

A Survey of Blood Product Orders Throughout Lehigh Valley Health Network

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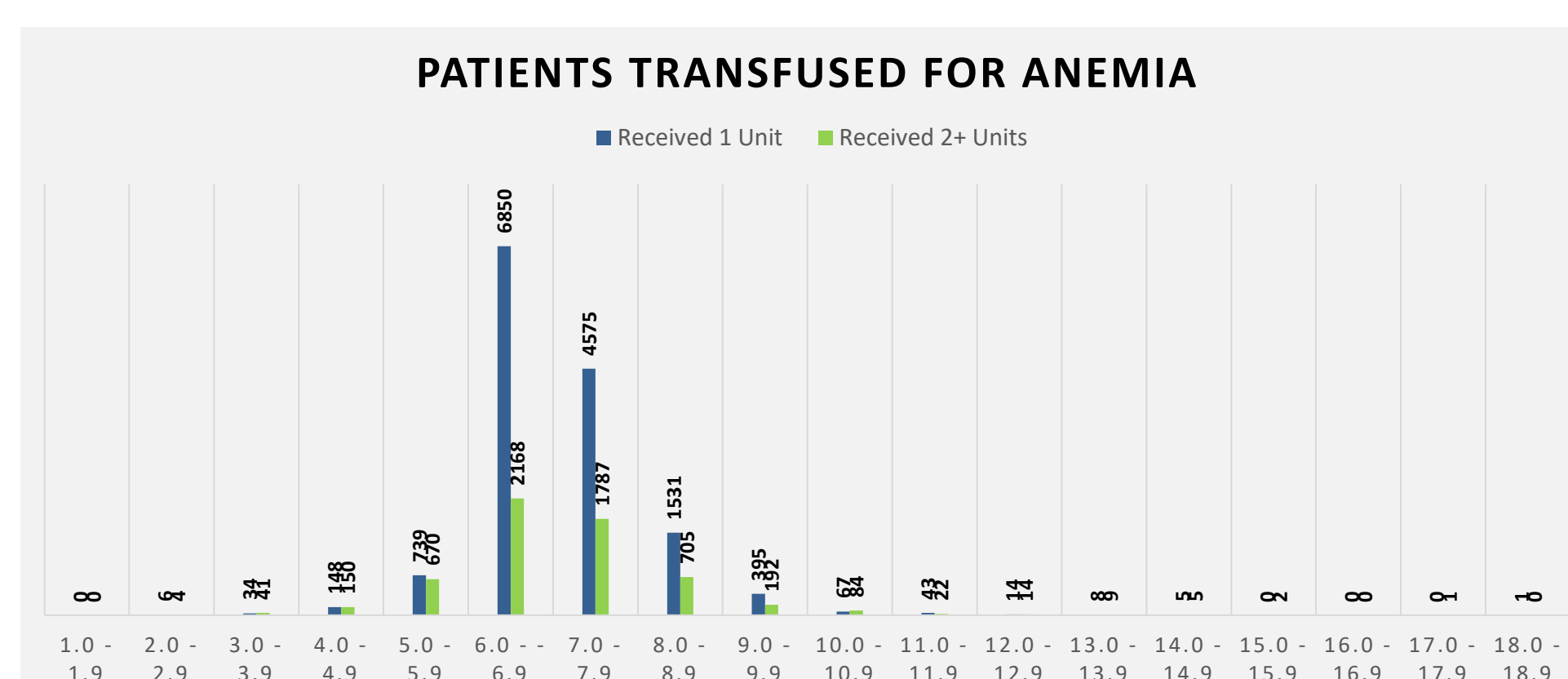
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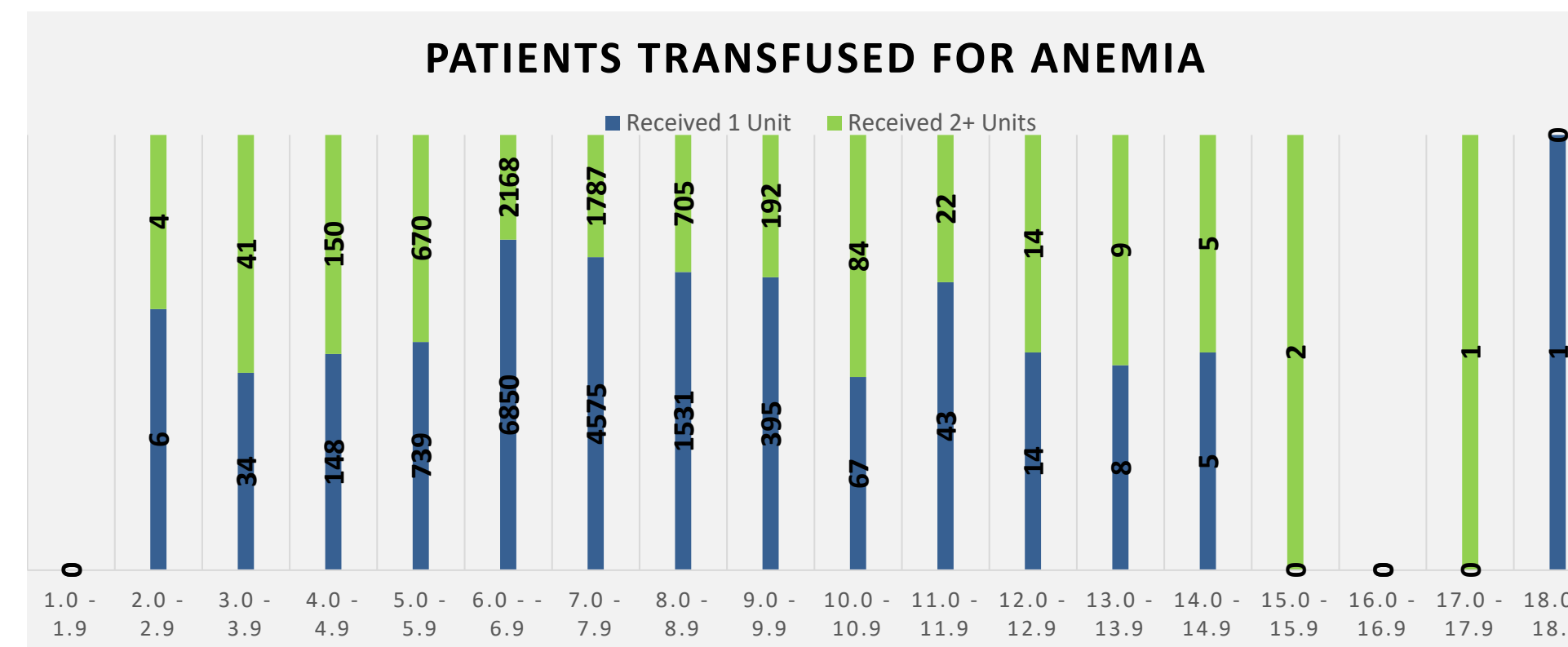
- The American Red Cross estimates that 21 million blood products are transfused each year in the US (1). At a time when hospital systems across the nation are trying to conserve resources (5), blood products are a ubiquitous item on the order list of many patient charts (4).
- Reducing multiunit blood orders has shown to be an effective method of saving costs
 - Healthcare systems across the nation are attempting to institute blood management programs to reduce waste
- The American Association of Blood Banks (AABB) currently recommends that hospitalists follow a conservative transfusion strategy (2), limiting blood transfusions to people that have a hemoglobin of at most 7-8 g/dL in the absence of active coronary disease, stroke, or heart failure (3).
- Data regarding multiunit blood orders at LVHN exists, but remains unstudied.

Indication	Order Cancelled or Unfilled (%)	Received 1 Unit (%)	Received 2 Units (%)	Received 3+ Units (%)	Total (n)
Anemia, Hgb Below 7	1,014 (7.4)	9,044 (66.0)	3,533 (25.8)	109 (0.8)	13,700
Anemia, Hgb of 7 or Above	667 (0.1)	6,638 (65.4)	2,821 (27.8)	25 (0.2)	10,151
Anemia Hgb Not Specified	121 (0.4)	1,552 (51.1)	1,331 (43.8)	23 (0.8)	3,037
Active Bleeding	238 (0.1)	1,662 (69.0)	498 (20.7)	10 (0.4)	2,408
Hematologic Malignancy	21 (7.4)	187 (66.1)	75 (26.5)	0 (0)	283
Hgb Below 8 with CVD	120 (4.1)	2,513 (84.1)	273 (9.4)	2 (0.1)	2,908
Cardiac Surgery	52 (5.7)	439 (48.1)	409 (44.8)	12 (1.3)	912

- Packed RBCs were ordered 33,399 times throughout Lehigh Valley Health network from 2017 to 2020. Anemia accounted for 26,888 of those orders
- Patients with anemia at LVHN receive 1 unit of blood roughly 2/3 of the time whether they have a hemoglobin value above or below 7
- When there was no specified hemoglobin value for an anemic patient who received blood, the rate at which patients receive 1 unit of blood drops to 51.1%

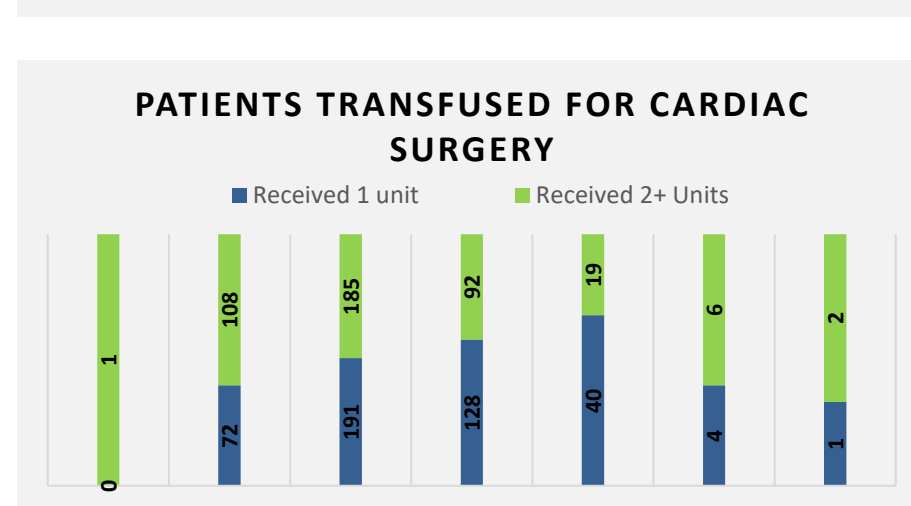
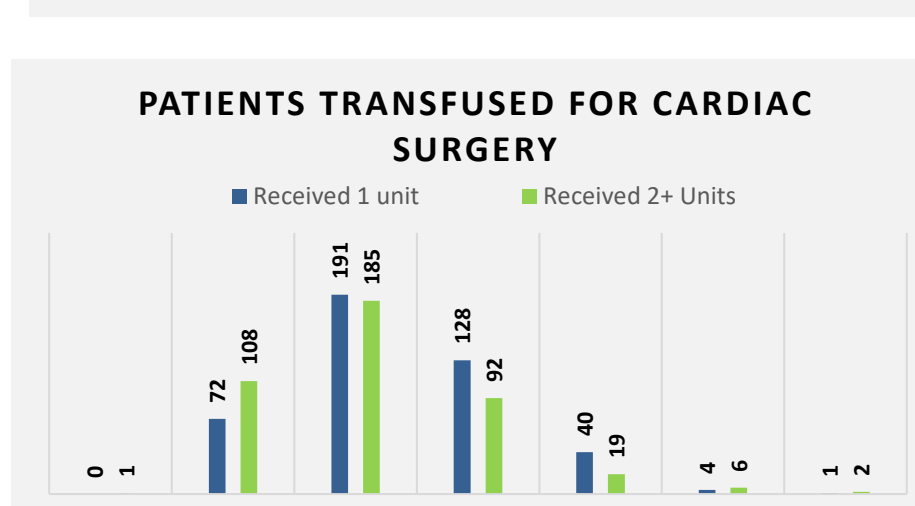
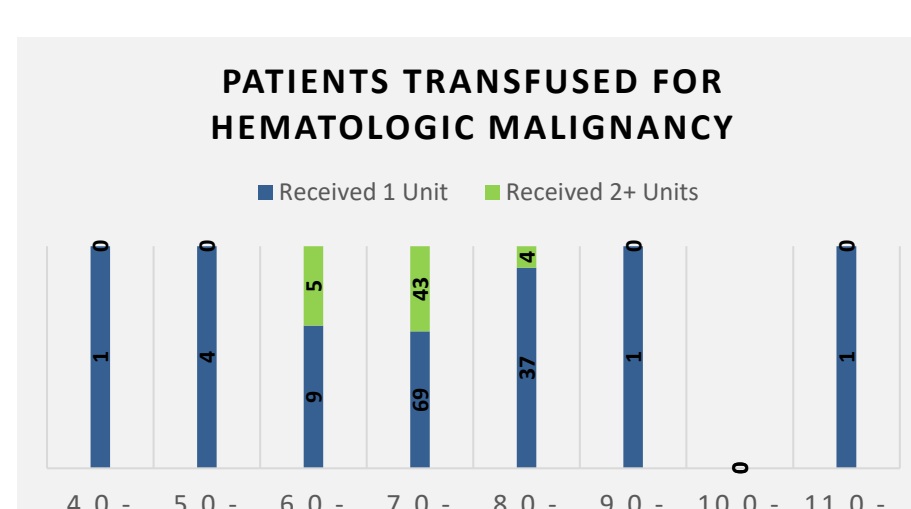
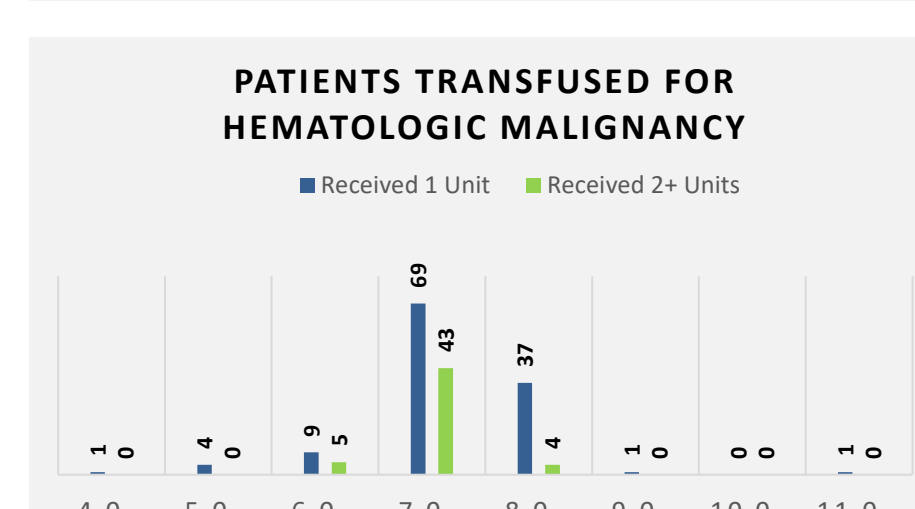
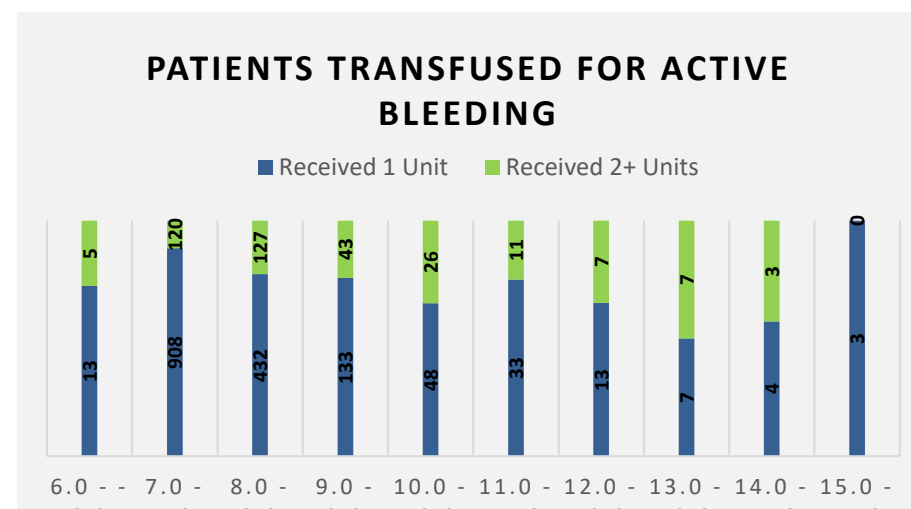
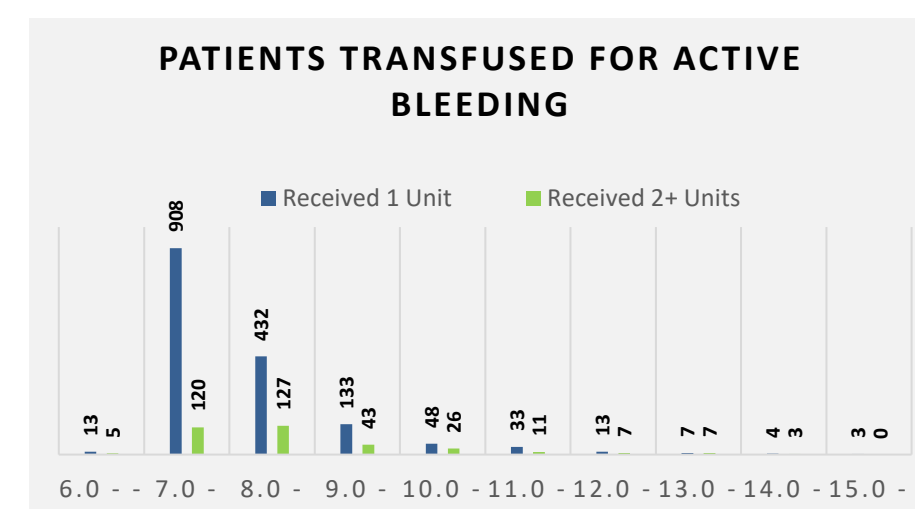


number of anemic patients given 1 or 2+ units for given hemoglobin range



proportion of anemic patients receiving 1 vs 2+ units for given hemoglobin range

- Out of all patients who received a transfusion for the indication of anemia, patients who had a hemoglobin within the range of 6.0 to 6.9 received 1 unit at the highest rate.
- Within the ranges of 7.0 to 10.9, the rate at which a patient will receive 2 or more units of blood increases slightly.
- There is a marked increase in the proportion of anemic patients receiving 2 or more units of blood when the hemoglobin value drops below 6



- The rate at which providers transfused one unit of pRBCs as opposed to two did not seem to be affected by whether the hemoglobin value at the time was above or below the transfusion threshold of 7
- However, when there was no hemoglobin value given at the time of the order, the rate at which providers transfused one unit of blood dropped from about 65 – 66% to 51.1%
- Merely having a lab value on hand before ordering a blood product may facilitate conservative blood product use.
- Alternatively it may be that situations in which providers are required to order more than 1 unit of blood are emergent and make it an inconvenience for providers to wait for blood counts before ordering and transfusing blood
- Orders for active bleeding and hematologic malignancy ended in patients receiving 1 unit at a similar rate to orders for patients with anemia
- On RBC orders for patients with cardiovascular disease with a Hgb of less than 8, patients received 1 unit of blood at a rate significantly higher than orders for patients with anemia with a specified Hgb value

Problem Statement

We aimed to look at data about the use of packed red blood cells throughout LVHN to determine the frequency of multiunit blood orders in hopes insights can guide the discussion of how to administer blood products throughout the network.

Location	Active Bleeding	Anemia	Hematologic Malignancy	Hgb < 7	Cardiac Surgery	Hgb Below < w/ CVD	Total
LVH CEDAR CREST	1432	7976	59	8986	823	1747	21023
LVH 17TH	15	77	0	99	0	15	206
LVH HAZLETON	235	2	0	492	0	323	1052
LVH MUEHLENBERG	390	2294	19	2610	87	429	5829
LVH POCONO	248	0	0	764	0	369	1381
LVH SCHUYLKILL EAST	88	1	0	495	0	23	607
CC 1240 JDMCC	0	1518	5	5	1	0	1529
CC 1210	0	257	32	0	0	0	289
LVH SVCS AT MHC	0	804	96	0	1	0	901
W TILGHMAN ST HOSPITAL	0	18	0	4	0	2	24
GOOD SHEPHERD SPEC HSP	0	116	0	245	0	0	361
HEALTH CENTER AT BANGOR	0	125	72	0	0	0	197
TOTAL	2408	13188	283	13,700	912	2908	33,399

- A data collection specialist pulled relevant data from EPIC EMR for more than 50,000 blood product orders throughout the Lehigh Valley Health Network
- Data points collected included: type of blood product ordered, units of blood product given per order, indication for the order, and hemoglobin values at the time of the order
- The data points ultimately included in the review were orders for RBCs for adults with one of the following indications: active bleeding, anemia, hematologic malignancy, cardiac surgery, hemoglobin < 7, and hemoglobin < 8 with cardiovascular disease
 - For this analysis, anemia was divided into 3 categories: anemia with Hgb < 7, anemia with Hgb >= 7, and anemia with an unknown Hgb value at time of transfusion.

- LVHN demonstrates success in judicious use of blood products, though there is room for improvement
- One unit of blood was given for most cases when a patients' hemoglobin value was less than 7
- It seems that it is not until an anemic patients' hemoglobin drops below 6 that there is an increased chance of a multiunit transfusion.
- Interestingly, not having a hemoglobin level at the time of the order seemed to increase the chances of a multiunit transfusion in anemic patients.
- There were cases when RBCs were given for patients with a Hgb value of greater than 7, but for many of these cases, the patient's Hgb value was less than 8, and is still in line with AABB guidelines

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