ASA News
AMERICAN STATISTICAL ASSOCIATION
Promoting the Practice and Profession of Statistics®
732 North Washington Street, Alexandria, VA 22314 • (703) 684-1221 • Toll Free: (888) 231-3473 • www.amstat.org • www.twitter.com/AmstatNews

# New Statistical Model First-of-Its-Kind to Forecast Future Demand of Blood Platelets, Reduce Waste by Analyzing Hospital Patient Data

*Approach that does not compromise patient care could save $80 million annually*

ALEXANDRIA, Va. (January 29, 2018) – Donated blood platelets continue to be wasted in today's modern health care delivery system since they have a short shelf life and must be used within five days of collection, according to the American Red Cross. Recognizing the challenge this presents in providing optimal patient care, researchers at Stanford University and Stanford Blood Center have developed a new statistical model that forecasts future platelet demand, thereby reducing waste—a development that could save millions of dollars annually. The research, titled "Big Data Modeling to Predict Platelet Usage and Minimize Wastage in a Tertiary Care System," appears in a recent issue of *Proceedings of the National Academy of Sciences* (*PNAS*).

"Although blood products are essential to modern medicine, currently, there is no reliable way to predict the use of perishable medical resources like blood platelets, as hospitals and blood banks have not yet developed a feasible method for predicting fluctuations in product usage," said Tho Pham, clinical assistant professor in the department of pathology at Stanford University and medical director at Stanford Blood Center. "Due to the combination of absolute need, uncertainty in daily demand and short shelf life of platelet products, they are often wasted due to expiration."

Typically, blood centers employ historical averages as they manufacture, test and then distribute product to hospital customers. Platelets vary the most in daily usage, have short shelf lives (practically only three days) and are expensive to produce and store. In a large tertiary care setting, where close to 15,000 units of platelets are potentially transfused annually, the wastage may translate close to $1 million.

Pham collaborated in the development of a first-of-its-kind statistical model that uses hospital patient data to determine platelet transfusion needs days in advance. His collaborators include Robert Tibshirani, professor of biomedical data science and statistics in the department of statistics at Stanford University; Saurabh Gombar, instructor in the department of pathology at Stanford University; Allsion Zemek, pathologist at Stanford University; Gomathi Krishnan, computing information systems analyst in the department of biomedical data science-research informatics at Stanford University; Robert Scott of Stanford Hospital Transfusion Service; and

Balasubramanian Narashimhan, senior research scientist in the department of statistics and director of the Data Coordinating Center in the department of biomedical data sciences at Stanford University.

Researchers investigated platelet usage patterns at the Stanford University Hospital, Stanford Transfusion Service and Stanford Blood Center and specifically interrogated the relationship between platelet usage and aggregated hospital-wide patient data over 29 consecutive months. They discovered platelet usage is highly dependent on weekday/weekend patterns, the number of patients with various abnormal complete blood count measurements and location-specific hospital census data.

“Leveraging this correlation, we built a model that forecasts platelet usage, guides collection practices and reduces wastage while maintaining a robust supply,” said Tibshirani. “Compared with historical expiration rates during that same time period, our model reduces the expiration rate from 10.5% to 3.2%. And, if implemented successfully nationwide, our model can potentially save $80 million in health care costs.”

The research team is in the process of implementing the model institutionally at Stanford and has fielded inquiries from blood centers throughout the United States and Canada. And while the statistical model thus far only applies to platelets transfusion and wastage, researchers believe it can be extended to other medical products that must always be on hand, have high costs and are perishable. “If generally applied,” they concur “this method represents a logical and automated approach to changing the way health care is delivered without ever compromising patient care.”

###

***About the American Statistical Association***
The ASA is the world’s largest community of statisticians and the oldest continuously operating professional science society in the United States. Its members serve in industry, government and academia in more than 90 countries, advancing research and promoting sound statistical practice to inform public policy and improve human welfare. For additional information, please visit the ASA website at www.amstat.org.

**For more information:**
Steve Pierson
(703) 302-1841
pierson@amstat.org