Leveraging the EHR to Improve Transfusion Practice and Utilization

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DISCLOSURE

In the past 12 months, I have not had any significant financial interest or other relationship with the manufacturers of the products or providers of the services that will be discussed in my presentation.
Hospital Based Transfusion Medicine Service (TMS)

• Blood Donor Center
• Blood Bank
  – Routine testing, AB ID, Transfusion reactions
  – Utilization and PBM
• Cellular therapy (stem cell collections, CAR-T)
• Apheresis (TPE, Red Cell Exchange, Photopheresis, Leukoreduction)
TMS supports:

- Routine BB-
  - PBM, Transfusion Reactions, Antibody Interpretation, Deviations
- Level 1 Trauma Center-
  - Massive Transfusion Protocol, Burn Unit
- MFM-
  - Intrauterine Transfusions
- NICU
  - Volume, Unit Hematocrit, Special product requirements, Reports
- Oncology/Transplant
  - HLA-matched platelet requests, Granulocyte Infusions
- Sickle Cell Center of Excellence
  - Alloimmunization
• Transfusion Medicine involves direct patient care and multidisciplinary coordination of care.
• Need to document our clinical recommendations and care plans that extend beyond just the blood bank LIS
• TMS visibility in the EHR
EHR – Utilization using CPOE with CDS

• Compelling reasons to utilize the EHR to improve blood transfusion practice include
  – Just in time, targeted education
  – Evidence based guidelines
  – Standardize interinstitutional transfusion practice- variability despite strong body of evidence based literature
  – Improve safety
  – Reduce waste

• Has been shown in multiple studies to cause a reduction of inappropriate blood production utilization
  – Cost savings easily in the millions (direct and indirect cost of transfusions)
A transfusion threshold of HEMOGLOBIN LESS THAN 7 g/dL is associated with better outcomes.
- Please consider not transfusing
- or, Indicate a relevant exception, and accept the alert.

<table>
<thead>
<tr>
<th>Component</th>
<th>Date/Time</th>
<th>Result</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemoglobin</td>
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<td>12.9</td>
<td>g/dL</td>
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Click here for, "Red Blood Cell Transfusion: A Clinical Practice Guideline From the AABB" (Annals of Internal Medicine, 2012)
Apheresis Orders and Consults notes

• Initial consult to initiate Pheresis [eval pt, indication, access, etc]
• Electronic placement of orders for
  – Plasma exchange: frequency, duration, medication, blood product ordering
  – Red cell exchange: indication, FCR, target Hct, amount of RBC units, blood prime? depletion?
• Procedure note
  – Includes volume removed; fluids, meds, anticoagulants given; patients net fluid status provided, any complications, date of next procedure, plan of care
EHR: TMS Consult Notes

• Severe transfusion reaction- Severe allergic, TACO, TRALI, Acute Hemolytic, Delayed Hemolytic, etc
  – moving beyond just putting a transfusion reaction interpretation in results review (often not even seen by clinicians)
  – Communicate critical information across multiple encounters

• Compatible blood products would take >2 days to be available (complex RBC molecular genotype, complicated antibody work up, heavily alloimmunized patients)

• As needed, As requested
EHR - TMS Platelet Refractory Evaluation

• Physician Orders HLA matched platelet
• BB contacts the MD
• Evaluate patient- 1 hour post CCI, history of response to plt transfusion
• Order anti-PLT/anti-HLA antibodies
• Consult note
  – Rec for platelet support until results come back
  – Rec for future platelet support based on results
## NICU Transfusion Report

Data pulled from BBLIS, Clin Lab LIS, Blood administration module, EMR (patient problem list, discharge codes, etc)

<table>
<thead>
<tr>
<th>Pt DOB</th>
<th>Pt weight at time of transfusion</th>
<th>Pt blood group</th>
<th>Mother blood group</th>
<th>Product transfuse order (transfuse prbc, transfuse plt, transfuse ffp)</th>
<th>Date transfuse order was placed</th>
<th>Time transfuse order was placed</th>
<th>Reason for transfusion</th>
<th>Volume transfused</th>
<th>Volume sent from the blood bank</th>
<th>Unit Number</th>
<th>Unit date of collection</th>
<th>Unit blood group</th>
<th>Unit hematocrit</th>
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<tbody>
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<td>o positive</td>
<td>o positive</td>
<td>PRBC</td>
<td>1/5/2020</td>
<td>1430</td>
<td></td>
<td>7</td>
<td>7</td>
<td>PR123</td>
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<td>o negative</td>
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<td>PRBC</td>
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<td></td>
<td>9</td>
<td>9</td>
<td>PR852</td>
<td>1/9/2020</td>
<td>o negative</td>
<td>65</td>
</tr>
</tbody>
</table>

| Unit date of collection | Unit blood group | Unit hematocrit | Transfusion start date | Transfusion start time | Transfusion end date | Transfusion end time | Heart Rate at the start of transfusion | Vitals at 15 mins into transfusion | Vitals at end of transfusion | Was a transfusion reaction reported | Result/Type of the transfusion reaction | Last hemoglobin on file at the time transfusion ordered | Last hematocrit on file at the time transfusion ordered | Date of result of hemoglobin value | Time of result of hemoglobin value |
|------------------------|------------------|-----------------|------------------------|----------------------|----------------------|------------------------|----------------------------------------|---------------------------------|------------------------------------------|----------------------------------------|---------------------------------------------|---------------------------------------------|--------------------------------------|-----------------|
| 1/2/2020               | o negative       | 70              | 1/5/2020               | 1700                 | 1/5/2020             | 2000                   | 150                                    | 165                             | 155                                      | no                                     | none                                        | none                                       | 8                      | 25              |
| 2/2/2020               | o negative       | 74              | 2/17/2020              | 1100                 | 2/17/2020            | 1400                   | 170                                    | 165                             | 140                                      | no                                     | none                                        | none                                       | 7                      | 22              |
| 1/9/2020               | o negative       | 65              | 1/16/2020              | 1000                 | 1/16/2020            | 1300                   | 160                                    | 165                             | 160                                      | no                                     | none                                        | none                                       | 9                      | 28              |
**Blood Product Ordering: Intrauterine Transfusions**

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<th>Display</th>
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<th>Result Processing Type</th>
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<tr>
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<td>No Special Processing</td>
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</tr>
</tbody>
</table>

[Find Millennium Assay] [Remove] [Skip] [Save]
Blood product order set: Intrauterine transfusions

- Indications as discreet field that call be pulled into reports

  **Indications for Intrauterine RBC transfusion:**
  - RBC Alloimmunization (anti-D)
  - RBC Alloimmunization (non-antiD)
  - Suspected viral infection (Parvo B19, etc)
  - Elevated MCA-PSV, cause unknown
  - Other (free text)

  **Indications for Intrauterine PLT transfusion:**
  - NAIT (autoimmune thrombocytopenia)
  - Suspected viral infection
  - Non-immune fetal anemia
  - Other
Smart Templates for Transfusion Data

- \( *TRrxnall \) = expand to pull if there has ever been a transfusion reaction workup ordered in this patient in the history of this system. Include date of the workup. Expand to pull the final interpretation rendered for that workup.
- \( *RBC24 \) = expand to pull all pRBC units transfused to this patient in the past 24 hours (put unit numbers, total number of units)
- \( *FFP24 \) = expand to pull all FFP units transfused to this patient in the past 24 hours
- \( *PLT24 \) = expand to pull all Platelet units transfused to this patient in the past 24 hours
- \( *CRYO24 \) = expand to pull all cryoprecipitate units transfused to this patient in the past 24 hours
- \( *bloodproducts24 \) = expand to include result of \( *RBC24, *FFP24, *PLT24, *CRYO24 \)
**Difficult to find compatible blood**

- Outpatient sickle cell center of excellence
- Hospital takes care of majority of the sickle cell related acute admissions.
- A small but significant portion of those patients have multiple alloantibodies and it can sometimes take 3-5 days to find red blood cells that are compatible for those patients
- Clinician orders pRBC when the patient really needs it, and then they get a phone call from us saying it will take at least 3 days to get this blood to our facility—angry clinician, delay in patient care
Intervention

• Create a diagnosis-based alert in the EHR
• When patient shows up in the ED, Pop up alert Informing the clinician that it is difficult to find compatible blood for this patient please have nurse call to notify the Blood bank
• This allows the blood bank physician to PROACTIVELY follow the patient’s clinical course, set expectations with admitting physician, and anticipate blood product needs.
Summary:

- Routine BB-
  - PBM, Transfusion Reactions, Antibody Interpretation, Deviations
- Level 1 Trauma Center-
  - Massive Transfusion Protocol, Burn Unit
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Questions?

Whatever you do always give 100% unless you're donating blood.