



STS ACSD Quality Improvement: Duke University Hospital Adult Cardiac Surgery Transfusion Task Force

March 2025

Melissa Williams, MHA BSN RN CPHQ



Duke Heart



Durham, North Carolina (~300K pop; 2M in Triangle)

1062 inpatient beds

Academic hospital

10 faculty cardiac surgeons

2024 Adult Cardiac Surgery volumes:

~400 isolated CABG

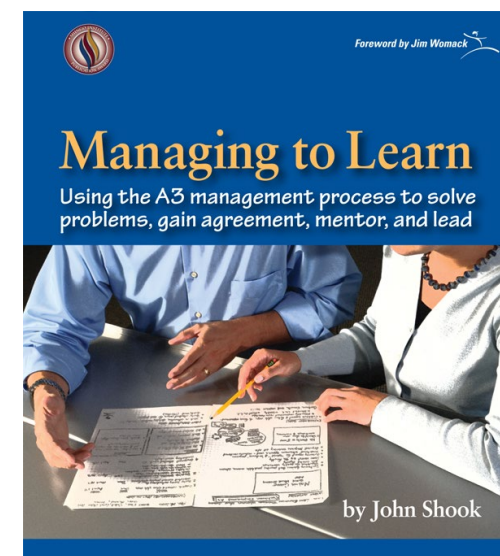
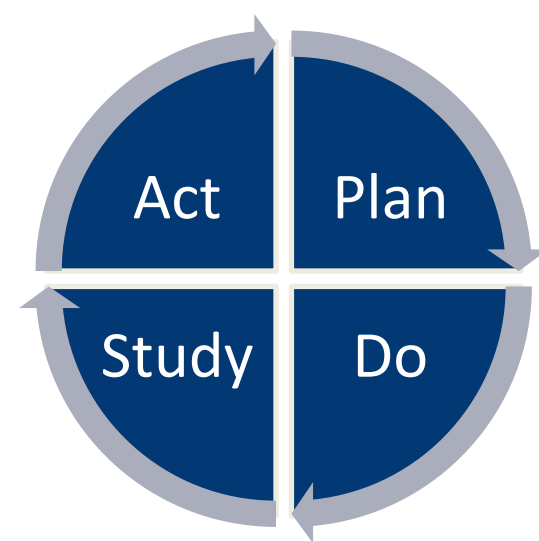
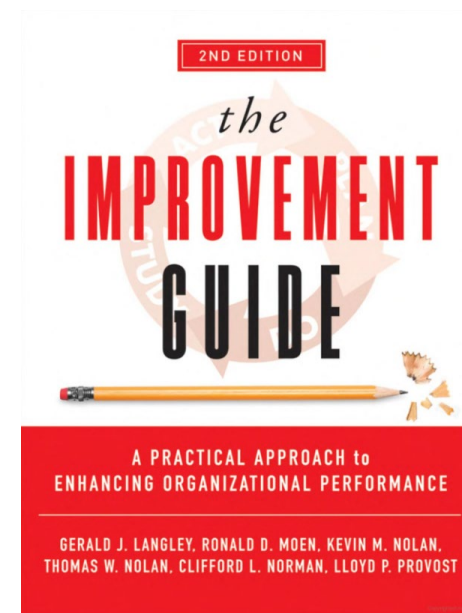
~400 valve procedures

~1100 "Other" cases – transplant, VADs, Aortic surgeries, etc



Duke Quality System

- Advancing health together through continuous improvement
- Tiered huddles
- PI/QI training for front-line leaders



Problem Description: _____
Date/Time Problem Experienced: _____

Location: _____
Should SRS be submitted? Yes No



Problem/A3 Owner: _____ Leader Coach: _____
Date Sent to Help Chain: _____ Improvement Coach: _____



1. Current Condition & Problem Statement

(What problem are we trying to solve? State in one sentence, if possible. What happened in this specific case? What problems did we encounter? Include visuals of the process (i.e. drawings, photos, etc.)

Is the problem contained? Yes No

Problem Statement: (What, Where, When, Who, How, How Many/Often, Consequence)

3. Target Condition

(What should this work look like if we are able to solve this problem so that it never happens again to anyone? Include visuals of the process (i.e. drawings, photos, etc.) Draw process using stick figures, arrows, etc.)

Hypothesis: (State hypothesis-es being tested: IF we do _____ THEN we expect _____ as measured by _____.)

4. Action Plan (Check, Act)

What will be done?	Who will do it?	By When?	Done?
Check:			
Act:			

2. Process Analysis – Determine Root Cause of the Problem(s)

(Use '5 Whys' to determine root cause. Keep asking why until the answer is one or a combination of the Rules in Use (shown below).)

Rule(s) In Use violation? Activity Connection Pathway Improvement



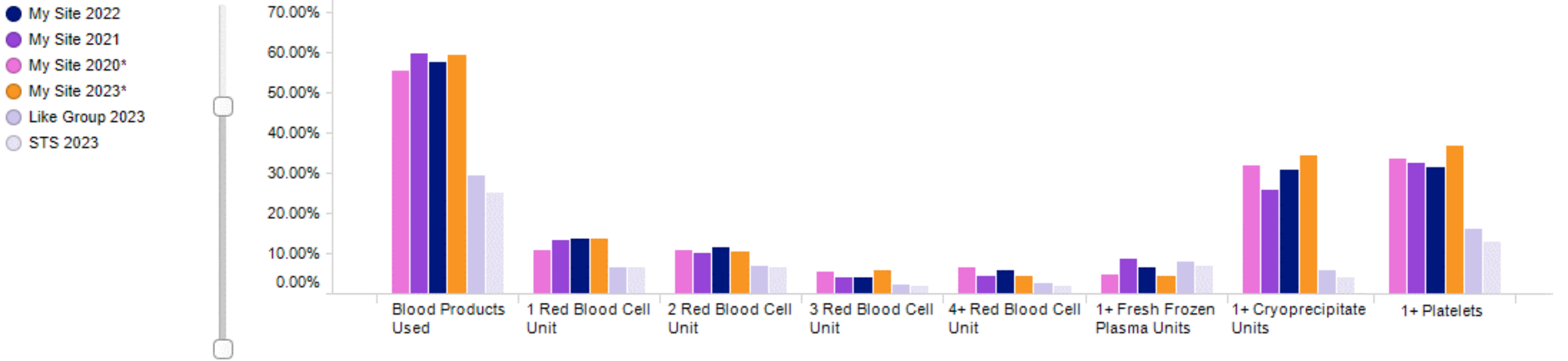
QI in cardiac surgery

- Physician Champion
 - CT Surgery Director of Quality, Dr. Brittany Zwischenberger
- Data collection & analysis
 - Lumedx registry vendor
 - Point-of-care documentation, bi-directional data exchanges with EMR (Epic)
 - SSRS reports
 - Data validation checks
 - Individual surgeon (including risk-adjusted outcomes)
 - Monthly trends for leadership
 - Executive summary
 - STS analyzed reports
- Task forces, focused on star rating outcomes



High transfusion rates compared to benchmarks

Isolated CAB IntraOp Blood Products Used



June 2023 (Harvest 3) STS Benchmark reports

Second source: Hospital data, access to Vizient member collaborative data, compared % of Cardiac Surgery discharges with any blood transfusion during hospitalization with other USNWR top hospitals.

Above 75th percentile in comparison group each quarter x5 quarters



Transfusion Task Force Timeline

December
2023

- Initial review of data over email
- Recommendation to form task force

January
2024

- First meeting
- Identified additional data for review
- Identified additional team members needed for multi-disciplinary approach

March
2024

- Review of detailed data
- Draft of preop anemia optimization algorithm, including outpatient anemia clinic
- Discussion of intraop algorithm; identified need to refresh knowledge
- ANH challenges discussed

May
2024

- Decision to change management of ANH in non-blood refusal patients from perfusion to anesthesia
- Plan to provide training on existing intraop transfusion algorithms to new residents/fellows
- Decision to set goal of reducing intraop transfusion in CABGs by half – to 30% by July 2025





Transfusion Task Force Timeline

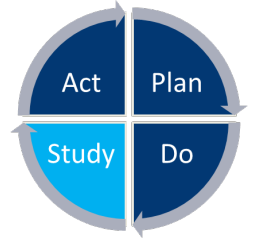
June
2024

- Finalized algorithm for Anemia Optimization in Cardiothoracic Surgical Patients
- Finalized plans for training of intraop algorithm
- Consolidation of documents for sharing with anesthesia, surgeon groups
- Plan to add trend to monthly outcomes report



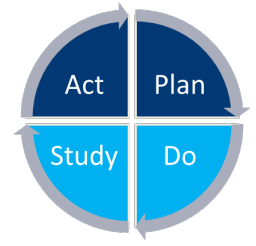
August
2024

- Reviewed data on utilization of preop anemia clinic
- Identified need for formal education on ANH
- End-of-case coagulation lab timing identified as an opportunity to clarify standard work
- Challenges in inpatient implementation of anemia optimization



November
2024

- Plans for formal training on ANH progressing, with plans for on-demand video
- ANH utilization tracking assigned to anesthesia fellow for QI project
- Fluid shortage after hurricane reviewed, no active concerns
- No change in transfusion rates through September – plan to re-emphasize with surgeons



January/
March 2025

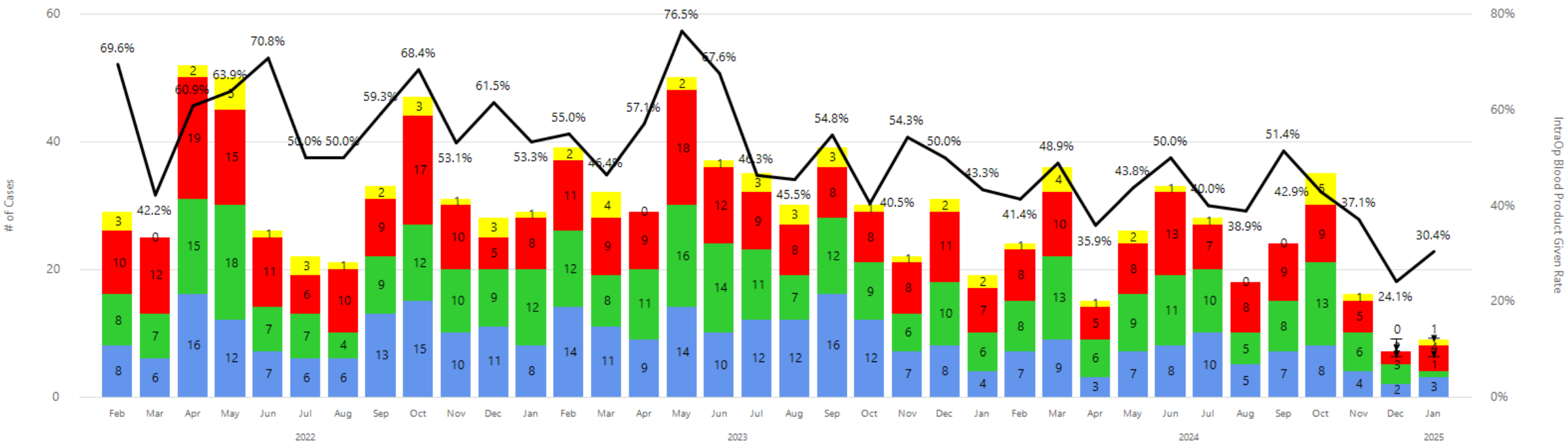
- ANH in non-blood refusal patients training completed. Early data shows increase in utilization in eligible patients from 12% to 37%
- December intraop transfusion rate in CABGs down to 24.1%
- Recognition of need to monitor for sustained performance





IntraOp Blood Transfusion (Isolated CAB)

— IntraOp Blood Product
 ■ IntraOp FFP
 ■ IntraOp RBCs
 ■ IntraOp Plts
 ■ IntraOp Cryo



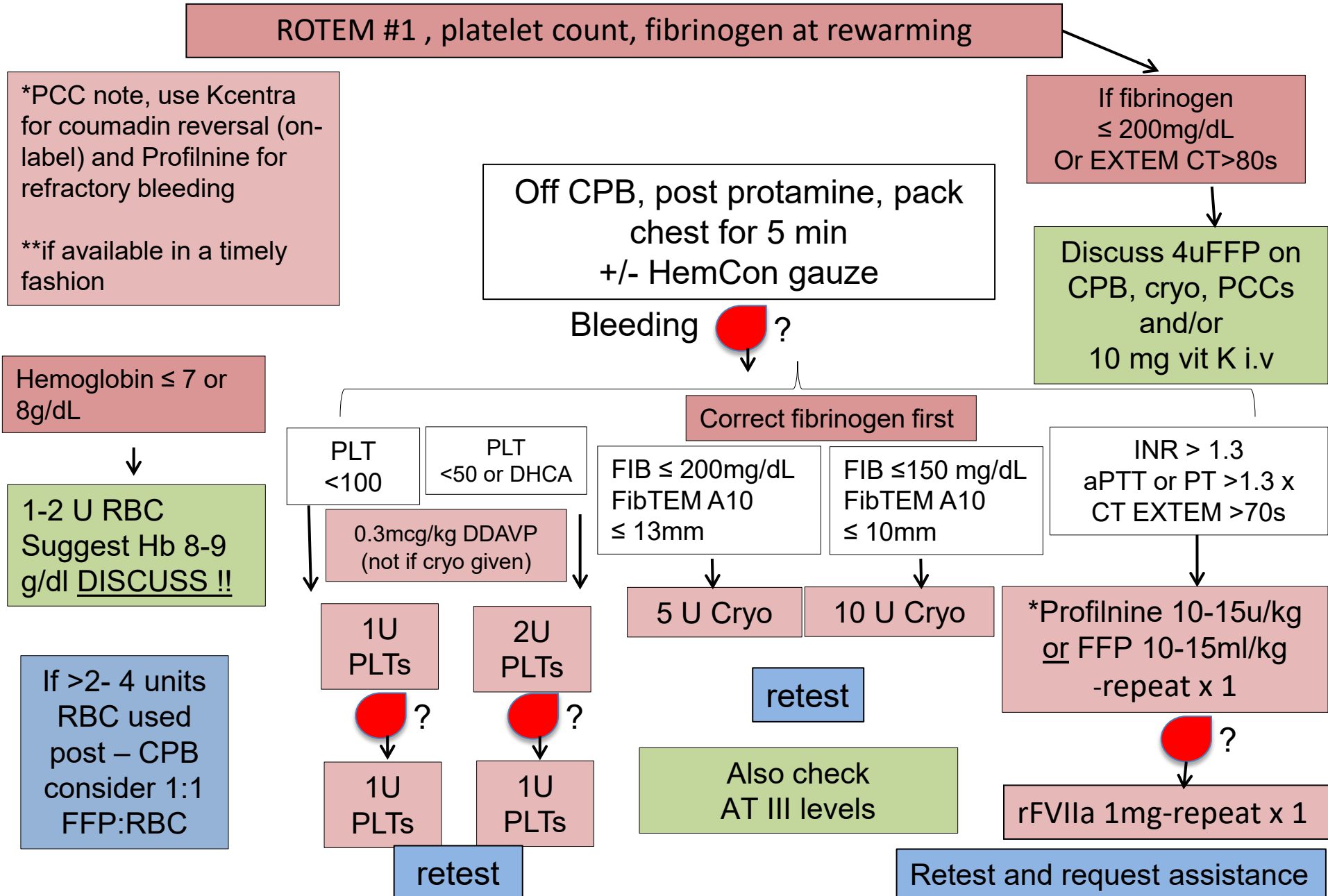
	2022												2023												2024												2025
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	
Cases	23	45	46	36	24	20	26	27	38	32	26	30	40	28	28	34	34	41	33	42	42	35	36	30	29	45	39	32	42	35	36	35	42	35	29	23	
IntraOp Cryo	8	6	16	12	7	6	6	13	15	10	11	8	14	11	9	14	10	12	12	16	12	7	8	4	7	9	3	7	10	10	5	7	8	4	2	3	
Rate	34.8%	13.3%	34.8%	33.3%	29.2%	30.0%	23.1%	48.1%	39.5%	31.3%	42.3%	26.7%	35.0%	39.3%	32.1%	41.2%	29.4%	29.3%	36.4%	38.1%	28.6%	20.0%	22.2%	13.3%	24.1%	20.0%	7.7%	21.9%	19.0%	28.6%	13.9%	20.0%	19.0%	11.4%	6.9%	13.0%	
IntraOp Platelets	8	7	15	18	7	7	4	9	12	10	9	12	12	8	11	16	14	11	7	12	9	6	10	6	8	13	6	9	11	10	5	8	13	6	3	1	
Rate	34.8%	15.6%	32.6%	50.0%	29.2%	35.0%	15.4%	33.3%	31.6%	31.3%	34.6%	40.0%	30.0%	28.6%	39.3%	47.1%	41.2%	26.8%	21.2%	28.6%	21.4%	17.1%	27.8%	20.0%	27.6%	28.9%	15.4%	28.1%	26.2%	28.6%	13.9%	22.9%	31.0%	17.1%	10.3%	4.3%	
IntraOp RBCs	10	12	19	15	11	6	10	9	17	10	5	8	11	9	9	18	12	9	8	8	8	11	11	7	8	10	5	8	13	7	8	9	9	5	2	4	
Rate	43.5%	26.7%	41.3%	41.7%	45.8%	30.0%	38.5%	33.3%	44.7%	31.3%	19.2%	26.7%	27.5%	32.1%	32.1%	52.9%	35.3%	22.0%	24.2%	19.0%	19.0%	22.9%	30.6%	23.3%	27.6%	22.2%	12.8%	25.0%	31.0%	20.0%	22.2%	25.7%	21.4%	14.3%	6.9%	17.4%	
IntraOp FFP	3	0	2	5	1	3	1	2	3	1	3	1	2	4	0	2	1	3	3	3	1	1	2	2	1	4	1	2	1	1	0	0	5	1	0	1	
Rate	13.0%	0.0%	4.3%	13.9%	4.2%	15.0%	3.8%	7.4%	7.9%	3.1%	11.5%	3.3%	5.0%	14.3%	0.0%	5.9%	2.9%	7.3%	9.1%	7.1%	2.4%	2.9%	5.6%	6.7%	3.4%	8.9%	2.6%	6.3%	2.4%	2.9%	0.0%	0.0%	11.9%	2.9%	0.0%	4.3%	
IntraOp Blood Prod	16	19	28	23	17	10	13	16	26	17	16	16	22	13	16	26	23	19	15	23	17	19	18	13	12	22	14	14	21	14	14	18	18	13	7	7	
Rate	69.6%	42.2%	60.9%	63.9%	70.8%	50.0%	50.0%	59.3%	68.4%	53.1%	61.5%	53.3%	55.0%	46.4%	57.1%	76.5%	67.6%	46.3%	45.5%	54.8%	40.5%	54.3%	50.0%	43.3%	41.4%	48.9%	35.9%	43.8%	50.0%	40.0%	38.9%	51.4%	42.9%	37.1%	24.1%	30.4%	



Summary of key action items

- Re-education on existing intraop transfusion algorithm
- Preop anemia optimization
- Revision of ANH processes
- Sharing benchmarked & trended data with teams
- Multidisciplinary collaboration
- Visibility of target state (A3 thinking)

Transfusion Algorithm for **INTRAOP BLEEDING**





Transfusion Triggers Summary

- **Platelets:**
 - Platelet count <100k – 1u plt
 - Platelet count <50k – 2u plt
- **Cryoprecipitate or Fibrinogen Concentrate:**
 - Fibrinogen <200: 1u cryo
 - Fibrinogen <150: 2u cryo
- **FFP/PCCs:**
 - CT EXTEM >70s, INR >1.3: FFP or PCCs

Anemia Optimization in Cardiothoracic Surgical Patients

Outpatient Preop Visit (with >2 weeks prior to surgery date)

- Evidence or suspicion of **Hgb <13**
- **Referral to Preop Anemia Clinic**
- Automatically selects anemia labs to draw in clinic. Labs must be drawn in clinic



Anemia clinic will:

- Treat nutritional deficiencies present
 - Consider ESA therapy
- **Need 2-4 weeks prior to surgery for maximal Hgb benefit prior to surgery**

Inpatient Prior to Surgery

- Hgb <12



Once Surgery is Scheduled, Give

1. Due to IV fluid shortage: Use **Ferric Gluconate 250mg IV x1** (may repeat dose daily until surgery up to 1 gram total dose) instead of Iron Dextran (Infed).
 - 1) Retacrit 40,000 units SQ x1
 - 2) Vitamin B12 1mg SQ x1
 - 3) 5mg Folic Acid PO/VT x1
 - 4) SQ Heparin 5000u q8h unless patient on Heparin infusion or contraindications

Do not give IV iron if patient has current infection or bacteremia.

Do not give ESA if patient has history of DVT/PE



Next steps

- CABG postop transfusion rates
- Other procedures types
- Repeat education on regular cycle
- Evaluate other outcomes (reop for bleeding, AKI, total cost of care)

Happy March Madness!



Go Blue Devils!



References

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Contact information:

melissa.Williams@duke.edu