2018 ONTARIO BEDSIDE AUDIT OF BLOOD ADMINISTRATION REPORT

ORBCoN

Ontario Regional Blood Coordinating Network

Inspiring and facilitating best transfusion practices in Ontario.

April 2019

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Executive Summary

The Ministry of Health and Long-Term Care established the Blood Programs Coordinating Office in 2005. One of the mandates of this program is to lead the implementation of a provincial blood utilization strategy and monitor and make recommendations for initiatives related to blood components and products. The Ontario Regional Blood Coordinating Network (ORBCoN) was formed by the program in 2006 to provide an organized and integrated approach to blood management.

One of the highest risks of transfusion is the risk of receiving a blood component intended for another recipient. The estimated frequency of transfusion of the wrong (incompatible) ABO blood group is approximately 1 in 40,000. [1] [2]The primary cause of these incidents is failure to follow clerical or technical procedures. Through audit, the root causes of these types of errors can be identified, and corrective actions put in place. [3]

The goal of this audit was to collect data from at least 50% of hospitals across Ontario, compare results against the results from the 2011 Bedside Audit [4] to see if there have been improvements in compliance with current standards for the bedside administration of blood. [5] [6]

Fifty-nine percent (59%) of hospitals in Ontario participated in this audit. Data collected from these participants revealed significant improvements in compliance for each section compared to the 2011 audit. The highest rate of compliance was seen in the section for identifying the recipient of the blood transfusion at 97%. The section that had the lowest rate of compliance was seen in the steps required for administering blood components to the patient at 91%. The highest rate of compliance by ward/area was seen in Obstetrical and Gynecology (99%) and the highest improvement in compliance from the previous audit was seen in the Chronic Care/Rehabilitation ward/area at 17%.

Areas ranking lower in compliance may need to be reviewed by their transfusion committee to take necessary steps to improving their compliance to standards. There is an increased risk of errors occurring if steps are missed during the administration of blood components/products at the bedside. As more hospitals participate in collaborative interdisciplinary and quality improvement initiatives, the hope is that they will continue to see the benefit of using this tool to help conduct audits, collect data and achieve compliance with standards. ORBCoN will continue to support Ontario hospitals to meet standard requirements that continue to improve the safety of administering blood at the bedside.

Introduction

The Ministry of Health and Long-Term Care established the Blood Programs Coordinating Office in 2005. One of the mandates of this program was to lead the implementation of a provincial blood utilization strategy and monitor and make recommendations for initiatives related to blood components and products. The Ontario Regional Blood Coordinating Network (ORBCoN) was formed by the Blood Coordinating program in 2006 to provide an organized and integrated approach to blood management for the province.

One of the highest risks of transfusion is the risk of receiving a blood component intended for another recipient. The estimated frequency of transfusion of the wrong (incompatible) ABO blood group is approximately 1 in 40,000. [1] [2]The primary cause of these incidents is failure to follow clerical or technical procedures. Through audit, the root causes of these types of errors can be identified, and corrective actions put in place. [3]

The goal of this audit was to collect data from a minimum of 50% of hospitals across Ontario, compare results against the results from the 2011 Bedside Audit [4] to see if there have been improvements in compliance with current standards for the bedside administration of blood. [5] [6]

This report summarizes the methodology and results of a 2018 audit of blood administration practices at the bedside in Ontario hospitals.

Methodology

Audit Tool Revisions

Building on the existing Bedside Audit web-based tool in ORBCoN's e-Tools accessible through the website www.transfusionontario.org, data fields were reviewed and updated to match the current Canadian practice standards for administration of blood products. [7] The standard audit form was reviewed and updated to reflect the revised data fields in the web-based audit tool. The audit tool developer reset the facility specific questions which were revised to capture updated information. The protocol for implementing this audit for hospitals was revised and provided an ethics application template to facilitate hospital-specific ethics review board applications if required. No patient identifying information was to be collected.

The web-based tool enabled designated users to select and print pre-programmed reports of their facility-specific data. The provincial administrator had access to print summary data reports to prepare this provincial report.

The revised audit tool and form were piloted at three hospital sites. Each site completed two case scenarios testing functionality of the form as well as ease of access and data entry on the web-based tool. Following the pilot, the form was revised to the final version.

Audit Distribution

All hospitals with a licensed transfusion service (TS) in Ontario were invited to participate in a voluntary audit of blood administration at the bedside between September 4th and November 30th, 2018.

Participating hospitals were asked to perform a minimum number of audits during the audit period based on the size of their facility. Small hospitals (<100 beds) were asked to perform two audits, community hospitals (>100 beds) were asked to perform five audits and large / university affiliated hospitals were asked to perform ten audits. The goal was to have a minimum 50% participation from hospitals in Ontario.

Results

A total of 88 of 150 (59%) Ontario hospitals participated and performed 455 audits. This represents an increase in participation by 10% and a 28% increase in the number of audits performed compared to the 2011 audit where 80 hospitals (51%) participated and 359 audits were performed. The overall compliance by section is shown in Table 1 below. No section showed 100% compliance overall, although some facilities did record 100% compliance in each section.

Table 1 Overall compliance for each section of the bedside audit

Section	2011 Compliance (%)	2018 Compliance (%)
Order confirmation check	79.5	92
Identification of patient check	92.8	97
Verification of component	87.3	95
Procedure check*	89.5	91

*Procedure check is the required checks during administration of blood components at the bedside

Participants were asked some general questions at the start of the audit. In both audits all hospitals reported that they have a policy in place that is specific for blood administration. Eighty-one (81%) hospitals participating in the 2018 audit indicated that they do train, certify and perform competency assessment of staff who administer blood products. There is variation in how often competency is assessed (see Table 2).

Table 2: How often is competency assessed for blood administration

How often is Competency Assessed?	# of Sites
Every Year	49
Every 2 Years	22
At hiring, again at extended leave or after an incident	1
Not specified in facility policy	1
Upon hiring only	6
Random	1
Uncertain	1

Participants were asked how they provide information regarding blood transfusion to patients. More than one option could be selected. Table 3 shows the % change in the response between the two audits.

Table 3: Is information provided to patients and how is it provided?

Does your facility have information to be provided to patients and by what means?			
	2011	2018	% Change
Verbal	48.5%	57.4%	+ 18%
Written	37.0%	77.1%	+ 108%
Electronic	6.6%	8.1%	+ 23%
Not Provided	7.9%	6.8%	-14%

Three hundred and sixty-three (80%) of the 455 audits were performed on routine transfusions compared to 74% from the previous audit. Seventy-three (16%) of the audits were identified as urgent transfusions compared to 18% from the previous audit and 19 (4%) were identified as STAT transfusions compared to 8% in the previous audit.

Many ward/areas of the hospitals were audited. The breakdown of these is shown in Table 4. Overall compliance varied between wards/areas, and there was significant improvement in all wards/areas as shown in Figure 1.

Table 4: Number of audits performed per ward/area

	2011		2018	
Ward/Area	Number of audits	Percent of audits (%)	Number of audits	Percent of audits (%)
Emergency room	57	16	91	20
Intensive Care Unit	53	15	55	12
Operating / Recovery room	7	2	3	1
Outpatient clinic	95	26	114	25
Medical / Surgical	118	33	161	35
Obstetrical unit	3	1	9	2
Chronic care / Rehabilitation	10	3	10	2
Neonatal / Paediatric	16	4	12	3

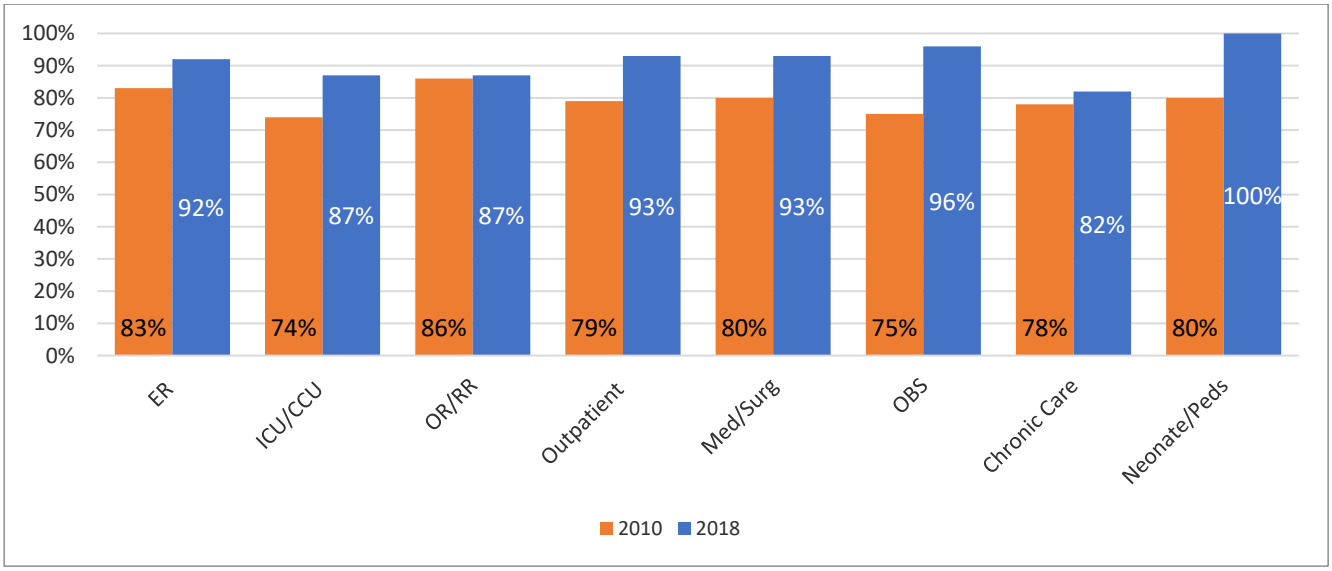

Figure 1: **Comparison of Compliance by Ward/Area between 2011 and 2018 audits**

All blood component types were audited. (Note: Only 1 audit was performed on a transfusion of cryoprecipitate). Figure 2

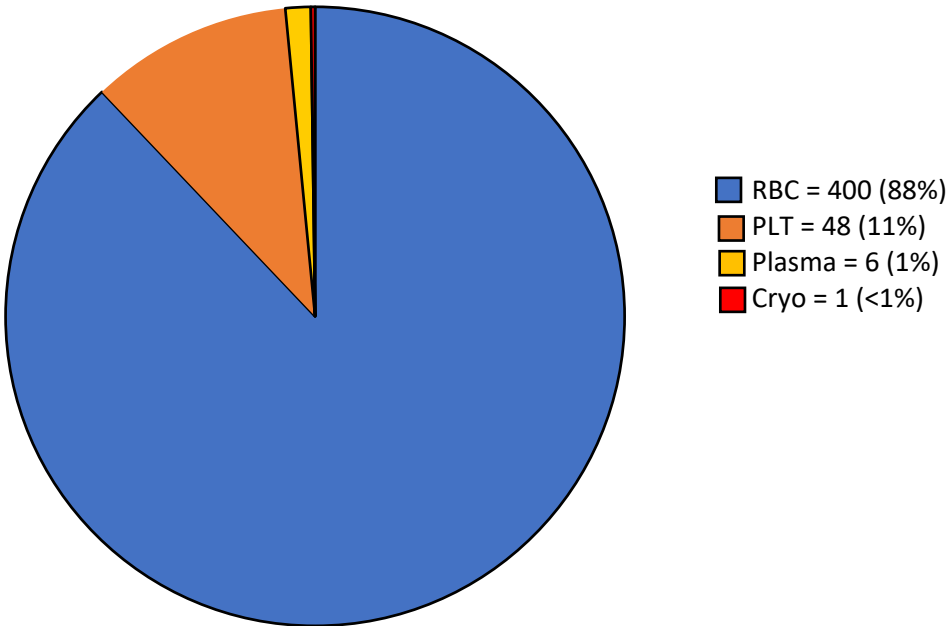

Figure 2: Blood components audited reported in percent

Hospitals were asked to document the time the blood component left the TS, the time the blood infusion was started and time the transfusion was completed. The average time between blood component issue and the start of infusion for 455 of the transfusions audited was 5.5 minutes (range 1 min to 57 min). In 7 of the submitted audits the time the product left the laboratory was the same time the infusion was started. Figure 3 shows the distribution of timing between issuing of component to the ward/area and the completion of the infusion for each component.

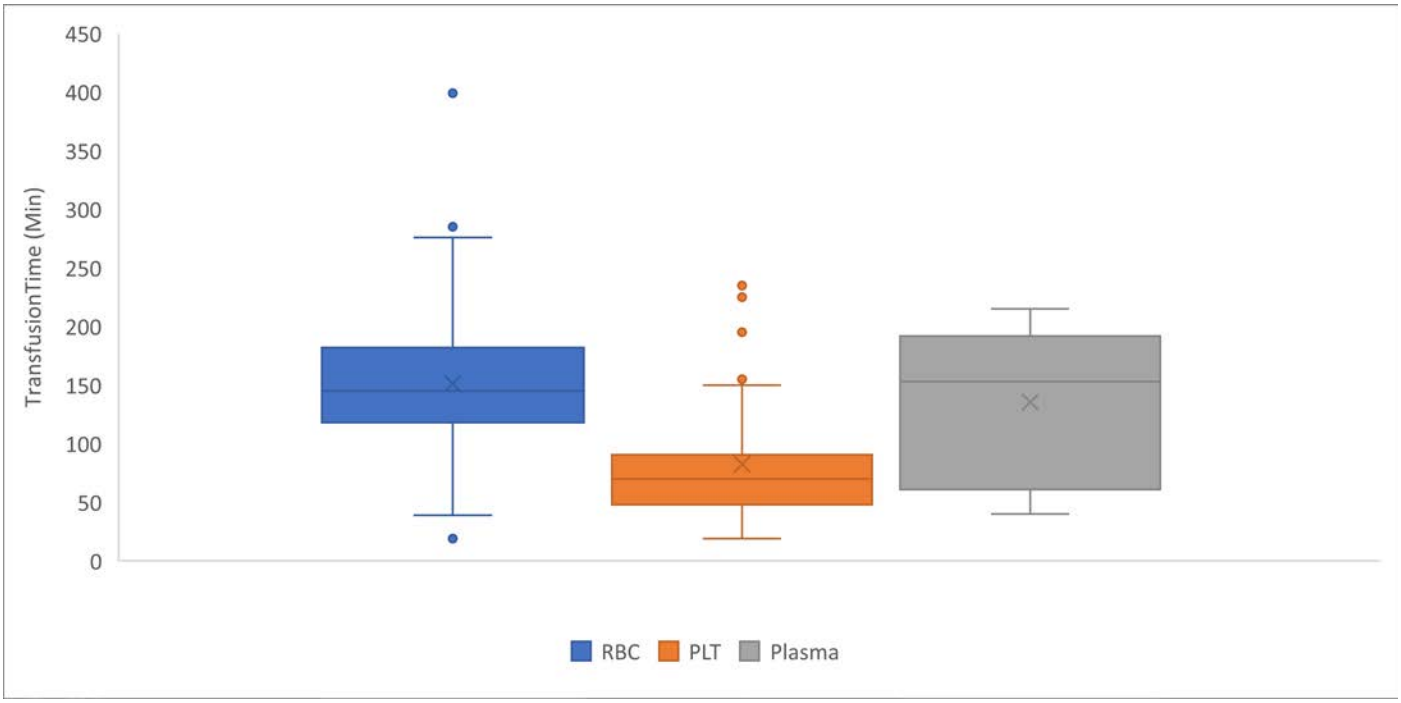

Figure 3: Transfusion time distribution for RBC, PLT and Plasma

Order Confirmation Check

The order confirmation check section captured information related to the physician's order for blood components and how it is checked at the time of the transfusion. The participant compliance for each question is shown in Table 5.

Table 5: Compliance with the order confirmation check questions

Required check	2011 Compliance (%)	2018 Compliance (%)
Is the physician's order documented?	99.7	99.7
Is the component type specified?	97.0	99.3
Is the infusion rate specified?	44.3	72.3
Is there evidence that informed consent was obtained?	86.6	95.6
Was the component verified against the physician order upon receipt on patient ward?	69.9	92.3

Several facilities commented that documentation of the infusion rate was part of a corporate policy for infusion rates.

Identification of Patient Check

The identification of patient check was designed to confirm the identification of the patient matches the patient identification on the TS label/tag attached to the blood component. This ensures the unit issued from the laboratory will be transfused to the intended recipient. This section of the audit demonstrated the highest rate of compliance. The results for the patient identification section of the audit are shown in Table 6.

Table 6: Compliance with patient identification check requirements

Required Check	2011 Compliance (%)	2018 Compliance (%)
Was the recipient information on the TS label / tag compared to the recipient information on the laboratory request form?	93.3	96.3
Were the recipient's name and one additional unique identifier on the TS label / tag compared with the identification attached to the patient?	92.5	96.3
Did the confirmation of the patient's identification and the TS label / tag take place in the presence of the patient? (at the bedside)	92.5	98.5

Verification of Component

The verification of component section of the audit was intended to monitor compliance with the standards that require the blood component be checked at the bedside prior to infusion. A check that the donor unit ABO/Rh group is compatible with the intended recipient was to be confirmed. The unit TS tag/label should be checked to ensure all information matches the Canadian Blood Services (CBS) blood supplier label on the blood component. The expiry date of the blood component is checked to ensure it has not expired. Participant results are shown in Table 7.

Table 7: Compliance with verification of component check requirements

Required check	2011 Compliance (%)	2018 Compliance (%)
Was the donor unit ABO/Rh on the CBS label verified to match that on the TS label	96.4	98.2
Was the donor unit number on the CBS label verified as identical to that on the TS label?	95.5	97.5
Was the recipient's ABO/Rh on the TS label/tag confirmed to be compatible with the donor unit?	95.8	95.8
Was the expiry date on the blood component verified to be acceptable?	69.9	90.3

Procedure Check

The procedure check section of the audit was intended to check the procedure of administering the blood component to the patient at the beside. This check included 1) intravenous (IV) line was inserted and that the vein was 'open' prior to receiving the unit from the TS and 2) the patient was informed of possible symptoms of adverse reactions. Vital signs should be taken on the patient prior to the start of infusion to serve as a baseline. [6] Ideally these should be taken within 30 minutes of starting the infusion. [8] Vital signs should be repeated 15 minutes after the start of infusion of the

blood component and compared with pre-transfusion vitals. Post-infusion vital signs should be taken as well, as a change in vital signs can be an indicator of an adverse reaction. [1] Acute transfusion reactions can occur within the first few minutes of starting the infusion. [8] The results of the procedure check are shown in Table 8.

Table 8: Compliance with procedure check requirements

Required check	2011 Compliance (%)	2018 Compliance (%)
Was the IV established and patent when the blood component unit arrived at the bedside?	93.9	97.1
Was patient advised of symptoms to watch for and report during or following transfusion?	73.5	78.2
Were pretransfusion vital signs checked within 30 minutes prior to transfusion?	89.1	93.8
Were vital signs checked 15 minutes after start of transfusion?	90.8	95.2

Twenty-seven hospitals indicated that they did not take vital signs within the 30 minutes prior to transfusion; 45% reported that they had taken them either between 30 and 60 minutes prior to transfusion, 22% one to two hours prior to transfusion and 33% reported the baseline vital signs were taken more than two hours before the transfusion.

Vital signs that were taken and documented during the transfusion are shown in Figure 4. Vital signs listed as "other" were: O_2 saturation alone (91.5%), O_2 saturation plus lung sounds (6.7%). Other vital signs recorded were mean arterial pressure plus O_2 saturation, ventilation, and oxygen/capillary refill to make up the remaining 1.8% of the "other" section.

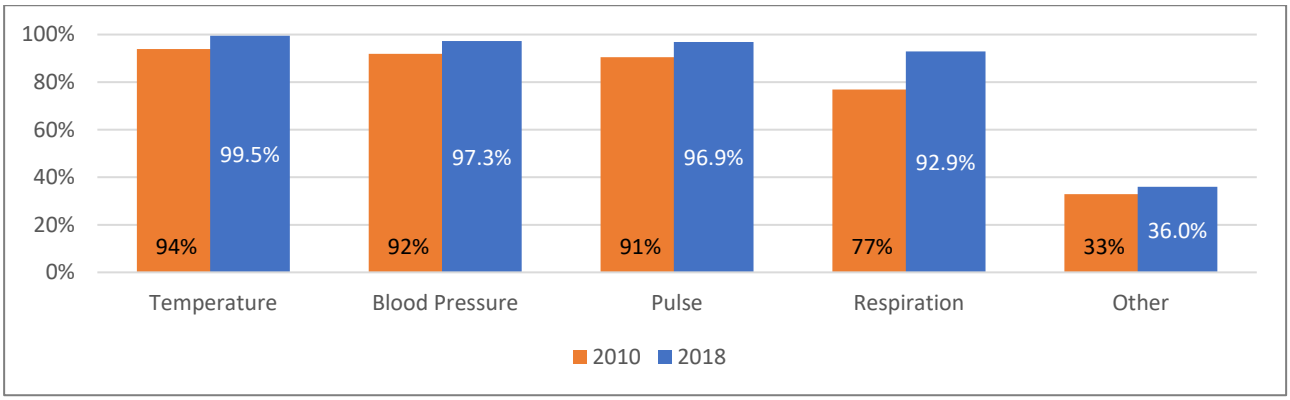

Figure 4: Vital signs taken during audited transfusions

Patients were advised of symptoms to watch for and report during or following their transfusion only in 78.2% of audited transfusions. The breakdown of this by ward/area appears in Figure 5.

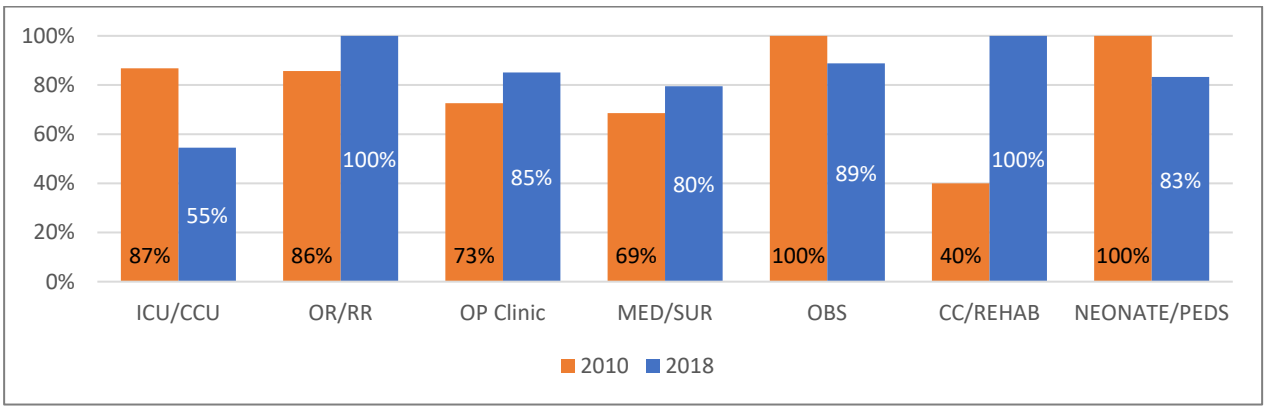

Figure 5: Patients advised of symptoms by ward/area

Discussion

The 2018 audit results have shown significant improvements in compliance for each section, but there is still room for improvement to reach 100% compliance. The highest rate of compliance was seen in the section of the audit that dealt with identifying the recipient of the blood transfusion at 97% (refer to table 1). Identifying the correct patient is paramount for patient safety, and it is expected to be 100%. There was a 6% improvement seen in confirming that the patient's identification matched the TS label / tag in the presence of the patient and at the bedside in the 2018 audit compared to the results of the 2011 audit. Comparing the patient identification with the identification on the blood component should always take place at the bedside, with the patient present. [(9)] Failure to do the bedside patient identification check could result in a patient receiving a blood component intended for another patient.

The section that revealed the lowest compliance rate for this audit (91%) was that related to checking the steps for administering blood components to the patient. This may be an area that sites who ranked lower in compliance may want to review, as when steps are missed there is a higher chance that an error can occur. For example, if vital signs are not taken within the appropriate timeframe, an opportunity may be missed to diagnose a transfusion reaction.

The highest compliance rate for the 2018 audit was seen in the Obstetrical and Gynecology ward/area with 99% compliance (n=9), which is a 16% improvement from the 2011 audit (n=3). Comparing compliance improvements between the 2011 and 2018 audits, the ward/area that demonstrated the most improvement was the Chronic Care/Rehab area, with a 17% improvement (this was the ward/area that had the lowest compliance in the previous audit).

When asked if the infusion rate was specified by the physician, 72% of the participants indicated that it was. Some also indicated that the infusion rate was determined by a set policy. This may be an area of focus for sites that have indicated there is no infusion rate provided for each order, or that a standard infusion rate is stated in hospital policies. Most transfusions should occur within 2 to 4 hours of component issue from the TS (and all within 4 hours), but the infusion rate should be based on the patient's clinical presentation. If the patient is at risk of circulatory overload, then a slower rate should be considered. [(1)]

Another area identified for improvement in this audit was recording of the time the blood component left the TS until the transfusion was completed. As stated earlier, it is important to ensure the blood

component is infused over 2 hours but does not exceed 4 hours from the time of issue from the TS. [10] Some sites recorded that the time between issuing the blood component until the infusion started was 1 minute, and the time that the infusion began until the time the infusion was completed was 8 minutes. Some indicated that there was no time between initial start of infusion and the time it was stopped. There was indication by some comments that the transfusion ended but the time could not be found in the hospital information system. This is a very important piece of information when investigating transfusion reactions.

There was no change in compliance between the2011 audit and the 2018 audit results confirming that the recipient's ABO/Rh listed on the TS label/tag was compatible with the donor unit. Confirming that the ABO/Rh of the recipient listed on the TS label/tag is compatible with the ABO/Rh of the donor unit is a vital step in avoiding transfusing the wrong patient and/or component. Blood components may be ABO/Rh compatible even if not ABO/Rh identical (e.g. group O red blood cells are compatible with all blood groups and Rh-negative components are compatible with Rh positive and Rh-negative blood groups).

The web-based audit e-Tool has been available for hospitals to use to conduct their own audits to help meet accreditation requirements for quality improvements since April 2011. [7] Since then, 51 (34%) Ontario hospitals have utilized this to conduct their own audits. As more hospitals participate in collaborative interdisciplinary and quality improvement projects, the hope is that they will see the benefit of using this tool to help conduct audits, collect data and report compliance with standards.

Limitations

The data collected for this report was provided by hospitals that volunteered to participate in the 2018 Ontario bedside audit of blood administration. Each participating hospital had control of the wards/areas to be audited. There was no significant difference between the number of audits of various wards/areas when comparing the 2011 versus the 2018 audit. While all participating sites stated they have a policy for blood administration, policies may differ in some details, including checking component expiry dates, documentation of infusion times, and informing patients about signs and symptoms to watch for during and after a transfusion.

Conclusions

The goal of achieving participation of minimum 50% of Ontario hospitals was exceeded. The 2018 Bedside Audit demonstrated there has been significant improvement in bedside practice and improved compliance with current standards for the administration of blood component/products. However, there is still room for improvement.

The web-based audit e-Tool has had an increase in uptake since 2011 and more sites are using this e-Tool to perform regular site-specific quality improvement audits as a requirement of laboratory accreditation in Ontario. [11]

All documents for bedside audit are available to any hospital in Ontario that would like to continue to audit their wards/areas periodically. The Bedside Audit web-based e-Tool and toolkit have been updated to reflect changes in standards and both are available on the ORBCoN website transfusionontario.org

Acknowledgements

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