Blood Stocks Management Scheme

Blood Stocks Management Scheme Inventory Practice Survey Frozen Components

Full Report

February 2023

Introduction and Purpose

Blood Stocks Management Scheme

The Blood Stocks Management Scheme (BSMS) invited hospitals to complete the annual inventory practice survey on adult frozen components. BSMS has observed in some hospitals that frozen component practices have changed and we understand there to be several contributing factors;

- The increase of thawed FFP shelf life to 5 days (120 hours) (for use in patients with unexpected major bleeding) (BSH guidelines, 2018), has permitted pre-thawing of the component which has enabled hospitals to support pre-hospital transfusion and stocking of FFP in remote fridges for rapid provision for major bleeding.
- Hospitals reported they have adopted standardised major haemorrhage protocols (MHPs) which includes the use of FFP and cryoprecipitate (cryo) as standard early in the protocol.
- Adoption of other haemostatic agents and alternatives to warfarin (e.g. direct oral anticoagulants) for anticoagulation therapy which do not require reversal with blood components has reduced the requirement on FFP.
- Widespread utilisation of point of care anticoagulation monitoring (e.g. thromboelastography (TEG) and rotational thromboelastometry (ROTEM)) during procedures associated with high blood loss to more rapidly identify coagulation deficiencies which may require transfusion support of individual specific components e.g. platelets, FFP or cryoprecipitate.
- Administration of tranexamic acid for patients where blood loss is expected to be >500ml.

The purpose of this survey was to obtain qualitative data from hospitals on their current inventory management practices for frozen components that may be contributing to the changes observed in the issues and wastage data.

Historical Issues and Wastage Data

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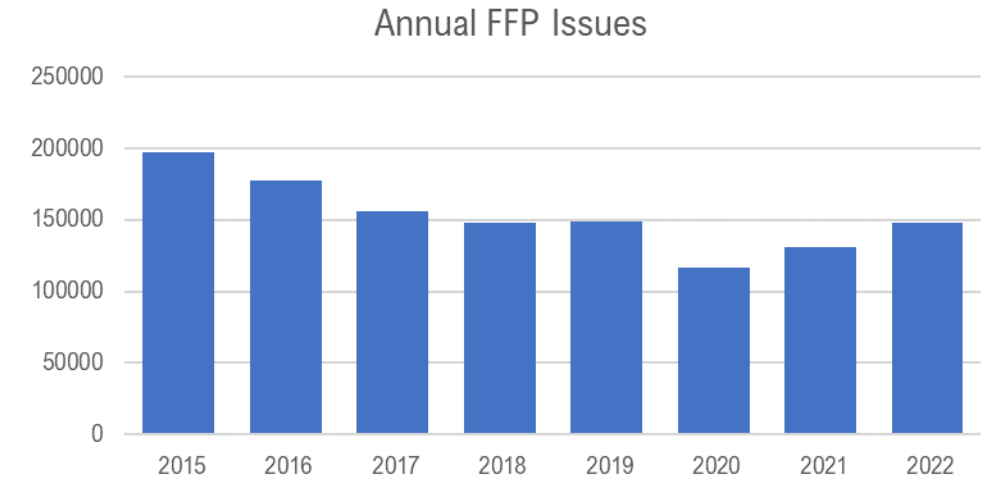
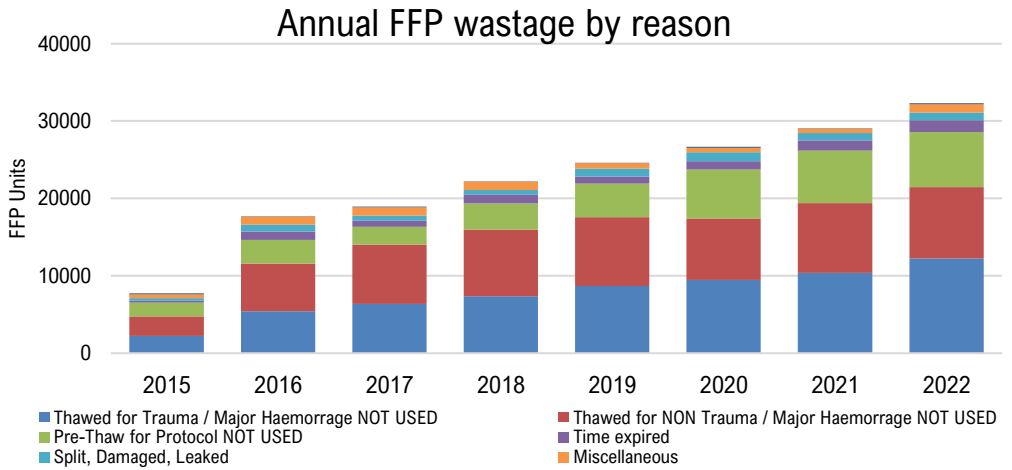
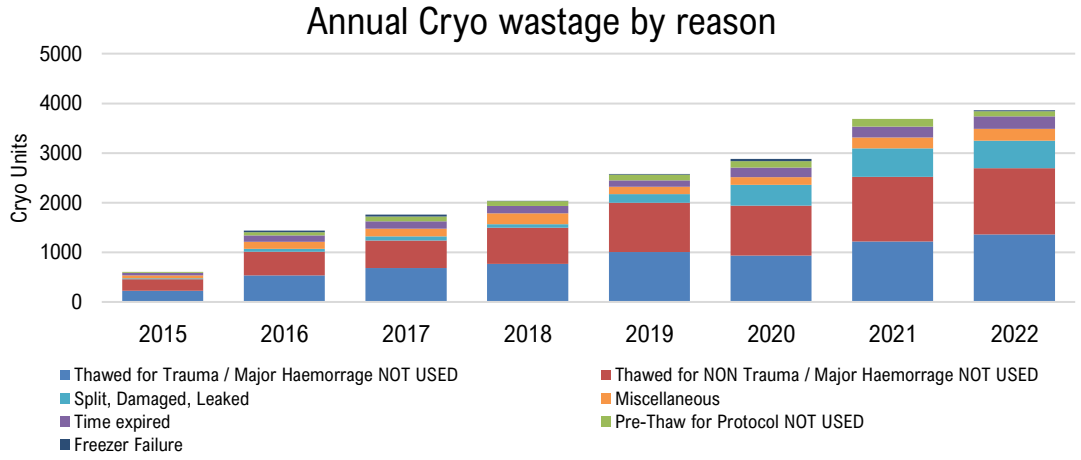
The BSMS data for FFP and cryo issues and wastage supports the theory that there have been shifts in practices with these frozen components.

Issues and wastage data (2015 – 2022)







Survey Guidelines

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- We asked that only 1 person submitted a form for each site and to answer the questions to the best of their knowledge.
- The questions related to **ADULT** frozen components only (Fresh frozen plasma (FFP) and cryoprecipitate (cryo).
- If hospitals did not routinely stock frozen components, we were still interested in their responses to understand the reason behind this decision.
- There were 30 questions and at the end of the survey there was an opportunity to add any additional information about frozen component practices.
- Platelet user group categories are used for frozen component hospital categorisation and have been used for some of this analysis. BSMS are due to release separate frozen component user group categories in 2023.

Who completed the survey?

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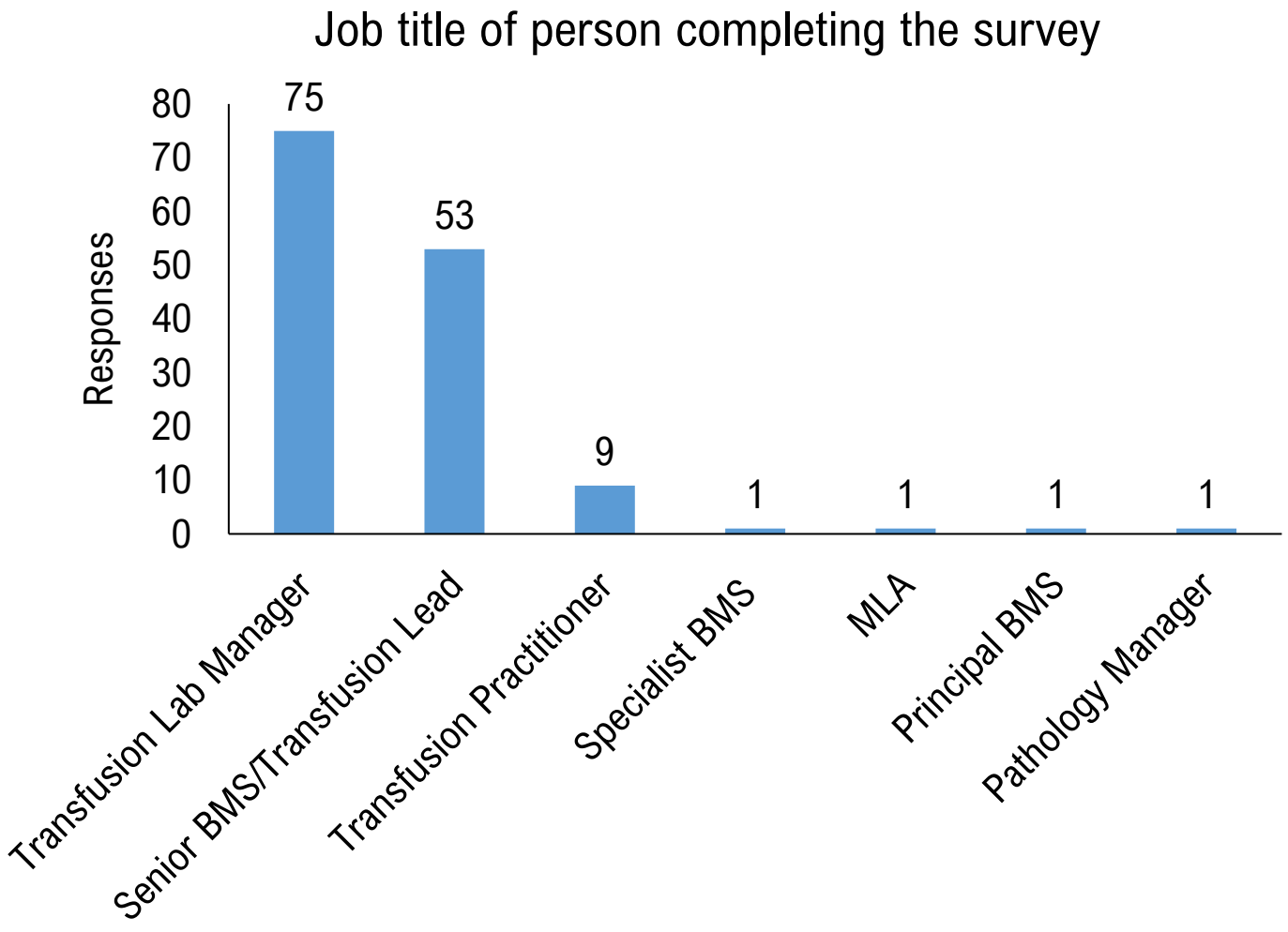

We received **141** responses with an average time of 14 minutes to complete the survey.

The survey was mainly completed by a Transfusion laboratory manager (75) or Senior BMS/Transfusion Lead (53).

Who completed the survey?

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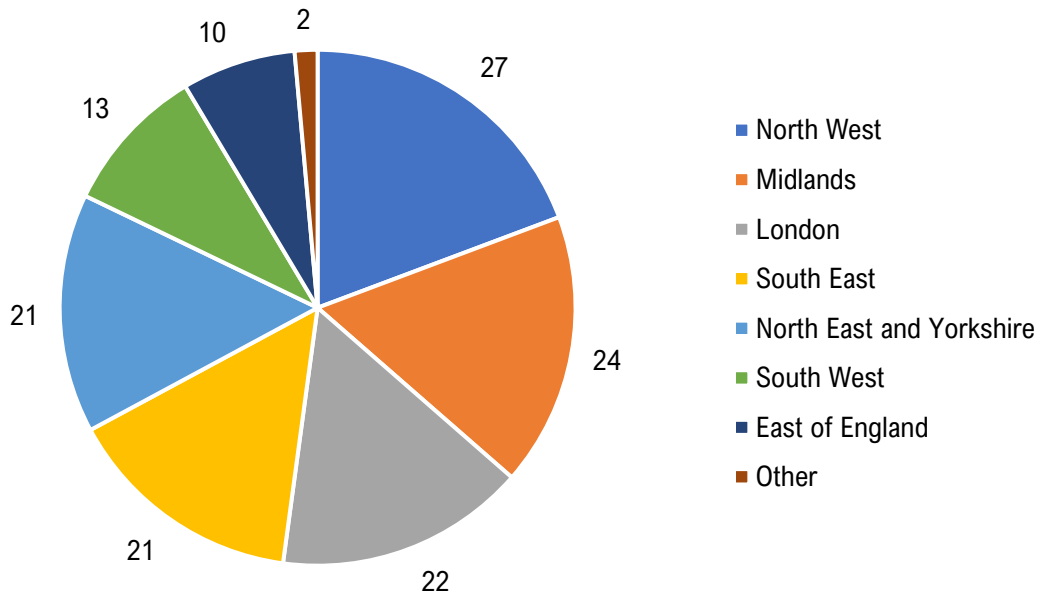
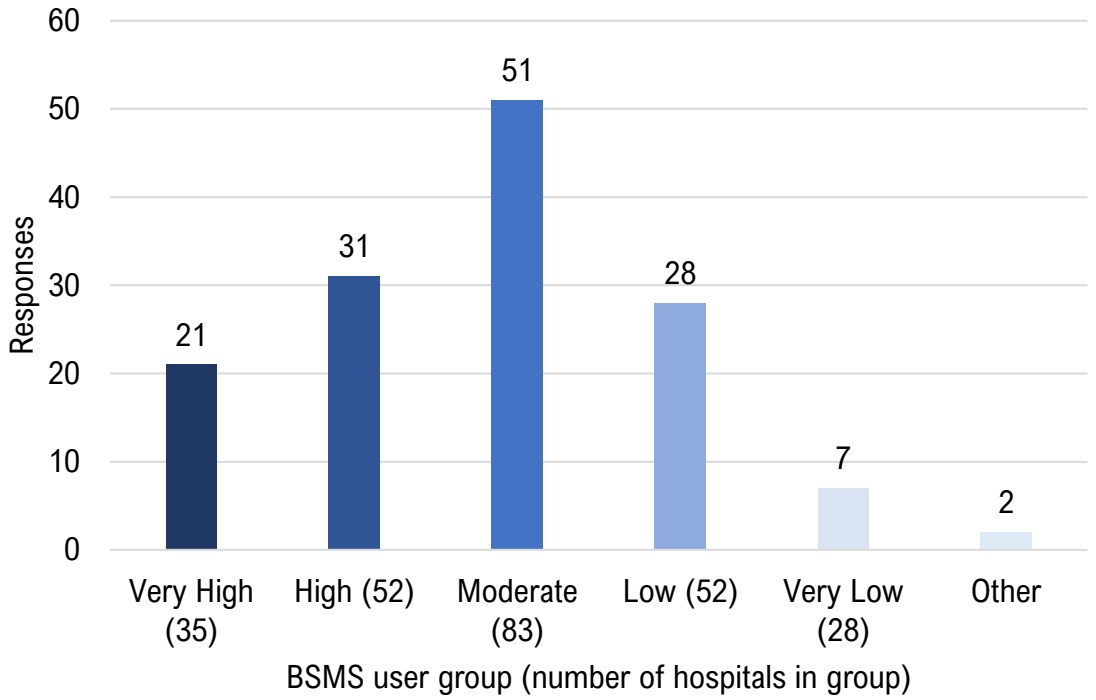
Number of respondents from each Regional Transfusion Committee (RTC)



Number of respondents from each BSMS user category



Responses from RTC regions show an even spread of responses although the largest number of responses were from the North-West (27), 75% of the hospitals in the region responded.

Responses show an even distribution across BSMS User Groups, 60% of hospitals in the very high user group (21 hospitals) and high user group (31 hospitals) responded, 61% of moderate user group hospitals responded, 54% low and 25% very low.

Do you stock FFP and cryo?

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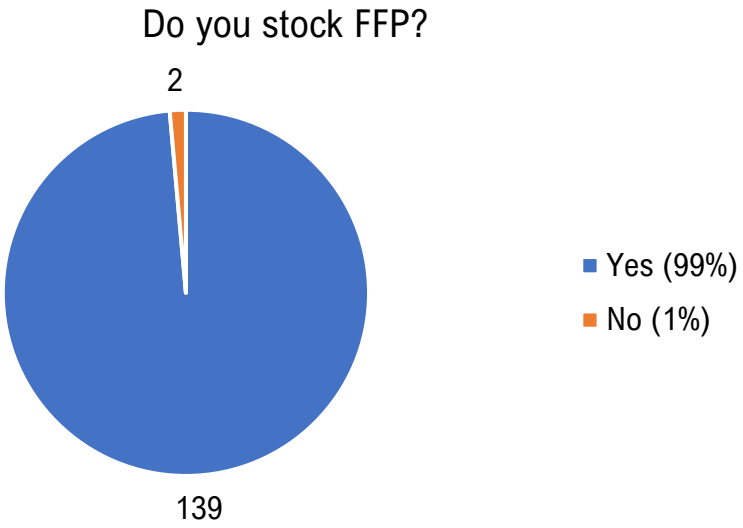

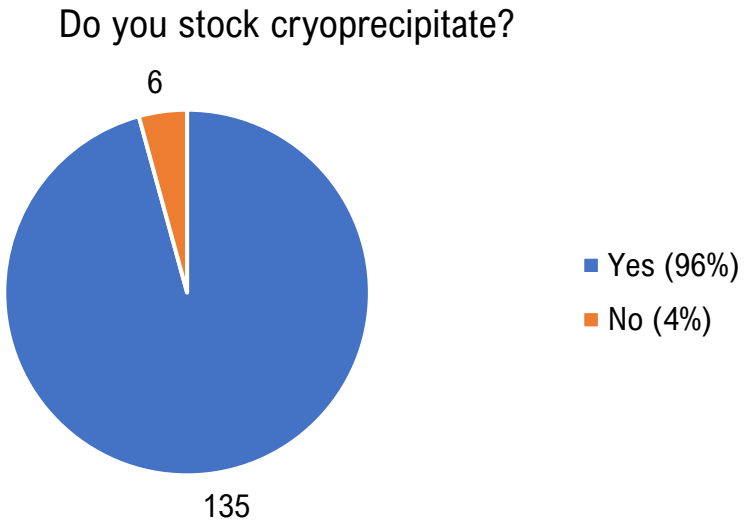

The majority of respondents (99%) did stock FFP.

Many stock both FFP and cryo, one hospital only stocked cryo alone, and one hospital stocked cryo and a commercial frozen component instead of FFP.

For those hospitals that did not stock FFP and/or cryo they were either low or very low user group categories (PLT categories).

Who is holding FFP and cryo?

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We used the hospital name/pulse code to identify the user category according to platelet issues. Total hospitals who indicated they are holding stock of each component are listed in the table below:

BSMS User Category (*using platelet category)	Total number of Hospitals in category	Survey response received	% survey participation	Hospitals responded FFP stock held	% respondents holding FFP Stock	Hospitals responded cryo stock held	% respondents holding cryo stock
Very High	35	21	60%	21	100%	21	100%
High	52	31	60%	31	100%	31	100%
Moderate	83	51	61%	50	98%	51	100%
Low	52	28	54%	27	96%	24	89%
Very Low	28	7	25%	7	100%	7	100%

- **60%** of very high and high users completed the survey and indicated stocks of FFP and cryo are held.
- **61%** of moderate users completed the survey, 51/51 hospitals stock cryo, one hospital stocked cryo but not FFP.
- **54%** of low users completed the survey and there was 1 hospital that did not stock either component. 2 other hospitals indicated they do not stock cryo routinely but do stock FFP.
- **25%** of very low users responded and 100% (7/7) stocked both FFP and cryo.

FFP and Cryoprecipitate (cryo) Stock Quantity

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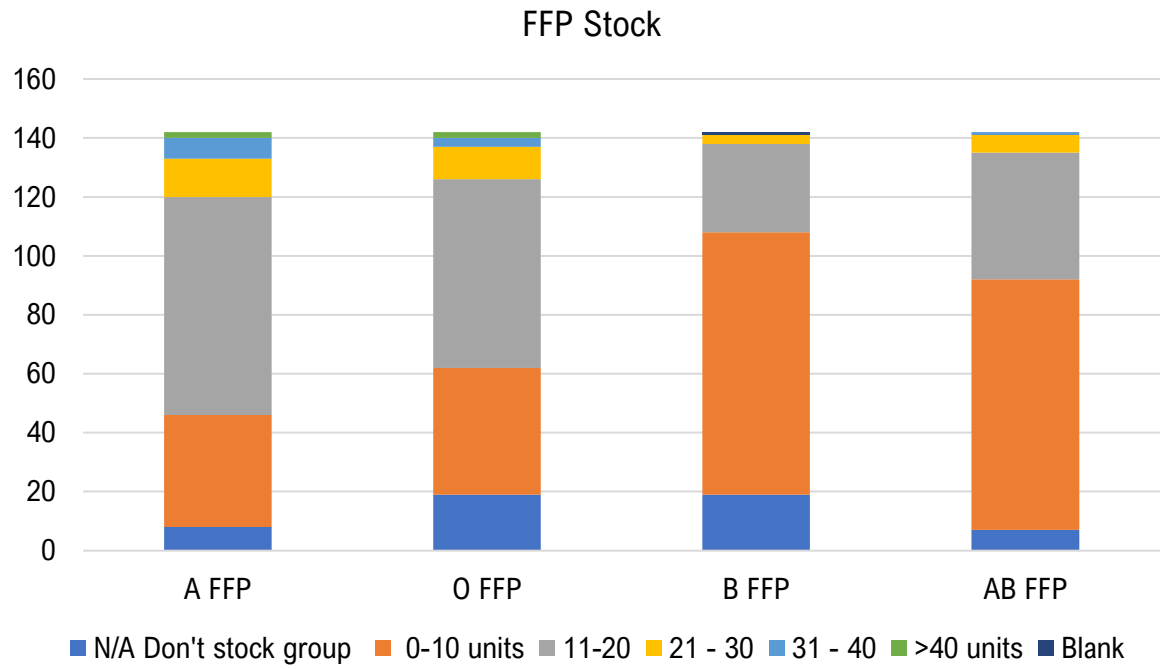

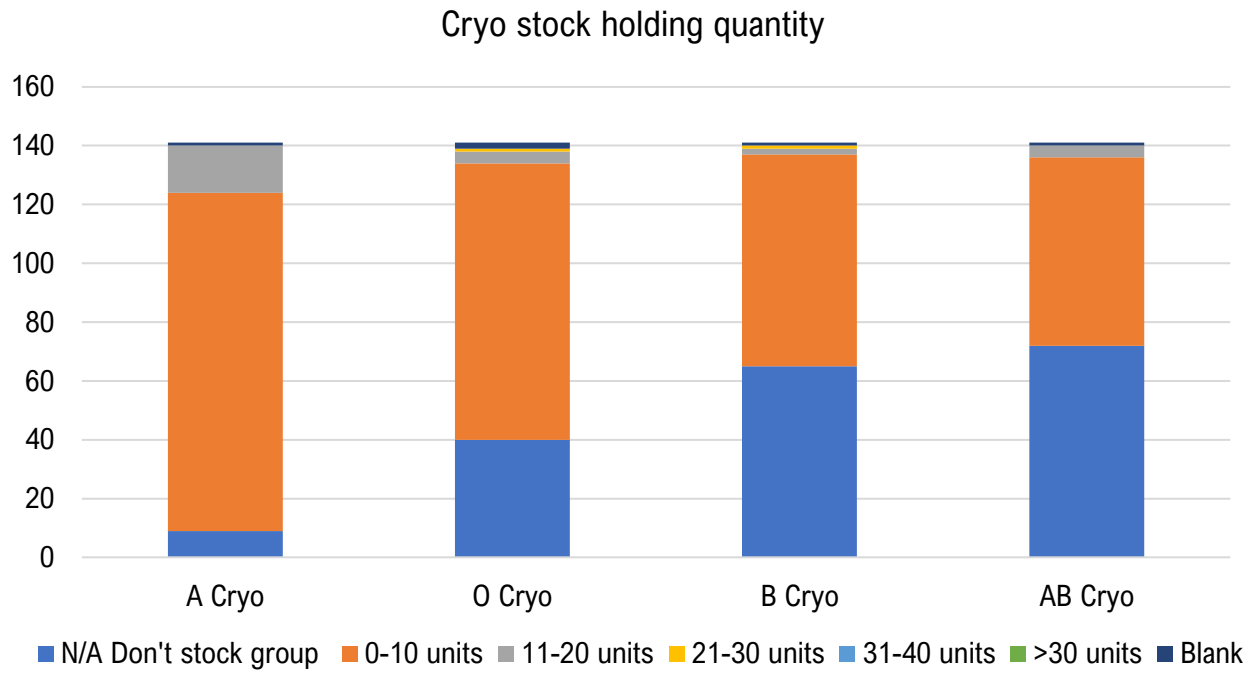

Respondents said groups A and O FFP were held in higher quantities than groups B and AB FFP.
When existing BSMS user groups (for PLT) and stock quantity are compared there is a spread of stock quantity held across the user groups with **no correlation** seen.

Most hospitals hold group A cryo (131 hospitals), closely followed by group O (99 hospitals).
Lower quantities of group B and AB cryo are held.

There is **no correlation** with quantity held and user group.

Commercial Frozen Products and Fibrinogen

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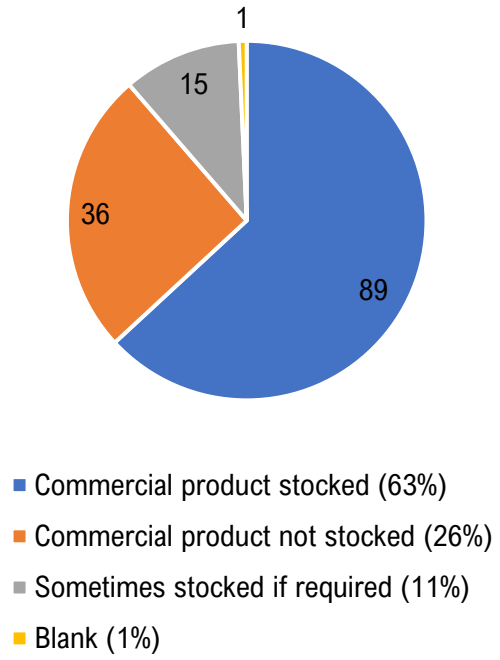
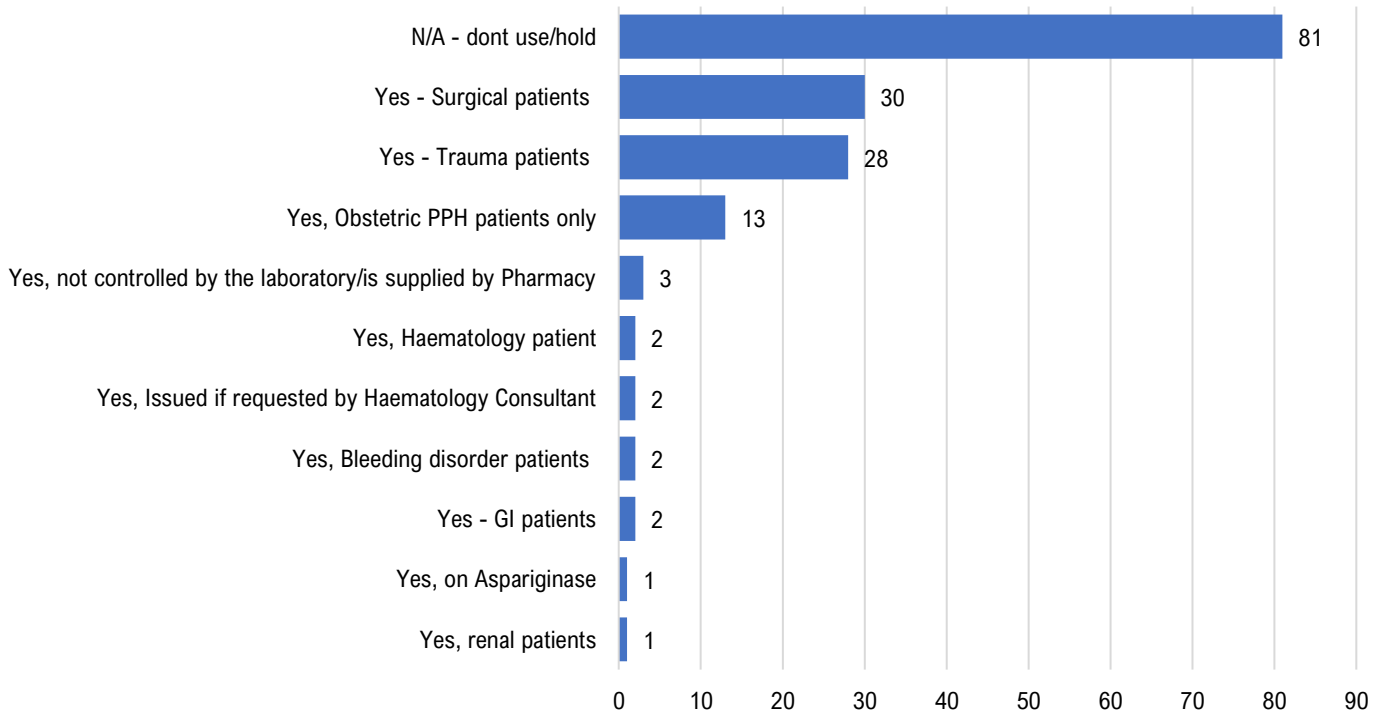
Do you stock commercial plasma products e.g. SDFFP?



Do you issue fibrinogen concentrate?



The majority of respondents (63%) do stock frozen commercial products (e.g. Solvent Detergent treated FFP (SDFFP)). Some hospitals (15 hospitals) do not routinely stock this product but will order and stock if required for a specific requirement (11%).
This survey did not ask respondents for usage examples of this product.

81 hospitals do not stock Fibrinogen concentrate (57%).
There are 60 hospitals (43%) that do routinely stock this product the main usage categories were for surgical, trauma or obstetric patients experiencing postpartum haemorrhage.

VANESA Data Recording

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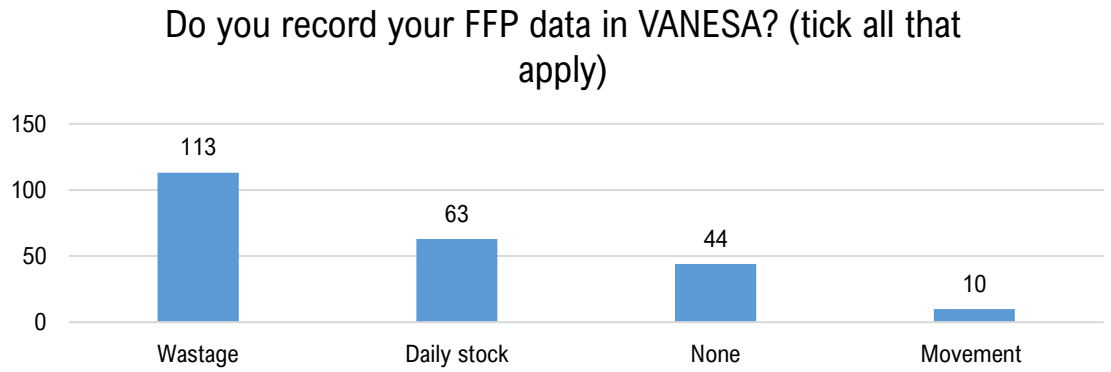

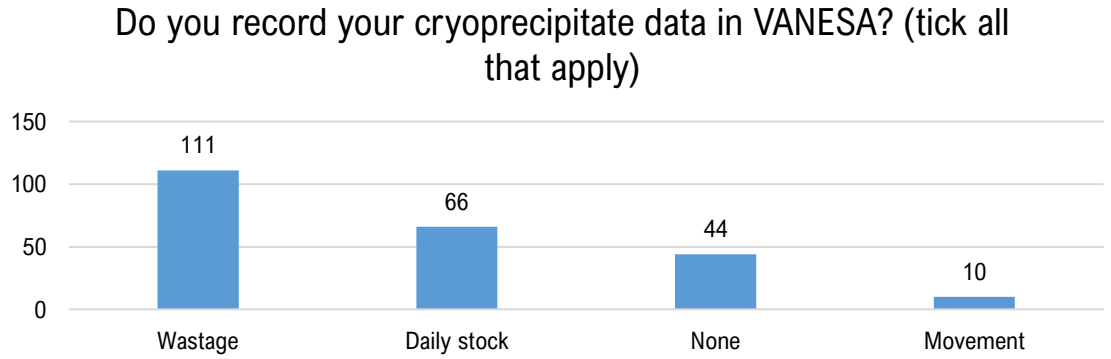

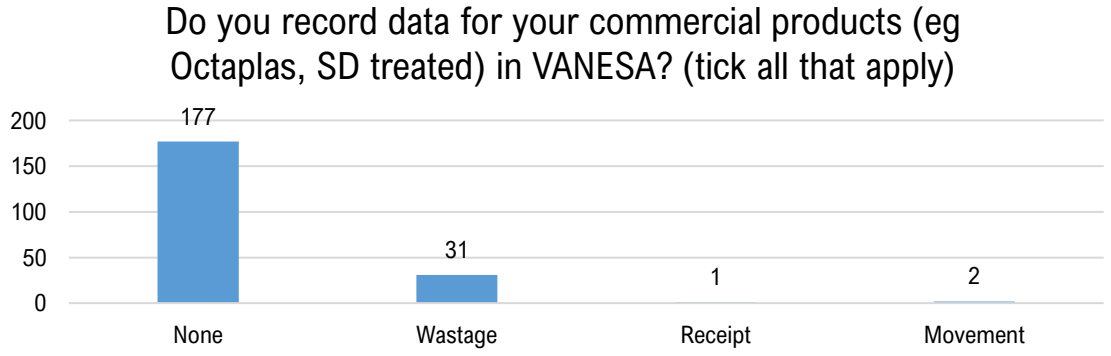

For FFP and cryo, wastage data was stated as highest recorded in VANESA (FFP 113, cryo 111), followed by stock data (FFP 63, cryo 66).

Commercial product (SDFFP) inventory data is not highly recorded in VANESA, with the majority of sites (177) responding that no data is recorded.

Reasons for not recording data in VANESA include;

Reason stated by respondents who stated no data is recorded;	Number of responses
Wasn't aware it was an option/never have historically	51
Do not keep stock	32
Need to change process - not a high priority	11
Transferred to avoid wastage	4
Minimal stock holding and movement so recorded as required	2

Component Usage Practices (3 questions)

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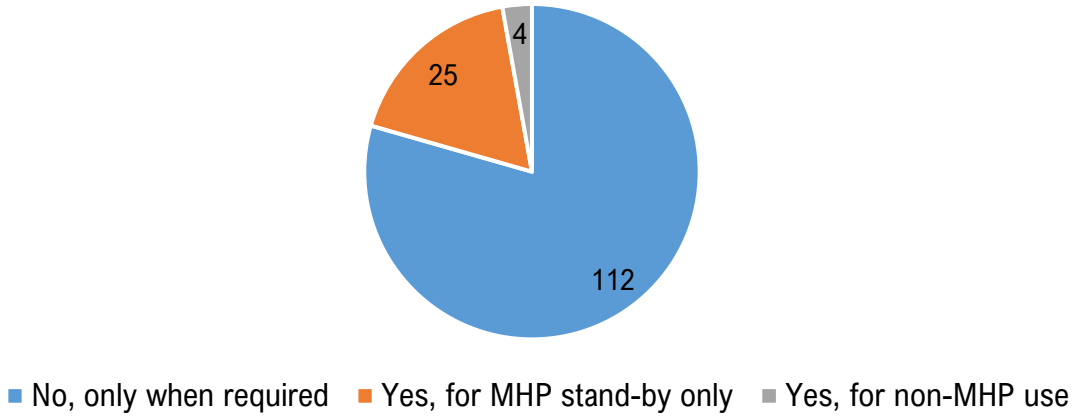
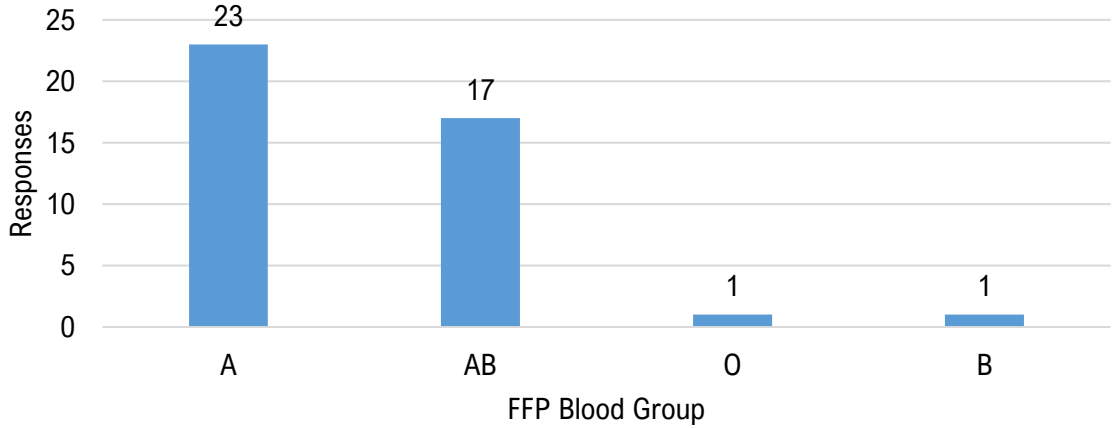
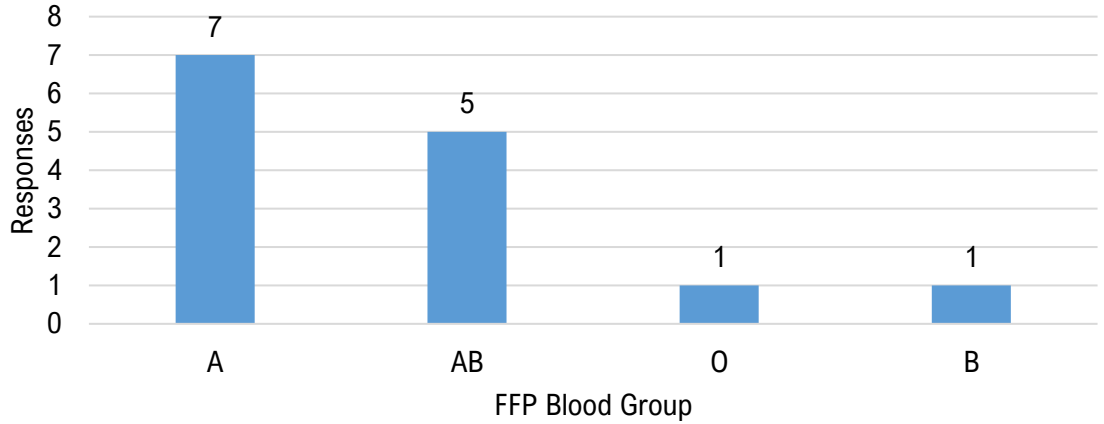
1. Do you pre-thaw FFP routinely (so there is thawed component available for rapid issue 24/7)?



2. If you do pre-thaw for MHP use, which blood group(s) do you select?



3. If you pre-thaw FFP routinely for non-MHP use, which blood group(s) do you select?



There were 3 questions regarding the practice of pre-thawing FFP for rapid issue. The majority of responses (112/141, 79%) indicated they do not pre-thaw FFP, 29/141 (21%) indicated they do pre thaw FFP.

Those that do pre-thaw FFP utilised group A or AB FFP for both MHP and non MHP use. There was 1/141 response that indicated they pre-thaw and use all 4 blood groups and 1/141 response that indicated group O FFP for non-MHP use, however this was an error later highlighted by the hospital, who actually use group A (data has been corrected).

Component Usage Practices cont.

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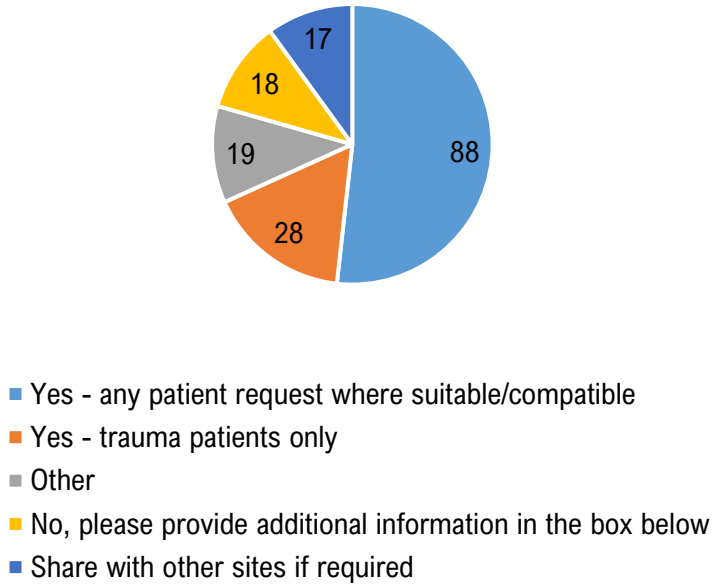
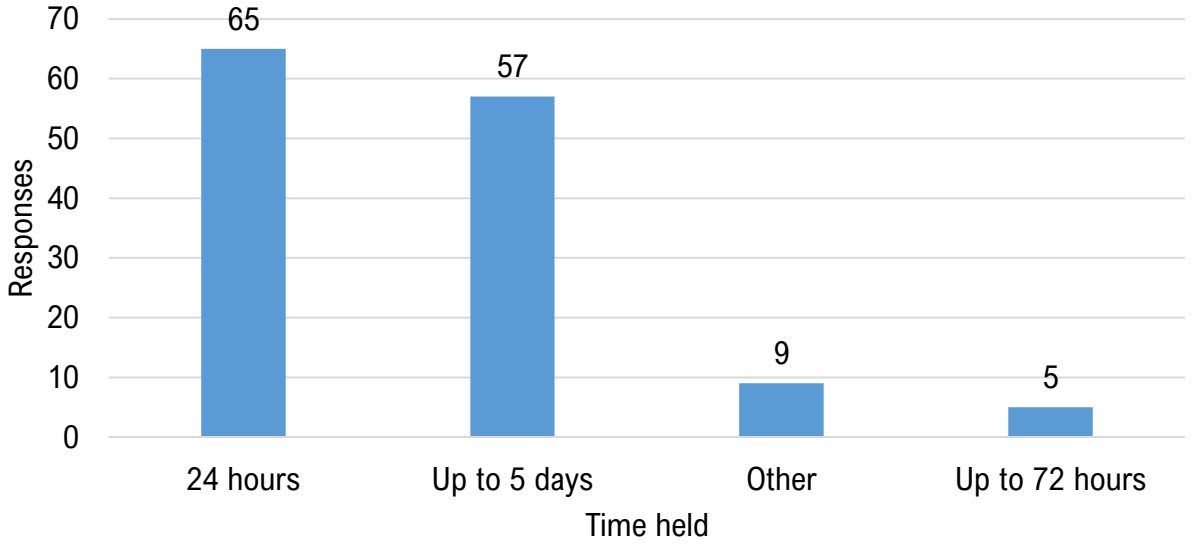
Do you re-allocate unused previously defrosted FFP?



How long do you hold unused pre-thawed FFP?



When asked if pre-thawed FFP was reallocated, the majority of responses (87%) indicated yes the component is reallocated appropriately.

Hospitals that do not re-allocate FFP explain this is due to low numbers of patients requiring FFP or constraints with LIMS systems.

When asked how long thawed, unused FFP was stored prior to discarding, most popular responses were either 24 hours (65/141 46%) or 5 days (120 hours) (57/141 40%). Those who provided additional comments stated that if stored for 5 days it would only be used for MHP patients.

Pre-Hospital Component Support Practice

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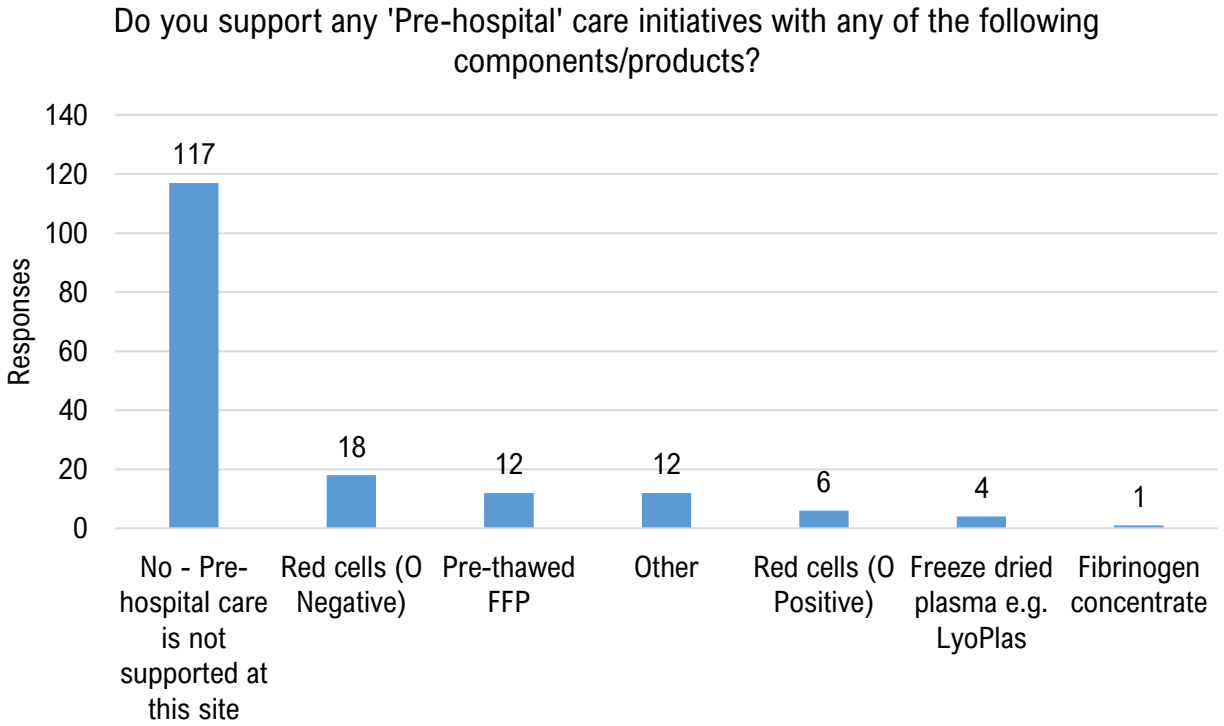

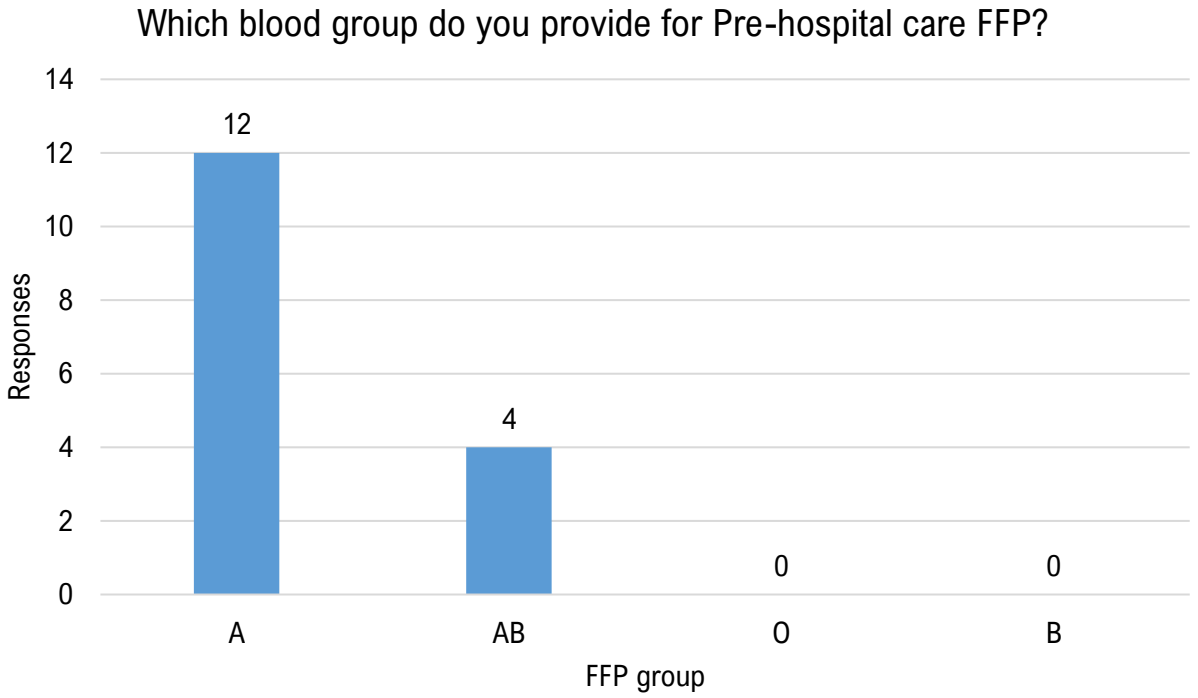

24/141 (17%) hospitals indicated they did support pre-hospitals care initiatives, whilst the majority of responses (117/141 (83%)) indicated they did not support any pre-hospital care initiatives.

A variety of components are issued, sometimes in combination, for pre-hospital care, including O Neg and O Pos RBC, FFP, Lyoplas and Fibrinogen concentrate. One hospital responded that they are about to participate in the SWIFT trial.

The preferred group of FFP provided for pre-hospital care is group A FFP (12/16) with group AB FFP also being provided by 4 respondents.

Cryoprecipitate Group Usage Practices

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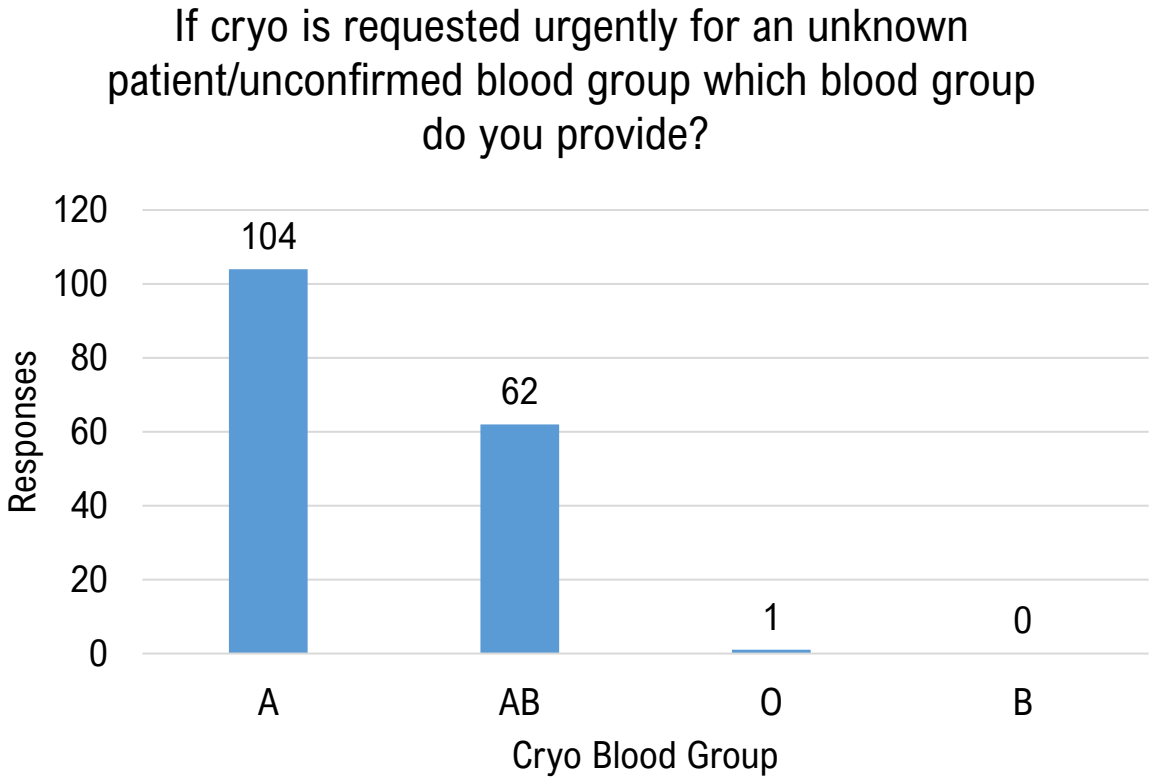

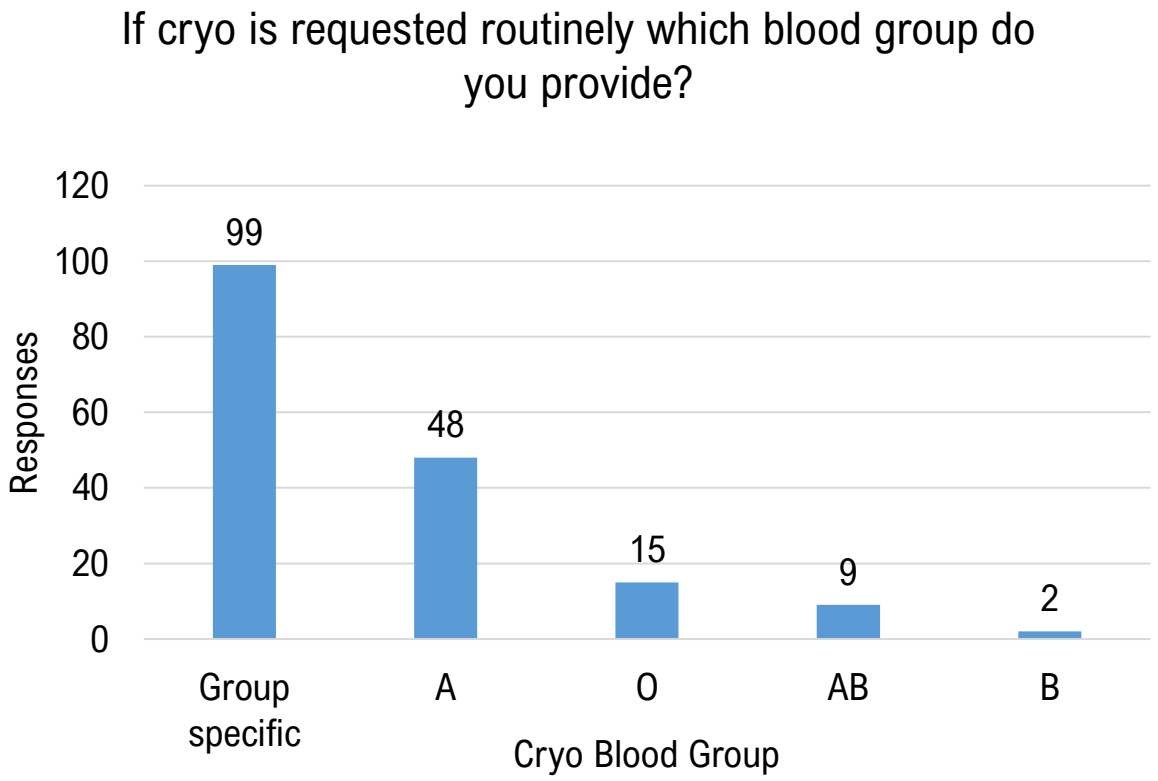

Hospitals were asked about blood group selection for cryo provision for patients where blood group is both unknown and known.

Group A cryo is selected for the majority (104/141) of patients where the blood group is unknown, closely followed by group AB (82/141). For patients where blood group is known the majority of hospitals indicated they would select group specific cryo (99/141), whilst some hospitals indicated they would select a generic group, primarily group A cryo (48/141).

Cryostat-2 Trial Participation and Practices

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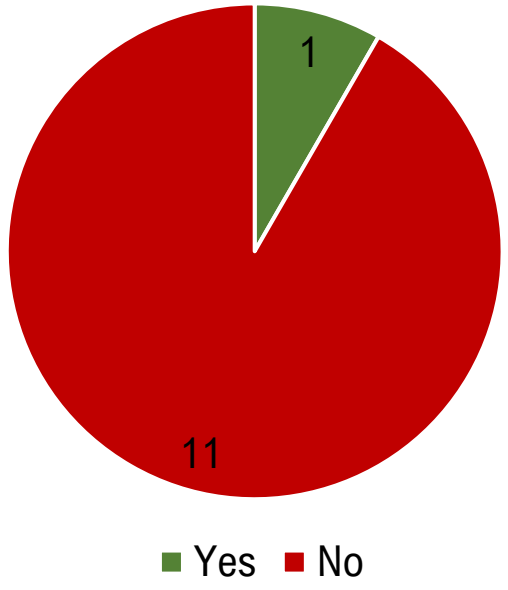
If you took part in the Cryostat-2 Trial have you continued to provide cryoprecipitate early in trauma/major haemorrhage?



Hospitals were asked whether they participated in the Cryostat-2 trial, 129/141 (91%) responses indicated they did not participate. For the 12 hospitals who indicated yes they did participate in the trial, 1/12 hospitals indicated they have continued to provide 2 units of cryo early in trauma/major haemorrhage but had already integrated this practice prior to participation in the trial.

Summary and Limitations

Blood Stocks Management Scheme

The purpose of this survey was to obtain qualitative data from hospitals on their current inventory management practices for frozen components.

- The majority of responses (112/141, 79%) indicated they do not pre-thaw FFP whilst 29/141 (21%) indicated they do pre thaw FFP for rapid issue.
- 24/141 (17%) hospitals indicated they did support pre-hospitals care initiatives, whilst the majority of responses (117/141 (83%)) indicated they did not support any pre-hospital care initiatives. A variety of components are issued for pre-hospital care, including O Neg and O Pos RBC, FFP, lyophilised plasma and fibrinogen concentrate.
- When asked how long thawed, unused FFP was stored prior to discarding, most popular responses were either 24 hours (65/141 46%) or 5 days (120 hours) (57/141 40%). Those who provided additional comments stated that if stored for 5 days it would only be used for MHP patients.
- Some hospitals stock alternative components such as fibrinogen concentrate, lyophilised plasma, commercial frozen product (solvent detergent treated FFP (SDFFP)) to provide clotting factor support to patients.
- VANESA data reporting is positive, however there are missing data for frozen component wastage, stock and movements. 51 respondents ‘were not aware’ of some aspects of data reporting in VANESA for frozen components.

Limitations

This survey collected qualitative data from voluntary respondents. This data is not comprehensive, may contain additional error to those identified (duplications were removed and a retrospective email was received notifying of a question answered incorrectly) and missing data from hospitals who did not participate.

Survey Conclusions

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Conclusions

Despite these limitations there are some conclusions that can be made from the survey responses collected.

- Variations in stock holding and provision of frozen components were identified, this supports that there are additional factors contributing to the changes in frozen component issues and wastage. There has been an increase in the adoption of clotting product alternatives (e.g. lyophilised plasma, fibrinogen and frozen commercial product - SDFFP) which may be used as alternatives to frozen components due to benefits such as effectiveness, storage or compatibility. Additional variation in practices may also be related to differences in hospital specialties supported, operational constraints and staffing, however there were not sufficient responses to draw any firm conclusions.
- Whilst 17% respondents indicated they do support pre-hospital care initiatives, not all who support pre-hospital care provide FFP. There may be other hospitals supporting pre-hospital care that did not respond and it is understood that from those hospitals who do provide FFP for these initiatives there is unavoidable FFP wastage attributed to this supporting this service.
- 21% of respondents indicate they pre-thaw FFP for rapid issue. There were 60% responses from very high and high user groups so it is suspected the number of hospitals pre-thawing FFP is likely to be higher, particularly for major trauma centres. Responses identified that thawed FFP that is not transfused is not always kept for maximum recommended periods and re-issued to appropriate patients.[1]
- Current evidence supports utilisation of compatible group frozen components (e.g. group A HT- plasma) for patients of unknown blood group to conserve group AB plasma.[1,2,3] There were 8 hospitals that reported they stock only group AB FFP or cryo and several hospitals reported utilisation of group AB FFP or cryo for an unknown trauma patient.
- VANESA data submission is known to be lower for frozen components, one barrier to data submission was reported to be that respondents are unaware of the functionality to record stock and wastage. The data obtained through this survey demonstrate that because clinical practices have changed, the reasons behind wastage reported have also changed since the original wastage categories were developed.
- Not all hospitals stock both FFP and cryo therefore the development of BSMS frozen component usage categories would need to be based on issue quantities for individual frozen components. BSMS can utilise VANESA data to identify the most appropriate categories to assign hospitals to based on number of issues according to individual frozen components.

Recommendations

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Recommendation	Action identified
Promote best practice guidance for utilisation of FFP up to 5 days post defrosting for patients with unexpected major bleeding only. For patients with other indications, FFP is suitable for 24 hours post defrost.[1]	Ways BSMS aim to share our survey report and recommendations; • The BSMS quarterly newsletter and 'The NHSBT Update'. • The BSMS website • Presentation by BSMS at regional and national meetings and internally within NHSBT where appropriate.
To conserve AB plasma, promote the evidence for utilisation of compatible blood group for MHP or major unexpected bleeding in unknown patients i.e. Group A HT Neg.[1,2,3]	
Promote and assist hospitals with VANESA data entry for frozen component wastage, stock and movement to allow BSMS to continue to support hospitals and NHSBT using data supplied by hospitals.	• BSMS VANESA user guide is available to assist hospitals with navigating data entry. • BSMS aim to produce some digital materials to assist with using VANESA e.g. 1 minute how to guides and Webinar materials.
BSMS to explore the amendment of wastage categories to capture the changes in the ways frozen components are used.	• BSMS to perform development work to improve definitions of wastage categories.
BSMS to develop frozen component usage categories based on number of issues to allow development of KPIs and benchmarking for frozen components.	• BSMS to assign hospitals discrete FFP and cryo user categories and develop KPI and benchmarking for issues and wastage.

References

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References

1. Green, L., Bolton-Maggs, P., Beattie, C., Cardigan, R., Kallis, Y., Stanworth, S.J., Thachil, J. and Zahra, S. (2018), British Society of Haematology Guidelines on the spectrum of fresh frozen plasma and cryoprecipitate products: their handling and use in various patient groups in the absence of major bleeding. Br J Haematol, 181: 54-67. https://doi.org/10.1111/bjh.15167
2. Dunbar, N.M., Yazer, M.H. and (2017), Safety of the use of group A plasma in trauma: the STAT study. Transfusion, 57: 1879-1884. https://doi.org/10.1111/trf.14139
3. Chhibber, V., Greene, M., Vauthrin, M., Bailey, J. and Weinstein, R. (2014), Group A Plasma for Emergency Release. Transfusion, 54: 1751-1755. https://doi.org/10.1111/trf.12537