

**NEW YORK STATE DEPARTMENT OF HEALTH
COUNCIL ON HUMAN BLOOD AND TRANSFUSION SERVICES**

Possible Strategies for Reduction of Transfusion-related Errors

Ensure that all staff understand the importance of appropriate match of the patient and blood. Administration of incorrect blood to the wrong patient may prove fatal because of ABO incompatibility. Nearly half of significant transfusion errors involve administration of the wrong blood, or administration to the wrong patient.

Implement a quality improvement program and internally track events at the facility. Acknowledge the potential for human error. Make an organizational commitment to error management. In-service training should incorporate principles of error reduction. Facilities can benefit from identifying and tracking their own events and "near misses" in order to identify systems attributes or other factors that may predispose to error. One such reporting system that can be used is the MERS-TM (see Kaplan, et al.) system. Tracking transfusion-related events can be part of an overall facility quality improvement program. Identification of errors and analysis for contributing factors, for commonality, and for root cause when indicated, can yield the knowledge of the facility's errors needed in order to take actions, including correction of latent system flaws.

Promote accurate identification procedures at the bedside. Each facility should make sure that identification procedures are appropriate and understood by staff. Identification of the patient must be compared with the blood unit tag at the bedside. This identification must be performed by the person administering the blood. We have observed that transfusionists often compare the unit paperwork at the nursing station or at the bedside and neglect the patient identification. Special procedures may be needed in locations, such as the operating room, that pose special identification challenges. It is important that each person understand his/her responsibilities.

Institute procedures to ensure accurate labeling at the time of phlebotomy. Thirteen percent of significant transfusion-related errors involve phlebotomy errors. One error-reduction strategy is to employ on-demand labeling. Preprinted labels generated at the nurses' station can easily be placed on the wrong specimen. Labeling of specimens at the bedside, either manually or using an automated system, may prove most reliable in avoiding mislabeled specimens.

Consider employing systems to assist in identification. Options include blood bank wristband systems, the blood bag locking device, and barcode systems to confirm identity between wristband and blood that include handheld printers and bar code readers. One option is to employ additional procedures for units posing the most risk, such as autologous units. It may be advantageous to employ the same system for medication administration and blood administration.

Assign non-sequential identifiers. Medical record numbers assigned sequentially may differ by only one digit. In combination with similar names, this can predispose to

confusion. This concern applies also to alphabetic identifiers assigned to emergency department patients. To the extent possible for elective surgery, it is advisable to schedule patients with the same or similar names for surgery on different days. Likewise, it is advantageous to place patients with the same or similar names on different hospital floors or units to avoid confusion.

Automate procedures to the extent possible. Consider employment of a blood bank computer system and automated blood testing devices that automate specimen identification.

Use telephone, other verbal, electronic, and faxed communications with care. Confirmation in writing may be helpful. Verbal communications may predispose to misunderstanding or misinterpretation. Written or electronic confirmation of information is most reliable. Assessment of the quality and clarity of faxed communications could facilitate verification of unclear text.

Separate blood units in the operating room. If possible, use separate refrigerators for each operating room. If this is not possible, a communal refrigerator should be large enough to achieve adequate and visible separation of units intended for different patients. Coolers for individual rooms may also be used, with appropriate management and quality control. Procedures should be in place to achieve retrieval of the correct unit(s) from the refrigerator or cooler.

Consider additional procedures in selected situations. Requiring a second sample to verify blood type may be helpful to verify patient identity, such as in outpatient populations in which exchange of insurance cards is prevalent. Extra vigilance for correct identification for autologous blood may be warranted.

Ensure that standard operating procedures (SOPs) are available at all times in the immediate work area. All staff who perform these procedures should be trained in them and informed of the potential consequences (including patient fatality) of not following the SOPs. The SOPs should be immediately available for reference for staff who perform the procedures infrequently.

Make sure clinical staff are well trained in identifying and handling transfusion reactions so that appropriate intervention can occur. Often, acute hemolytic transfusion reactions are not recognized or are not recognized as quickly as they could be and additional incompatible blood is administered. Each facility should make sure that in-service training is appropriate and kept up-to-date.

**NEW YORK STATE DEPARTMENT OF HEALTH
COUNCIL ON HUMAN BLOOD AND TRANSFUSION SERVICES**

Dennis Galanakis, M.D., Chairperson
SUNY Health Science Center
Stony Brook, NY

Lazaro Rosales, M.D.
American Red Cross Blood Services
Syracuse, NY

Robert Dracker, M.D.
North Area Pediatrics, Inc.
and Infusacare Medical Services
Syracuse, NY

Morton Spivack, M.D.
Mount Sinai Hospital
New York, NY

William Fricke, M.D.
The Genesee Hospital
Rochester, NY

Barbara A. DeBuono, M.D., M.P.H.
(Ex-officio), Commissioner of Health
New York State Dept. of Health
Albany, NY

Alicia E. Garcia, M.D.
Maimonides Medical Center
Brooklyn, NY

Jeanne V. Linden, M.D., M.P.H.
New York State Dept. of Health
Albany, NY

Ms. Gloria Rochester
Queens Sickle Cell Advocacy Network
St. Albans, NY

David Wuest, M.D.
Memorial Sloan-Kettering Cancer Center
New York, NY

BLOOD SERVICES COMMITTEE

Dennis Galanakis, M.D., Chairperson
SUNY Health Science Center
Stony Brook, NY

Jeanne Linden, M.D., M.P.H.
New York State Dept. of Health
Albany, NY

Elizabeth S. Gloster, M.D.
SUNY Health Science Center
Brooklyn, NY

Klaus Mayer, M.D.
Memorial Sloan-Kettering Cancer Center
New York, NY

Kathleen Grima, M.D.
New York Blood Center
Valhalla, NY

Helen Richards, M.D.
Harlem Hospital
New York, NY

Joanna Heal, M.D.
American Red Cross Blood Services
Rochester, NY

Joan Uehlinger, M.D.
Montefiore Medical Center
Bronx, NY

The Committee gratefully acknowledges the assistance of Dr. Morton Spivack,
Chairperson of the Transfusion Safety Committee.

REFERENCES

General Background

- Br Med J, issue 7237 (March 18 2000). Special issue devoted to medical errors. Includes editorials and articles on: computerized bedside medication, non-medical near miss reporting systems, human error, system changes to reduce complexity, how to investigate and analyze incidents, and technology to reduce rates of medication errors.
- Kohn LT, Corrigan JM, Donaldson M, eds. *To Err is Human. Building a Safer Health System*. 1999. Institute of Medicine Committee on Quality of Health Care in America. National Academy Press, Washington DC.
- Williamson LM, Lowe S, Love E, et al. 1999. *Serious Hazards of Transfusion. Annual Report, 1997-1998*. The Serious Hazards of Transfusion Steering Group, Royal College of Pathologists. Manchester, U K.
- Motschman TL, Moore SB, Error detection and reduction in blood banking. *Clin Lab Med* 1996;16:961-973.
- Linden JV, Kaplan HS. Transfusion errors: Causes and effects. *Transfus Med Rev* 1994;3:169-183.
- Linden JV, Paul B, Dressler KP. A report of 104 transfusion errors in New York State. *Transfusion* 1992;32:601-606.
- Sazama K. Reports of 355 transfusion-associated deaths: 1976 through 1985. *Transfusion* 1990;30:583-590.

Special Problems

- Linden JV. The release of unsuitable units through misinterpretation of laboratory results transmitted by facsimile. *Transfusion* 2000;40:435-438.
- Linden JV, Kaplan HS, Murphy MT. Fatal air embolism due to perioperative blood recovery. *Anesth Analg* 1997;84:422-426.
- Linden JV, Kruskall MS. Autologous blood: Always safer? *Transfusion* 1997;37:455-456.

Error Reporting

- Battles JV, Kaplan HS, Van der Schaaf TW, et al. The attributes of medical event-reporting systems: experience with a prototype medical event-reporting system for transfusion medicine. *Arch Pathol Lab Med* 1998;122:231-238.
- Kaplan HS, Battles JB, Van der Schaaf TW, et al. Identification and classification of the causes of events in transfusion medicine. *Transfusion* 1998;38:1071-1081.

Error Reduction Strategies

- Sandler SG, Langeberg A, Avery N, et al. A fully automated blood typing system for hospital transfusion services. *Transfusion* 2000;40:201-207.
- Marconi M, Langeberg AF, Sirchia G, et al. Improving transfusion safety by electronic identification of patients, blood samples, and blood units. *Immunohematol* 2000;16:82-85.
- Wenz B, Mercuriali F, AuBuchon JP. Practical methods to improve transfusion safety by using novel blood unit and patient identification systems. *Am J Clin Pathol* 1997;107(4 suppl 1):S12-16.
- AuBuchon JP, Littenberg B. A cost-effectiveness analysis of the use of a mechanical barrier system to reduce the risk of mistransfusion. *Transfusion* 1996;36:222-226.
- Mercuriali F, Inghilleri G, Colotti MT, et al. One-year use of the Blood loc system in an orthopedic institute. *Transfus Clin Biol* 1994;1:227-230.
- Wenz B, Burns ER. Improvement in transfusion safety using a new blood unit and patient identification system as part of safe transfusion practice. *Transfusion* 1991;31:401-403.