# Real Time Monitoring of Erythrocytes With the QTA Tracer System At the Ryhov County Hospital Blood Center Resulted in Changed Routine

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## Background

About 500 000 blood units are collected from blood donors and used for the preparation of blood components for blood transfusion in Sweden every year. The shelf life of a red blood cell (RBC) unit in SAGM solution is 42 days within a controlled temperature environment of 2-6˚C. There is limited knowledge about how time and especially temperature affect blood units. However, even today´s blood units all over the world are transported to different health care sites without a guaranteed quality control of the required cold-chain.

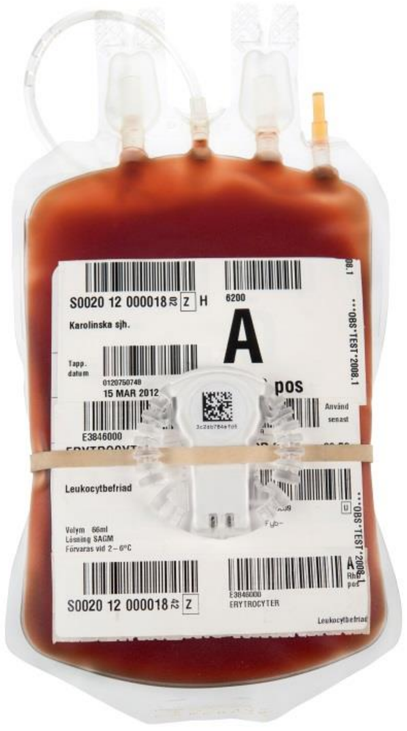
## Purpose

The purpose of this thesis is to explore the actual temperature variation during internal storage and internal transports of blood units during its actual shelf life in its real environment.

## Method

At the Blood Center at Ryhov the QTA Tracer System® was used log the temperature and time. Tracers were attached to 168 blood bags that then were stored at the internal refrigerators or transported between Jönköping and Värnamo.

The log-files were then analyzed with excel spreadsheet to identify individual blood bags, i.e. tracers, that were out of temperature range.



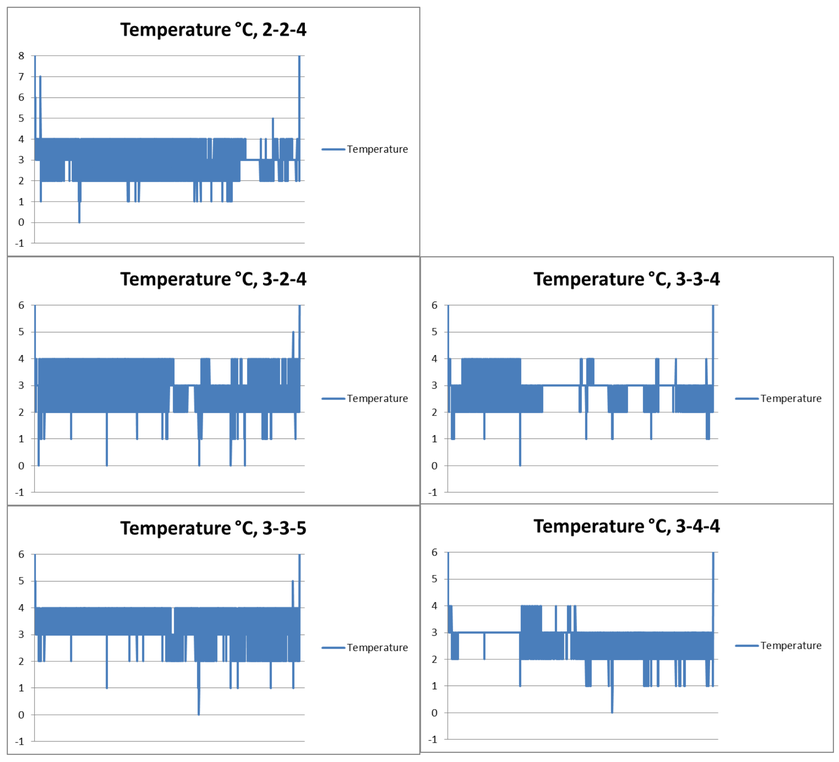

## Results

During the one week period from the 30th of November to the 8th of December 2012 in total 80 (n=80) tracers placed in refrigerators generated a 306 875 samples. During this week the measured temperatures at 75 positions (n=75), 93.75% were within the specified limit, 2-10˚ C.

At seven different occasions the measurements showed a to low temperature under the specified 2˚ C at five (n=5), 6.25%, of 80 positions specified.

During the period of May to September 2013 were 88 (n=88) blood bags with tracers shipped to Värnamo. At two different shipments did the temperature reached below the lower temperature of 2˚ C for four, 4,54%, of the marked blood bags.

In total 7 of the blood bags reached 0˚ C during these trials.




## Conclusions

The test showed that there were actual deviations from the standards in the physical environments surrounding the blood bags even though the correct procedures were followed. To all the blood bags that reached below 0˚ C a control of their level of hemolysis were performed. The fact that all of them had well below the stipulated 0.8% of hemolysis could raise the question of the ‘zero-tolerance’ to go below 0˚ C due to the risk of hemolysis.

The blood center made some minor changes to some of procedures to reduce the deviations. They also continuously monitor their blood bags to incremental develop their routines.

## Take home message

**Actual deviations from the standards in the environments surrounding the blood bags occurred.**

**To all the blood bags that reached below 0˚ C a control of their level of hemolysis were performed. All of them had well below the stipulated 0.8% of hemolysis .**

**This fact could raise the question of the ‘zero-tolerance’ to go below 0˚ C due to the risk of hemolysis.**

**Some changes was implemented to reduce the deviations. The blood bank continuously monitor their blood bags to develop their routines.**

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