Nurses Apply Translational Research Skills to Implement EBP Solutions for Detection of Blood Transfusion Reactions

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Introduction

- 20,933,000 blood products transfused in the U.S. during 2011 with a 0.24% adverse event rate

(Gehrie, Hendrickson, & Tormey, 2015; Sullivan et al., 2015)

- Reported blood transfusion reaction rates ranged from 0.14-2.1% in reviewed literature

(Cortez-Gann, 2017; DeYoung et al., 2015; Gehrie, Hendrickson, & Tormey, 2015; Hardwick, Osswald, & Walker, 2013)

Purpose

The purpose of this project was to ensure five regional hospitals blood administration policies, processes, and practices align with current evidence for detection of adverse blood product reactions.

Aim

The aim of this project was to align policies, processes, and practices around blood product transfusion reaction detection in five acute care hospitals with current synthesized evidence obtained from an Integrated Research Review.

Background

Five acute care regional organizations located in the southwest United States recorded 51/12,077 (0.422%) transfusion-related adverse reactions in 2017, thus highlighting the importance of identifying evidence to support vital sign frequency to detect transfusion reactions.

Significance

Frequency of Vital Signs

- Findings primarily recommended vital signs be obtained before, after 15 minutes, and at transfusion completion

(Battard Menendez, 2016; Cortez-Gann, 2017; DeYoung Sullivan et al., 2015)

- One VA hospital study reported blood transfusion was not associated with significant changes in recipient vital signs (respiratory rate nor SaO_2 were included in definition of “vital signs” by investigators) of 3,496 blood component infusions

(Gehrie, Hendrickson, & Tormey, 2015)

Significance

- Throughout the literature, vital signs were noted to not be enough to detect blood transfusion reactions.
- Physical assessment changes occur prior to vital sign changes in reviewed literature.
  - In one reviewed study, 40% of sample had vital sign changes after patient reported symptoms

(DeYoung Sullivan et al., 2015)

- Current vital sign monitoring at start, 15 minutes after, and at the conclusion of a transfusion may not detect delayed reactions.

Methods

- Research Academy participants compared findings from a literature review using Integrated Research Review methodology to current blood administration policies to ensure evidence-based practices are employed for early detection of blood transfusion reactions. (Bauer, Damschroder, Hagedorn, Smith & Kilbourne, 2015; Cullen et al., 2018; Massingham, 2014)
- Stevens Star Model of Knowledge Transformation© was used to guide Research Academy fourth cohort project work for translation of research into practice. (Stevens, 2013)

Methods

- Three clear themes arose from synthesized literature review findings:
  - inclusion of respiratory assessment,
  - inclusion of a physical assessment, and
  - engaging family and patients as partners in detecting blood product transfusion reactions.

Methods

- The three emerging themes were used to guide policy, process, and practice change recommendations by the group of direct care nurses with Research Academy faculty to guide them.
- Consensus was reached for changes to relevant policies, electronic health record, and implementation steps.

Methods

- Meetings were scheduled with nurse leaders to present suggested changes to process, policy, & practice for approval
  - nursing informatics
  - nurse policy and procedure
  - compliance
  - laboratory
  - education
  - regional hospitals
  - executive teams
- Research Academy participants presented suggested changes to their peers for approval.

Results

Covenant Health's Research Academy participants compared findings to current blood administration policies & procedures

- Assessment is done with every set of vital signs
- Patient education will be printed with every blood administration consent automatically
- Multiple regional hospital blood transfusion policies are standardized into one regional policy
- All five Electronic Health Record changes were approved to drive nursing process to align with literature findings
- Participants have shared their evidence-based practice findings and practice change work through two local and one national dissemination opportunities

Policy Changes

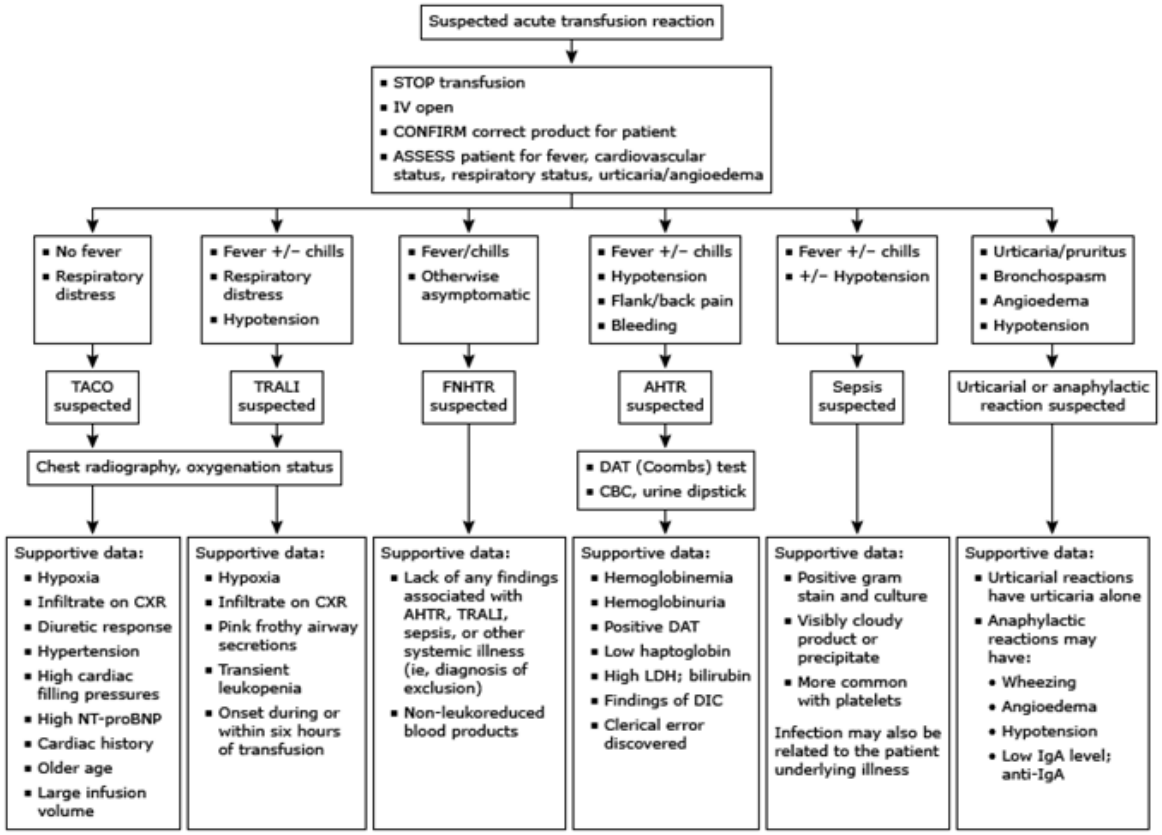
- Refer to other policies where applicable
- Combine the following policies:
  - Administration of Blood and Blood Products
  - Identi-Match Identification System
  - Blood/Blood Component Reaction Investigation
- Vital Sign Changes
  - Delegation
  - Define parameters

Policy Changes to Include Reaction Grid to Replace Transfusion Reaction Policy

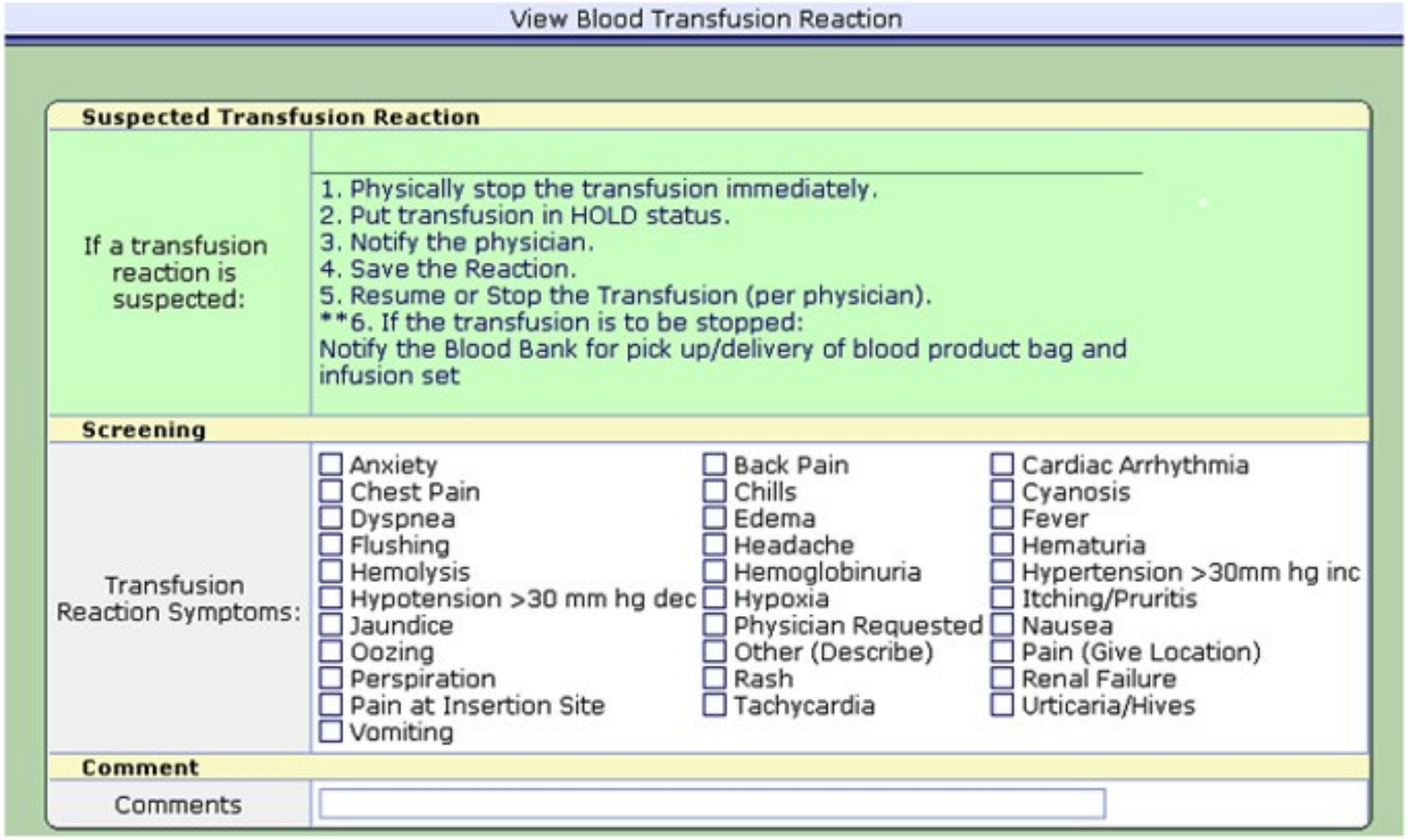
Reaction	Timing	Symptoms
Allergic reaction (mild)	• Within **seconds to minutes** during the transfusion • Up to **24 hours** after the transfusion	Hives or red welts on the skin, mild itching, rash, localized swelling, flushing (red face), wheezing, shortness of breath, or stridor (high-pitched noise or sound)
Anaphylactic reaction	• Within **seconds to minutes** during the transfusion • Up to **24 hours** after the transfusion	Shortness of breath, flushing (red face), wheezing, labored (working hard) breathing, low blood pressure, localized swelling, chest tightness, or cramps
Febrile nonhemolytic reaction	• Within **minutes to hours** during the transfusion • Within a **few hours to 24 hours** after the transfusion	Fever (increase of 1° C or higher), chills, flushing (red face), nausea, headache, minor discomfort, or mild shortness of breath
Acute immune hemolytic reaction	• Within **minutes** during the transfusion • Up to **24 hours** after the transfusion	Fever, red or brown urine, back pain, fast heart rate (tachycardia), abdominal pain, low blood pressure, feeling anxious, chills, chest pain, nausea, or fainting spells
Transfusion-related acute lung injury (TRALI)	• Within **1 to 2 hours** during the transfusion • Up to **6 hours** after the transfusion	Shortness of breath, trouble breathing, low blood pressure, fever, pulmonary edema

Transfusion Reaction Algorithm Added to Policy

Initial approach to a suspected acute transfusion reaction



Electronic Health Record Changes



View Blood Transfusion Reaction

Suspected Transfusion Reaction

If a transfusion reaction is suspected:

1. Physically stop the transfusion immediately.
2. Put transfusion in HOLD status.
3. Notify the physician.
4. Save the Reaction.
5. Resume or Stop the Transfusion (per physician).

**6. If the transfusion is to be stopped:
Notify the Blood Bank for pick up/delivery of blood product bag and infusion set

Screening

Transfusion Reaction Symptoms:

☐ Anxiety	☐ Back Pain	☐ Cardiac Arrhythmia
☐ Chest Pain	☐ Chills	☐ Cyanosis
☐ Dyspnea	☐ Edema	☐ Fever
☐ Flushing	☐ Headache	☐ Hematuria
☐ Hemolysis	☐ Hemoglobinuria	☐ Hypertension >30mm hg inc
☐ Hypotension >30 mm hg dec	☐ Hypoxia	☐ Itching/Pruritis
☐ Jaundice	☐ Physician Requested	☐ Nausea
☐ Oozing	☐ Other (Describe)	☐ Pain (Give Location)
☐ Perspiration	☐ Rash	☐ Renal Failure
☐ Pain at Insertion Site	☐ Tachycardia	☐ Urticaria/Hives
☐ Vomiting		

Comment

Comments

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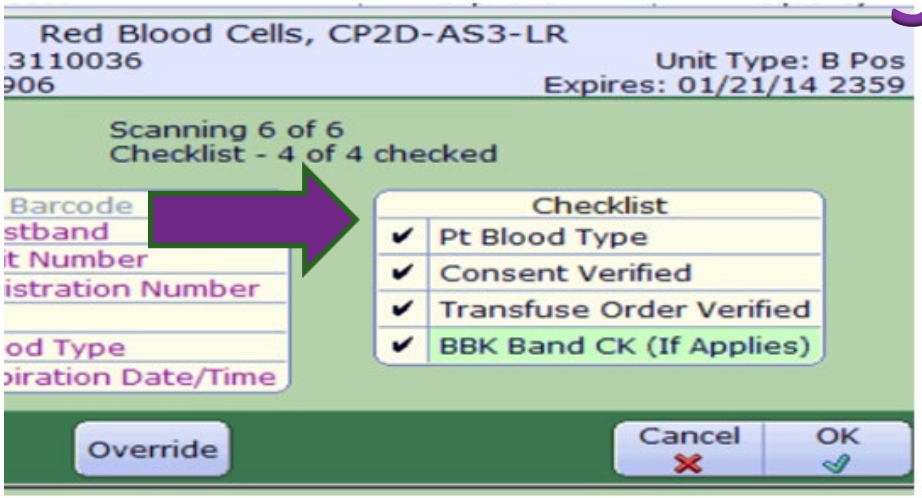
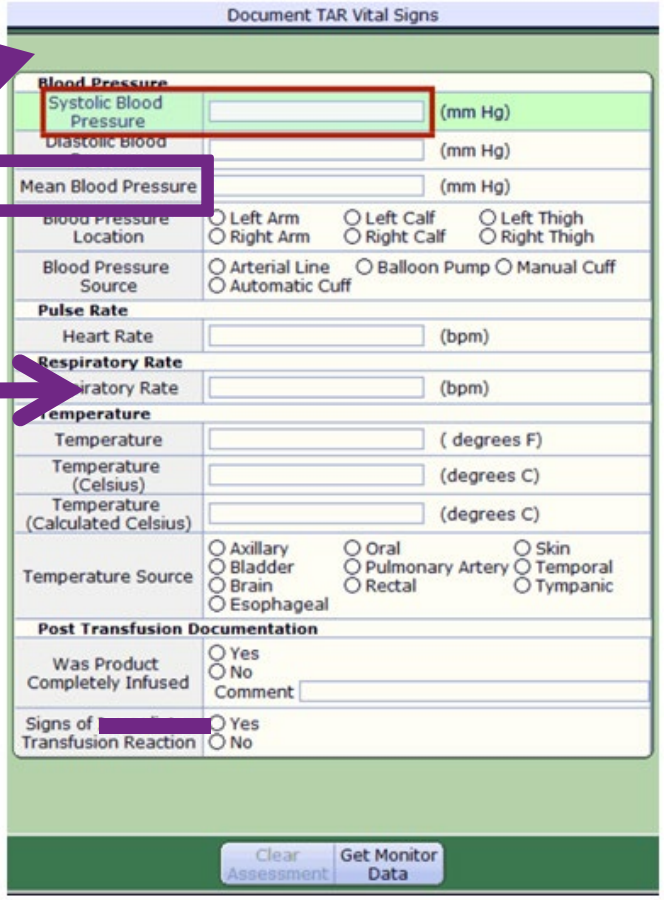
SaO_2





Discussion

- More research needs to be completed to answer how often vital signs should be done to detect blood transfusion reactions to guide nursing practice.
- Early detection potentially prevents adverse outcomes, increased lengths of stay, higher costs to treat, and promotes customer satisfaction.

Discussion

Although a clinical question may not be answered and only low level of evidence may be found to address a clinical question, changes to policies, processes, and practices may be indicated based on additional findings in reviewed literature.

Conclusion

- Role-modeling research skills by nurse leaders in academic and acute care organizations empowers direct care nurses proficient application and promotes an increased research capacity.
- The mentoring and role-modeling how to be a change agent through evidence-based practice implementation should continue to the point of patient care by changing policy, protocols, and practice alongside direct care nurses.

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