Managing Canada's Precious O Rh Negative Red Blood Cell Supply

Jon Fawcett
Hospital Liaison Specialist, Southern Ontario
Canadian Blood Services

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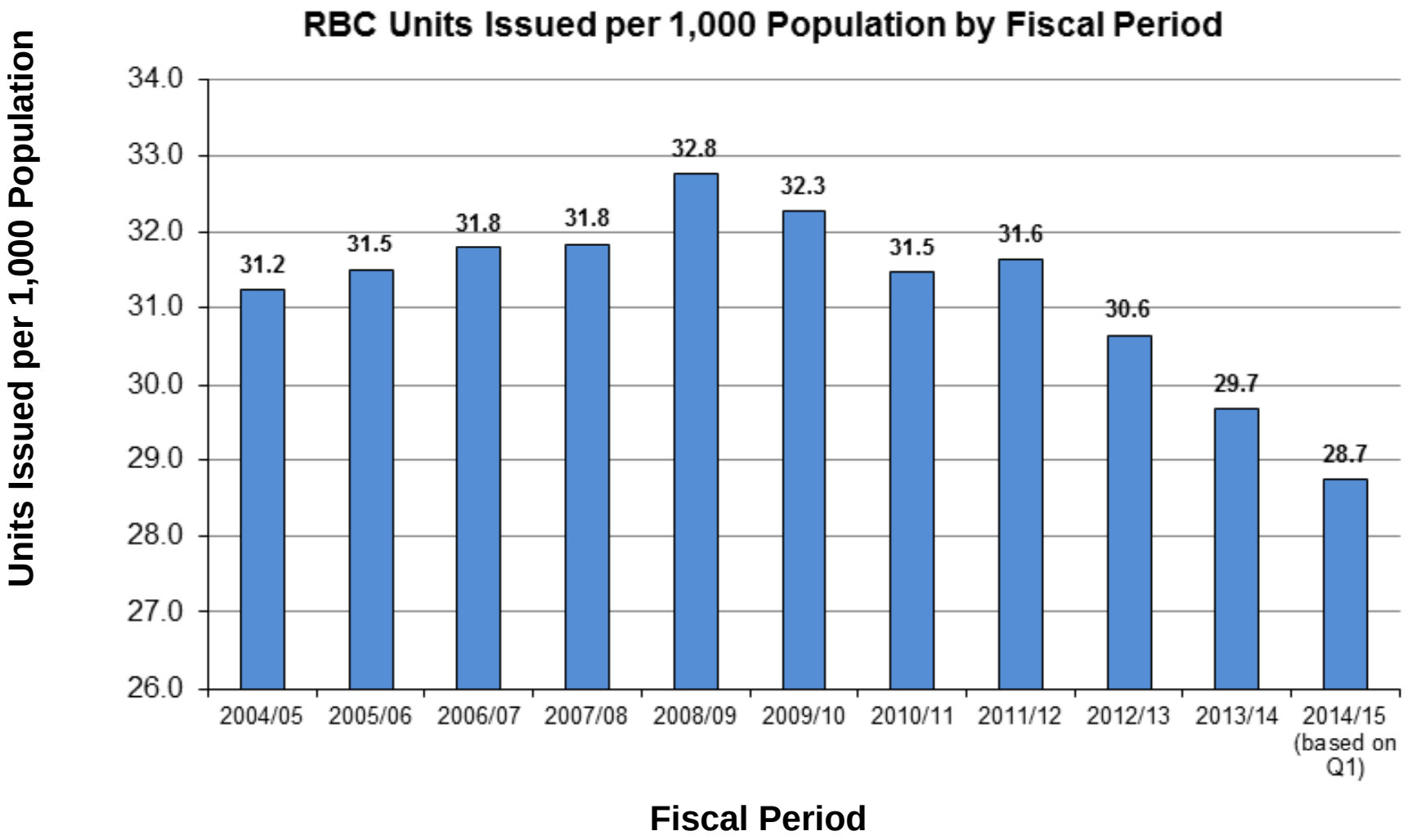
Objectives

- To describe the current issues of O-Rh negative red cells
- To explain the challenges with the current supply of O-Rh negative red cells
- To identify strategies to increase the supply of O-Rh negative red cells
- To identify strategies to decrease the demand for O-Rh negative red cells

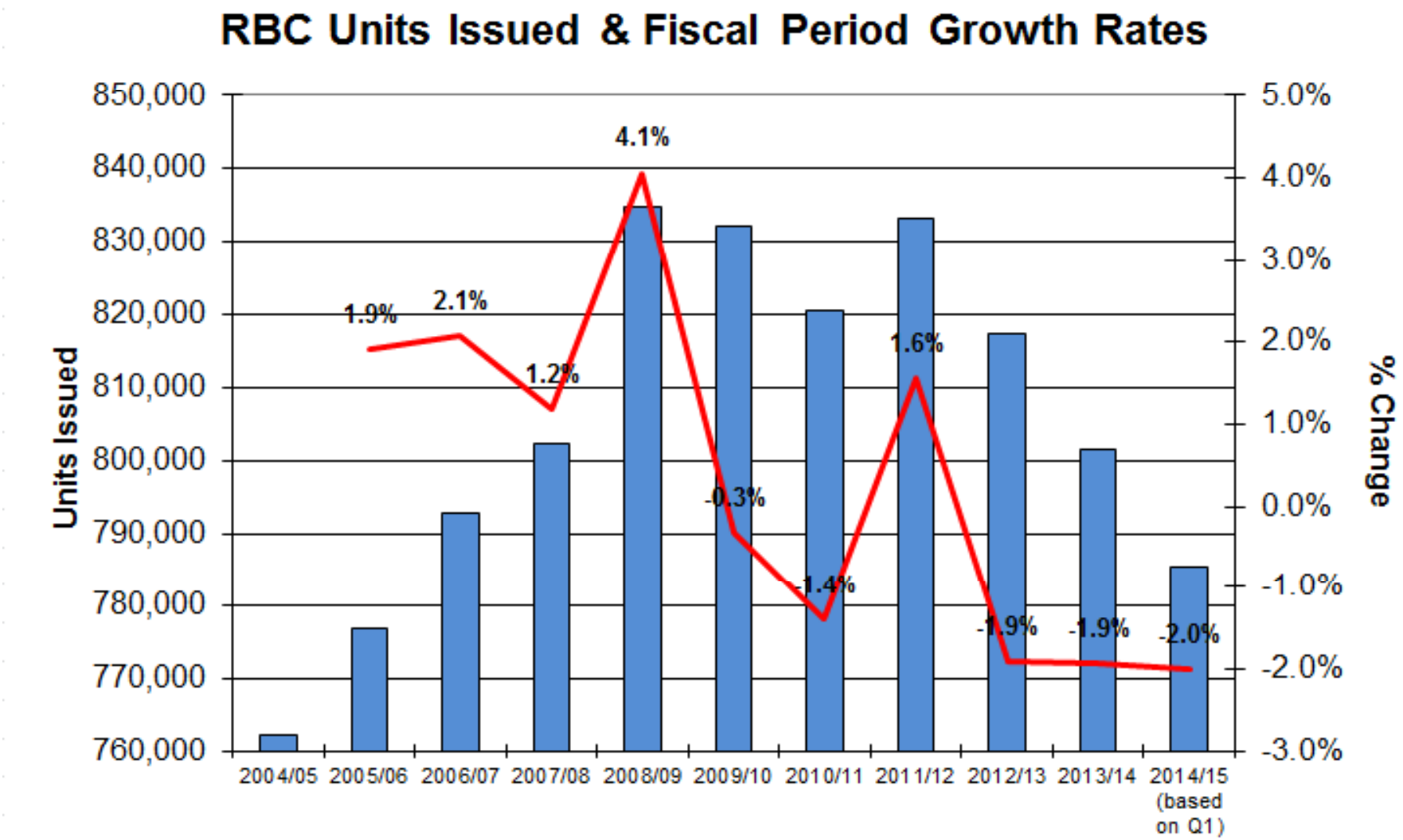
Demand for red cells

RBC Units Issued (per 1,000 Population)



Source: CBS internal distribution data. Represents ~75% of Canadian supply

RBC Units Issued
(Total and Growth Rates)



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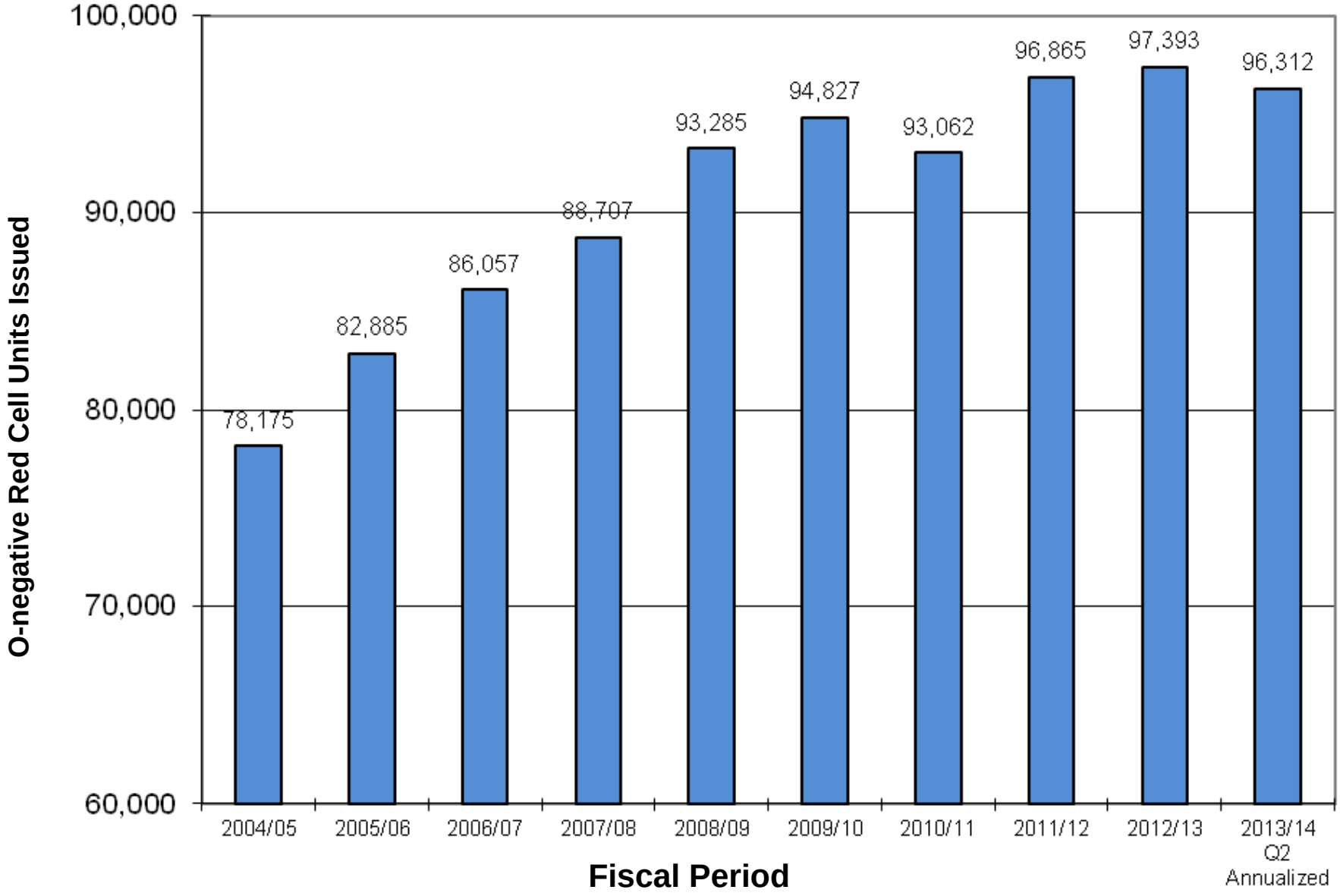
Factors Likely Influencing Red Cell Utilization in Canada

- Increased focus on blood conservation strategies
- Development of Provincial Blood Coordinating offices
- Changing hospital practice
  - Use of electronic crossmatch
- Changing paradigm of transfusion as a medical therapy
- Medical innovations

Demand for O-negative red cells

O-negative Red Cell Units Issued



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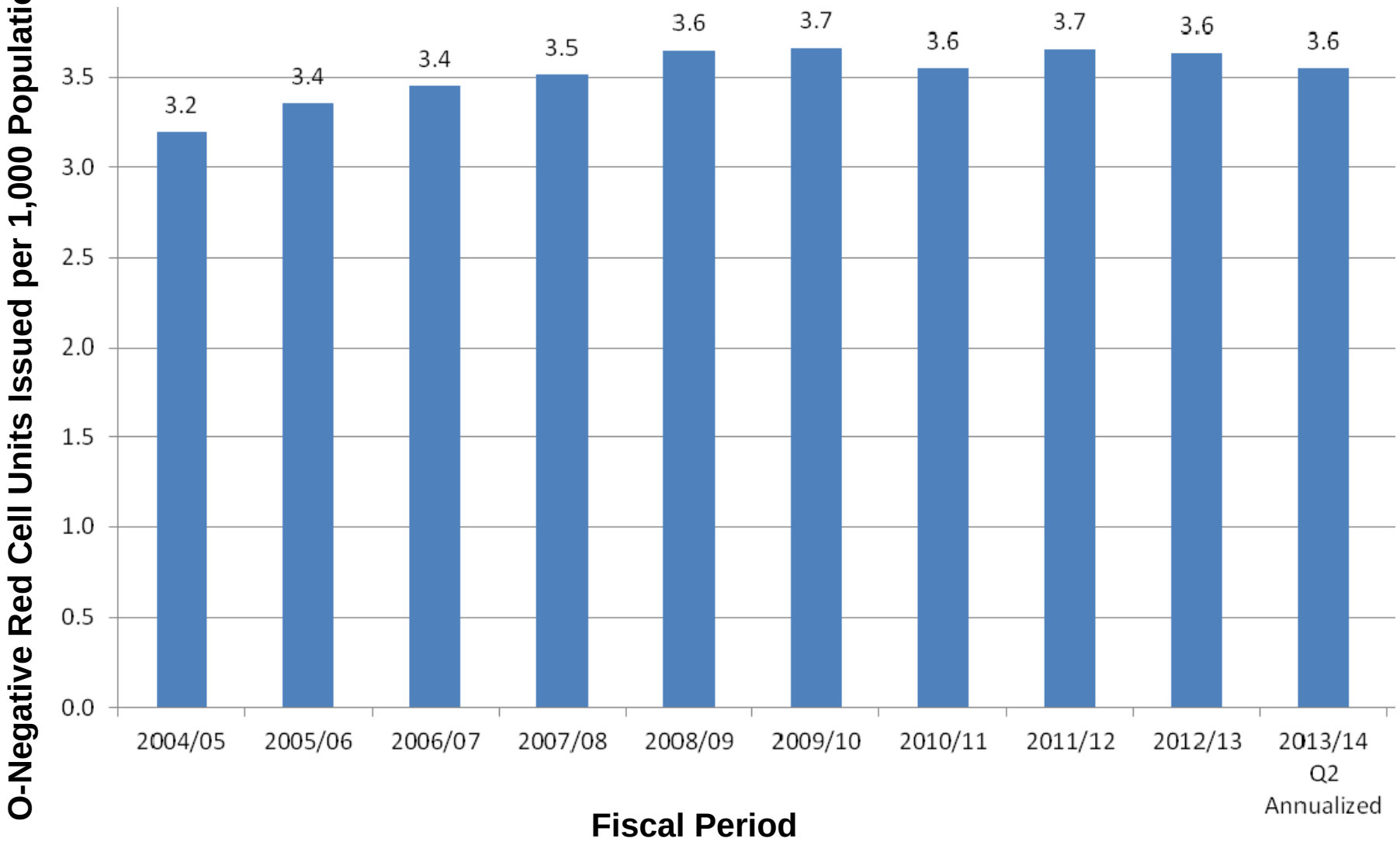
O-negative Red Cells Issued (per 1,000 pop)



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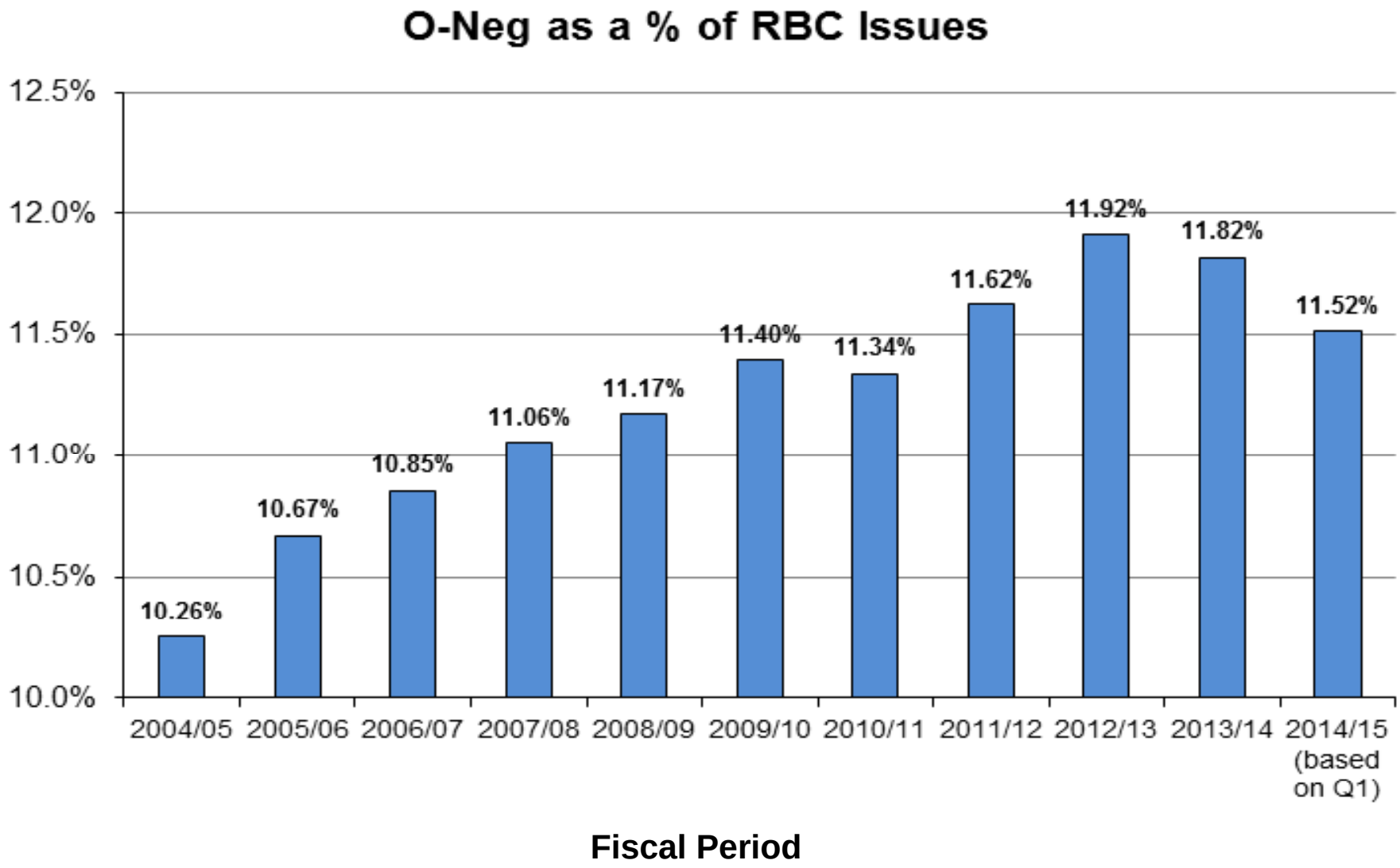
O-negative red cell units issued (% of total RBC Issues)



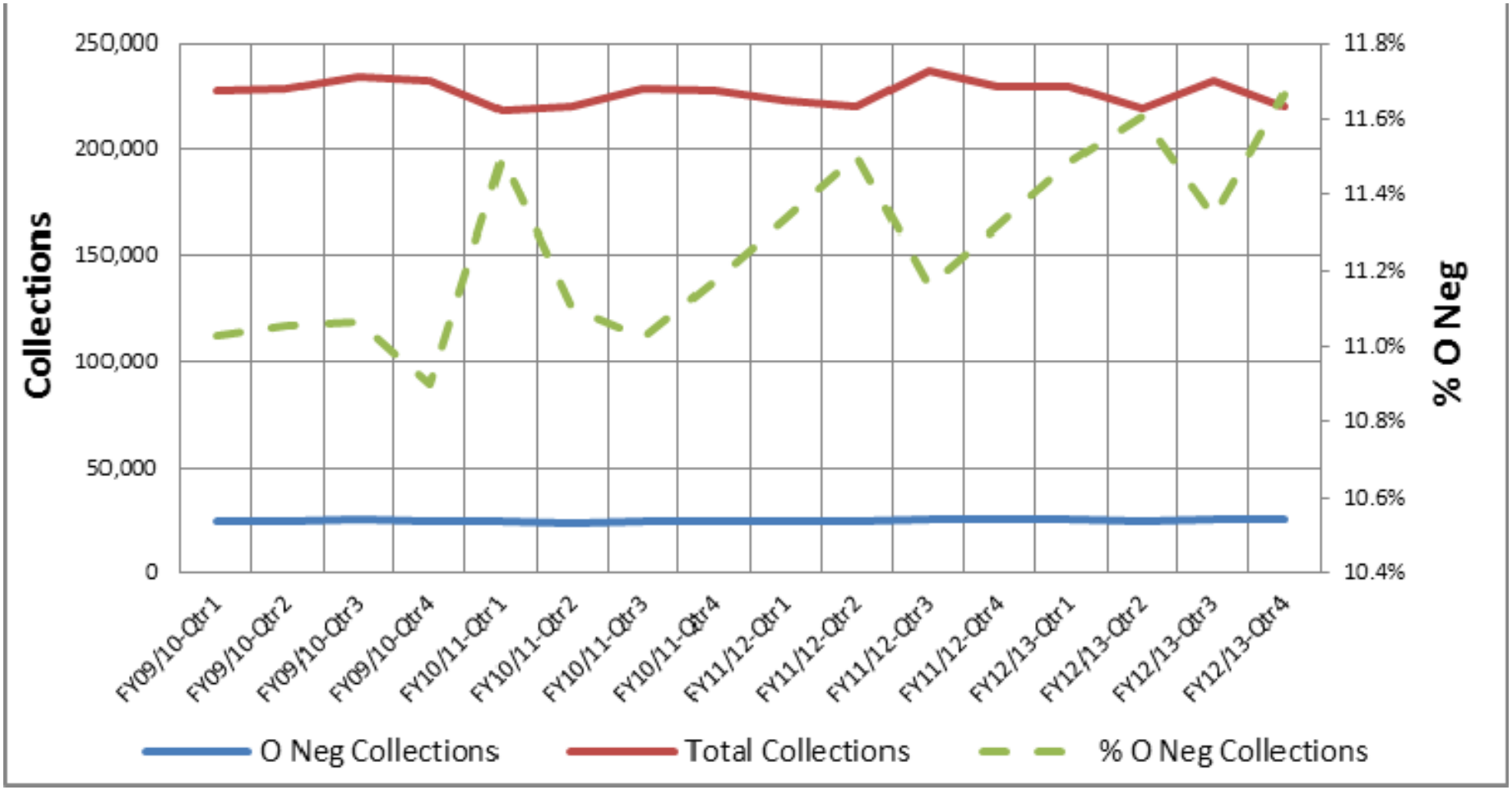
Source: CBS internal distribution data. Represents ~75% of Canadian supply

Factors likely influencing demand for O-negative red cells

- Use of massive hemorrhage protocols
  - "blood boxes" containing o-neg red cells, AB plasma, platelets
- Increased use of phenotype-matched blood
- Other???

Supply of O-negative red cells

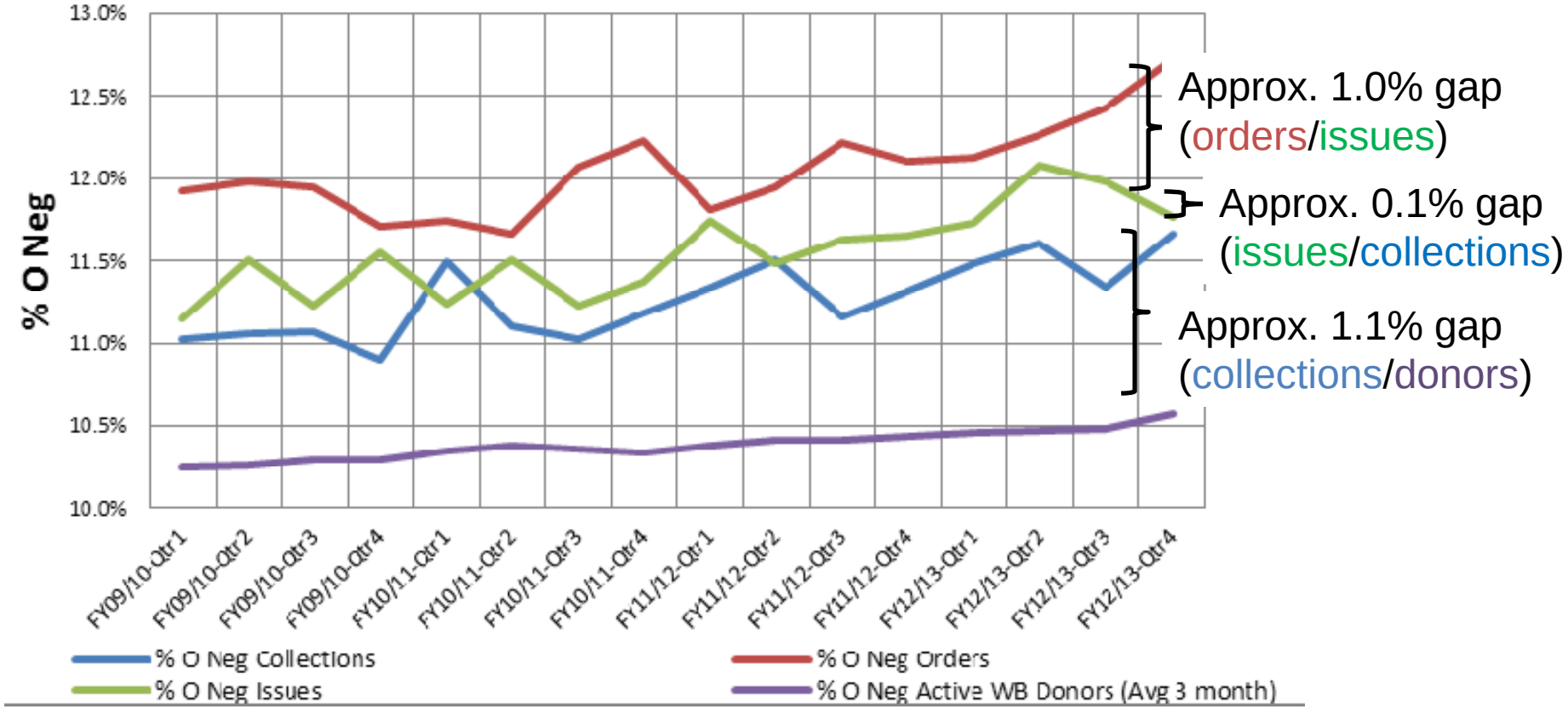
O-negative Collections



- % of O-neg collections has increased
  - 0.6% increase over past 4 years

Slide from Dan Shavrnoch

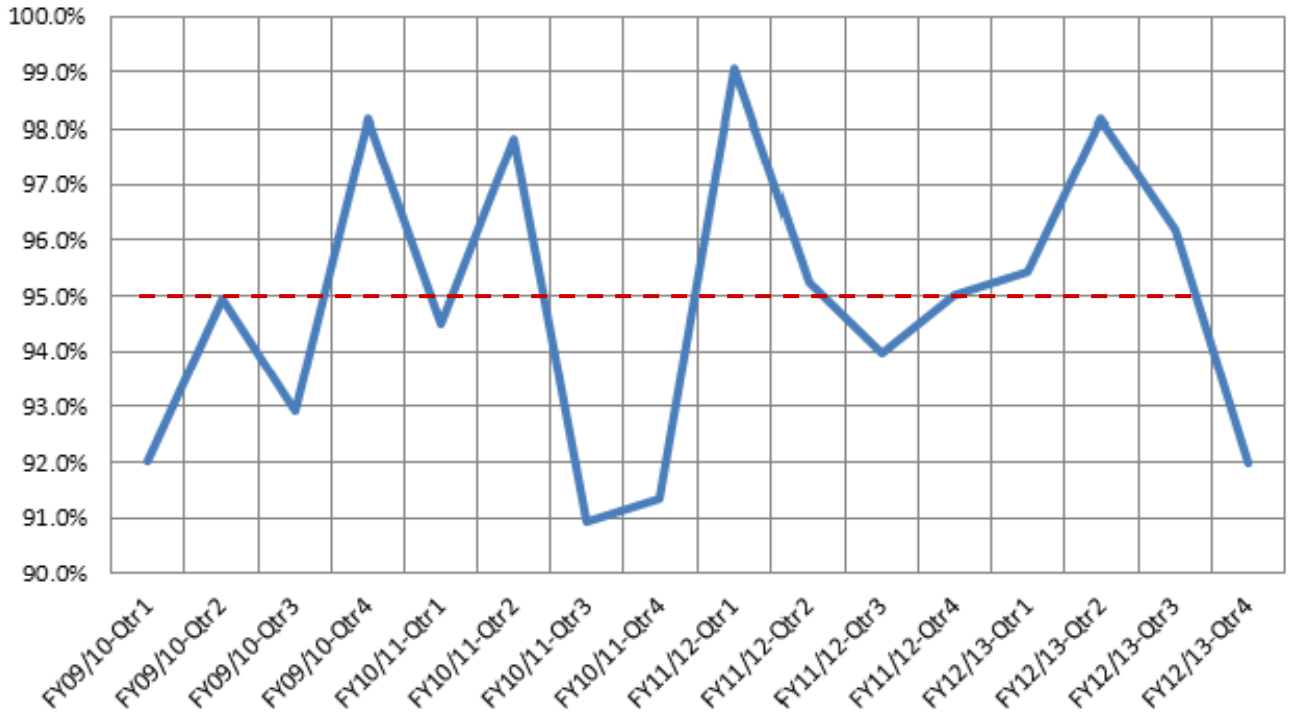
% O Neg – Comparison of metrics (collections, orders, issues, donors)



- ~2.2% gap between O-neg orders and available O-neg active WB donors
- ~1.1% gap between O-neg orders and issues

Slide from Dan Shavrnoch

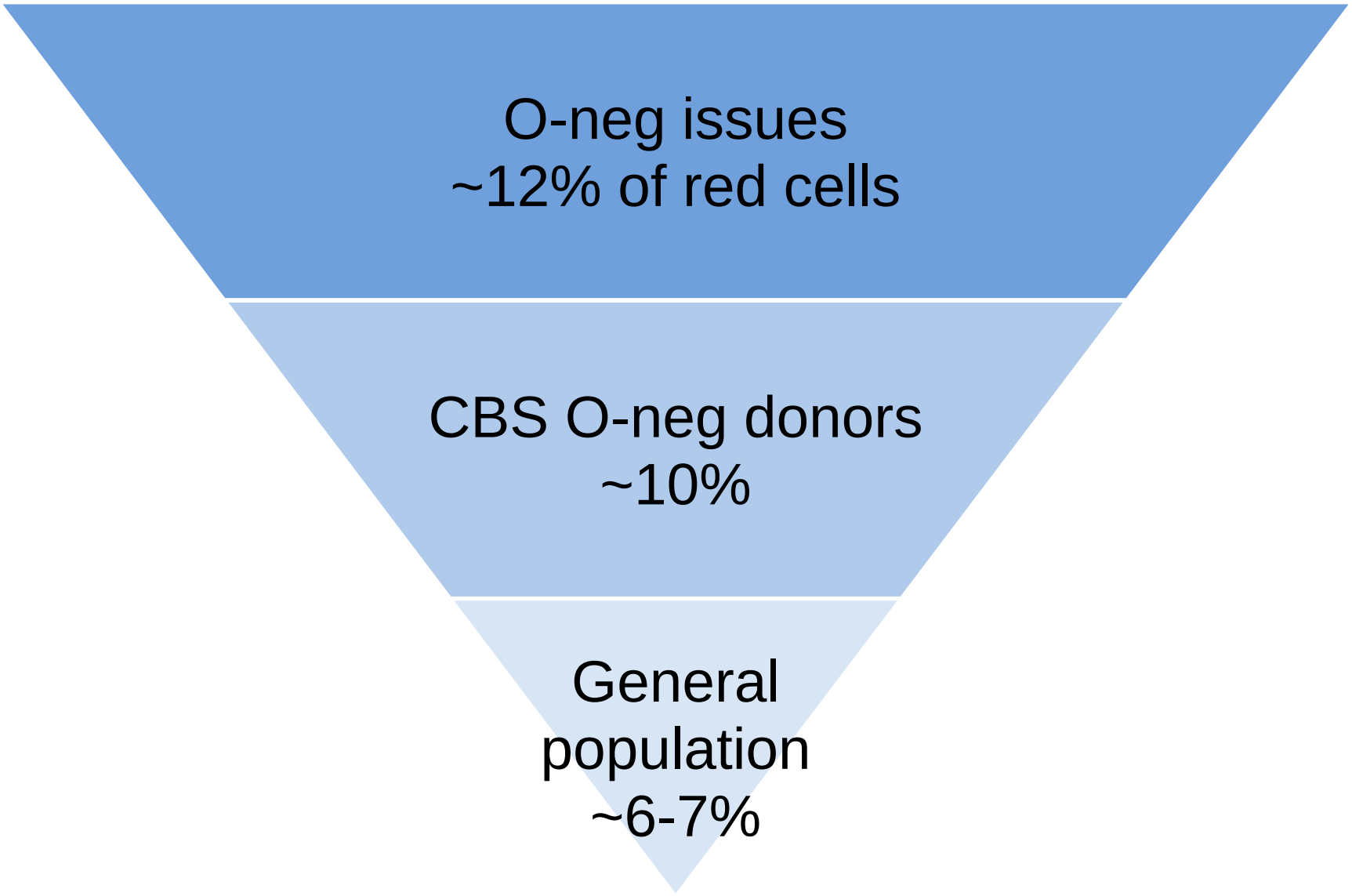
O-negative red cells – Order Fill Rate



- Over 16 Quarters, the (average) RBC O Neg Order Fill Rate has been above 95% EIGHT times, and below 95% EIGHT times

Slide from Dan Shavrnoch

The problem


O-neg issues
~12% of red cells
CBS O-neg donors
~10%
General
population
~6-7%

The Solutions

- Increase supply of O-negative red cells
- Decrease demand for O-negative red cells

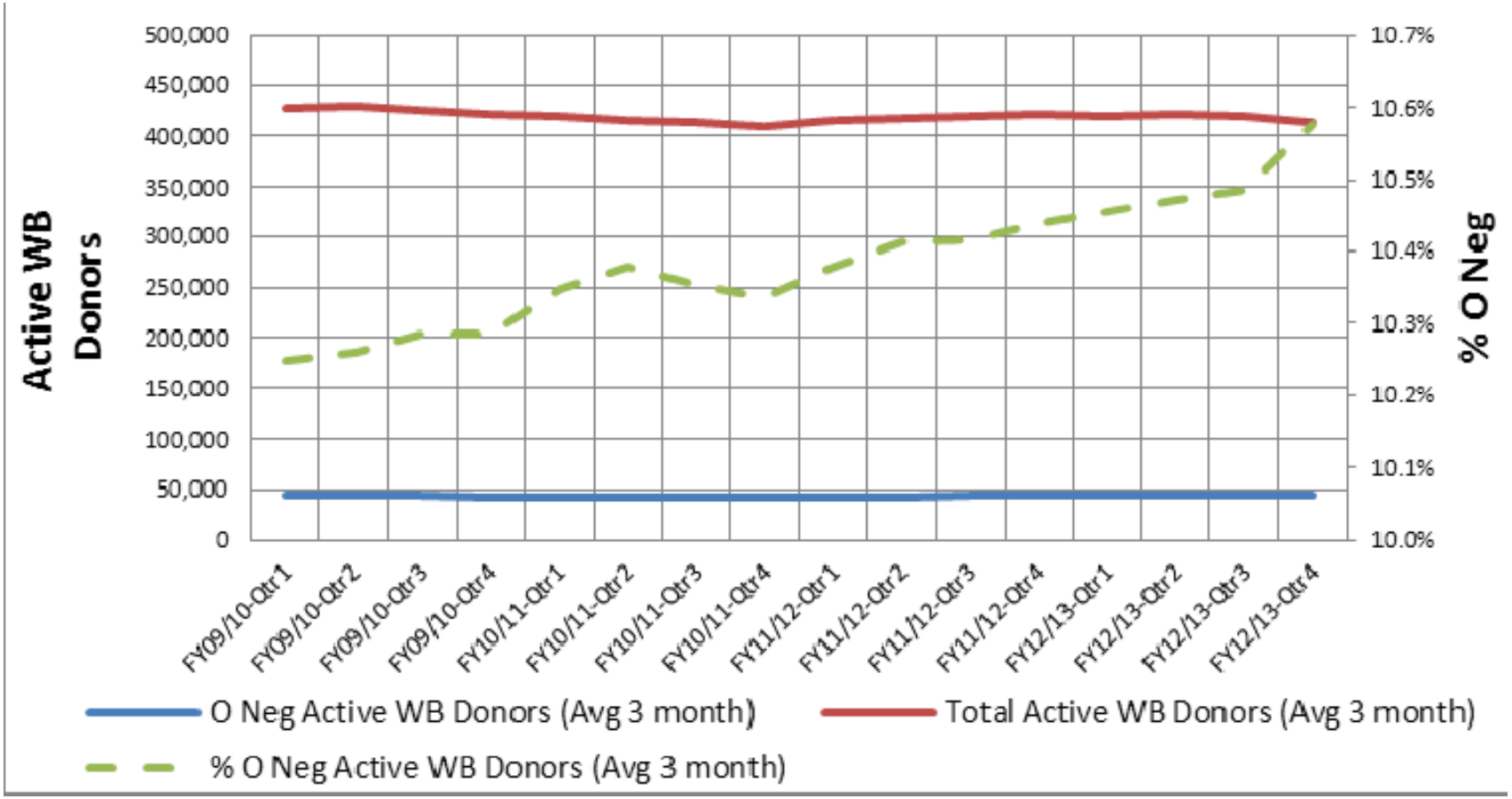
Strategies to increase the supply of O-negative red cells

Supply of O-negative red cells

- CBS has made a concerted effort to recruit and retain O-negative donors as well has encouraging frequent donations from these donors

- CBS strives to collect a higher percentage of O-neg units than is present in the donor population

O-negative active whole blood donors

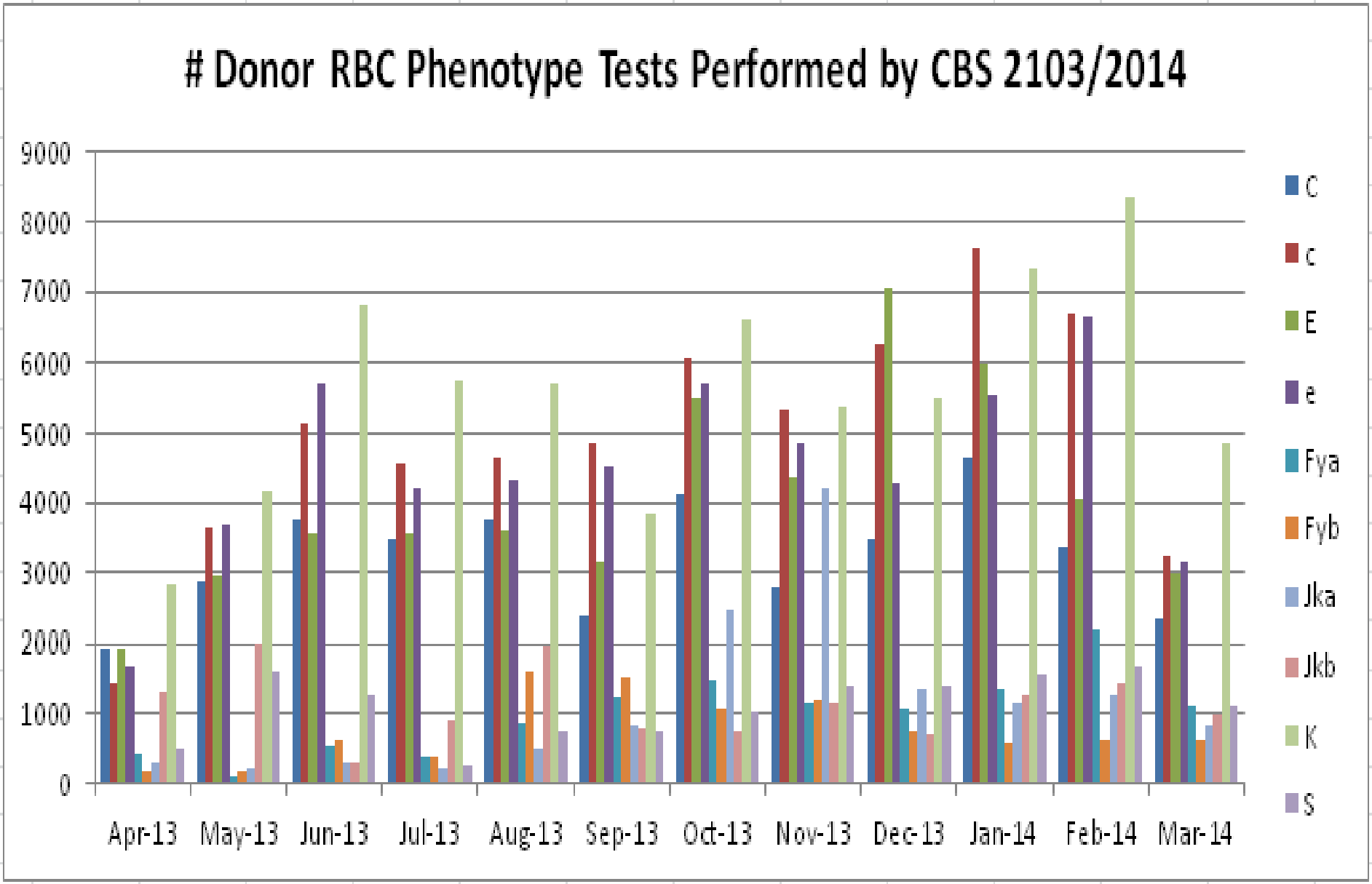


- % of O-neg WB donors has increased
  - 0.4% increase over past 4 years

Slide from Dan Shavrnoch

O-neg – average number of yearly collections per active whole blood donor

- O Neg Collections per Active WB Donor has increased over the past 4 years, from ~ 2.32 to 2.36 per year


Donor RBC Phenotype Tests Performed by CBS 2103/2014
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Apr-13
May-13
Jun-13
Jul-13
Aug-13
Sep-13
Oct-13
Nov-13
Dec-13
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Strategies to decrease the demand for O-negative red cells

Demand for O-negative red cells

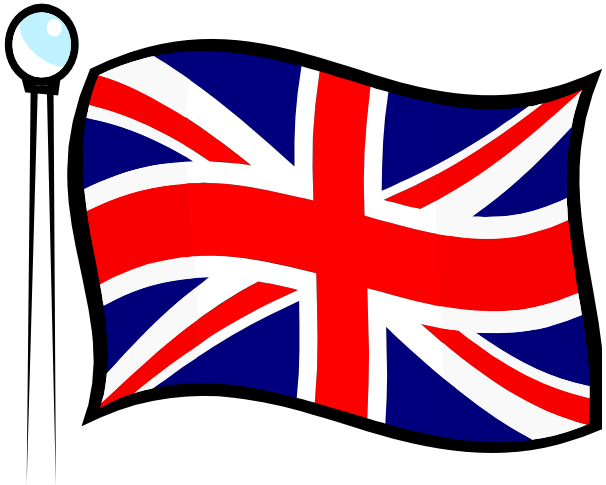
- O-neg red cells need to be used appropriately to ensure availability for those patients for whom there is no alternative

Demand for O-negative red cells

- "*The greater good of the community, including its patients who present as Rh-neg and cannot receive what they need, is compromised by wasting Rh-neg because a rare patient MAY be harmed*"

Dr. Paul Schmidt, Florida Blood Services
www.cbbsweb.org

What the UK did to decrease demand for O-negative red cells…



NHS Blood and Transplant

UK and O-neg

- Concern that O-neg blood was being used inappropriately and that, at a time when levels of donated red cells are low, there was the possibility that demand would outstrip supply

- Conducted audit to determine whether stockholding and the use of O-neg red cells were appropriate

UK and O-neg

- Invited hospitals in England, Scotland, Wales and Northern Ireland to participate
  - 182/318 participated
- Collected transfusion data on first 40 transfusion episodes from June 1, 2008, patients only included once
- Hospitals asked to record stock levels of each blood group at same time each day in June

UK: O-neg--Indications for use

Mandatory indications

- O-neg patients with anti-D
- O-neg females ≤60 yr
- Emergency use for females ≤60 yr where blood group is unknown

Recommended indications

- O-neg patients who receive/are likely to receive repeated transfusions

Stainsbury and Murphy, 2003
NHS Blood and Transplant. 2010 Re-audit of the Use of Group O RhD Negative Red Cells

UK: O-neg--Indications for use

Acceptable indications

- O-neg males or females > 60 yr with no anti-D where ≤ 8 O-neg units are transfused
- Non-O-neg infants ≤ 1 yr of age where group specific units are unavailable
- Emergency patients where the blood group is unknown at the time of transfusion, up to 2 units
- Non-O-neg patients requiring special phenotype blood where group specific units are unavailable

Stainsbury and Murphy, 2003
NHS Blood and Transplant. 2010 Re-audit of the Use of Group O RhD Negative Red Cells

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UK: O-neg--Indications for use

Unacceptable indications

- O-neg males and O-neg females > 60 yr with no anti-D where > 8 units are required
- Emergency where group is unknown and patient receives ≥ 3 units

Stainsbury and Murphy, 2003
NHS Blood and Transplant. 2010 Re-audit of the Use of Group O RhD Negative Red Cells

UK and O-neg

- Average stockholding in hospitals of O-neg red cells was 16.7% of red cell stock
  - Only 2.7% of sites reported having levels <8%
- 77.6% of O-neg transfusions were given for mandatory, recommended or accepted reasons
- In 11.3% of documented transfusion episodes, O-neg was transfused non-emergently to known non-O-neg recipients to avoid outdating

O-Negative Red Cells: General Principles/Recommendations

1. Hospitals should regularly review policies for use of O-neg RBC for emergencies and investigate incidences where use is considered inappropriate

2. Hospitals should regularly review practice of emergency transfusion of O-negative red cells to non-O-neg patients

3. Hospitals must provide group specific red cells rapidly to avoid unnecessary use of emergency group O-neg RBC

NHS Blood and Transplant. 2010 Re-audit of the Use of Group O RhD Negative Red Cells

O-Negative Red Cells: General Principles/Recommendations

4. For group O-pos recipients with alloantibodies, all efforts must be made to identify phenotypically matched group specific blood

5. The blood supplier should provide a sufficient number of extensively phenotyped O-pos units of blood in order to enable the appropriate selection of group specific blood for patients with alloantibodies

NHS Blood and Transplant. 2010 Re-audit of the Use of Group O RhD Negative Red Cells

O-Negative Red Cells: General Principles/Recommendations

6. Adequate inventory policies should be in place to minimize wastage of O-neg RB

- UK: reduce stockholding level to <10.5%

7. Appropriate policies which guide use of O-neg RBC should be introduced in order to reduce unnecessary high stockholding levels

NHS Blood and Transplant. 2010 Re-audit of the Use of Group O RhD Negative Red Cells

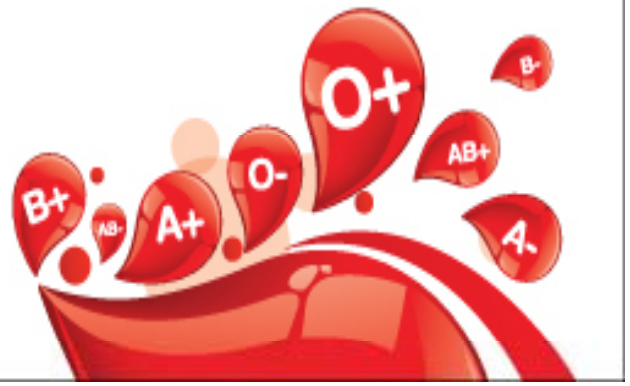
Raising awareness of the issue

Range of O-neg issues by hospital type


GOAL:
Promote optimal utilization of O Rh negative red blood cells by heightening hospital awareness of issue trends over time.

BloodBrief

-An Update on ONeg-



- Issue a ‘status report’ to top 50 hospital users:
- 3 years of issue data
  - O neg as % of:
    - All blood groups
    - Total group O blood
  - Ranking (1st, 2nd, 3rd etc)

Current Ranking:

1st # O Rh negative Red Blood Cells received from CBS

	Total O neg RBC units issued	O neg as % of all blood group RBC units issued	O neg as % of group O RBC units issued
2012-2013	4475	13.5%	26.5%
2011-2012	4255	11.9%	24.3%
2010-2011	4498	12.6%	25.7%

O Negative RBC Ranking (within list of top 50 hospital users)

	Per absolute # of O neg units received	O neg as % of all bld groups	O neg as % of all grp O
2012-2013	1st	15th	15th
2011-2012	1st	T 18th	17th
2010-2011	1st	11th	T 10th

Engagement

Hospital Transfusion Committees

- Letter addressed to Chair, TM Director cc'd
- Physician to Physician correspondence
- Also will copy: Centre MD, Hospital Liaison Specialist, Production Manager, PBCO, Ministries of Health

Progress

- First set of Blood Brief reports sent out September 2013
  - Several hospitals requested data for all hospitals within their centre

- Follow-up survey (30 hospital sites)
  - 84% influenced to review transfusion practice

One Canadian Hospital example

One hospital's example

- All males (regardless of age) and all females > 50 years receive O-pos red cells for unmatched support

- No ER has stock inventory
  - All unmatched inventory is held under blood bank control

One hospital's example

- Inventory levels are assessed on a daily basis at blood bank rounds
- If the CBS local numbers are <3.5 DOH
  - standing orders are cancelled
  - Screening practice is initiated of patients requiring O-neg RBC
- Redistribution program in place to receive O-neg units with 7 days or less until expiry to ensure no wastage

O Rh negative Red Blood Cell Utilization and Inventory Management Best Practices CL# 2014-14

Posted 2014-09-22

- Top 20 O- RBC users shared best practices

1. Develop and implement a policy for hemorrhaging patients whose blood group is not known
2. Develop and implement policies for optimal inventory management
   - 9 ideas shared…

Policies for Optimal Inventory Management

1. Small rural hospitals should stock a mix of O Rh positive and Rh negative red blood cells.
2. Revaluate optimal inventory levels on a regular basis, or after hospital organizational/clinical program changes. Promptly notify CBS of any adjustments.
3. Transfuse oldest units first unless there are other clinical considerations.
4. Always request group specific units for patients with red blood cell antibodies. Notify your local CBS immediately for any difficult to fill antigen negative requests.
5. Reduce inventory tagged for specific patient use, using strategies such as crossmatch on demand/electronic crossmatch, type and screen, and a maximum surgical blood order schedule (MSBOS).
6. Cancel inventory tagged for specific patients after 24 hours or immediately after imminent need has passed, and make allowances for patients with red blood cell antibodies.
7. Share inventory between affiliated hospital sites.
8. Track Rh negative transfusions to Rh positive patients.
9. Monitor soon to outdate units and as a last resort, transfuse to Rh positive patients to avoid wastage or redistribute to larger nearby hospitals where they are less likely to expire. Track and review redistribution data, and adjust ordering practices if redistribution frequency is excessive.

Policies for Optimal Inventory Management

- Small rural hospitals should stock a mix of O Rh positive and Rh negative red blood cells.
- Cancel inventory tagged for specific patients after 24 hours or immediately after imminent need has passed, and make allowances for patients with red blood cell antibodies.
- Monitor soon to outdate units and as a last resort, transfuse to Rh positive patients to avoid wastage or redistribute to larger nearby hospitals where they are less likely to expire. Track and review redistribution data, and adjust ordering practices if redistribution frequency is excessive.

Conclusions

- O-negative red cells are a precious resource
  - Despite increased donations from a limited number of donors, O-neg demand, at times, exceeds supply

- O-neg red cells need to be used appropriately to ensure availability for those patients for whom there is no alternative

Acknowledgements

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Thank you!