

## Oxygen Delivery Ability of Red Blood Cells Predicted by New Formula

SCIENTISTS have developed a way of assessing the ability of [red blood cells](#) to deliver oxygen by measuring their shape. This test could improve specialist transplant and transfusion practice as well as blood banking.



FlowScore- a formula developed at Oxford University in collaboration with NHS Blood and Transplant - predicts how quickly red blood cells release their oxygen. This process is important for oxygenating the [body's tissues](#), including organs and muscles, particularly in people receiving large transfusions.

Healthy fresh red blood cells have a distinctive biconcave – or dumbbell – shape for efficient oxygen release. During refrigerated storage, red cells become energetically stressed and more spherical, which slows [oxygen](#) release.

Factors affecting oxygen release from red cells were described at Oxford's Department of Physiology, Anatomy, and Genetics but the testing method was too laborious for routine use in blood agencies working to improve the monitoring of blood stored for transfusion. To adapt the research findings to [blood banking](#), NHS Blood and Transplant's Component Development Laboratory joined the project, providing blood samples stored according to NHS protocols and measurements from haematology analysers.

During routine blood counts, haematology analysers use [flow cytometry](#) - a method that passes cells through a laser beam to study their characteristics. When light hits a cell, the pattern of scattering reveals information about their size and shape. It was found that this information accurately predicts oxygen release from red blood cells, and the predictive formula was called FlowScore. The innovation makes measurements of red cell oxygen transport simpler, faster, and more accessible for laboratories worldwide.

Blood banks can now use FlowScore as a quality-control measure during processing and storage. For example, FlowScore was able to quantify the beneficial effects of rejuvenation and detect periods of blood handling outside blood bank-grade conditions. The latter may be critical in monitoring stored [blood quality](#) in developing countries with higher ambient temperatures. FlowScore could also provide a way to check the quality of blood for specific vulnerable patient groups, should future research show patient benefit.

Dr Peter Smethurst, from the NHSBT Blood and [Transplant](#) Component Development Laboratory, said: “FlowScore could become quite fundamental to the way blood is tested to ensure its quality. It is a technical breakthrough that should improve the monitoring of stored blood and drive improvements that will most benefit vulnerable recipients of red cell transfusions.”

Dr Rebecca Cardigan, Head of the NHSBT Blood and Transplant Component Development Laboratory, said: “FlowScore is an accessible marker of cellular performance to complement other [quality metrics](#). It has been very exciting to conduct this cross-disciplinary and multi-agency collaboration, translating the excellent basic research in Oxford to provide a basis for better assessment of stored blood and transfusion practice across the world.”

**Source:**

<https://www.news-medical.net/news/20241222/New-formula-predicts-oxygen-delivery-ability-of-red-blood-cells.aspx>