The implementation of platelet additive solution (PAS) in buffy coat platelet concentrates at WCBS

Shaldine Sutton

Component Processing Supervisor

Table of contents

- Background
  - Advantages of PAS
  - Evaluation
- Method
  - Calculation
- Results
- Conclusion

Background

- 2005 - Buffy coat (BC) platelet concentrates (PC) suspended in 100 % plasma
- WB donations bled in ≤ 12 mins
- Placed at 20 – 24 °C within 6 hours of donation
- Rested for 4 – 18 hours
- Centrifuged 4500 RCF for 12 mins @ 20 °C

Background

- Separation by component extraction
- BC rested for a minimum of 2 hours
- Pooled 4 BCs of the same ABO group with similar collection times and one corresponding plasma
- Pooled BCs with plasma underwent a second soft centrifugation

Background

- Buffy coat rich plasma was transferred into a final platelet storage bag

- Per requirements 1 % of PC production undergoes Quality Control:

  - Volume - x no. of BC in pool (>40 ml)
  - Platelet counts (≥ 2,4 x 10^{11}/ unit)
  - pH (>6,4)
  - White blood cell count (if filtered) ≤ 5 x 10^{6}/ unit

Advantages of platelet additive solution

It seemed appropriate to investigate replacing plasma with PAS as there are the following advantages:

- Increased plasma availability for fractionation
- Reduced risk of plasma associated patient adverse reactions
- Improved PC storage conditions, reduced platelet activation
- pH stability
- Reduced photochemical absorption times in pathogen inactivation technology

Evaluation

- Platelet concentrates in PAS contain approximately 35 % plasma carryover from the buffy coats
- 2017 evaluation was done to determine if PAS with 30 – 40 % plasma carryover was a suitable replacement for 100 % plasma in BC PC
- Platelet specifications for quality ie. Volume, platelet count and pH were monitored

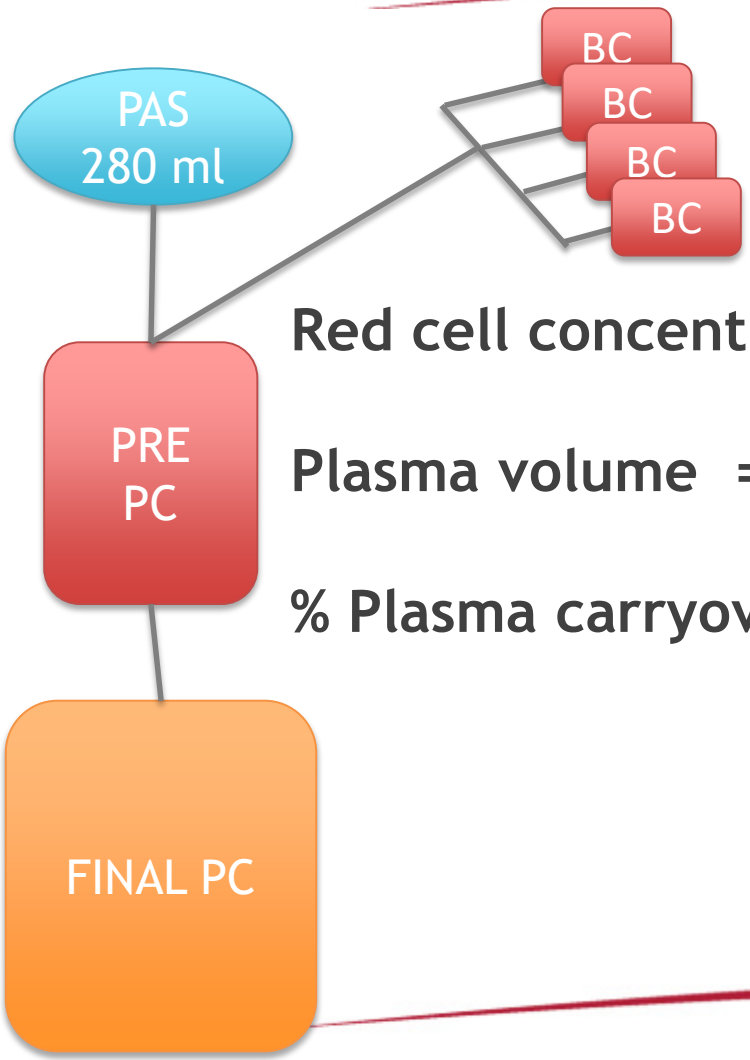
Method

- 3 different PAS types selected viz. PAS 1, PAS 2, PAS 3.
- 48 PC were produced, 12 with each PAS type and 12 with plasma

- **Centrifugation @ 20 °C:**
  - Plasma PC 830 RCF for 8,5 minutes
  - PAS PC 630 RCF for 6,5 minutes
- **Sampling:**
  - Pre PC for Hct and platelet count before centrifugation
  - Final PC on day 1, 5 and 7 for platelet count and pH

- Percentage plasma carryover calculated

Calculation - % plasma carryover



Red cell concentrate (RCC) = Hct x pre PC volume

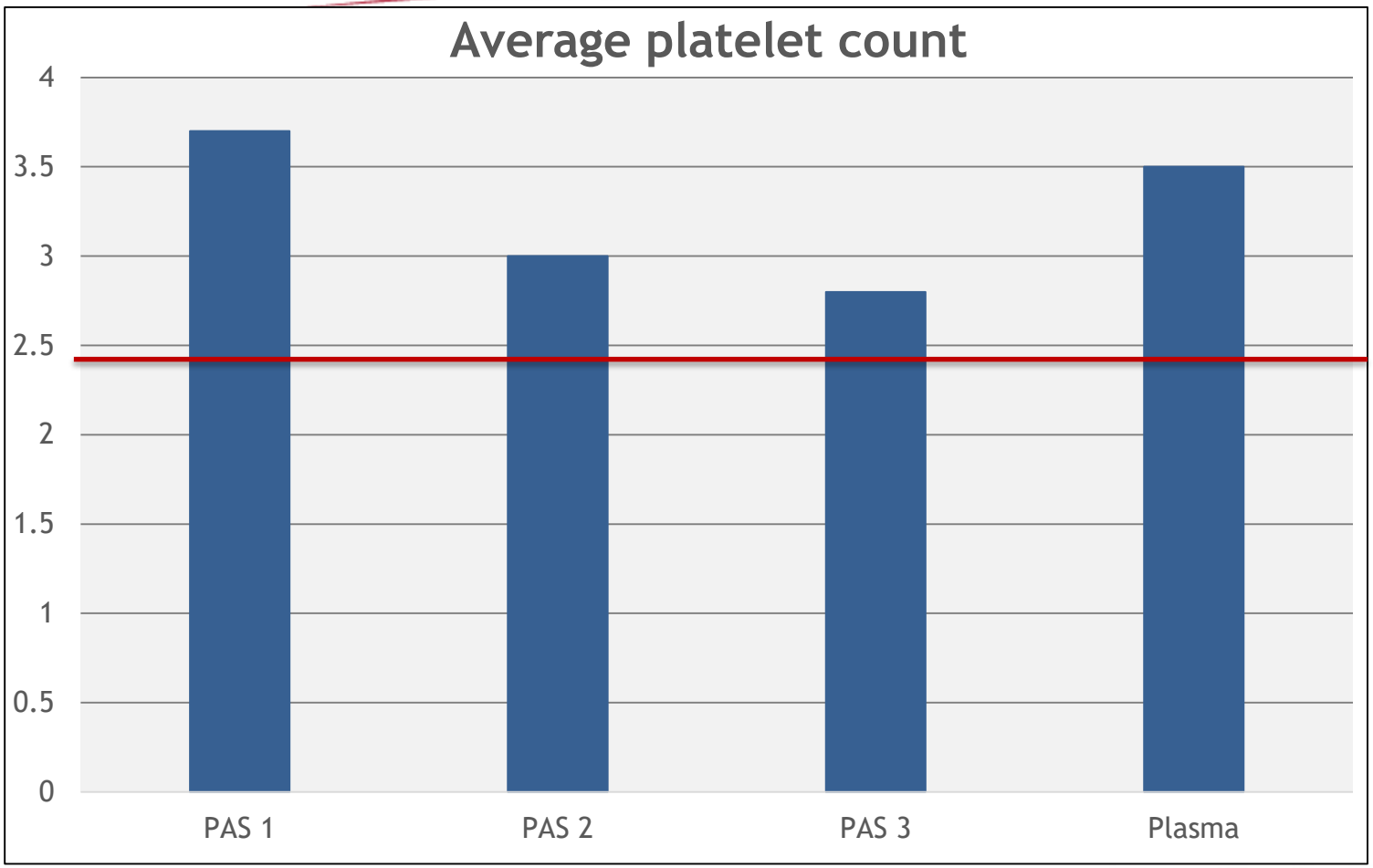
Plasma volume = Pre PC vol - RCC - PAS

% Plasma carryover = Plasma volume/(plasma+PAS)

Evaluation Results

	PAS 1	PAS 2	PAS 3	PLASMA
% Platelet recovery	74	72	73	81
% Plasma carryover	38	37	37	N/A
Average pH day 5	7	7	7	7
pH failures day 5	0	0	0	1
Platelet count failures day 5	0	2	2	0
Average volume (ml)	363	334	328	340

Evaluation Results (Platelet count requirement 2,4 x 10^{11}/ unit)

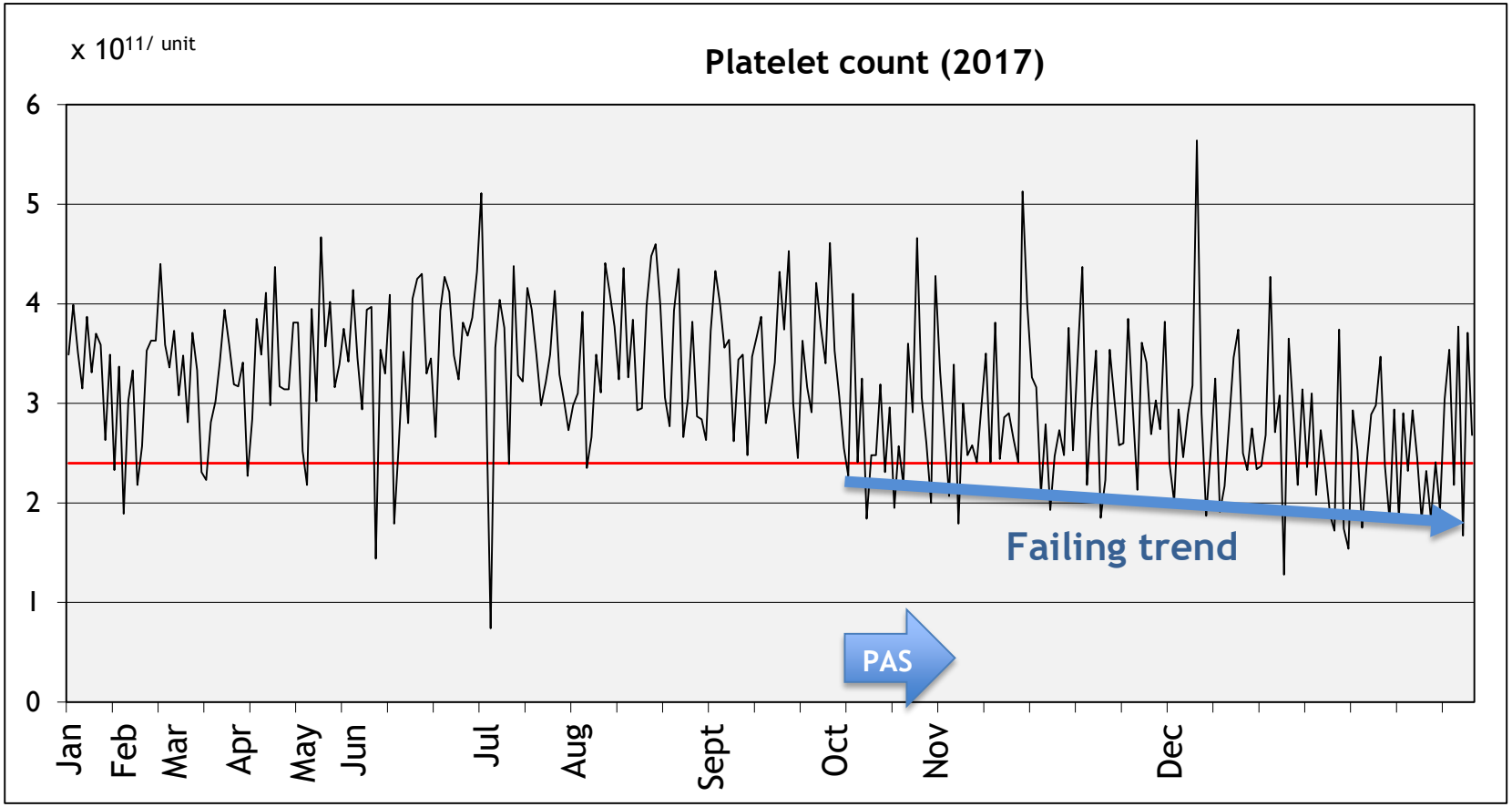


Western Cape Blood Service
Do something remarkable

Evaluation Results

- > 80 % quality control (QC) pass rate
- The 3 PAS types compared well
- PAS was routinely implemented in October 2017
- But following implementation…

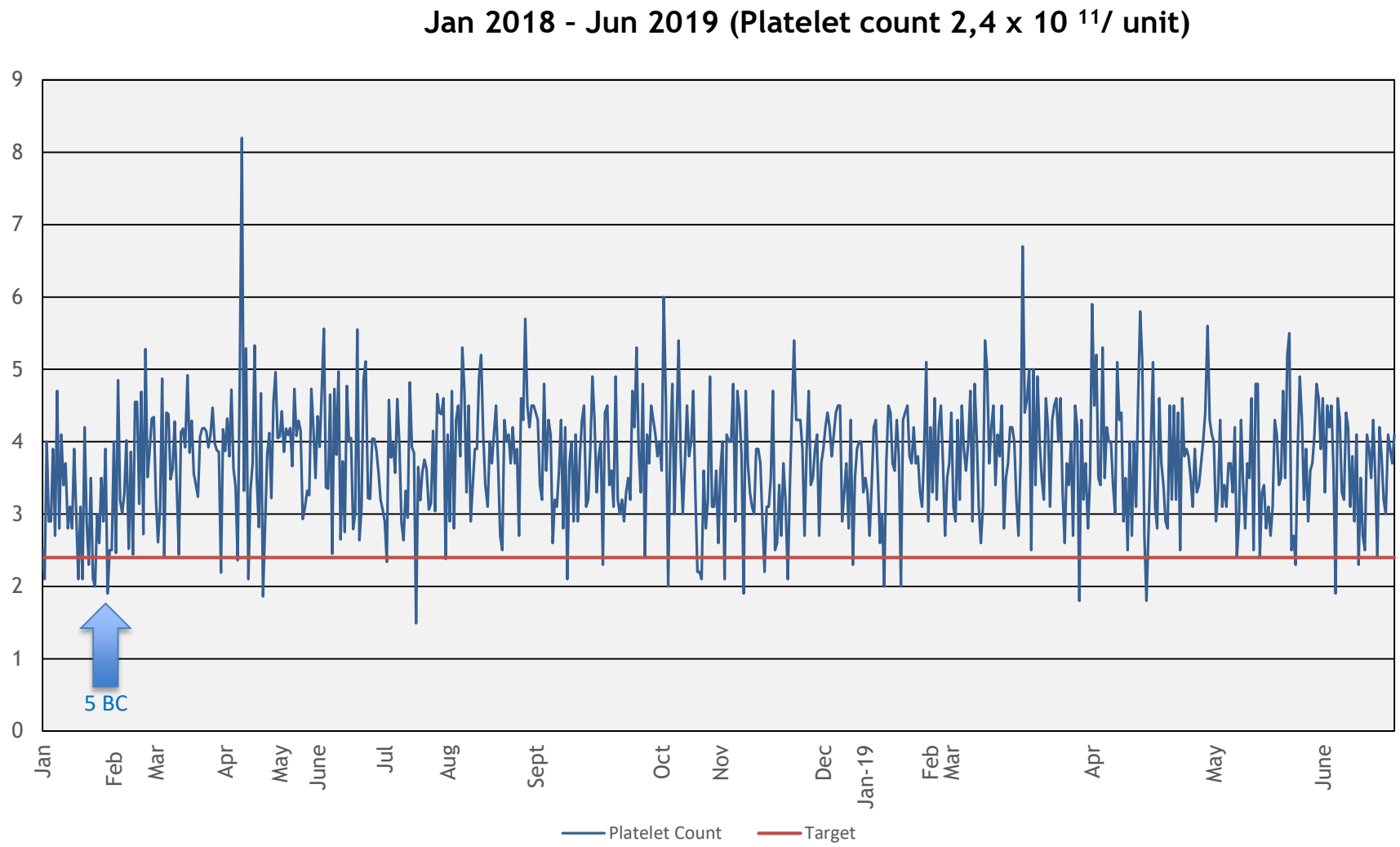
QC Results


x 10^11/ unit
Platelet count (2017)
6
5
4
3
2
1
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sept
Oct
Nov
Dec
Failing trend
PAS

Conclusion

- The evaluation was done using 4 BCs
- Sample size was too small to detect a failing trend
- PAS with anticoagulant has a dilution effect causing a loss of platelet numbers during storage which could account for failures
- From February 2018 we increased from 4 to 5 BC in PC
- To date, WCBS, has experienced a 96 % platelet count and 100 % pH QC pass rate

QC Results



Western Cape Blood Service
Do something remarkable

Thank you

Acknowledgements:

Dr G Bellairs
M Imholtz

Questions