

Triggers for Red Blood Cell Transfusion in the NHLBI Recipient Epidemiology and Donor Evaluation Study III (REDS-III) Transfusion Recipient Database

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Background

Many red blood cell (RBC) transfusion guidelines have been published although it remains unclear to what degree current medical practice adheres to these guidelines. Studies of transfusion practice have shown significant variation in RBC utilization. Evaluating the impact of RBC transfusion guidelines and blood conservation strategies on current practice across the REDS-III hospitals will contribute valuable input to the extant data. With this study we report current variation in pre-transfusion hemoglobin (Hb) levels for RBC by transfusion location using the REDS-III recipient database.

Methods

The NHLBI REDS-III program provided support for 11 US academic and community hospitals with electronic medical records participating in this database. Electronic health record data from all inpatient and outpatient transfusion recipients were obtained from quarter one 2013 of a planned 4-year collection period. Using this database, we determined pre-transfusion Hb values by issue location in those patients who received a RBC transfusion, as well as Hb values for the non-transfused inpatient population.

Results

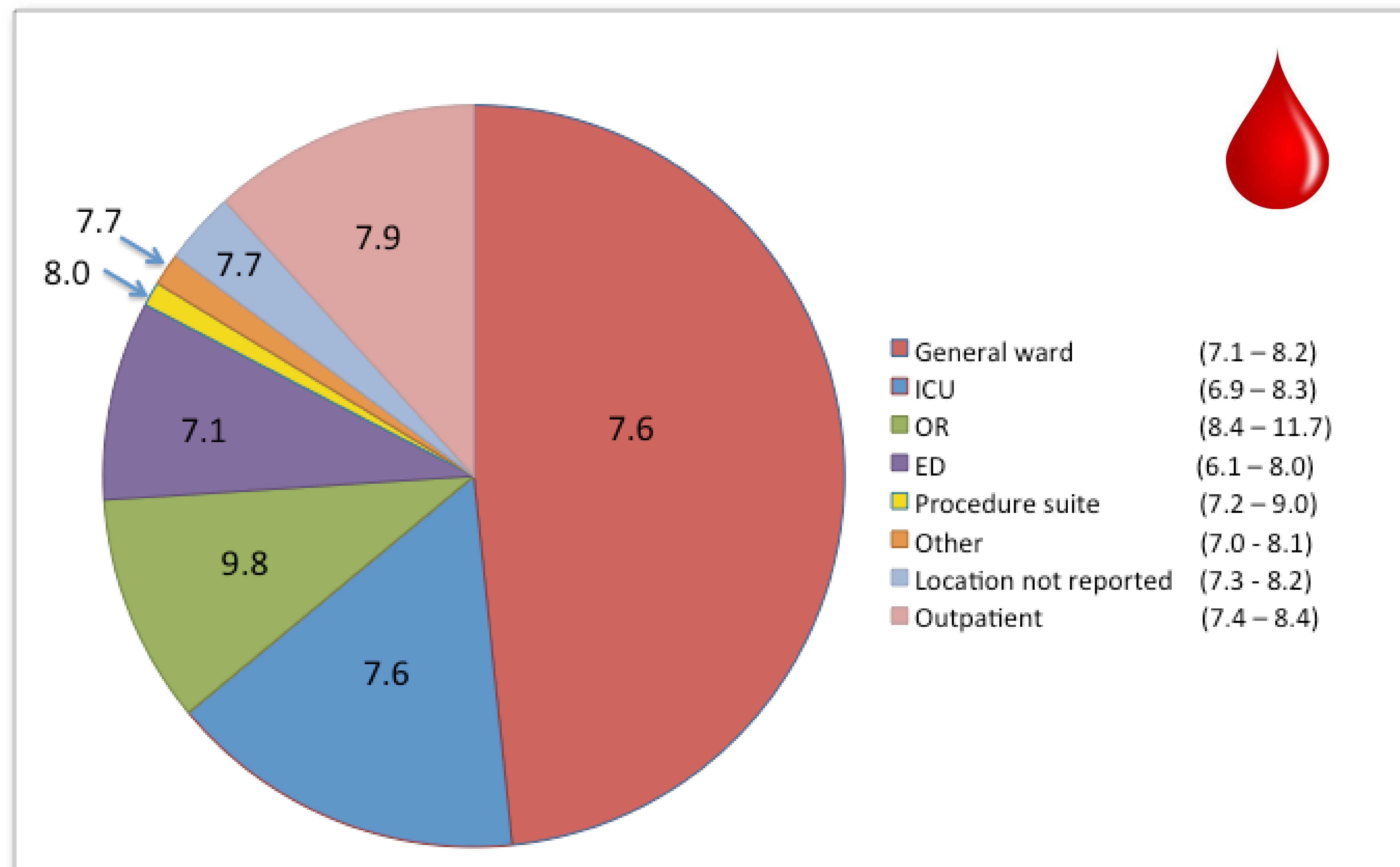
In Q1 2013 data, there were 7227 inpatient and 2911 outpatient RBC transfusion encounters. Overall, 5836 (80.8%) inpatient and 946 (32.5%) outpatient encounters had at least one pre-transfusion Hb measurement within 30 minutes to 24 hours preceding the first RBC transfusion, as multiple transfusion encounters per patient were possible. The table below reports the mean, standard deviation, median and range of those values by issue location. Median pre-transfusion Hb values (as depicted in the graph) from most issue locations, were near or lower than current recommendations (7.1-8.0 g/dL), with the exception of the operating room (9.8 g/dL), where levels may not account for acute operative bleeding.

Pre-transfusion hemoglobin values by issue location for RBC transfusions in 11 US hospitals

RBC Issue Location	N*	Pre-transfusion Hb (g/dL)				
		Mean	Std Dev	Min	Median	Max
General ward	3279	7.7	1.1	3.7	7.6	19.0
ICU	1061	7.7	1.3	2.8	7.6	15.1
OR	677	10.1	2.3	4.4	9.8	21.2
ED	588	7.3	2.1	1.9	7.1	16.1
Procedure suite	72	8.4	1.7	4.9	8.0	13.0
Other	96	7.8	1.3	5.5	7.7	12.9
Location not reported	214	7.7	1.1	2.8	7.7	13.0
Outpatient	795	7.8	0.9	3.4	7.9	12.6

*Number of encounters with Hb values 30 minutes to 24 hours prior to first RBC transfusion

Median Pre-transfusion Hemoglobin (g/dL) by RBC Issue Location*



* Slices are proportional to the number of RBC transfusion encounters per issue location

Conclusion

Transfusion practice, as defined by pre-transfusion Hb trigger, varied by issue location while approaching current guideline recommendations but room for improvement remains. With continued collection and quality review, including attention to linkage and extraction algorithms, these data will be examined with increasing granularity, lending detail to analyses of transfusion components previously not observed. This analysis provides proof of concept that the REDS-III database can be used to examine transfusion practice for red blood cell components across a range of hospitals with differing electronic medical records systems.

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