InfoUsion (Informatics + Transfusion Medicine): A Big Data Solution for Monitoring Blood Product Utilization Data in Near Real-Time

Bryan Guillory MD, Lori Silva RN MSHI, Brad Elkins, Danielle Sylvester MT, Diana Hendon RN, Daniel Heisler, James Sikora MD, Lance Williams MD, X. Long Zheng MD PhD, Marisa B. Marques MD

Division of Laboratory Medicine, Department of Pathology, The University of Alabama at Birmingham; Birmingham, AL 35249

Abstract: InfoUsion is a web-based blood utilization application that provides a big data solution to creating automated, actionable blood utilization data visualizations that are updated in near real-time. Thus, InfoUsion can facilitate quick detection and intervention when inappropriate transfusions happen, thereby reducing usage and contributing to positive outcomes for patients.

Introduction: Studies show that a restrictive transfusion approach leads to better outcomes.\(^1\)\(^2\) Therefore, in order to improve patient outcomes by optimizing blood product utilization, we must develop tools that allow for monitoring blood product utilization in near real-time. With the advent of the electronic medical record and data warehousing, we now have a container for electronically capturing and storing blood utilization data. That data can then be organized and visualized using big data analytics tools. These tools also allow for reporting data trends in near real-time.

Methods: A list of blood product codes were obtained from the UAB Blood Bank and used to locate blood utilization data within the data warehouse. The data were organized into tables, and big data analytics tools were used for visualization. We validated the data in InfoUsion by comparing the results with the previous method of manually collecting data and creating reports using Excel.

Results: When comparing one month of utilization data, our manual method showed 8% more transfused units than that reported in InfoUsion. Deeper analysis showed approximately 5% discordance between the numbers of blood products transfused reported with the manual method versus InfoUsion. This discordance was attributed to errors in the manual method that led to single units being counted multiple times in patients who had more than one medical record number in the electronic health record. Once the duplicates were removed, there was 100% concordance between the manual reporting method and InfoUsion. When broken down by units transfused by location, the manual method reported 7% more units being reported at a specific location over that reported by InfoUsion. Further analysis showed that no location was listed for 7% of the units reported in InfoUsion.

Conclusion: InfoUsion can be used to generate accurate, actionable blood utilization data visualizations that are updated in near real-time. Future plans for InfoUsion include incorporating predictive analytics capabilities as well as research studies on how it impacts blood product utilization and patient outcomes at our institution.

References