

NHS BLOOD AND TRANSPLANT

LIVER ADVISORY GROUP

SUMMARY OF CUSUM MONITORING OF OUTCOMES FOLLOWING LIVER TRANSPLANTATION

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. The following changes were agreed at the November 2017 meeting (**LAG(17)26a**) and implemented when the monthly CUSUMs were produced in December 2017:
 - a. The baseline period was updated to 1 January 2012 to 31 December 2016.
 - b. Prior to December 2017, all centres were only monitored against their individual centre specific mortality rates. It was agreed that, in addition to the centre specific mortality rate CUSUM charts, all adult transplant centres would also be monitored against the national mortality rate; thus all seven transplant centres now each receive two sets of charts. It was also agreed that only a signal under the national mortality rates would require a formal response to NHSBT.
 - c. Paediatric transplant centres will only be monitored against the national mortality rate due to the low number of deaths during the baseline period.
 - d. The chart threshold at which a centre is deemed to have had a significant increase in mortality requiring investigation was decreased from 2.5 to 2.0 increasing the chart sensitivity.
3. 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 twelve month period since the last CUSUM monitoring update in May 2017. Where signals have occurred, actions that were taken and lessons learnt are noted.

RESULTS

4. **Table 1** shows that there was one signal under the previous baseline period in August 2017 and two under the revised baseline period in January and March 2018. Two of the signals in August 2017 and January 2018 were at the same transplant centre for adult elective transplants. Both signals were examined at an internal/external review in January 2018 by an external chair and neither NHSBT nor the transplant centre have received the official report.
5. A transplant centre signalled in March 2018 for adult super-urgent liver transplants against the centre-specific rate but not against the national rate. As the centre did not signal against the national rate, the centre was informed of the signal but were not required to provide a formal response.

Table 1 Summary of CUSUM signals since April 2017

Month CUSUM report issued	No. reports issues	No. signals	No. signals requiring investigation	No. investigations outstanding
Previous baseline period				
April 2017	7	0	0	0
May 2017	7	0	0	0
June 2017	7	0	0	0
July 2017	7	0	0	0
August 2017	7	1 ¹	1	0
September 2017	7	0	0	0
October 2017	7	0	0	0
November 2017	7	0	0	0
Total	56	1	1	0
Revised baseline period				
December 2017	7	0	0	0
January 2018	7	1 ¹	1	0
February 2018	7	0	0	0
March 2018	7	1 ²	0	0
Total	28	2	1	0

¹ These signals were jointly investigated at an internal/external review in January 2018
² Adult transplant centre signalled on the super-urgent centre-specific charts and not on the national charts. Hence the centre was informed of the signal but were not required to provide a formal response to NHSBT

NEW NATIONAL LIVER OFFERING SCHEME

6. The new National Liver Offering Scheme was implemented on 20th March 2018 and now offers livers to named elective chronic liver disease, cancer and variant syndrome patients using proportional allocation. The CUSUM monitoring will not include patients transplanted under the NLOS until the CUSUM charts produced in September 2018.

CONCLUSION

7. Over the last twelve months, there have been three signals in liver transplantation CUSUM reporting; two for adult elective liver transplants and one for adult super-urgent transplants.
8. A formal external/internal review was held in January 2018 to examine both adult elective liver transplant signals and NHSBT await the final report detailing actions that were taken and lessons learnt.
9. Ninety-day mortality following liver transplants performed under the new National Liver Offering Scheme will not be included in the CUSUMs until September 2018.

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