

# Analysis of Fresh Frozen Plasma Waste and Implementation of Liquid Plasma Utilization for Life-Threatening Bleeding Events Policy

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## INTRODUCTION

Fresh frozen plasma (FFP) is a blood product that is typically indicated for the management of bleeding in patients who are coagulopathic. Historically, 25-30% of patients who are critically ill receive FFP transfusions. In massive transfusions, a 1:1 ratio between red blood cells and fresh frozen plasma should be utilized. This guideline directed strategy necessitates the expeditious procurement of FFP, which presents with certain limitations.

Once the decision is made to transfuse, it takes approximately 20-30 minutes to thaw the product. Thawing can lead to packaging breaks making product unusable. Once thawed and not used within the appropriate time frame, typically 5 days, the FFP is considered "wasted product." To minimize waste and provide prompt care to hemorrhaging patients, many healthcare facilities have started using never frozen, liquid plasma (LQP). Similar to FFP, LQP is obtained from donated blood, however, unlike FFP, it is refrigerated eliminating the need for thawing and extending the shelf life significantly; 28 days on average. The advantageous use of LQP has led to decreased product waste, alongside quicker utility of product during life-threatening hemorrhagic events.

The purpose of this project is to analyze the amount of wasted FFP and to introduce a LQP utilization policy by comparing OSUMC FFP usage data to area hospitals.

## AIM Statement

Utilizing liquid plasma to obtain timely control of life threatening bleeding events resulting in cost savings.

## METHODS

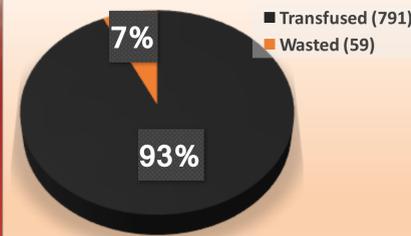
1. A literature review was performed to further analyze the appropriate use of liquid plasma with benefits in regards to transfusion protocols and improvement with wastage of frozen plasma.
2. A plan-do-study-act model was designed involving the participating resident members of the Transfusion Committee in addition to the laboratory manager.
3. 2019 FFP transfusion versus wastage data was analyzed with the intention to further assess the potential for cost savings while decreasing waste. This data was compared to area hospitals in regards to appropriate practices effective for waste reduction with a review of standards and evidence reported in the medical literature.
4. A policy for maintaining stock of liquid plasma was developed based on current medical literature and policies from both the local blood bank and area hospitals.

## RESULTS

### Overview of Fresh Frozen Plasma Activity for 2019 at OSUMC

Ordered	1215
Transfused	791
Wasted	59

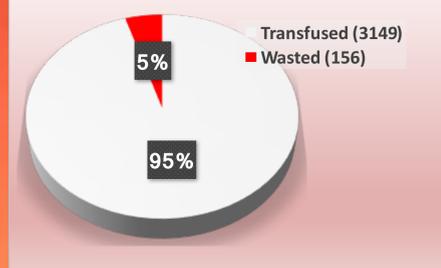
### OSUMC 2019 FFP Transfused vs. Wasted



### SJH 2019 FFP Transfused vs. Wasted

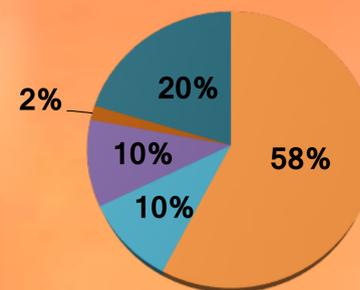


### SFH 2019 FFP Transfused vs. Wasted



### Sources of Wasted FFP OSUMC 2019

Thawed, Not Given Broke in Water Bath ECMO Expired Other



Cost of waste = ~\$2,500\*

## LIQUID PLASMA:

-Cost-saving\* -Time-saving  
-Life-saving

No difference in cost of product (FFP vs. LQP)

## Policy:

A minimum of 2 units\* LQP to be kept in-house for expeditious use during life-threatening bleeding events and ECMO transport.

\*This number is based on OBI recommendations for hospital size

## DISCUSSION

Current U.S. and international literature review demonstrated liquid plasma's role primarily involved life-threatening bleeding events. Oklahoma Blood Institute (OBI) reports that hospitals with similar bed capacity to OSUMC maintain a stock of 2 units of LQP for such events at any given time. Some sources report LQP's coagulation profile to be superior in comparison to FFP.

Data regarding FFP waste of area hospitals was reviewed and compared to OSUMC. Findings demonstrated that area hospitals maintained a supply of liquid plasma for expeditious use for bleeding events. Additionally, the percentage of FFP waste at OSUMC was higher than that of the neighboring facilities who were able to provide data, regardless of hospital bed capacity. SJH and SFH had waste of 3% and 5%, respectively being larger facilities compared to OSUMC, while SMRMC (Russellville, Ark.) had a waste of 6%, being a similar-sized institution.

Post analysis and literature review, we propose that **LQP be kept on-hand at the OSUMC blood bank to be used in the event of life-threatening bleeds, with the ability of being used for ECMO transport when necessary.**

## CONCLUSION

Liquid plasma is indicated for the initial treatment of patients who are undergoing massive transfusion due to life-threatening hemorrhage. It can play a vital role in rapid correction of coagulopathies leading to conservation of other blood products including fresh frozen plasma. While there are appropriate situations when FFP should be transfused over LQP, i.e. coagulopathies consisting of deficiencies of factor V, the use of LQP serves several benefits including:

- storage time of up to 26 days (versus that of 5 days for thawed FFP)
- decreased preparation time and rapid availability
- elimination of thawing process with product damage.

In order to decrease FFP waste at OSUMC, it is proposed that LQP be kept in house for use in life-threatening hemorrhages. This product can be immediately available for massive transfusions and quickly administered to achieve hemodynamic stability. LQP would eliminate the need for awaiting the thawing process, resulting in timely control of life-threatening bleeding events, with decreased waste of FFP resulting in cost savings.

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Better hemostatic profiles of never-frozen liquid plasma compared with thawed fresh frozen plasma

Nena Matijevic; Yao-Wei Wang; Bryan Cotton; Elizabeth Hartwell; James Barbeau; Charles Wade; John Holcomb;

Publication Date: July 2014

Never-frozen liquid plasma blocks endothelial permeability as effectively as thawed fresh frozen plasma

Yanna Cao; Anahita Dua; Nena Matijevic; Yao-Wei Wang; Shibani Pati; Charles Wade; Tien Ko; John Holcomb;