

National Survey on the Use of O RhD Negative Blood

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on behalf of The National Transfusion Laboratory Managers Group

Executive Summary

This survey was commissioned in order to establish if recommendations from previous surveys and audits, on the use of O RhD negative red cells, have been adopted before a further audit is considered.

In 2008 a multi-regional audit of O RhD neg red cells use (Foukaneli, Lyons, 2008) found that stock holding, for this component, averaged at 16.7%². The repeat NCA audit (2010) indicated that only 16% of hospitals participating in the audit had stock levels below 10.5% and 10% was transfused to non O RhD negative patients in order to prevent time expiry. Over 5% of transfusions involved more than 2 units and 2% more than 3 units of O RhD negative components³. A more localised audit in the East of England region (2012) indicated that 23% of O RhD blood was given to non O RhD negative patients. This involved 49 units of which 19 (39%) were transfused to avoid time expiry⁵.

Hospitals were advised to manage stock levels of O RhD negative blood and introduce policies around the appropriate use of this component aligned with recommendations regarding transfusion in general. In the South West there did not seem to be a correlation between the numbers of “fridges” and use/wastage (2011).

The findings from this survey suggest that many of the recommendations from previous work are not being implemented. This assertion is supported by the following findings:

- Stockholding continues to be above the recommended maximum 10.5% in 66% of organisations who responded to the questionnaire
- 18% said they did not have a policy of transfusing O RhD negative to non O RhD negative patients to avoid time expiry
- 92% said they did **not** monitor transfusion of O RhD negative to non O RhD negative recipients to avoid time expiry as a KPI
- 42% did **not** have a policy for transfusing O RhD positive blood to adult males of unknown blood group
- 34% did not investigate > 2 units O RhD negative use in emergencies
- 59% of hospitals are able to switch to group specific red cells within 15 minutes.

There are recommendations that are being followed around active management and practice to impact on levels of O RhD negative use. This assertion is supported by the following findings:

- 76% always followed up Massive Haemorrhage (MH) activations
- 66% always investigated when more than 2 units of O RhD negative unit were used in emergency
- 94% reviewed their O RhD negative stock levels, 30% at least annually
- 81% have a lab stock holding policy to transfuse O RhD negative blood to non-O RhD negative patients
- 99% said they have a policy for active stock management of emergency units.

This survey analysis supports the decision not to carry out another NCA audit of the use of O RhD negative red cells at this time. Previous recommendations still need some time to embed in practice. The current target of 10.5% O RhD negative stock holding also does not seem to relate to the appropriate use of this precious resource. A focus on more appropriate use will ensure that it is available to those patients for whom there is no alternative.

Recommendations

- 1. Hospitals to collect data, on the percentage of O RhD negative units transfused on non-O RhD negative recipients to prevent time expiry, quarterly and present at local Transfusion Laboratory Meetings for benchmarking levels*
- 2. Hospitals must find a system to review use of O RhD negative red cells in an emergency and investigate incidents where its use is considered inappropriate (reflection of the NCA 2010 recommendation)*
- 3. Hospitals should review their processes for the release of ABO compatible red cells to ensure timely issue of group specific blood*
- 4. Manufacturers of grouping analysers should review their platforms to ensure a reliable blood group is available to facilitate this with a target of <15 mins*
- 5. Hospitals should consider increasing the frequency (i.e. weekly) of emergency O RhD negative stock rotation*
- 6. NHSBT to complete a feasibility study to show what impact sharing O RhD negative between organisations might have*
- 7. NHSBT to provide information to the NTLM to show how integrated working has supported a reduction in O RhD negative issues, use and wastage*
- 8. NBTC, BSMS and NHSBT Customer Services teams should provide a platform to contact people willing to share their best practice nationally*
- 9. NHSBT to formally report on their actions from the 2010 NCA audit to the NBTC.*

Rational for Survey

This survey was conducted in response to a request made to the National Blood Transfusion Committee's (NBTC) Transfusion Laboratory Managers Group from the NBTC's Executive Group to re-examine the use of O RhD negative red cells in hospitals.

BSMS data shows that the ordering of O RhD negative red cells by hospitals potentially exceeds the available supply from a limited donor population. Anecdotal evidence suggests that recommendations from previous audits are not being implemented. It was therefore suggested that a further multi regional or national audit of O RhD negative red cell use should be undertaken.

However, it was agreed that initially a brief survey should be undertaken to determine current hospital practice around the use of this component. The aim of the survey was to ascertain the extent of uptake of the recommendations from previous audits and surveys and to understand the reasons for and constraints to compliance with guidelines and recommendations from previous large scale audits^{1,2,3,4}.

Background and Previous Audit Activity

There have been several audits on the use of this blood component in the past with associated recommendations. Most recently, these include:

2008 Multi Regional Audit of O RhD Negative Red Cell Use²

- O RhD negative stockholding for all sites averaged at 16.7%

2010 National Comparative Audit of O RhD Negative Red Cell Use (re-audit)³

- 16% of hospitals had stock levels below 10.5%
- 10% was transfused to non-O RhD negative patients in order to prevent time expiry
- Over 5% of emergency transfusions involved more than 2 units O RhD negative and 2% more than 3 units.

2011 A Survey of O RhD-Negative Red Cells in the South West⁴

- There did not seem to be a correlation between the numbers of blood issue 'fridges and use/wastage.

2012 East of England Regional Audit of O RhD Negative Use⁵

- 23% of O RhD negative red cells were given to non-O RhD negative patients. This involved 49 units of which 19 (39%) were transfused to prevent time expiry.

Guidelines/Recommendations

NBTC guidelines for the appropriate use of group O RhD negative red cells were written in 2008, updated in 2009. The BSMS has produced some recommendations on stock management of O RhD negative blood⁶.

Guidelines and recommendations published in 2008 established general principles concerning the use of O RhD negative RhD blood. These were:-

- Stock levels should be kept below 8%, later modified to 10.5%. The 2008 NCA audit suggested hospitals should aim to keep stocks to at least 12% by 2009
- Adjust O RhD negative stock to avoid elective transfusions, with this component, in order to prevent time expiry

- In emergency use set a limit of 2 units before moving to group specific red cells
- Avoid O RhD negative transfusions in older patients of non child bearing potential and unimmunised males (no anti-D detected) if O RhD positive red cells are available.

Method

An online survey was constructed using SNAP Surveys©. A copy of the survey is available on request. The survey was distributed by the Chair of the National Transfusion Laboratory Managers (NTLM) Group via the Regional Transfusion Committee (RTC) network to all hospitals with a transfusion laboratory on site.

Sites were identified in the survey by NHS Blood and Transplant Pulse code and Regional Transfusion Committee (RTC) region only. Data was analysed proportionally (n, %).

Results

Response rate

125 completed responses were returned. This is approximately 50% of the total number of sites to which the survey was distributed. A power estimation suggests this is a borderline sample size representative for the whole population. All regions responded.

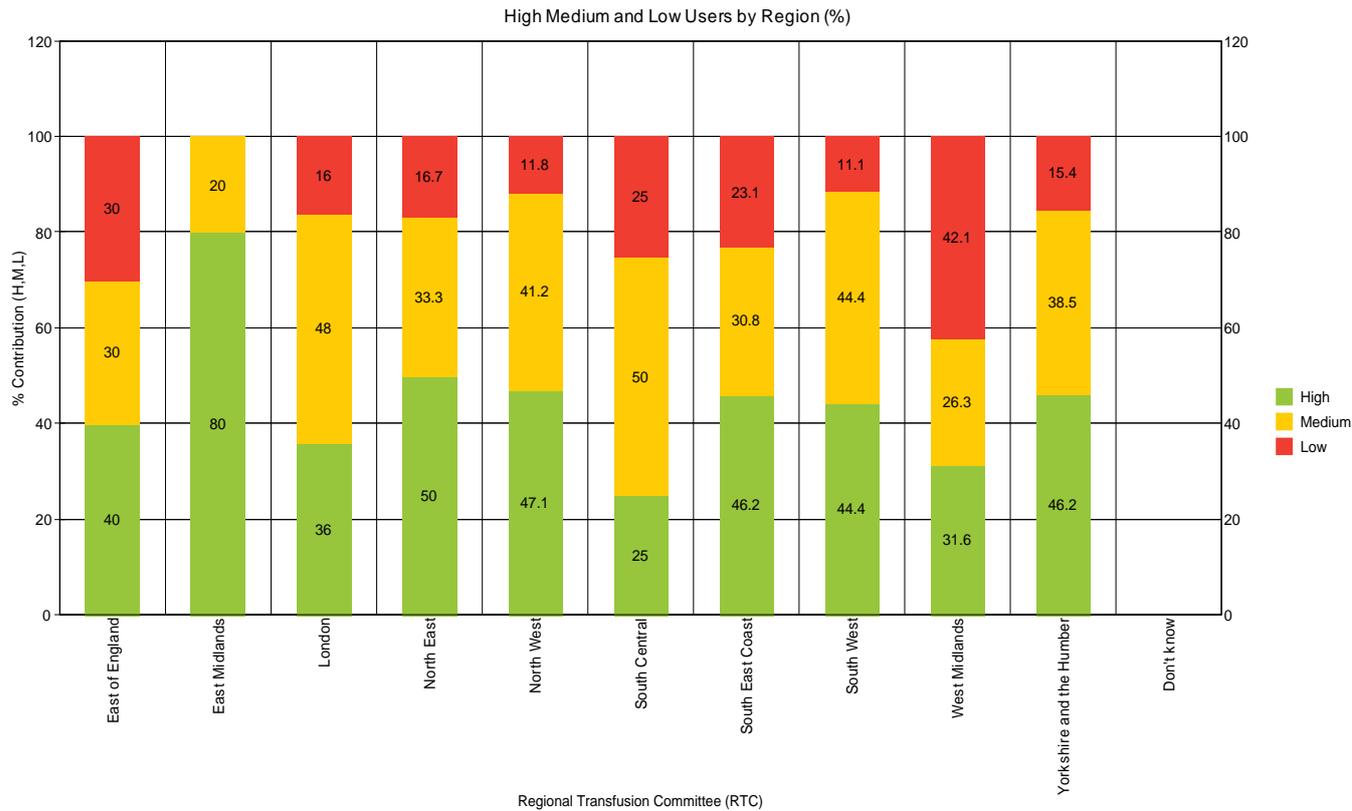
Table 1 gives number responding as percentage of total number of sites from each region. Figure 1 indicates the percentage response to the survey from each RTC region in terms of high, medium and low O RhD Negative blood users.

Table 1 number of sites responding as a percentage of total number of sites of each RTC region.

Regional Transfusion Committee	No Sites Responding* (%)	Total Number of Sites in Region
East of England	13 (52)	25
East Midlands	5 (33)	15
London	25 (45)	55
North East	9 (56)	16
North West	17 (35)	48
South Central	9 (33)	27
South East Coast	14 (51)	27
South West	12 (44)	27
West Midlands	19 (57)	33
Yorkshire and the Humber	13 (44)	29

* includes partial responses, n = 136

Fig 1. Percentage response rate of high, medium and low users in each RTC region.



Results compared to 2010 NCA recommendations

The 2010 National Comparative Re-Audit of O RhD Negative Red Cell use made a number of recommendations based on the findings of the audit. The NCA project collected data from 215 sites on over 5000 transfusion episodes. Table 2 indicates the recommendations from this piece of work and compares these data with the findings from this current survey.

Table 2. Compliance Against Previous Recommendations

Re-Audit of the use of Group O RhD negative red cells, NCA 2010 Recommendations	2014 Survey Findings
<p>1. Hospitals must regularly review use of O RhD negative red cells for emergencies and Investigate incidents where its use is considered inappropriate.</p>	<p>Majority of hospitals are following recommendation;</p> <ul style="list-style-type: none"> 76% said they always followed up MH activations, 22% sometimes and 2% never followed it up. <p>59% of hospitals could switch to group specific red cells by 15 minutes.</p>
<p>2. Hospitals must provide group specific red cells rapidly to avoid unnecessary use of emergency group O RhD negative red cells.</p>	<p>Time it takes to switch to group specific red cells (mins, denominator = 123)</p> <ul style="list-style-type: none"> ≤10 min n = 44 (35%) 11- 15 n = 28 (23%) 16 – 20 = 22 (18%) 20 – 30 = 10 (8%) >30 = 19 (15%)
<p>3. In some cases in an emergency non-O RhD negative patients are being unnecessarily transfused with more than 3 units of O RhD negative red cells; hospitals should regularly review practice to ensure that this is kept to a minimum.</p>	<p>Majority of hospitals are following recommendation;</p> <ul style="list-style-type: none"> 66% said they always investigated when more than 2 units of O negative were used, 34% said they did not investigate when more than 2 units of O negative were used.
<p>4. For Group O RhD positive recipients with alloantibodies all efforts must be made to identify phenotypically matched group specific blood.</p>	<p><i>N/A – This was outside the scope of this survey.</i></p>
<p>5. NHSBT/ Blood Services must provide a sufficient number of extensively phenotyped O RhD positive units of blood in order to enable the appropriate selection of group specific blood for patients with alloantibodies.</p>	<ul style="list-style-type: none"> 34% have a maximum stockholding of 10.5% and below
<p>6. Hospitals must reduce their stock levels of O RhD negative red cells to the recommended level of 10.5% in order to avoid transfusions to non-O RhD negative patients and wastage due to time expiry.</p>	<p>Majority of hospitals are following recommendation;</p> <ul style="list-style-type: none"> 94% said they reviewed their O negative stock levels. 6% said that they did not review their O negative stock levels. 81% said they have a lab stock holding policy to transfuse O negative blood to non-O negative patients. 18% said they did not have a policy of O negative to non O negative transfusion to avoid time expiry 99% said they have a policy for active stock management of emergency units with timely rotation back into general stock. 58% said they have a policy for transfusing O pos blood to adult males with unknown blood group. 42% said that they did not have a policy for doing that
<p>7. Appropriate policies which guide use of O RhD negative red cells should be introduced in order to reduce unnecessarily high stockholding levels.</p>	<p>Majority of hospitals are following recommendation;</p> <ul style="list-style-type: none"> 94% said they reviewed their O negative stock levels. 6% said that they did not review their O negative stock levels. 81% said they have a lab stock holding policy to transfuse O negative blood to non-O negative patients. 18% said they did not have a policy of O negative to non O negative transfusion to avoid time expiry 99% said they have a policy for active stock management of emergency units with timely rotation back into general stock. 58% said they have a policy for transfusing O pos blood to adult males with unknown blood group. 42% said that they did not have a policy for doing that

Additional results that were collected from the survey

Stockholding Review Frequency

Figures 2 and 3 explores the frequency at which sites review their stockholding of O RhD negative blood and any impact this may have on stockholding.

Fig 2

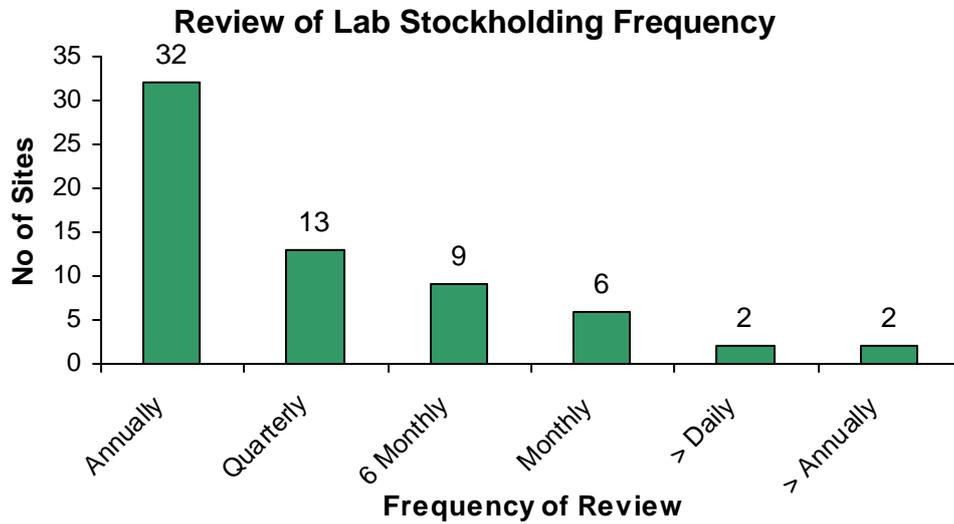
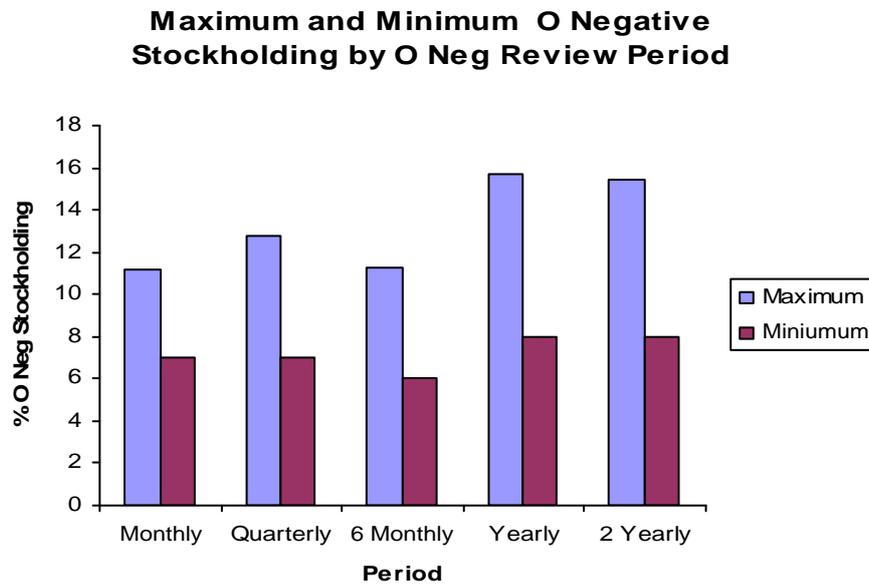


Figure 3. (also included tabulated data)



Maximum & Minimum O RhD Negative Stockholding (%) by O Negative Review Period					
	Monthly	Quarterly	6 Monthly	Yearly	2 Yearly
Maximum	11.2	12.8	11.3	15.7	15.4
Minimum	7	7	6	8	8

Satellite Fridges

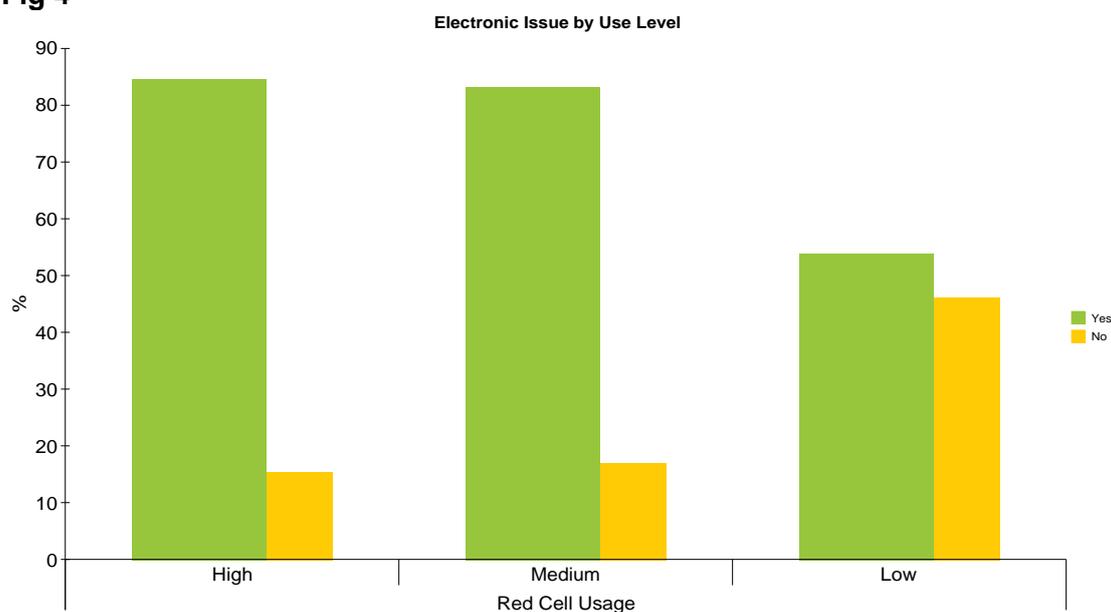
Not surprisingly, high users had the highest number of satellite fridges, followed by medium and low.

O RhD negative stock holding details were given for 375 fridges. Removing any stock or lab issues fridges 18% of fridges held more than 2 units of O RhD negative red cells. The mode O RhD negative red cell stock in satellite and remote fridges was 2.

Electronic Issue

Figure 4 indicates the proportion of sites using electronic issue in terms of high, medium and low use of O RhD negative blood.

Fig 4



Remote Issue Fridges

19/124 (15%) sites who answered the question, said they supported remote issue fridges. 53% of these were located at high using sites; the remainder were employed at medium sites (21%) and low using sites (26%). In addition-:

- 85% said they did not support remote issue fridges
- 28% said they had not introduced the “two sample rule”

Time to Expiry

2013 Blood Stocks Management Scheme (BSMS) best practice recommendations suggested frequency of when to return O RhD negative red cells back to stock and when to consider transfusing O RhD negative to prevent time expiry.

Figure 5 indicates the average time when O RhD negative is used on non-O RhD negative patients to avoid time expiry compared to the BSMS recommendations. The minimum time to expiry was 1 day and the maximum was 14 days.

92% said they did **not** monitor transfusion of O RhD negative to non O RhD negative recipients as a KPI.

Fig 5. Average time when O RhD negative is used on non-O RhD negative patients to avoid time expiry. The lines intercepting the bars are the triggers indicated by BSMS best practice recommendations.

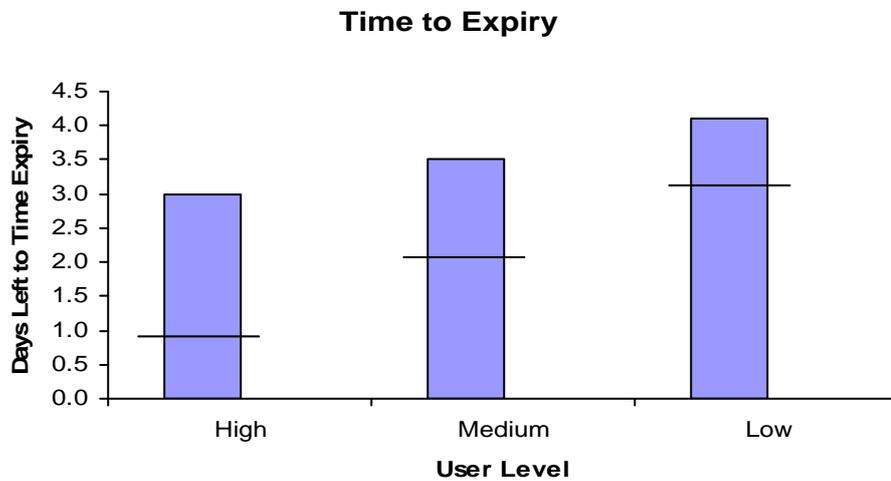
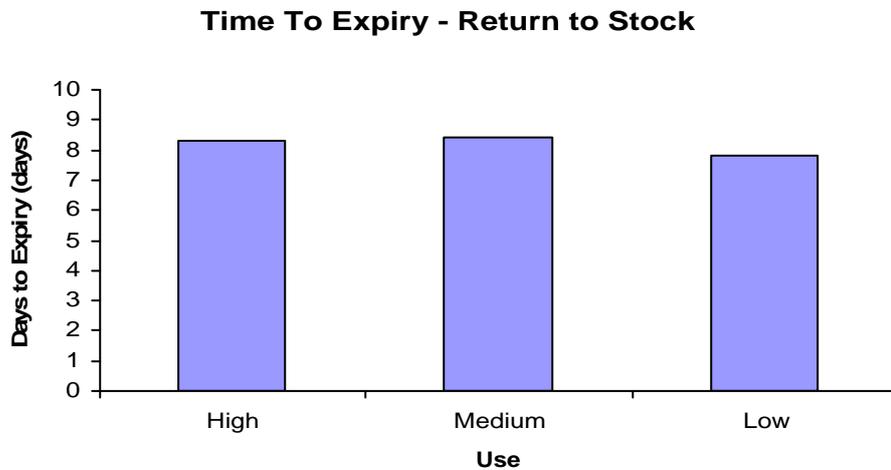


Figure 6 shows the average time until expiry when O RhD negative red cells should be returned to stock.

Fig 6.



Stockholding

Fig 7

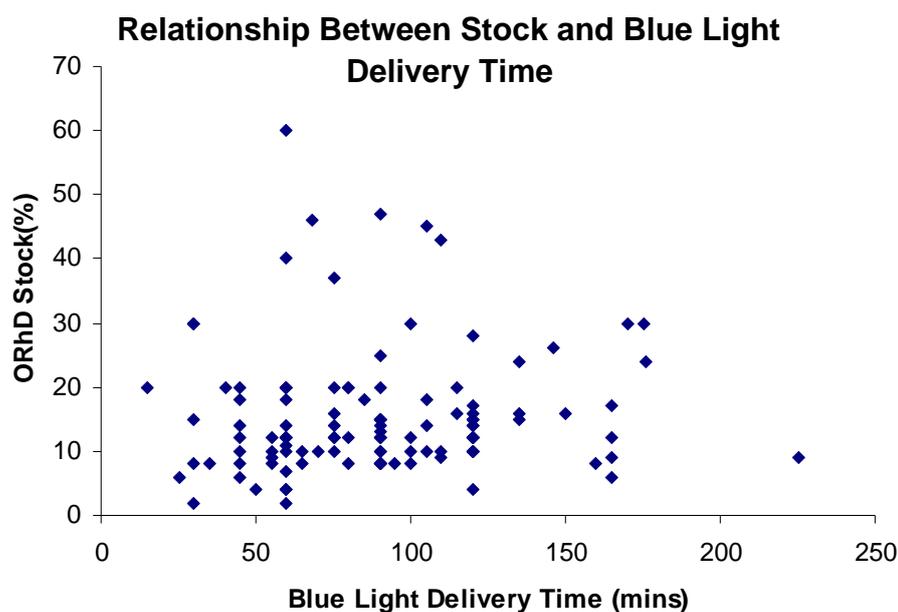


Figure 7 shows the relationship between O RhD negative stock holding and blue light delivery time, where each point is a site. There may be a very weak positive correlation between stock and blue light delivery time. Formal calculation of a correlation coefficient may not be appropriate due to the nature of the variables. The 2010 audit also suggested there was no conclusive evidence that stock and blue light delivery times were strongly associated.

O RhD negative stock sharing between organisations

62% of respondents said they would not accept blood from another organisation
Of these respondents;

- Logistics (43%) and Cold chain (57%) were stated as the barriers to accepting blood from other organisations
- 46% said they were not prepared to do so.

Differential O RhD negative Red Cell Pricing

With increased marketing required to attract enough donations, O RhD negative blood is more expensive to procure. NHSBT is considering the introduction of differential blood pricing to help to manage O RhD Negative use. The proposal is to charge £150 for a unit of O RhD Negative; this would be offset by a corresponding reduction in the cost of other units, so that if O RhD negative accounted for less than 11% of issue there would be no financial penalty.

41% said they would NOT support this proposal

Further Support

- 79% said they do not require further support with O RhD negative red cell management
- 68% said they would be willing to share best practice

Discussion and Recommendations

The findings from this survey showed there are recommendations being followed around active management and practice to impact on levels of O RhD negative red cell use. These can be seen from those indicated green in table 1. However, this survey also suggests that recommendations from previous work are not all being implemented.

It is thought that having levels of O RhD negative red cell stock below a level of 10.5% would avoid transfusion to non-O RhD negative patients and thus avoid wastage due to time expiry. The Multi-regional audit (Foukaneli, Lyons) found that stock holding for all sites averaged at 16.7% held as O RhD negative blood². The repeat NCA audit (2010) indicated that only 16% of hospitals participating in the audit had stock levels below 10.5%. Although there was an improvement from these audits with 34% of hospitals participating in this survey having a maximum stock holding of 10.5% or below the majority still have stocks above 10.5%.

The repeat NCA audit (2010) indicated 10% of units were transfused to non RhD negative patients in order to prevent time expiry. A more localised audit in the East of England region (2012) indicated that 23% of O RhD red cells were given to non O negative patients. This involved 49 units of which 19 (39%) was due to time expiry⁵. This survey also showed that 92% of participants did not monitor transfusion of O RhD negative red cells to non O negative recipients. If this was collected regularly, as a KPI, it could show the level of overstocking of O RhD negative that exists without relying on the fixed 10.5% target.

This could also give confidence to hospitals to reduce levels of O RhD negative stock incrementally to see a change in this KPI. This may take longer for hospitals to implement due to challenges of gathering data from LIMS systems; but, a new focus and target for hospitals regarding O RhD negative use may be needed to make an impact in national O RhD negative issues to hospitals.

Recommendation: Hospitals to collect data on the percentage of O RhD negative red cells transfused on non-O RhD negative recipients, to prevent time expiry, quarterly and present at local Transfusion Laboratory Meeting for benchmarking levels.

As the total number of red cell use is decreasing it is important that stock levels of O RhD negative red cells are also reviewed to reflect changes in practice. The survey showed that hospitals which reviewed their stock holding levels of O RhD negative monthly, quarterly or 6 monthly had lower levels of O RhD negative stock holding than those who reviewed them yearly or longer. As red cell use decreases emergency stock holding in satellite fridges will still be required. Even when units are not used in these fridges, experience of historical events can make it difficult to remove them from service. This could affect the 10.5% O RhD negative stock holding as an indicator of appropriate O RhD negative management.

Only 66% of hospitals said they always investigated when more than 2 units of O RhD negative red cells are used. This may reflect the fact that in some trauma settings it is very difficult to set a limit of 2 units of emergency use before moving to group specific. This could be due to O RhD negative red cells being given on route and due to the number of red cells within trauma packs. This suggests that the recommendation should change to encourage review of total blood use following emergency, trauma or massive haemorrhage use supporting the first recommendation in the 2010 NCA audit to which 76% said they always followed up massive haemorrhage activations. However, some said they sometimes (22%) or

never (2%) follow up massive haemorrhage activations. A process to review inappropriate use of O RhD negative red cells for emergency must be in place to ensure feedback to end users to influence change.

Recommendation: Hospitals must find a system to review the use of O RhD negative red cells in an emergency and investigate incidents where its use is considered inappropriate (reflection of the NCA 2010 recommendation).

The majority of hospitals had appropriate policies for stock management and guiding the use of O RhD negative red cells. Only 58% said they have a policy for transfusing O RhD positive red cells to adult males with unknown blood group, however the actual number of hospitals where this is in practice maybe fewer than this. The risk of giving O RhD positive units to female patients and allo-immunisation rates seem to be the biggest concerns around a blanket policy. The risks associated with allo-immunisation has to be considered based on the chance the patients will return for another emergency transfusion. Education and implementation of other safety systems could also help implement this policy. Hospitals that have successfully implemented this policy should be encouraged to their share practice and experiences. The BSMS's red cells for emergency use⁶, best practice document, gives some good ideas to help introduce this into practice.

The NCA 2010 audit indicated that hospitals able to provide group specific blood in less than 15 minutes use up to 50% less emergency O RhD negative red. This survey of practice showed that only 59% of respondents could switch to group specific red cells by 15 minutes. Hospitals must ensure a process for getting rapid groups are available to allow group compatible to be issued in place of O RhD negative. The NTLM group discussed the impact of the 2 sample policy on this recommendation; working with emergency departments to quickly get these two samples also supports prompt provision of group specific red cells.

Recommendation: Hospitals should review their processes for the release of ABO compatible red cells to ensure timely issue of group specific blood.

Recommendation: Manufacturers of grouping analysers should review their platforms to ensure a reliable blood group is available to facilitate this with a target of <15 mins.

This survey looked at the days left to expiry when hospitals would consider transfusing O RhD negative to non-O RhD negative patients. On average the low, medium and higher user hospitals left it to 4, 3.5 and 3 days respectively, until they considered transfusing to prevent time expiry. All averages were above those suggested in the BSMS best practice guidance. There were no major differences between high, medium and low users in their average time blood was returned to stock in relation to the expiry date. The NTLM group discussed that more frequent, weekly, restocking/rotation of emergency stock could reduce the number of O RhD received and the corresponding reduction in wastage (or increase in use to non-O RhD negative patient to prevent time expiry).

Recommendation; Hospitals should consider increasing the frequency (i.e. weekly) of emergency O RhD negative stock rotation.

Sharing O RhD negative red cells between organisations would support a reduction in overall O RhD negative red cells within the system. However 62% of hospitals said they would not accept blood from another organisation and 46% of these were not prepared to do so. Logistics and cold chain are the biggest challenge in addition to the different SOPs and systems. It is thought a nationalised system of transport with support from NHSBT could influence the 46% that were not prepared to do so; however, further feasibility studies will need to be done. There has also been discussion on integrated working of NHSBT with hospitals to support the reduction of O RhD negative red cells within the system.

Recommendation: NHSBT to complete a feasibility study to show what impact sharing O RhD negative between organisations might have.

Recommendation: NHSBT to provide information to the NTLM to show how integrated working has supported a reduction in O RhD negative issues, use and wastage.

68% of respondents said they are willing to share their best practice.

Recommendation: NBTC, BSMS and NHSBT Customer Services teams should provide a platform to contact people willing to share their best practice nationally.

The 2010 NCA recommendations number 4 and 5 were outside the scope of this survey. However, it is important that NHSBT and hospitals continue to work together to reduce the risk of group O RhD negative red cell shortages through management of both supply and demand. The NHSBT have reported supporting work with better allocation of Ro units to reduce the level of substitutions but many hospitals still indicate that their %O RhD negative issue are inflated due to these substitutions.

Recommendation: NHSBT to formally report on their actions from the 2010 NCA audit to the NBTC.

The NBTC guidelines for the appropriate use of group O RhD negative red cells were written in 2008 and updated in 2009. As these are no longer consistent with BCSH compatibility testing guidelines and with the BCSH guidelines for Massive Transfusion to be published soon, BCSH has agreed that it will produce the next set of guidelines on this subject. NBTC support and focus should be given to the BCSH group writing the O RhD negative guidelines to ensure a shorter turnaround time to publication.

In conclusion, this survey analysis supports the decision not to carry out another NCA audit of the use of O RhD negative red cells at this time. Previous recommendations discussed here, still need some time to embed in practice. The current target of 10.5% O RhD negative stock holding does not necessarily relate to the appropriate use of this precious resource. A focus on more appropriate use will ensure that it is available to those patients for whom there is no alternative.

Limitation to survey

There was a low response rate from hospitals. Findings and recommendations are only based on the responses received and following discussions at the March 2015 NTLM meeting. For the purposes of audit evaluation it is thought that those who did not reply reflect the practice for those who did. However, it should be considered that those who did not reply may have not done so due to poor O RhD negative management practice.

A regional breakdown of hospitals that completed the survey and regional focused results will be made available to members of the NTLM to take back and discuss at regional Transfusion Laboratory Managers meetings to support discussion and support for the recommendations.

National Transfusion Laboratory Managers Group Members

Name	RTC Region/Group Representing
Stephen Bassey (Chair)	National Commissioning Group
Gary Steel	Yorkshire & The Humber region
Malcolm Robinson	South East Coast region
Adrian Ebbs	East of England region
Mike Dawe	MHRA
Julie Staves	South Central region
James Taylor	West Midlands region
Cheryl Kempton	North East region
Maggi Webb	South West region
Peter Baker	North West region
Brian Robertson	London region
Chris Philips	NHSBT

Audit support by

Brian Hockley, Data and Audit Manager, NHSBT

Aman Dhesei, Regional Lead - Patient Blood Management Practitioner Team, NHSBT

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