

NHS BLOOD AND TRANSPLANT

LIVER ADVISORY GROUP

SUMMARY OF CUSUM MONITORING OF OUTCOMES FOLLOWING LIVER TRANSPLANTATION

LAY SUMMARY

Cumulative Sum (CUSUM) monitoring is a statistical method used to monitor patient deaths within 90 days of liver transplantation at each centre. It compares outcomes from a recent period with those from a historic reference period to identify any significant changes in early post-transplant survival.

If the number of patient deaths within 90 days is higher than expected, a “signal” may be generated. When this happens, the transplant centre is contacted to review the relevant cases and identify any issues or learning points, which are reported to NHS Blood and Transplant. This paper summarises the recent results of this analysis and any subsequent investigations.

INTRODUCTION

1. NHSBT monitors short-term patient outcomes following organ transplantation through centre specific cumulative sum (CUSUM) analyses. These are undertaken monthly for liver transplantation. These ‘within centre’ analyses enable prompt detection of any changes in mortality rates, providing external assurance and enabling centres to compare current outcomes with their own past performance to assist in internal auditing. CUSUM monitoring compares current outcome rates with an expected rate.
2. Each month, CUSUM monitoring reports on 90-day mortality following liver transplantation are produced and sent to each centre. This paper summarises the results of these reports for the six-month period since the last CUSUM monitoring update from November 2025. Where signals have occurred, actions that were taken and lessons learnt are noted.
3. CUSUM monitoring reports have been sent out to Dublin since October 2023 and there have not yet been any signals against the centre specific, UK and national rates.

RESULTS

4. **Table 1** summaries the CUSUM reports over the six-month period since the last Liver Advisory Group meeting. There were two signals from CUSUM charts produced between November 2025 and April 2026.

Table 1 Summary of CUSUM signals for charts produced between November 2025 and April 2026				
Month CUSUM report issued	No. reports issued	No. signals	No. signals requiring investigation	No. investigations outstanding
November 2025	8	0	0	0
December 2025	8	1	0	0
January 2026	8	0	0	0
February 2026	8	0	0	0
March 2026	8	0	0	0
April 2026	8	1	1	1
Total	48	2	1	1

5. There was one signal in December 2025 for elective adult liver transplants performed up to 31 July 2025 at King's College against the centre-specific expected mortality rate and did not require formal investigation.
6. There was one signal in April 2026 for elective adult liver transplants performed up to 30 November 2025 at Leeds. The CUSUM signalled against the national expected mortality rate. All appropriate parties were notified and the investigation is ongoing.

CONCLUSION

7. Over the last six months, there have been two signals for adult elective liver transplants, one against the centre-specific and the other against the national rate. One signal investigation is ongoing.

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