Managing Transfusion Service Quality

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• Context.—Providing blood products for transfusions is a complex process subject to errors both within and outside the transfusion service. Transfusion-related errors can have grave consequences for the patient undergoing transfusion. As with many processes performed within health care systems, there is an expectation of error-free practice. Although this is an unobtainable goal, a focused quality-management plan, employing a medical event reporting system in a just working environment, can effect measurable system-quality improvement.

Objective.—To illustrate the intrinsic value of quality-improvement activities through discussion of examples of quality misadventures from our transfusion service during the past 20 years.

Data Sources.—Examples of quality-improvement activities were extracted from our quality-system archives. The published literature on transfusion quality was reviewed.

Conclusions.—Active reporting, structured investigation, and systematic measurement of transfusion-related errors are effective methods for improving and maintaining transfusion quality.

them. It would be nice to claim that we’ve found the “Holy Grail” of error elimination, but this is not the case. Error management is a day-by-day, career long process.

LESSON 1: USE A STRUCTURED PROCESS TO LEARN EVERYTHING POSSIBLE FROM SENTINEL EVENTS AND NEAR MISSES

Case 1 (Continued)

The medical director of the transfusion service was informed of the potential patient mix-up described above. Further investigation revealed that the 2 trauma patients had entered the emergency department within 10 minutes of each other. Each was registered with a unique trauma alias and medical record number. Both had a wristband placed on an arm. All samples used for blood bank typing were labeled appropriately. However, the addressograph plates, which were used to stamp requisitions for laboratory work and blood requests, were switched in the emergency department. The units of red blood cells issued to the operating room were tagged appropriately according to the request for blood. However, 2 different people should have compared the information on the crossmatch tag to the information on the wristband before starting the transfusion per standard operating procedure (SOP). This did not occur because the wristband had been covered by drapes and made unavailable during the operation. Instead, the information on the crossmatch tag was compared with the information on the addressograph, which had been switched in the emergency department with the patient eating dinner in her hospital room.

It would be easy to attribute this incident to a simple case of not following SOPs, and prescribe retraining of all operating room personnel on the importance of comparing information on the crossmatch tag to the information on a wristband. However, a preliminary investigation revealed that transfusion practices in the operating room had morphed significantly from the established SOP. A focus group was formed of nurses, physicians, and blood bank leadership to map the transfusion process chart defined in the institutional SOPs (Figure 1) and to identify (1) where the process was not being followed consistently, (2) reasons for the process variation, and (3) improvements to the process based on an analysis of risks.

Problem.—No procedure existed to make sure the addressograph that traveled with the patient and was used to stamp requisitions actually matched the patient’s wristband.

Solution.—A new procedure was implemented to be sure that the addressograph was matched to the wristband every time a patient entered and exited a patient care unit (PCU), including the operating room.

Problem.—We were surprised to find out that wristbands were commonly covered with drapes, or worse, cut away from the patient because a limb was needed for line placement. Many times, patients would enter the postanesthesia care unit or intensive care unit without identification.

Solution.—A process was created allowing a wristband label to be attached to the patient’s forehead for blood administration if the limb with the wristband had to be covered with drapes during the case. In the event a wristband had to be cut off and no other limb was available, the wristband could be taped to the endotracheal tube during the surgical procedure and later be placed back on the patient if done so before the patient left the operating room. If the wristband was not replaced before leaving the operating room, a new wristband was placed on the patient, and a new sample was obtained to repeat the type and screen before type-specific blood would be issued for the patient.

Problem.—After a trauma patient was stabilized, the PCU would change the patient’s name from the trauma alias to their given name, so that family and friends could communicate with hospital personnel more effectively. Once the given name was entered in the hospital information system, it would overwrite the trauma alias in the blood bank computer system. If the person making the registration change became distracted, they could change the wrong alias.

Solution.—To avoid confusion, the blood bank would now be informed of any name change, before the event, so that they could be prepared to repeat all testing to avoid leaving the patient stranded without available blood. A new wristband placement, a new sample, and repeat ABO testing would be required on all name changes performed in the hospital if blood transfusion was anticipated during the remainder of a patient’s hospitalization.

Problem.—A nurse on the focus group noticed the medical record numbers of the 2 patients differed by only the last digit because they were admitted about the same time.

Solution.—Changes were made to all trauma and disaster packs to be certain that alias medical record numbers in the packs were not sequential.

Problem.—Interaction with all relevant parties involved in this event made it clear that requirements for blood bank sample labeling, sample acceptance, and transfusion protocols were not clear. Further investigation revealed that transfusion training for new nurses had been dropped from orientation. In addition, the annual skills assessment for each PCU that transfused blood products was supposed to include protocol training in blood administration. Most PCUs had dropped that review. These changes to training occurred during a history of acute nursing shortages in our state and everything had been “streamlined” to acquire and keep nurses on the floor.

Solution.—After this event, a training module was created for nurses and anesthesiologists. This module included a competency examination. If the module/exam is not completed/passed, an individual cannot transfuse blood products (“hang blood”). Training for all new nurses was restored to orientation, and each PCU that transfused blood products restored blood-bank training to its annual skills assessment.

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Transfusion-Related Deaths Reported to the US Food and Drug Administration (FDA) for Fiscal Year 2009a

<table>
<thead>
<tr>
<th>Complication</th>
<th>No. (%)</th>
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<tbody>
<tr>
<td>TRALI</td>
<td>13 (30)</td>
</tr>
<tr>
<td>HTR</td>
<td>12 (27)</td>
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<tr>
<td>TACO</td>
<td>12 (27)</td>
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<tr>
<td>Microbial infection</td>
<td>5 (11)</td>
</tr>
<tr>
<td>Anaphylaxis</td>
<td>1 (2)</td>
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<tr>
<td>Hypotensive reaction</td>
<td>1 (2)</td>
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</tbody>
</table>

Abbreviations: CBER, Center for Biologics Evaluation and Research; HTR, hemolytic transfusion reaction; TACO, transfusion-associated circulatory overload; TRALI, transfusion-related acute lung injury.

a Source: CBER/FDA, accessed 2011: Annual summary of fatalities reported to the FDA following blood collection and transfusion.
Figure 1. Flow diagram of the transfusion process. The diagram identifies all critical events, which if performed incorrectly could result in Wrong Blood in Tube and potentially an ABO-incompatible transfusion. Abbreviations: ABO, blood typing for groups A, AB, B, and O; ADT, admission discharge transfer; ID, identification; LIS, laboratory information system; MRN, medical record number; PCU, patient care unit; RBC, red blood cell; Rh, testing for Rh antigens; X-match, crossmatch.
Lesson 2: Identify and Fix Root Causes

Case 2
A technologist in the blood bank printed 4 crossmatch tags for a single patient. The technologist placed the units on the table in the order the tags were printed. When attaching the tags, it became apparent that one tag had the name of a different patient. A variance was reported because the technologist was concerned that the wrong tag could have ended up in the PCU during a hectic situation.

Problem.—The root cause of this problem was determined to be the sharing of 2 crossmatch tag printers by several technologists working in the blood bank at the same time. If 2 technologists sent crossmatch tag requests to the same printer, tags for multiple patients could intermix, depending on when the print requests were sent.

Solution.—The corrective action plan was simple and relatively cheap (compared with the disaster of tagging a unit of blood with the wrong patient’s name). A crossmatch tag printer was purchased for each individual workstation, and technologists were allowed to print and tag blood for only one patient at a time.

Lesson 3: Fix Systems, Not People

Case 3
A full-term infant was born in a rural hospital. The infant’s respiratory rate increased sufficiently that helicopter transport of the child to a pediatric hospital was arranged. The child’s physician feared the child might have pneumonia and placed an intravenous line in case the infant decompensated and required medications or fluid. The child arrived at the pediatric hospital with ecchymosis and evidence of intracranial hemorrhage on ultrasound. Bleeding from a lumbar puncture resulted in lower-extremity paralysis. Fearing disseminated intravascular coagulation, blood products were ordered. The medical director of the blood bank reviewed the patient’s laboratory test results and called the newborn intensive care unit to tell the nurse it appeared that the baby had been inadvertently heparinized. The nurse shouted that she had not given the patient heparin, yelled “How dare you try to blame me for this,” and hung up the phone. The baby’s blood heparin level was 4.75 U/mL—much greater than the therapeutic range of 0.30 to 0.70 U/mL. The attending physician of the newborn intensive care unit was contacted with the result and was advised that heparin reversal would be necessary to stop the bleeding. Further investigation revealed that the child had been inadvertently overdosed with heparin at the rural hospital, not the pediatric hospital. After placing an intravenous line, the nurse had grabbed a vial that she thought contained 10 U/mL of sodium heparin to create a heparin lock in the intravenous line but instead used a bottle that was much more concentrated. The rural hospital decided to fire the nurse. A long nursing career ended but was the problem really solved?

Failure to identify and implement system fixes can have tragic effects on personnel. They are often set up to fail.

Problem.—The rural hospital involved with this heparin overdose was extremely small and focused on routine deliveries and healthy babies. Any complicated pregnancies were referred to tertiary care facilities. A “crashing” baby was an extremely rare event with which staff had little experience. This may have caused the nurse to be a little rattled and out of her comfort zone. The nurse clearly failed to verify the heparin concentration before “heplocking” the intravenous catheter as standard protocols require; however, the system most likely set the nurse up to fail.

Possible Solution.—We do not know if the rural hospital addressed the root cause of this unfortunate system failure. Unfortunately, a root cause analysis might have addressed the following questions: Why did this hospital have vials of heparin in the nursery with heparin concentrations normally used to place people on cardiopulmonary bypass? If the pharmacy used that concentration to mix heparin solutions to treat patients with deep venous thrombosis, why would that concentration ever be allowed out of the pharmacy? If there was a legitimate reason to have concentrated heparin in the nursery, what preventative measures had been taken to prevent a dose mix-up? Many system fixes for this problem could be proposed, none of which would include ending the nurse’s career. Most distressing is that without a system fix, the problem will probably recur.

Lesson 4: The Transfusion Service Cannot Operate Safely in a Silo

Case 4
A type and screen was ordered, and it revealed a change in the ABO type from the previous sample 72 hours earlier. The transfusion safety officer (TSO) immediately went to the PCU to investigate the incident with the assistance of the unit nurse manager. The TSO found preprinted wristband labels stuck on the outside of multiple patient rooms. The wrong label was selected for the most recent sample, which resulted in an error in the blood collection process known as “wrong blood in tube.”

Case 5
A type and screen was ordered on a patient, but the sample was labeled from a wristband on a patient who had been discharged from the hospital a month earlier. The TSO went to the PCU but did not find any preprinted labels. Further investigation by the TSO revealed that test tubes had been labeled in bulk for the patient. Extra tubes (already labeled) were inadvertently returned to inventory. The wrong blood in tube occurred when the nurse grabbed a tube, thought the label must have been from the patient currently occupying the room, and sent the sample to the blood bank.

Problem (Cases 4 and 5).—A sentinel event like an ABO-incompatible transfusion gets the attention of everyone involved. Unfortunately, the lessons learned from sentinel events can be forgotten by hospital personnel because institutional memory is lost with turnover. When investigating our ABO sentinel event (case 1), it became apparent that blood bank involvement with PCUs had become limited to consultations with clinicians on reactions, blood product usage, and didactic lectures. The blood bank had become so busy that interaction with nurses or nurse managers of PCUs was sparse.

Case 4 and 5 Solution.—A TSO was hired to remedy this problem. This individual is responsible for ensuring the pretransfusion circle, from patient wristband placement, to sample identification, to the clerical checks performed before hanging a unit of blood, is being done properly. The person acts as a human interface between the blood bank and all PCUs that transfuse blood. This individual must
develop rapport with all nurse managers in the hospital by meeting with them on a regular basis, by being available for in-service presentations, and by consulting with and assisting PCUs with unique transfusion needs. The TSO also works with hospital admitting and registration to ensure patients are properly identified, that wristbands are placed properly, and that transfusion SOPs establish appropriate name-change policies and proper timing of name changes.

We were fortunate to find a TSO who was both a registered nurse and a medical technologist. This provided rapid credibility and insight to the problems facing nurse managers. This individual is extremely friendly and courteous but tough as nails (“kill them with kindness”). Not every transfusion service is large enough or can afford a full-time TSO, but the functions should be assigned to someone, and it should be the individual’s top priority. Rapport cannot be overemphasized and must be
established in times of peace because the TSO must have previously established relationships when crisis intervention is needed as in the following true scenarios.

**Case 4 Solution.**—The nursing staff knew they were only to print labels from the wristband at the time a sample was collected. The reason given for mass-producing wristband labels on multiple patients was that most of the label guns on the floor were broken or lost. The TSO removed all preprinted labels and provided a label gun for every patient room on the PCU. Regular inspections of this PCU occurred until the TSO had confidence that the practice of mass-producing labels had ceased.

**Case 5 Solution.**—The TSO checked tube inventory in every room on the PCU and removed any prelabeled test tubes. The nurse manager reviewed with her PCU the proper policy of making a wristband label and placing it on a tube only at the time a sample is collected.

**LESSON 5: MAINTAIN THE GAINS—AUDITING TRANSFUSION PRACTICE**

Audits are a necessary evil to control recurrence of previously identified deviations from SOPs. Evil, only because they can be viewed by nursing staff as intrusive and can create a feeling that “big brother” is watching.

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### Blood Administration Audit (continued)

<table>
<thead>
<tr>
<th>Administration Techniques and Monitoring (continued)</th>
<th>YES</th>
<th>NO</th>
<th>NA</th>
</tr>
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<tbody>
<tr>
<td>3. Were any medications or IV solutions attempted to be infused through the filter tubing while the transfusion was taking place? If yes, what was attempted to be infused and why?</td>
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<tr>
<td>4. Did the transfusionist document the transfusion start time on the transfusion record?</td>
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<tr>
<td>5. Did the crossmatch label or tag remain attached to the unit during transfusion?</td>
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<tr>
<td>6. Did the transfusionist monitor and record the patient’s vital signs (temperature, blood pressure, pulse, and respirations) and observe for signs and adverse reactions after the first 15 min?</td>
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**Administration Techniques and Monitoring (ask questions)**

1. How long would you observe the patient after a transfusion for suspected adverse reactions? (answer, for a minimum of 30 min)
2. Where did you dispose of the empty blood bag following the transfusion?
3. In outpatient areas only: are written instructions provided for possible adverse effects?

**Administration Techniques and Monitoring (follow-up)**

1. Did the transfusionist monitor and record the patient’s vital signs and observe for signs of adverse reaction again at 30 min?
2. Did the transfusionist record the stop time on the transfusion record?
3. Did the transfusionist document any adverse effects if any occurred?
4. If an adverse effect was observed, did transfusionist (or designee) notify physician?

**Disposition (verified by documentation)**

1. Was the “Transfusionist Must Complete” section completed after the completion of the transfusion?
2. Was the medical record copy (original) of the unit tag charted?

**Timeline (verified by documentation)**

1. At what time was the unit released from the laboratory?
2. At what time was the infusion of the component started?
3. Difference = (acceptable = usually <30 min)
4. Was the transfusion completed within 4 h (should be completed within 2 h unless the patient can tolerate only gradual expansion of the intravascular volume)? How long did the transfusion take?

\[(B) \text{ Total scoring points possible} \quad \frac{(A)}{(B)} \text{ Total survey scoring points} \quad \frac{(A/B \times 100)}{100} \text{ Percentage scored} \quad \]

**Figure 2.** Continued.
**Figure 3.** Variance form used in a medical event reporting system. Forms are available to employees on a spreadsheet and assigned a unique identification number. Form completion must be as proximal in time to the event as possible to capture all relevant information. Corrective action is focused on root cause analysis and system fixes. Abbreviations: FDA, US Food and Drug Administration; QA, quality assurance; QCC, quality control coordinator; SOP, standard operating procedure; Tech, transfusion services employee.
The bottom line is big brother is watching, but the positive relationship created by the TSO can decrease any bad feelings between nurses and the blood bank.

Audits can be performed with formal audit tools or be as simple as a walk through a PCU looking for premade wristband labels. The frequency of audits can vary, depending on the history of the PCU and the severity of the problem being audited. Our institution had many problems with mass-produced wristbands, so audits started initially at daily intervals and then continued weekly until the problem was resolved.

We visit each PCU at least twice a year for a formal blood administration audit (Figure 2). The audit includes review of physician orders, checking for use of a proper blood administration filter, checking for attempts to mix anything with blood other than normal saline, and whether or not vital signs are monitored appropriately. The final audit is graded, and any deficiencies are reported to the nurse manager. Good grades are rewarded, whenever possible, with movie tickets or coffee vouchers.

Audits evaluating proper wristband identification of patients are simple but useful. Patients are not only checked for the presence of a proper wristband but also to be sure no extra wristbands are on or around the patient nursing station. We have had errors created from wristbands placed in other hospitals and not removed after patient transfer to our facility.

LESSON 6: ESTABLISH A MEDICAL EVENT REPORTING SYSTEM AND A JUST WORKPLACE ENVIRONMENT

Case 6

A patient is admitted to the hospital for a series of therapeutic plasma exchanges to treat myasthenia gravis. The first procedure is performed using albumin for replacement fluid and using an apheresis catheter placed in the left femoral vein. Three hours after the procedure, the intensive care unit attending physician called to report a “3–4 unit hematoma” on the right side of the groin. The clinician had just completed an aggressive fluid resuscitation for severe hypovolemic shock. The bleeding on the right side of the groin was puzzling because the catheter had been placed on the left side, and bleeding rarely occurs in a properly placed venous catheter. Further investigation revealed that a house officer had originally attempted to place the catheter in the right groin but had punctured the femoral artery by mistake. Pressure was held on the artery until bleeding stopped, a pressure bandage was placed on the wound, but no mention of the mistake was charted in the medical record or communicated to the apheresis team. The cause of the right groin hematoma was no longer a mystery. A platelet plug would have stopped the bleeding after the missed stick, but plasma exchange, using albumin, removed the clotting factors required to stabilize the platelet plug.

Problem.—This appeared to be an isolated incident for the PCU involved, and it was. However, the apheresis team had seen many poor patient outcomes related to failed line attempts from many different PCUs. At the time of this event, quality-assurance activities in our institution were performed by each individual PCU. Meeting with each individual PCU about improving outcomes with central line placement was at first difficult because the individual PCUs didn’t see an incident trend and didn’t feel there was a problem.

Solution.—The apheresis team collected all of the information related to central line mishaps during 2 years throughout the entire institution. A meeting was held with all PCUs (approximately 20) to present the information. It became clear to everyone that although each PCU did not see a trend regarding morbidity from line placements, the aggregate number of events in the hospital were disturbing. The PCU medical directors decided to restrict central line placement to interventional radiology, a specialized surgical service, or an intensive care unit if the attending physician was present, and it was an emergency. The apheresis service has not seen serious morbidity from central line placement in the past 10 years since this change. Corrective action took place only after the trend was demonstrated to medical directors of PCUs, and they had the “big picture.”

The cases described so far are the type that grab you by the throat and really get your attention because the potential for patient harm is high. Dealing with problems in crisis mode is certainly not the ideal way to manage. A medical event reporting system (MERS) is a useful tool to manage errors before they become sentinel events. The MERS was patterned after error-management systems used in the airline industry. Investigators evaluating catastrophic plane crashes realized that many accidents could have been predicted if people were paying attention to events before the disaster. Airports may have had near-miss situations, secondary to poor runway layouts. Thorough investigation of the near misses could have resulted in changes to runway traffic or design because a crash was inevitable. Likewise, thorough investigation of repair records of certain airplanes may have predicted a critical mechanical failure.

A MERS starts with recording every variance from SOP or any error that occurs in the blood bank. We were very skeptical when we started recording our variances because they were numerous and recording them seemed like a distraction and a poor use of manpower. This skepticism dissipated quickly when the sheer number of variances piled up, and it became apparent that reducing errors would be impossible until we understood every mistake we made.

Our variance forms (Figure 3) are numbered like bank checks and maintained in a database. Each variance is ranked in severity. We use only 4 ranking levels: (1) a variance that caused harm to a patient, (2) a near-miss variance that had the potential to cause harm, (3) a variance that caused a dangerous situation, and (4) errors considered to be clerical.

Once all errors are on the table, they can be evaluated for trends or patterns; a root cause can be determined; and a temporary corrective action plan can be implemented. A permanent corrective action plan can be implemented later, if not instantly feasible.

The focus of all corrective action should be on system fixes, such as improving computer systems, clarifying SOPs, improving training and competency programs, or better-organizing workflow and the workplace environment. Every effort should be made to avoid demonizing the individual involved in a mistake. Most employees come to work every day, wanting to perform the best possible job, knowing they have a huge effect on patient care. This does not mean that fraud, substance abuse, or a carefree approach to patient care is accepted, but it is important to strive for a just workplace.
The key to a successful MERS is to have all errors documented. This will not happen if employees are fearful of retribution. Employees must understand that the only mistake they can make is not reporting a mistake. Creating a safe environment for variance reporting is critical. This can be accomplished by focusing on the system whenever possible.

Case 7

Shaking chills and a temperature increase were reported on a patient who was less than 20 mL into a red blood cell transfusion. During the laboratory workup for a hemolytic transfusion reaction, the direct antiglobulin test was microscopically positive. No visible hemoglobin was evident in the plasma or urine, and all clerical checks were repeated with no discrepancies found. The technologist performing the transfusion reaction workup was the same individual who performed the compatibility testing before transfusion. She informed the medical director that results from the initial indirect antiglobulin test, method A, was negative, and blood was released with an immediate-spin crossmatch per SOP.

Problem.—The technologist obtained the pretransfusion sample to perform a direct antiglobulin test, which was negative. She was concerned she had made a mistake but wasn’t sure where in the testing this could have occurred. She joking about being happy the laboratory had implemented a MERS in the past 6 months because we wouldn’t be looking to fire her if she had followed the SOP.

Solution.—The medical director asked her to repeat the indirect antiglobulin test with both the pretransfusion and posttransfusion samples using 2 different methodologies: the original indirect antiglobulin test method (I) and a different method (II). Repeat testing showed test I results to be negative with the pretransfusion and posttransfusion samples, but test II results were 2+ with the pretransfusion and posttransfusion samples. A Coombs crossmatch with the unit issued to the patient was 2+. Incompatible. A clinically significant antibody was later identified using test method II. The vendor that manufactured the method I reagents used in the indirect antiglobulin test that missed the clinically significant antibody was contacted. A thorough investigation revealed that an additive to their screening cells had been modified slightly. The new additive had happened to inactivate one clinically significant antigen, which resulted in missing the alloantibody present in this patient’s blood. This case led to a national recall of the vendor’s reagents and allowed the vendor to correct the problem before a tragic outcome occurred. Not only had the technologist not made a mistake, but her belief that we were not “looking to fire her” led to a recall that helped many patients across the country.

FINAL THOUGHTS: WHAT WE SHOULD EXPECT FROM OUR QUALITY-IMPROVEMENT ACTIVITIES

Providing blood products for transfusions is a complex process subject to errors both within and outside the transfusion service. As with many processes performed within health care systems, there is an unrealistic expectation of error-free practice. Fortunately, serious morbidity resulting from transfusion errors is uncommon, and transfusion-associated mortality is rare. To protect patients and identify risks embedded in our current practices, we must take advantage of root-cause analyses of near-miss events and process errors identified and quantified with a MERS that facilitates event reporting. To monitor the progress of our efforts, we must identify and monitor quality indicators (eg, specimen mislabeling; patient wrist banding) that correlate with critical elements of transfusion processes and patient outcomes. Unfortunately, the rarity of sentinel events can lead to complacency and lax practice. Consequently, we must accept that routine auditing of actual (not assumed) practices is also essential to maintaining patient safety.

All of this can be a lot of work for the transfusion service—for very little kudos. Is there objective evidence then, that our efforts are rewarded with improved processes and patient safety?

1. Since the advent of the Serious Hazards of Transfusion hemovigilance initiative in the United Kingdom, reporting into the system has increased, whereas the total number of deaths directly attributable to transfusions has decreased dramatically since the mid-1990s. This demonstrates that a national reporting system can collect sufficient data to identify trends for infrequent/rare events and that focusing attention on outcomes data through a national initiative can effect change. The United States has also witnessed a decrease in transfusion-related mortality reported to the US Food and Drug Administration during the past 5 years, largely because of efforts to decrease the incidence of transfusion-associated lung injury.

2. Participants in the College of American Pathologists Q-Tracks program, a continuous laboratory monitoring program with longitudinal tracking, have consistently demonstrated statistically significant performance improvement for multiple quality measures for multiple years.

3. Several groups have recently reported concrete examples of quality-improvement initiatives that have resulted in improved transfusion processes.

Without a doubt, thousands of individual laboratories have their own unpublished success stories. Of course, not all quality initiatives succeed, and maintaining the “gain” of quality improvements is a challenge requiring constant vigilance. Our own experience has convinced us that a focused transfusion quality-improvement program is well worth the considerable effort we continue to invest.

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References


