

The Balancing Act: Managing Regular Platelet Shortages in the Hospitals

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Conflict of Interest

- Honoraria, Advisory Boards, Research funding
 - Amgen
 - Alexion Pharmaceuticals
 - Baxter
 - Celgene
 - Ortho Biotech
- CBS Associate Medical Director – London

Blood Provider and the Hospital



Outline

- Red Alert!
 - What constitutes a platelet shortage for CBS?
 - What constitutes a platelet shortage for hospital?
- Hospital response to platelet shortages
 - Amber phase
 - Red Phase
- Evidence to support SOP?
- Mock platelet shortage 2014
 - What we learned
 - Where can we do better?

Green/Yellow/Red Phases

Green Phase implies that normal blood component inventory levels exist and supply generally meets demand. This phase includes a broad range of inventory levels ranging from an ideal inventory to temporary shortages that occur periodically and can be managed with existing Canadian Blood Services/hospital actions.

Amber Phase implies that blood inventory levels are insufficient to continue with routine transfusion practice and hospitals/RHA will be required to implement specific measures to reduce blood usage.

Red Phase implies that blood inventory levels are insufficient to ensure that patients with non-elective indications for transfusion will receive the required transfusion(s).

CBS – Platelet Inventory

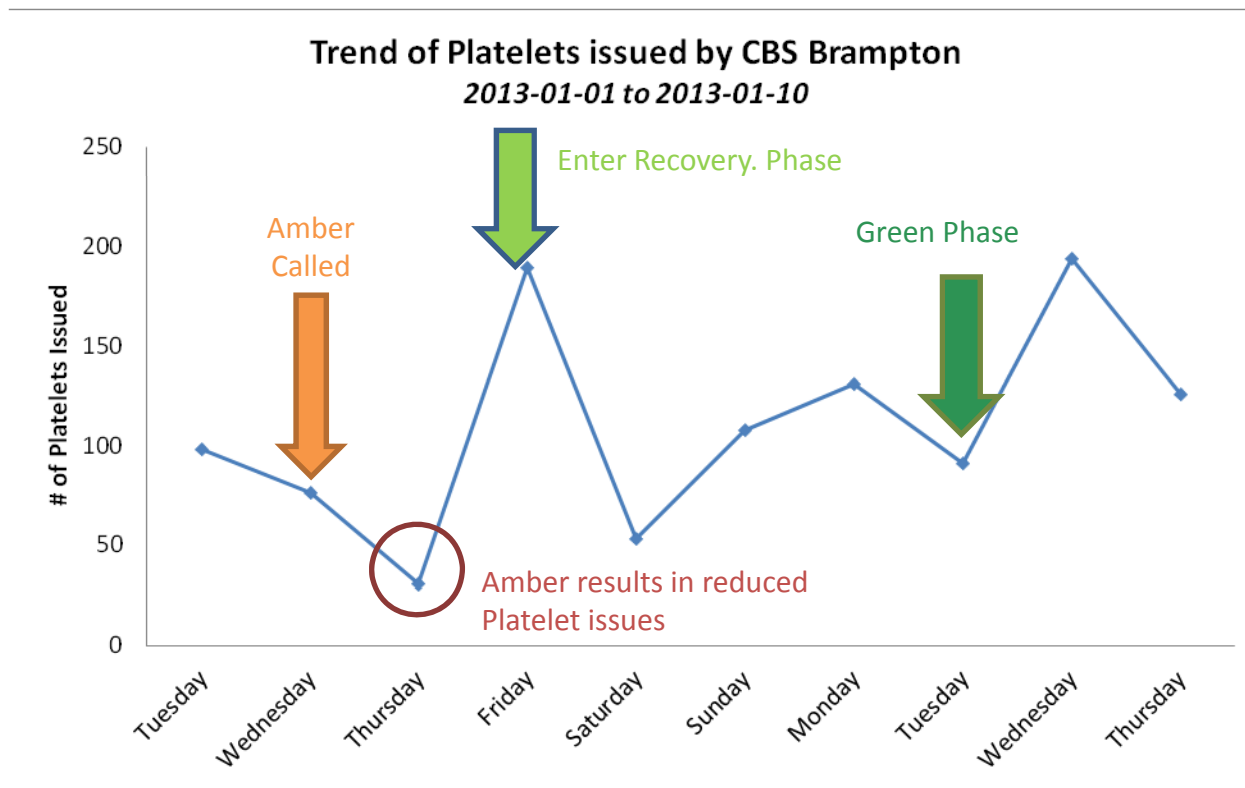
<u><i>Platelet Inventory Level*</i></u>	<u><i>% of National Requirement</i></u>
Green Phase (minimal decrease to optimal)	50 – 100% of daily national requirement
Amber Phase (serious)	25 – 50% of daily national requirement, recovery expected within 12 hours
Red Phase (critical)	< 25% of daily national requirement, <u>no recovery</u> expected within 12 hours

*As platelets only have a shelf-life of 5 days and CBS routinely does not have more than a 1.5 day inventory on hand at any time, platelet inventory levels are expressed as a percentage of the daily national requirement rather than “days on hand”.

<http://www.nacblood.ca/resources/shortages-plan/index.html>

Background

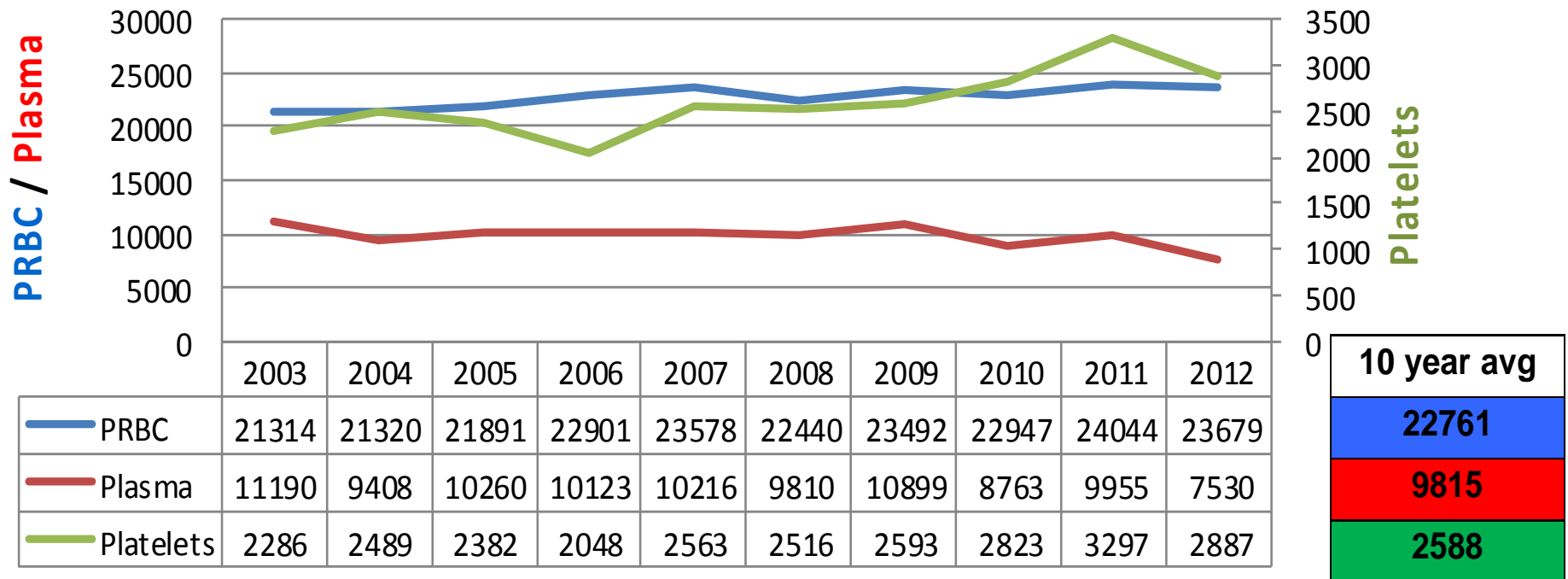
- Wednesday afternoon and Thursday, January 3rd orders triaged through CBS Medical



Note: Average daily Platelet issues for Brampton for F2012/13 Q4 = approx. 120

LHSC – Blood Utilization

10 year PRBC, Plasma, Platelet Utilization (2003 - 2012)



London Daily Platelet Utilization - 2013

- MON \approx 8.0 (range 1-29)
- TUES \approx 9.5 (range 5-20)
- WED \approx 8.7 (range 2-19)
- THURS \approx 10.8 (range 5-19)
- FRI \approx 10.9 (range 6-17)
- SAT \approx 5.8 (range 1-13)
- SUN \approx 6.3 (range 1-14)

AVERAGE of 60 platelets per week

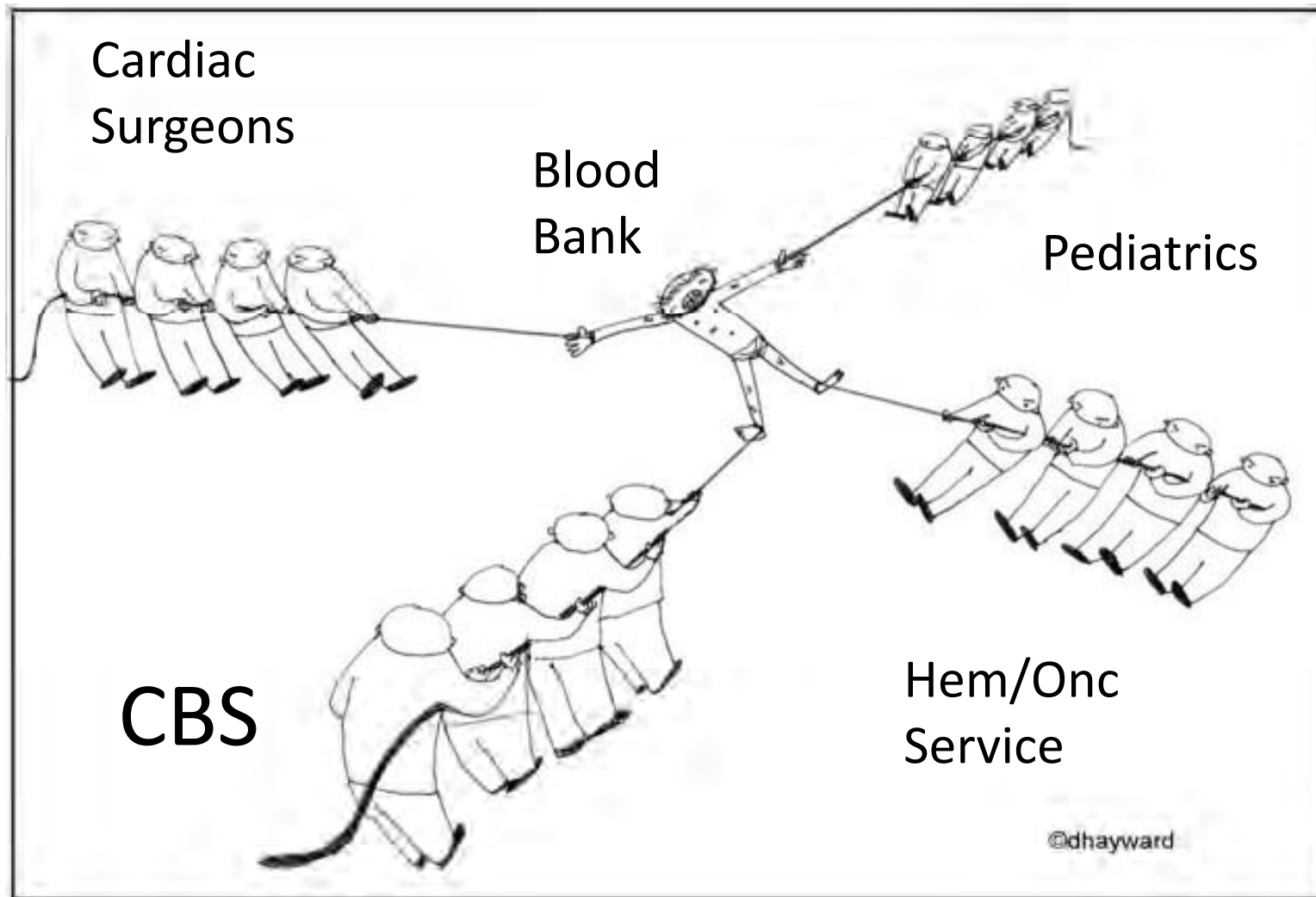
Platelet Inventory – LHSC

When constitutes a platelet shortage?

N

	Grp	VICTORIA			UNIVERSITY		
		<i>Green</i>	<i>Amber</i>	<i>Red</i>	<i>Green</i>	<i>Amber</i>	<i>Red</i>
Platelet dose	O	2	1	0	1	1	0
	A	2	2	1	2	1	1
Platelet dose IRR+	O	4	2	1			
	A						
	B	1	0	0			
Total #		15	9	5	3	2	1

Amber Alert – Our SOP



Amber Phase 1 - <50% /<12 hours to recovery

- All orders for platelets are reviewed;
- ***Prophylactic transfusions***: reviewed with the ordering physician, and may be temporarily deferred
- ***Scheduled procedure*** (e.g. line insertion, radiology):
 - Platelets < 50x10⁹/L: platelets issued as requested
 - Platelets > 50x10⁹/L: requires BTL Medical Director's approval.
- ***Patient bleeding and/or in OR***: platelets issued as requested.

Amber Phase 2- <50%/>12 hours to recovery

- Notification shortage is faxed
 - ORs, Pediatric and Adult oncology areas
 - Confirmation of receipt - signed and returned within one (1) hour or telephone follow- up
- All orders for platelets are documented and reviewed;
- ***Prophylactic transfusions*** are deferred.
- ***Scheduled procedure*** (e.g. line insertion, radiology): procedures should be deferred unless emergent. If procedure will not be deferred, BTL Medical Director must approve the transfusion.
- ***Patient bleeding and/or in OR***: platelets issued as requested.

Faxed Memo

- Critical Shortage of Platelets
 - The Canadian Blood Services has informed us that there is a critical shortage of platelets
 - All prophylactic platelet orders will be reviewed and released based on available inventory
 - If you anticipate a need for platelets please call the Blood Transfusion Laboratory immediately to determine availability

TO:

- SJHC O.R. FAX #66299**
- University Hospital O.R. FAX #33235**
- Victoria Hospital O.R. FAX #58238**

FROM: Blood Transfusion Laboratory .

SUBJECT:

CRITICAL SHORTAGE OF PLATELETS

To ensure you have received this fax and that the 2 bullets below are completed, please fax back this cover sheet after signing and dating below.

- ✓ I have paged and notified the Site Chief Anesthesia / designate.
- ✓ I have posted this fax sheet for surgeons and anesthesiologists to view.

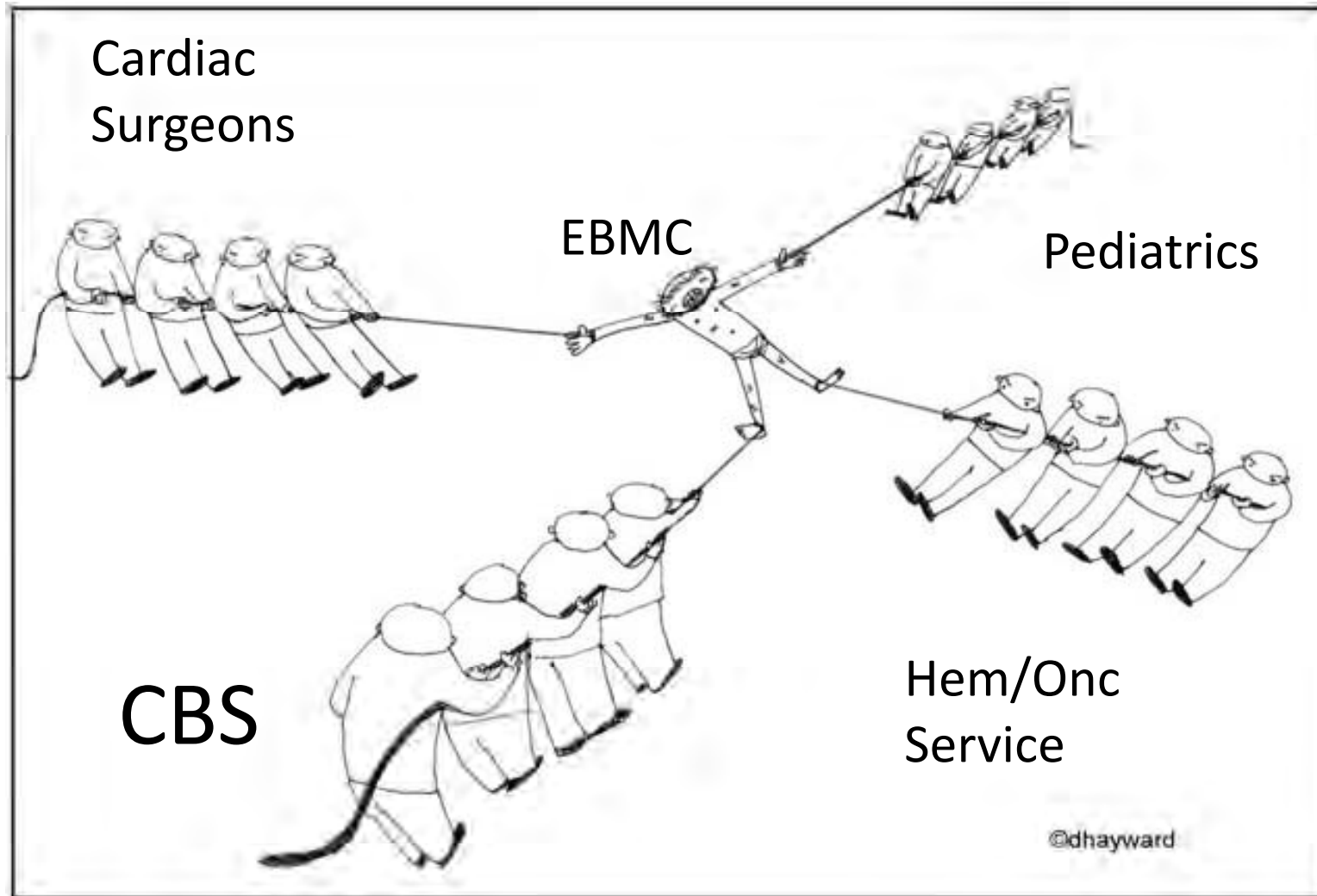
PRINT NAME / TITLE

SIGNATURE

DATE / TIME

Please FAX back to **58471**, as soon as possible.

Red Alert – Call the EBMC



Red Phase - <25%/>12 hours to recovery

- Notification shortage is faxed
 - ORs, Pediatric and Adult oncology areas.
 - Confirmation of receipt - signed and returned within one (1) hour or telephone follow-up
- If shortage is expected to extend beyond 24 hours, the Emergency Blood Management Committee
- email notification of shortage is sent to all Medical Staff

Red Phase

- Platelets issued to actively bleeding patients only
- All elective procedures associated with “probable” platelet transfusion deferred unless patient safety will be adversely affected.
- Consideration will be given to reducing the standard adult dose to half of the current dose,.
- Consideration will be given to using platelets for up to 7 days of storage *i.e.* 2 days post expiration.



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Transfusion and Apheresis Science

journal homepage: www.elsevier.com/locate/transci



Review

Contingency plan implementation

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Amber Phase - Platelets

Platelets $<10 \times 10^9$ g/L
and no bleeding

Platelets $<50 \times 10^9$ g/L
and significant bleeding

Platelets $<30 \times 10^9$ g/L
and invasive procedure/
surgery

Give 1 platelet dose. If
bleeding or surgery 1
dose and reassess

All standing platelet
transfusion orders reviewed
by Transfusion Medicine
physician

Consider decreasing twice
weekly transfusion to once
weekly

Platelets transfused for
platelet counts $<10 \times 10^9$ g/
L

Red Phase - Platelets

Platelets $<5 \times 10^9$ g/L
and no bleeding

Platelets $<50 \times 10^9$ g/L
and significant bleeding

Platelets $<20 \times 10^9$ g/L
and invasive procedure/
surgery

Give 1 platelet dose. If
bleeding/surgery 1 dose
and reassess

All standing platelet
transfusion orders reviewed
by Transfusion Medicine
physician

Consider decreasing twice
weekly transfusion to once
weekly

Platelets transfused for
platelet counts $<10 \times 10^9$ g/L

SOP's- What's the evidence?

Contingency Plans

SOP's – Evidence?

- Strict adherence to guidelines
 - Bleeding < 50
 - Non deferrable surgical interventions < 30 - 50
 - 1 adult dose
- Don't we all do this already ?



SOP- Delay Prophylaxis?

- Reconsider or delay Prophylactic platelets
 - Strict adherence to <10
 - Reduce threshold to 5?
 - TOPPS study
- Small risk associated with delay
 - Usually shortage duration <24 hours



SOP – Half Doses?

- Half doses of adult platelets??
 - PLADO, STOP
 - Enrolled only stem cell transplant or chemotherapy inpatients , No coagulopathy, No recent surgery.
 - Extrapolation of the results regarding bleeding outcomes to other patient populations such as those in contingency plan hazardous



SOP- Extended Outdate

- Extended outdate – 5 to 7 days??
- Multiple ex vivo studies
 - Platelet morphology, biochemistry and function
 - Platelet increments modestly reduced
 - Bleeding outcomes?
- Platelet increments generally higher for platelets stored 3 versus 4 to 5 days but no effect on clinical bleeding (Blood. 2012;119(23):5553-62)
- Transfusion associated Sepsis?



SHORT COMMUNICATION

A tabletop exercise to assess a hospital emergency blood management contingency plan in a simulated acute blood shortage

M. J. Galloway, G. Jane, L. Sudlow, J. Trattles & J. Watson *Department of Haematology, Sunderland Royal Hospital, Sunderland, UK*

Received 01 April 2008; accepted for publication 09 July 2008

Mock Shortage of RBC

- National Blood Transfusion Committee for England and North Wales contingency plan
- Large - Regional Hospital 11 500 units of RBC in the 2006–2007
- 40% of normal inventory x 21 days

Who gets blood?

- Resuscitation including trauma
- Emergency surgery plus curative cancer surgery
- Life-threatening anemia including receiving chemotherapy or undergoing a stem cell transplant
- Chronic anemia - bone marrow failure or chronic renal failure -local transfusion trigger of 80 g/L
- Rh group-incompatible blood with the exception of women of child-bearing age

Who doesn't get blood?

- Elective surgery - cancelled (> 20% chance of requiring 2 or more units RBC)
 - major vascular surgery
 - revision arthroplasty
 - radical prostatectomy
 - major spinal surgery
- Non-life-threatening post-operative or non-surgical anemia would not receive red cell transfusions.

What happened with 40% inventory?

- 22/661 - surgeries cancelled
- 22 -non surgical non-life threatening anemia cancelled or delayed
- 35 BMF and CRF elective transfusions cancelled or delayed (? Rescheduled)
- 3 inappropriate transfusions cancelled
- 3 traumas (>6 units, range 8-10)

Summary

- Sufficient RBC for everyone
- No need to use Rh incompatible blood
- Without restrictions
 - end-of-day-stocks would have been depleted for all groups at some point other than A+
 - 3 patients in whom a transfusion was appropriate would not have had blood available
 - Rh incompatible units for non-childbearing age recipients

Summary

- Emergency Blood Management Group 12 members
 - Groups role - overseeing the process
- Too LARGE ! impractical to manage a red alert phase at an operational level
 - Operational team is best placed to deal with the day-to-day issues
 - Small operational group would need to report regularly to the full emergency blood management group - clear lines of communication and accountability within the organization.
 - Consultant haematologist would have a major and time-consuming role in liaising and discussing individual requests for transfusion with clinicians

Mock Platelet Shortage - Ontario

- What happened at LHSC?
- Amber alert – Monday afternoon
 - Fax sent
 - Reviewed OR lists
 - Who will need platelets?
 - Surgery site chiefs and anesthesia, transplant surgeons
 - Platelet orders reviewed by BTL

Orders Reviewed

- Mock Emergency
 - Is your patient bleeding?
 - If no, is there a planned procedure?
 - Can the procedure be deferred?
 - Is this a prophylactic platelet transfusion?
 - Can this platelet transfusion be deferred?
 - Would you consider a 50% dose with an expected increment of 10 to 20?

Platelet Shortage Survey - LHSC

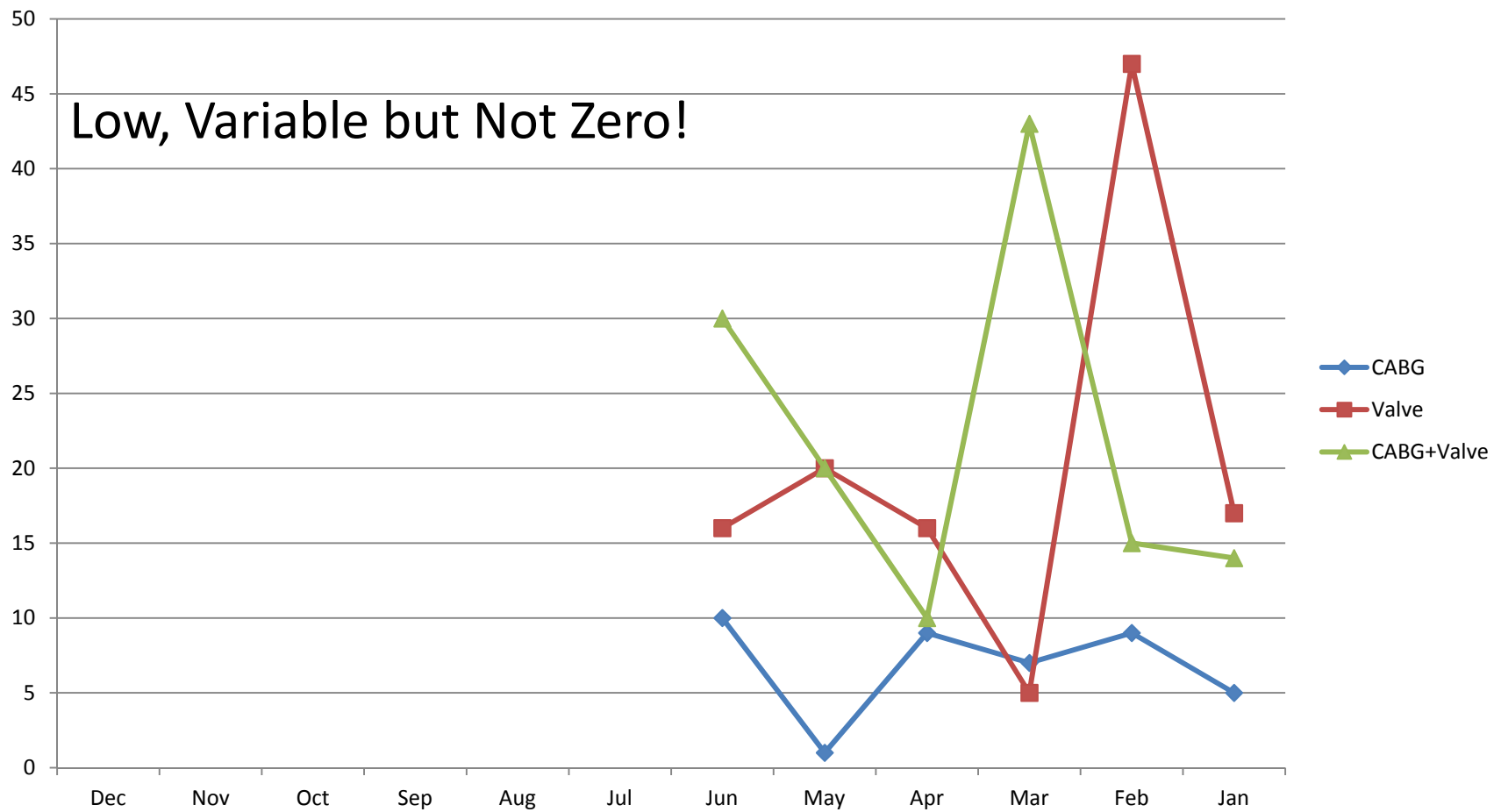
	Yes	No
Is your patient bleeding?	1 (minor)	5
If no, is there a planned procedure?	1 (neprhostomy)	5
Can the procedure be deferred?	1	
Is this a prophylactic platelet transfusion?	5	1
Can this prophylactic platelet transfusion be deferred?		5
Would you consider a 50% dose with an expected increment of 10 to 20?	3	3

- 6 platelet transfusions “mock” deferred
- No surgeries were “mock” deferred!

Mock Platelet Shortage - Ontario

- Following day - Red Alert
 - EBMC gathered!
 - EBMC too large but small working group
 - Trauma pathway
 - reassess fixed ratio → laboratory guided orders
 - Difficult questions at hospital level
 - Surgery without anticipated use of platelets
 - No cardiac surgery deferred
 - Limiting supply in severe bleeds
 - Trauma, Obstetrics

Platelet Utilization in Cardiac Surgery



Mock Platelet Shortage - Ontario

- Systemic questions
 - Are tertiary centers expected to act as a Supply Hub?
 - What is the inventory at other sites in the province?
 - Does CBS unilaterally adjust deliveries?
 - How much does a hospital request?

Conclusion – Platelet Shortages

- At hospital level short term shortages in platelets can likely be managed with strict inventory management at tertiary care site
- Longer term shortages would be challenge for hospitals to manage individually
- Enough “supply” within the system regionally to cope if a “shared inventory” management for the region was adopted