

The Impact of Multidisciplinary Interventions on Transfusion Practices

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OBJECTIVES

- Conduct a systematic review of multidisciplinary interventions aimed at optimizing transfusion practices.
- Evaluate the impact of implemented multidisciplinary interventions:
 - Blood product wastage
 - MTP (Massive Transfusion Protocol) active time
- Identify opportunities for further improvement in transfusion practices

INTRODUCTION

Appropriate transfusion practices are critical for patient care. However, the improper use of blood products can lead to complications and mortality. Despite more restrictive transfusion practices and limited availability of O negative blood, also known as uncrossed-matched blood, there is still a high demand for its use. The transfusion rate of O negative blood has increased since 2013, with Massive Transfusion Protocols (MTPs) being a significant source of usage. However, inappropriate MTP use can result in significant blood wastage, which is particularly concerning as MTPs involve transfusing over 10 units of RBCs within a 24-hour period. At Oklahoma State University Medical Center (OSUMC), MTPs are administered at a ratio of 4 units of RBCs to 4 units of fresh frozen plasma to 1 unit of platelets. The risks associated with MTPs include dilutional coagulopathies, citrate toxicity, hypothermia, hypocalcemia, and hyperkalemia.

In Spring 2020, the Oklahoma Blood Institute (OBI) contacted Oklahoma State University Medical Center faculty about the high usage of O negative blood and the need to improve transfusion practices. This project aims to evaluate the effectiveness of interventions designed to enhance transfusion practices, specifically in uncrossed-match transfusions and the Massive Transfusion Protocol (MTP).



Picture 1: MTP Practice Drill
This picture showcases the transfusion committee conducting a multi-disciplinary practice MTP drill conducted in the ER

METHODS

To overcome gaps in transfusion practices, the OSUMC Transfusion Committee streamlined the MTP process and blood product usage. The committee consists of members from the Blood Bank, Oklahoma State University (OSU) attending and resident physicians across different specialties, and nursing. Monthly meetings were held to review transfusion cases with potentially inappropriate transfusions resulting in a letter requesting additional clarification and education for the ordering physician if needed.

Additional interventions were implemented to further improve OSUMC's transfusion practices.

Interventions:

In October 2020, the OSUMC Blood Bank received education on the age, sex, and appropriateness of transfusing RH negative blood products.

In Fall 2021, an annual hospital-wide Grand Rounds session was initiated to review transfusion practices with the Choosing Wisely Campaign, uncrossed match transfusions, and MTP. The panel included members from the OSU Transfusion Committee and OBI for questions.

In Spring 2022, the Transfusion Committee performed a quality improvement project to provide additional education about the proper utilization of MTPs and emphasized documentation to residents across different OSU specialties.

In Summer/Fall 2022, nursing staff worked with quality improvement and the physicians within the transfusion committee to standardize the MTP process via practice drills. These drills were held in the ER, ICU, and OR settings with respective staffing. The process emphasized interdisciplinary involvement with nursing staff, attending and resident physicians, Blood Bank, and quality assurance participation.

In 2023, a standardized form of documentation was introduced in order to more closely track and report the usage of blood products during a called MTP.



Picture 2: Grand Rounds Presentation 2024 Panel
This picture showcases the guest panel from OBI, Pathology, and Blood Bank discussing MTP initiatives and proper transfusion practices.

RESULTS

Data from OSUMC Blood Bank was obtained between 2021 - 2024 on transfusion practices, including discard reports, O negative blood usage, uncrossed matches, and MTP usage, both before and after implementing interventions. This data will be analyzed to evaluate the effectiveness of the interventions, particularly in relation to MTP and uncrossed matched blood usage.

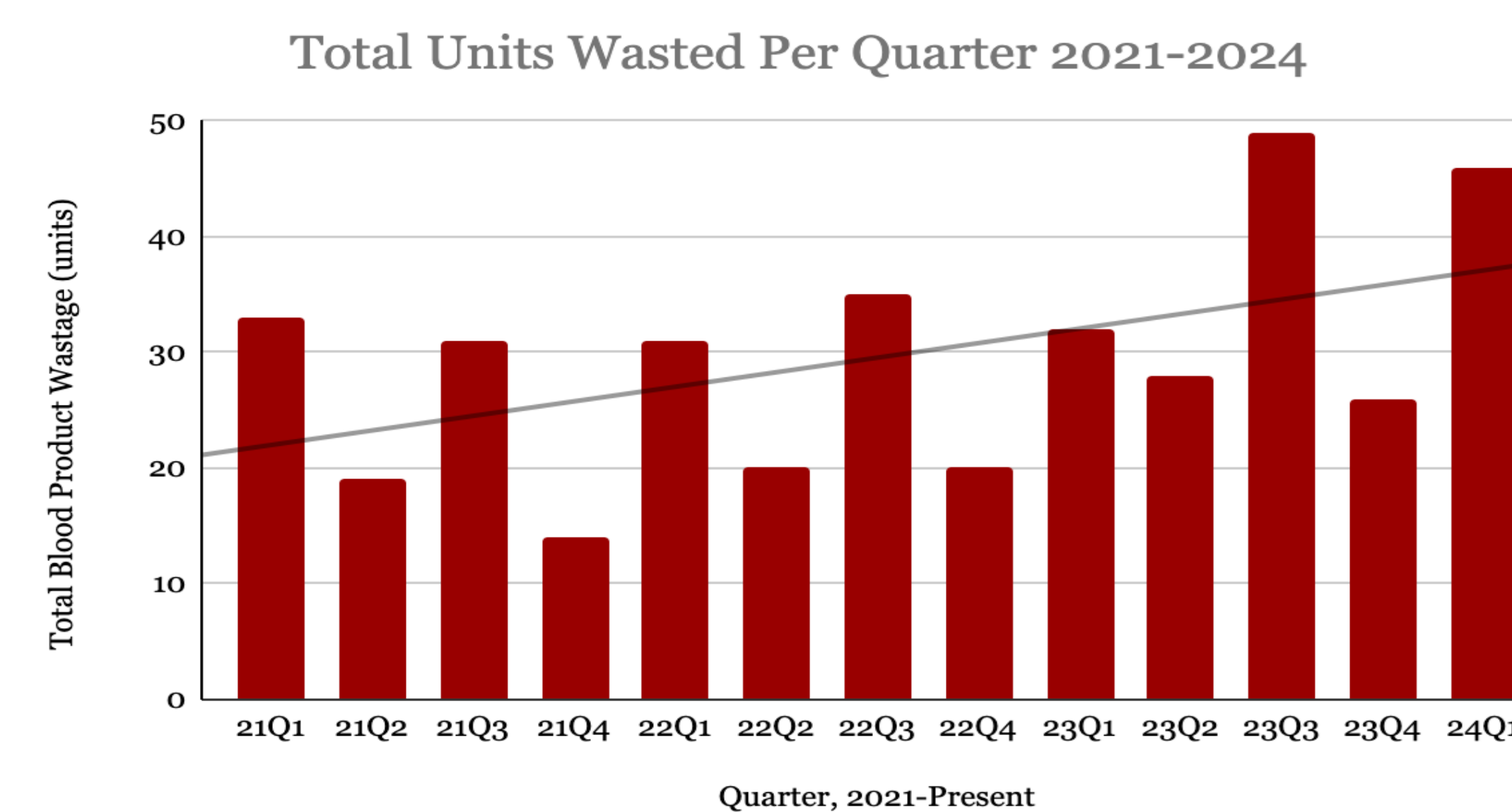


Figure 1. Total hospital-wide blood product usage, 2021-2024
Total blood product wastage has declined since 2020 based on prior data analysis. From 2021 to present there has been an overall increase in the amount of blood product wastage. Total wastage in 2021 was 97, in 2022 was 106, in 2023 was 135 and the first quarter of 2024 was 46.

| | 2021 | 2022 | 2023 | 2024-Q1 |
|--|------|------|------|---------|
| Total MTPs Called | 29 | 19 | 20 | 6 |
| Total Products Used | 261 | 301 | 189 | 49 |
| Total Products Wasted | 30 | 37 | 41 | 10 |
| Documented MTP Start and Stop Times | 14% | 79% | 80% | 83% |

Table 1. MTP blood usage and wastage, 2021 - present

Table 1 above compares the number of MTPs called from 2021 to present, as well as the total amount of blood products appropriately transfused (used) cumulatively during MTPs for the corresponding year. Products wasted denotes those units that were not transfused due to various reasons including expiration and improper temperature control. Wasted products are discarded appropriately. Documented MTP Start/Stop Times acts as a marker for appropriate use of MTP protocol.

DISCUSSION

When compared to previous data analysis from 2020, prior to the implementation of educational interventions related to MTP standardization and proper transfusion practices, the amount of blood product usage and wastage has decreased overall. However, from this initial decrease in 2021 and 2022, we can see an increase in the amount of blood product usage in 2023 and the first quarter of 2024. This initial decrease and now increase in usage speaks to the need for continuing education and reinforcement of proper MTP and blood product usage practices.

The increase in usage noted allows for opportunity to continue tailoring interventions that would allow for further education on the importance of proper blood product usage.

As the overall wastage of blood products increased in 2023 compared to previous years, we see that the amount of wasted products during MTPs has grossly remained the same, if not decreased. This continues to indicate better awareness of appropriate orders among residents and staff with regard to MTP practices. Through continued education and practice trials, we should continue to see a reduction in blood product wastage and MTP use. Our standardized MTP protocol has contributed to this success, leading to decreased wastage and fewer MTPs needed.

CONCLUSION

The comprehensive outlined education initiatives have resulted in improvements in appropriate blood product usage, resulting in reduced waste of valuable resources and improved use of the massive transfusion protocol. The results underscore the importance of ongoing efforts to promote evidence-based transfusion practices and minimize the risk of adverse events associated with transfusions. Moving forward, the committee plans to maintain our educational efforts through grand rounds, interdisciplinary meetings, and practice drills to reinforce proper protocol usage. Further potential areas of investigation include assessing the impact of standardized transfusion protocols on patient outcomes, streamline timing between orders and transfusions, and explore additional ways to minimize wastage across all blood products. The transfusion committee is dedicated to identifying gaps in transfusions and equipping our residents and staff with the knowledge and skills needed to deliver optimal patient care.

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