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THE IMPORTANCE OF PBM METRICS

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Data collection is the backbone of a patient blood management (PBM) program. Whether used for a program that is newly formed or ongoing, audits and data collection are the keys to success.[1] Electronic medical record (EMR) systems will provide most of the necessary data.[1] One way to minimize the number of records to review is to select only those transfusions with laboratory values considered outside the guidelines or for a particular service (e.g., surgery or hematology-oncology).[1] While the only way that physician data collection can be definitive is to ensure the practitioner is the one entering the order, and to capture the process electronically or to review the source documents if recorded on paper, this is not always possible.[1] For purpose of brevity this article will cover only red blood cell (RBC) transfusions, but these recommendations are also applicable to platelets, plasma and cryoprecipitate.

Today, health care quality focuses on outcome-metrics or how the care provided affects the health status of the patient.[2] Outcome-metrics are often displayed as a rate or percentage of a total. The following outcome metrics below are examples related to procedures and transfusion practice: percentage of inpatients receiving RBC transfusion and RBC transfusions by case-mix index.[2] The AABB/The Joint Commission Patient Blood Management Certification program and AABB's Standards for a Patient Blood Management Program recommend several metrics to consider. These include transfusion rates by procedure or provider service line, usage, discard and wastage of blood components, effectiveness and appropriateness of transfusion.[3]

Because there are few published national benchmarks for blood utilization, a first step for an institution is to benchmark against itself. Advantages of internal benchmarking include ease of collecting data and reporting results, while creating a baseline for future process improvement. Disadvantages include lack of external references or goals and inability to learn from those performing at a higher level. Examples of internal metrics are inpatient RBC transfusions per 1,000 patient-days or 100 admissions, percentage of one-unit transfusions, the average number of RBC units given to each transfusion recipient and the percentage of inpatients who received transfusions. An individual institution or health care system can establish metrics and goals, track over time and, in turn, drive initiatives that impact these measures. Markers that include total admissions and discharges can be used, for example, when institutions calculate inpatient RBC transfusions per 1,000 patient-days, the number of patient-days normalizes daily fluctuations in blood use that can affect the data. In the table, hospital C had an increase in RBC units transfused and admissions, but the actual percentage of inpatient recipients decreased. Hospitals B and D reduced RBC transfusions, despite an increase in admissions and decreased the percentage of inpatients receiving a transfusion.[2]

To be effective, metrics must be specific, measurable, achievable, relevant and time-specific. These criteria ensure that the metrics chosen for a facility will be acceptable to the institution, providers and other health care staff. An example of such a metric for PBM could be defined as follows: after provision of education about transfusing one RBC unit at a time to stable, nonbleeding adult inpatients, the goal of single unit RBC transfusions would be to set a target to increase from 50% to 75% during the next year. This meets all the criteria listed above, is specific to RBC transfusions and it is relevant and measurable. Implementation of provider education, review of RBC orders, and sharing of data are steps to reach this achievable target during the specified period.[2]

A method of improving compliance with hospital transfusion guidelines is using the computerized provider order entry (CPOE) system with clinical decision support (CDS).[4-8] A message appears that will show recent laboratory values and let the clinician know this transfusion request falls outside of institutional guidelines. The clinician can then decide to proceed with the transfusion or cancel the order.[5] Compliance with guidelines serves two purposes: first, it prevents unnecessary transfusions that may expose the patient to both infectious and noninfectious risks; second, it provides substantial cost savings since it has been shown that the cost of a transfused RBC unit is 3.2 to 4.8 times higher than blood acquisition costs.[9,10]

More targeted approaches to the enforcement of transfusion guidelines have been initiated with a focus on high blood loss services.[11] To begin to standardize the practice, a "bubble" graph (Figure) can be used.[12] At one institution, this graph plotted all surgeons who performed total hip arthroplasties (THA) by the frequency that they transfused RBCs to their patients and by the mean number of RBCs transfused per patient.[13] By presenting the data in an easily understandable fashion and identifying the surgeons who repeatedly transfused large quantities of RBCs, specific feedback and education could be provided. Since physicians are often competitive and no one wants to be an "outlier", this may motivate them to reflect and change their own practice when they see how they compare with their peers.[11]

One of the key points to distributing data is to ensure that physicians and nurses are aware that your facility has a PBM program. It is not helpful if much effort has been placed into development only to hear during an audit or survey colleagues say "I didn't know we had a PBM program."[14] The next step after extracting the data is to present and distribute information in a meaningful way.[14] An effective method is to show the patient's pre- and posttransfusion hemoglobin levels. This encourages single unit transfusions as it can illustrate that the physician overshot the target transfusion threshold with the administration of multiple units. For example, a patient had a pretransfusion hemoglobin of 6.9 g/dL and was administered two units with a posttransfusion hemoglobin of 9.0 g/dL. Even if the patient had met the higher transfusion threshold requirements (i.e., orthopedic surgery), the posttransfusion hemoglobin value was at least 1.0 g/dL higher than required.[14] Bar or line graphs are also useful tools when evaluating behavior change with single vs. multiple unit transfusions as they are easy to view trends over time and monitor if the effects of certain interventions such as single unit transfusion screen savers and/or educational sessions were successful.[15,16]

Data can be presented with physician codes, but the biggest impact reported has been when the actual physicians' names were used.[5] Some institutions will provide physician data at their PBM or transfusion committees, relying on department representatives to distribute this information. Other institutions may report the information to the department chief.[14]

It is critical to include a representative from information technology (IT) on the PBM and/or transfusion committees. As IT is often inundated by requests for reports, this will assist with an understanding that PBM is an important, evidence-based field where their efforts will be used in a meaningful way to change and improve medical and transfusion practice within the hospital.[15] It is also important to use the hospital's data to educate clinicians about transfusion guidelines and clinical evidence from randomized controlled trials supporting restrictive transfusion. This will create buy-in and adherence to the guidelines.[5,16]

Progress in appropriate blood utilization is being made. The percentage of U.S. hospitalizations requiring RBC transfusions decreased from 6.8% in 2011 to 5.7% in 2014 (adjusted relative risk (aRR) of 0.83). The percentage of U.S. hospitalizations requiring plasma transfusions decreased from 1.0% in 2011 to 0.87% in 2014 (aRR 0.87).[17] It was believed that the decreases in RBC and plasma utilization reflected evidence demonstrating the efficacy of restrictive practice for RBC transfusions, implementation of PBM programs, conservation initiatives (e.g., cell salvage, pharmacotherapy and improved surgical techniques), advocacy from medical organizations, and the publication of transfusion guidelines.[17]
In conclusion, given that most of the evidence supporting a restrictive transfusion strategy has been published in the past decade, PBM programs have only recently gained momentum and credibility.[5] A survey by the AABB of practices in 2013 reported that only 38% of hospitals had a formal PBM program, highlighting the potential for growing PBM.[18] Widespread compliance with guidelines will result in increased quality as well as cost savings for patients, payers, and medical centers, as well as preservation of the blood supply for patients who truly need transfusions.[5]

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Table

Table 3-1. Comparison of Blood Utilization Metrics for Four Hospitals: 2015-2016

	Hospital A	Hospital B	Hospital C	Hospital D
Bed size	500	275	25	125
2016				
Total RBCs transfused	23,216	3,187	120	1,558
Total patient days	155,881	53,381	1,737	26,799
RBCs/1000 patient days	148.9	59.70	69.1	58.14
Total admissions	28,749	12,005	615	7,569
RBCs/100 admissions	80.8	26.5	19.5	21
Percent inpatients w/transfusion	15.6%	14%	18%	10%
2015				
Total RBCs transfused	21,280	3,902	94	1,913
Total patient days	141,102	52,887	1,585	24,636
RBCs/1000 patient days	150.8	73.78	59.3	77.65
Total admissions	27,082	11,559	513	7,156
RBCs/100 admissions	78.6	34	18.3	27
Percent inpatients w/transfusion	15.3%	18%	20%	13%

Figure