

# A Canada-wide survey of perceptions and practices related to routine blood test ordering in the ICU

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## Introduction

Routine blood testing, pre-ordered in advance, is common in the intensive care unit (ICU), and often occurs without considering the pretest probability of finding an abnormality. This practice may increase risk of anemia, blood transfusion, false positive findings, unnecessary investigations, and healthcare costs. The purpose of this survey was to understand practices and attitudes around blood test ordering among Canadian ICU physicians.

## The Survey

Our target sample was 1 intensivist from each level 3 ICU in Canada. The final survey consisted of 15 questions across 3 domains: "Global assessment," "Who orders and why," and "Day-to-Day Practice," as well as 11 demographic questions.

## Results

**Table 1: Demographics**

<b>Number of respondents</b>	84
<b>Average clinical experience</b>	12 ± 9 years
<b>Urban vs Rural</b>	85% vs 15%
<b>Teaching vs. Non-teaching</b>	60% vs 40%
<b>Mean number of beds</b>	14 ± 6
<b>Unit model of care</b>	96% closed unit

**Table 2: How often do you think unnecessary blood tests are ordered for patients in your ICU (percent)?**

<b>Never</b>	0
<b>Almost never</b>	3
<b>Sometimes</b>	67
<b>Almost Always</b>	26
<b>Always</b>	4

**Table 3: Frequency preference for ordering specific blood tests in the first week of ICU admission (percent)**

	<b>CBC</b>	<b>Lytes</b>	<b>Ext. Lytes</b>	<b>Urea/Creatinine</b>
Less than daily	20	15	43	17
Daily	62	71	29	68
More than daily	1	1	1	0
Not routinely	17	13	26	15

**Table 4: Daily goal-oriented checklist addressed on rounds (percent)**

<b>Yes</b>	55
<b>No</b>	45
<b>Checklist includes re-evaluation of regular blood tests</b>	
<b>Yes</b>	73
<b>No</b>	27

**Table 5: How often do results of pre-ordered recurring blood tests lead to a change in patient management, as compared with real-time ordered tests in response to a specific clinical situation (percent)?**

<b>Never</b>	0
<b>Rarely</b>	13
<b>Sometimes</b>	59
<b>Frequently</b>	28
<b>Always</b>	0

**Table 6: The top 5 factors influencing blood test ordering in the ICU**

<b>Factor</b>	<b>Number of times selected</b>
Physician preference	59
Institutional tradition	41
Pre-printed order set	40
Nursing preference	25
Residents/trainees ordering	17

## Conclusion

Most respondents believe blood tests are at least sometimes ordered unnecessarily. The most frequently cited determinant of routine blood testing was physician preference. The survey results warrant comparison to a prospective audit of actual practice before developing specific recommendations.

# Blood waste and the harms of serial phlebotomy in the ICU.

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**Background:** ICU patients are frequently anemic.<sup>1</sup> Serial phlebotomy is a contributing factor to hospital acquired anemia,<sup>2</sup> which has been associated with increased mortality.<sup>3</sup> This project aims to characterize ICU phlebotomy and inform a stewardship initiative “Pause the Draw” at St. Michael’s Hospital (SMH).

## Hypothesis:

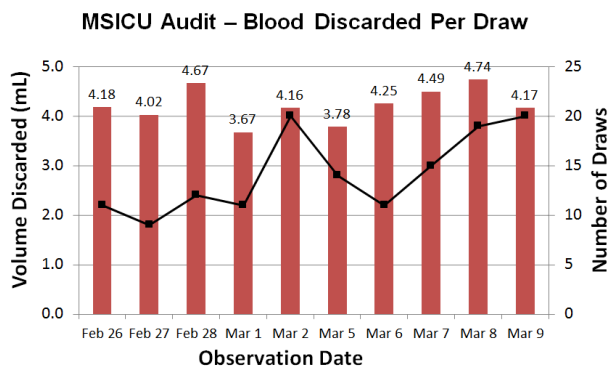
- 1) Phlebotomy volume in the ICU is independently associated with anemia and/or blood transfusion.
- 2) Low weight, female, and length of ICU stay are associated with phlebotomy induced anemia.

**Design:** Retrospective cohort Sep 2014 to Aug 2015 of Medical Surgical ICU (MSICU) patients in a tertiary academic centre (St. Michael’s Hospital, Toronto, ON).

## Cohort:

	Full Cohort (N=1093)	Transfused (N=314)
Age (yr)	61.8	63.3
% Female	40.6%	39.8%
Daily Phleb. (mL)	40.6	46.4
Nadir Hb < 80	21.5%	86.0%
ICU LOS (d)	6.2	10.5
Hosp. LOS (d)	21.8	31.5
Hosp. Mortality	%	%

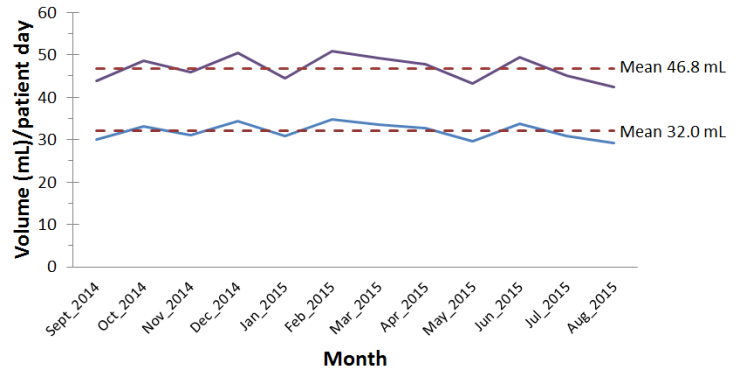
## Waste Audit:



	Arterial	Central	PICC
Waste / Draw (mL)	3.89	5.50	6.25

**Total Waste / Patient Day = 14.8 mL**

## MSICU Phlebotomy Volumes

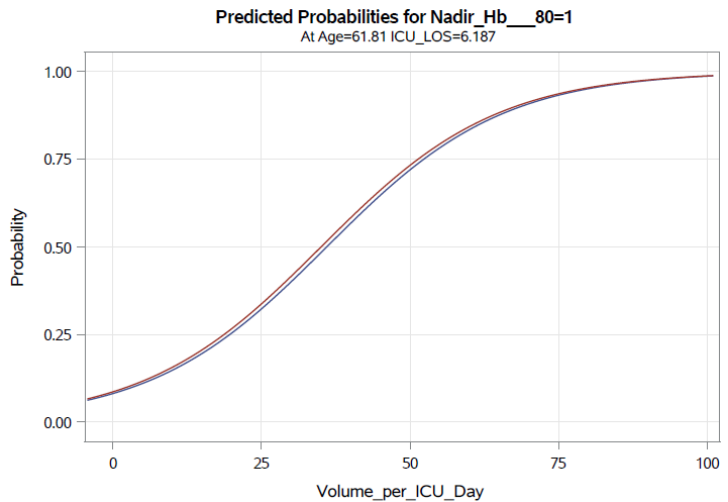


**Multivariate Regression:** Increasing daily phlebotomy volume was associated with lower nadir hemoglobin and higher a odds of red cell transfusion.

Per 10 mL increase in daily phlebotomy:

Nadir Hb < 80 mg/L: OR 2.13 (95%CI, 1.84 - 2.45, p < 0.001)

PRBC Transfusion: OR 1.93 (95%CI, 1.67-2.23, p<0.001)



## Future Work / Limitations

- Inclusion of important covariates: severity of illness, comorbidities, presence/absence of bleeding events.

## Discussion Points:

- 1) What are some potential risk factors of phlebotomy induced anemia we should be considering?
- 2) How might patient risk factors be used to inform phlebotomy practices? Is there a role?
- 3) Lessons learned using this data to inform phlebotomy reduction (“Pause the Draw”) at SMH.

## Choosing Wisely Improves Clinical Transfusion Practice

Ryan Lett, Donna Ledingham, Paula Van Vliet, Robin Lawrence, Dena Arnott, Jennifer Lambert, Melissa Kopciuch, Saskatchewan Health Authority

Regina underwent an audit of transfusion practice in 2015-2016. During that timeframe, an average of 738.3 units of red blood cells (RBCs) was transfused per month. The majority of transfusion orders (71.4%) were for 2 units of RBCs, 14.3% were for single units and 14.3% were for 3 or more units.

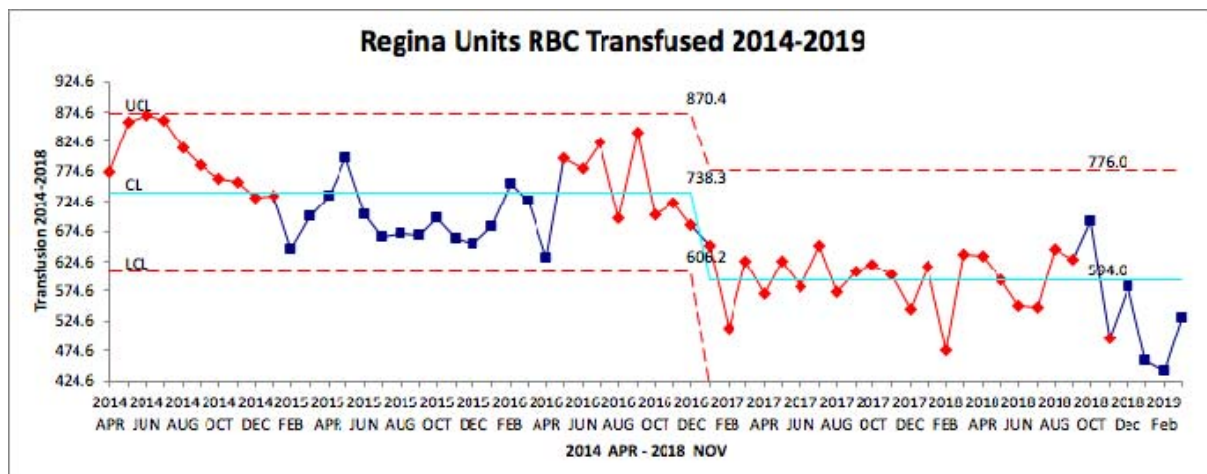
In September of 2016, the Regina Transfusion Committee approved the use of Choosing Wisely's, "Why Use Two When One Will Do?" campaign and posted posters of local clinician champions with the above slogan. In the subsequent year, a significant number of education sessions were held for physicians, residents, nurses, pharmacists and administrators to encourage restrictive transfusion practice as well as encouraging the use of intravenous iron in anemic, iron deficient, patients.

An RBC PPO was developed but its overall use was very low. Education sessions have continued as needed for interested groups. In November 2018, one of the two hospitals became a participatory site in the START (Screening by Technologists and Auditing to Reduce Transfusion) study, led by Dr. Callum out of Sunnybrook. The study design is similar to that of Module 3 in the Choosing Wisely Toolkit for Transfusion Medicine utilizing the lab technologists to ensure physician orders are appropriate.

When we examined the impact of education on RBCs (prior to screening orders), the monthly average of transfused RBCs was 594, representing a 19.5% decrease from baseline and an average of 144.3 fewer units per month. An audit of transfusion orders showed a change to the majority of orders being for single units (70.6%); 27.5% of orders were for two units and 1.8% were for 3 or more units.

Implementation of screening in November resulted in a further reduction of 93 units RBC per month, with average transfusions per month during the START study at 501.2. Since implementing Choosing Wisely's Toolkit, transfusions in Regina have decreased by 32%.

Choosing Wisely's toolkit is an effective means for hospitals and transfusion departments to improve clinician ordering practice.



## Appropriateness of red blood cell transfusion within the Obstetrics and Gynecology department in a tertiary care centre: does hospital-wide education improve appropriateness?

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### Objective

Determine what proportion of red blood cell transfusions within our Obstetrics and Gynecology department are appropriate and what is the effect of a hospital wide educational strategy promoting appropriate use of transfusion?

### Educational strategy

- Focused effort to reshape the culture and attitudes surrounding RBC transfusions
- Grand Rounds
  - Transfusion appropriateness
  - Patient blood management
- Posters
  - “Why use two when one will do”

### Why this is important – risks

- Alloimmunization = 1:13
- Minor reactions = 1:100
- Lung injury = 1:1000
- Major morbidity = 1:21,000

### Appropriateness criteria

Non-bleeding patient appropriate if all three were met:

1. Initial hemoglobin < 70 g/L
2. Post-transfusion hemoglobin < 90 g/L
3. Single unit of RBC ordered with reassessment prior to subsequent

Actively bleeding patient appropriate if ≥ 1 were met

1. Post transfusion hemoglobin < 100 g/L, or
2. Patient received ≥ 5 units PRBC

### Challenges

- Defining an appropriate transfusion
- Retrospective design – limited ability to precisely define the intervention

### Lessons learned

- Inappropriate RBC transfusions are common
- Low hemoglobin in a non-bleeding patient is the most common reason for inappropriateness
- Easy audit to carry out at and results are simple to act on
- CWC tool kit provides a perfect platform to develop a testable intervention



	Obstetrics	Gynecology
Patients discharged	4092	518
Patients transfused	58 (1.4)	25 (4.8)
Total transfusion events	71	30
Appropriate	34 (47.9)	14 (46.7)
Active bleeding	14 (41.2)	7 (50)
No active bleeding	20 (58.8)	7 (50)
Inappropriate	37 (52.1)	16 (53.3)
Active bleeding	7 (18.9)	3 (18.8)
No active bleeding	30 (81.1)	13 (81.3)
No reassessment	25 (67.6)	12 (75)
Over transfusion	13 (35.1)	5 (31.3)
Initial Hgb > 70 g/L	5 (13.5)	2 (12.5)

Table 1: Pre-intervention data, expressed as n (%)