

BSMS Spotlight

... on **ELECTRONIC ISSUE**

Introduction

Electronic Issue (EI) excludes ABO and RhD incompatibility through computer verification of donor and recipient ABO and RhD groups. Its use was first reported by Butch et al. in 1994.

Although it has gradually been introduced as the preferred method for the provision of red cells by an increasing number of hospitals worldwide, many other hospitals are unable or unwilling to use EI because they do not have the necessary equipment or computer software.

A survey by UK NEQAS (BTL) in 2002 identified that 55/445 (12%) of respondents routinely used EI to provide blood, and a further 18% planned to introduce it within 12 months.

When EI is introduced there is a change of emphasis away from the crossmatch to the antibody screen with secure and reliable screening pro-

ocols that meet the requirements of BCSH guidelines.

The introduction of EI can also have an impact on red cell stock management. EI can be used for issuing red cells "on demand", in this case hospitals are able to further reduce their inventory level. Other hospitals have reduced their crossmatch reservation time.

Two papers (Cox et al., Georgsen and Krstensen) have reported substantial savings following the introduction of electronic issue. This is primarily due to a reduction in the number of outdated units. The Funen transfusion service in Denmark reduced outdated of red cell components by almost 90%. The Hunter area Pathology service reduced outdated red cell units by 30% following the introduction of an electronic blood release system.

Impact on Blood Stock Management

A survey of the blood stocks management scheme registration questionnaires identified 27 hospitals using electronic issue. 14 of these were in the 'High blood usage' category (>11,000 red cell units p.a.), which accounted for 26% of all 'High usage' hospitals. 11 hospitals were in the 'Moderate blood usage' category (6,000 to 11,000 red cell units p.a.), which accounted for

11% of all 'Mod Usage' hospitals. A further 2 hospitals were in the 'Low usage category' (<6,000 red cell units p.a.).

The issue, stock, and wastage data from these hospitals has been analysed and compared to peer hospitals not using electronic issue. A summary of the results of the analysis are reported overleaf.

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Special points of interest:

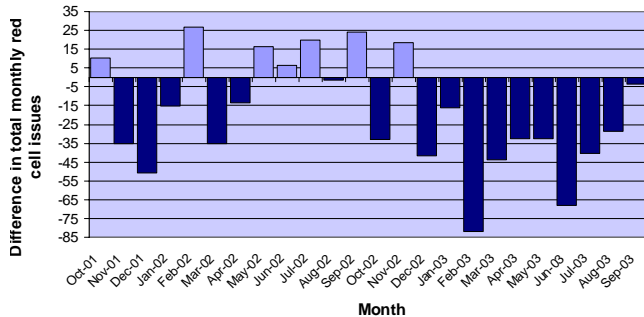
- 27 / 256 BSMS participants use EI
- 26% of BSMS 'High Usage' hospitals use EI
- 11% of BSMS 'Moderate Usage' hospitals use EI
- BSMS hospitals using EI generally receive less blood
- BSMS hospitals using EI have a lower inventory level
- BSMS hospitals using EI have less wastage



Red Cell Issues

Examination of the differences in average total monthly

Fig 1. Difference in red cell issues between 'High Usage' EI users and non-users (negative values show issues to EI users were lower than to non-users)



Red cell issues to 'High Usage' hospitals using EI are mostly lower than to those hospitals not using EI.

issues to those 'High Usage' hospitals that are using Electronic Issue (EI) and those who are not over the past 24 months reveals a widening gap (Fig 1). During October 2001 to October 2002, EI users occasionally received more red cell issues and sometimes received less. However, since December 2002, EI users have consistently received less issues than the non-users. Although no data is currently available on when hospitals started using EI, this increasing difference is likely to reflect

more 'High Usage' hospitals starting to use EI. Hospitals using EI are able to reduce their red cell issues because less red cell units are tied up in crossmatch fridges and available issuable stock can be used more efficiently.

The reduced issues represents a significant cost-saving to the hospital. Between December 2002 and September 2003, EI users received, on average, 39 units less per month; representing a cost saving of over £4000 per month.

Further analysis performed on 'Moderate Usage' and 'Low Usage' hospitals revealed a similar pattern; red cell issues to EI users are lower.

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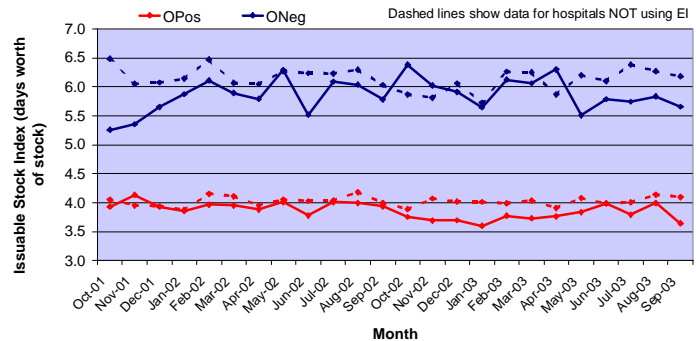
Red Cell Inventory

"Hospitals using Electronic Issue are able to hold less stock"

Analysis of the average 'High Usage' hospitals' red cell issuable stock index (ISI) indicates that those hospitals using Electronic Issue (EI) hold less days worth of stock than those hospitals not using EI (Fig 2). The average OPos ISI for EI users was consistently below the level for the non-users. The difference has become more pronounced post December 2002. This pattern is repeated in the ONeg ISI and across all other blood groups (not shown). Further analysis of 'Moderate Usage' and 'Low Usage' hospitals also indicates that EI hospitals are able to hold less stock, although there is

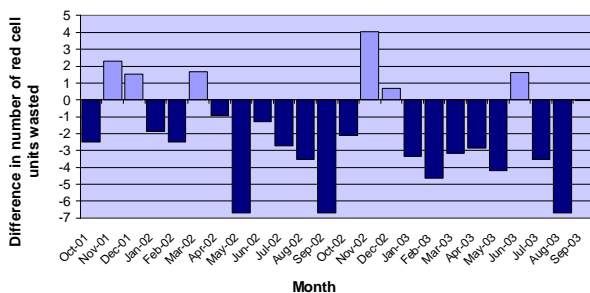
more variability. This provides further evidence that hospitals using EI are able to hold less stock.

Fig 2. Variation in OPos and ONeg Issuable stock Index for 'High Usage' EI users and non-users



Red Cell Wastage

Fig 3. Difference in wastage between 'High Usage' EI users and non-users (negative values show wastage by EI users was lower than non-users)



'High Usage' hospitals using EI waste less red cell units than those hospitals who don't use EI.

Analysis of red cell wastage in 'High Usage' hospitals indicates that those using Electronic Issue (EI) waste, on average, less than those hospitals not using EI (Fig 3). In 18 months between October 2001 and September 2003, wastage by EI users was up to 7 units less per month than non-users. If

tion issues is combined with this potential saving in wastage costs, a total of near £5000 per month could be saved by a hospital receiving over 11,000 red cell units p.a.

The potential cost benefit from reduction in wastage for smaller hospitals (<11,000 units p.a.) could be even greater.

the cost-saving associated with the reduc-



Hospital Experiences

Wrexham Maelor Hospital

Electronic Issue (EI) was introduced at **Wrexham Maelor Hospital** in October 2001 after the BCSH guidelines on electronic issue were published and following the introduction of an EI module on the Telepath computer system. The laboratory uses an IBG Multisampler linked to an automated BioVue reader. To be eligible for electronic issue, samples have to be processed via the Multisampler, and then meet the criteria set up in the algorithms within the Telepath EI module. An ABO and Rh group is carried out using two different sets of grouping reagents, a three cell antibody screen is performed using the Indirect Antiglobulin technique using Biovue cards. There is automatic electronic transfer of results to the Telepath system.

EI is used for all crossmatch requests apart from urgent, emergency, and out of hours requests. EI is not used for out of hours

requests because not all staff have been trained to use the automation in place in the blood transfusion laboratory.

The introduction of EI has had a significant effect on reducing workload at Wrexham Maelor. It has also lowered the stress levels of staff. In addition, with modifications to the Maximum Blood Ordering Schedule, red cell stock holding has been lowered by approximately 10%. There has also been a 10% drop in the number of units issued (EI & conventional).

Since the introduction of EI 26,048 units have been issued 12,663 (49%) of these by EI. There have been five reported suspected transfusion reactions, but none proved to be due to serological incompatibility. Further increases in the EI rate will be dependant upon increased training for a selective number of staff, or updated automation with a trickle feed approach compared to the use of batch testing.

“Electronic Issue has resulted in lowered stress levels in the blood transfusion laboratory and the atmosphere is much calmer.”

Norfolk and Norwich Hospital

Norfolk and Norwich Hospital (a ‘High Usage’ hospital) complied with the recommendations in the BCSH guidelines for their implementation of Electronic Issue (EI). Of 11,370 crossmatch requests during 2002, 6,663 (59%) were fulfilled using EI. The blood bank personnel are less stressed as EI means there is less manual handling of blood bags and specimens re-

sulting in improved health and safety in the laboratory. The reservation time for cross-matched blood has been reduced and they have found this has helped their stock management performance.



Queen Elizabeth Hospital, Kings Lynn

Queen Elizabeth Hospital, Kings Lynn have further developed Electronic Issue by the introduction of a fast issue system. Using this system blood is not issued until the decision to transfuse has been taken.

When a comparison was made of data from the last quarter of 1999 (prior to electronic issue) and the last four months of 2001 it was found that the number of crossmatches had reduced by over 18%, the number of units issued had reduced by 10%, and the number of units dereserved

had fallen by nearly 35%.

They concluded that the introduction of new technology including electronic cross-match and fast issue, together with an active education programme had resulted in a significant reduction in blood usage, despite increasing activity.



Introducing new technologies offers potential for significant reduction in blood usage.



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Hospitals and the NBS working together to maximise the use of donated blood by increasing understanding of blood supply management.



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Comment by the BSMS Manager:

Analysis of red cell issue, stock and wastage data from the Blood Stocks Management Scheme indicates that there are benefits to blood supply management when electronic issue is used for the provision of blood. These benefits also affect the blood supply chain.

The data suggest that there is a reduction in red cell issues, red cell inventory levels are reduced and there is a reduction in wastage. These findings verify reports from Denmark and Australia where hospitals introducing electronic issue noticed a significant fall in their red cell wastage.

The benefits to the blood supply chain include reduced pressure on the donor base through a reduction in demand, improved health and safety in the blood transfusion laboratory through less manual handling of blood bags and specimens, and a reduction in stress levels. There are cost benefits through reduced demand and lower wastage levels.

The use of electronic issue can be at least as safe as serological crossmatching provided that the BCSH guidelines are followed.

Judith Chapman

Recommended Reading

The UK BCSH guidelines for blood bank computing (BCSH 2000) give the criteria necessary for the electronic selection and issue of blood.

Other papers highlight the switch of emphasis from the crossmatch to the antibody screen and the reduction in red cell outdating and cost benefits.

BCSH (2000) Guidelines for blood bank computing *Transfusion Medicine* 10 307-314

BCSH (2004) Guidelines for compatibility procedures in blood transfusion laboratories *Transfusion Medicine* (in press)

Butch SH., Judd WJ., Steiner EA., Stoe M., Obermand HA. (1994) Electronic verification of donor-recipient compatibility: the computer crossmatch *Transfusion* 37 960-964

Chapman JF., Milkins CE., Voak D. (2000) The computer crossmatch: a safe alternative to the serological crossmatch *Transfusion Medicine* 10 251-256

Cox C., Enno A., Deveridge S. (1997) Remote electronic blood release system *Transfusion* 37 960-964

Engelfriet CP., Reesink HA (2001) The use of computer crossmatch (international Forum) *Vox Sanguinis* 80 184-192

Georgsen J., Krstensen T., (1998) From serological to computer crossmatching in nine hospitals *Vox Sanguinis* 74 (Suppl 2) 419-425

Safwenberg J., Hogman CF., Cassemar B. (1997) Computerised delivery control—as useful and safe complement to the type and screen compatibility testing *Vox Sanguinis* 72 162-168



For more information on Electronic Issue, we suggest reading some of these papers.

