therapy (days)
Minor (early hemarthrosis, minor muscle or oral bleeds)	20-40	10-20	Repeat dose if there is evidence of further bleeding	Until bleeding resolved
Moderate (Bleeding into muscles, bleeding into the oral cavity, definite hemarthroses, and known trauma.)	30-60	15-30	12 - 24	Until bleeding resolved
Major (Gastrointestinal bleeding, intracranial, intra-abdominal or intrathoracic bleeding, central nervous system bleeding, bleeding in the retropharyngeal or retroperitoneal spaces, or iliopsoas sheath. Fractures, Head trauma)	80-100	Initial: 40-50 Repeat: 20-25	8 - 12	Until bleeding resolved

**Dosing for Perioperative Management:**

Type of surgery	Factor VIII Level required (IU/dL or % of normal)	Dose (IU/kg)	Frequency of Doses (hours)	Duration of therapy (days)
Minor (including tooth extraction)	30 – 60	15-30	12-24	Until bleeding resolved
Major (tonsillectomy, inguinal herniotomy, synovectomy, total knee replacement, craniotomy, osteosynthesis, trauma)	100	50	6-12	Until healing is complete

**Routine Prophylaxis in Adults:** The recommended dose for routine prophylaxis is 25 units/kg three times a week

**Routine Prophylaxis in Children:** The recommended dose for routine prophylaxis is 25 units/kg every other day

## Results

Metric	Percent Compliance (%)
Hematology/Transfusion Medicine approval	95.8*

Pharmacist Intervention	Number of doses n = 120 (%)	Urgent Order Metrics	Average (min.)	Min	Max
No change	95 (79.17)	Time from POE order entry to RPh verification	13.2	3	30
Vial size rounding	18 (15)	Time from RPh verification to eMAR documentation	47	19	76
Incorrect dose	3 (2.5)				
Both rounding & incorrect dose	4 (3.33)				

- The majority of factor orders were approved by transfusion medicine and/or hematology.
- Pharmacist intervention was required for vial size rounding or incorrect dose
- Purchasing of factor products within the pharmacy resulted in increased financial stewardship and cost savings

## Lessons Learned

- Successful transition of coagulation factor dispensing from the blood bank to pharmacy required multidisciplinary effort, planning and education
- Development of administration guidelines, CPOE Decision Support, and dose preparation in a USP compliant cleanroom have led to improved safety and efficiency of the ordering and dispensing process

## Next Steps

- Ongoing review of the ordering and dispensing process for areas of improvement and adjustment
- Ongoing multidisciplinary education on the new process
- Identification of opportunities for clinical guideline development in collaboration with providers

Workflow improvements included: implementation of clinical decision support (indication based dose calculator, imbedded guidelines); prospective order review by a pharmacist; development of guidelines for intravenous administration, and documentation in the electronic medication administration record (eMAR)

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