

NHS BLOOD AND TRANSPLANT

CARDIOTHORACIC ADVISORY GROUP

UPDATING MORTALITY RATES USED FOR HEART CUSUM

BACKGROUND

- 1 NHSBT monitors short-term patient outcomes following organ transplantation through centre specific cumulative sum (CUSUM) analyses. These are undertaken monthly for cardiothoracic transplantation and enable prompt detection of any changes in mortality rates. They also provide external assurance and enable centres to compare current outcomes with their own past performance to assist in internal auditing.
- 2 CUSUM monitoring compares current outcome rates with an expected rate and it was previously agreed that the expected rates would be updated on a regular basis to maintain consistency with current clinical practice. The expected rates were previously updated in 2018 and this paper presents the updated expected mortality rates and the impact of applying these changes.

UPDATING THE EXPECTED BASELINE

- 3 The current expected rates are based on first, NHS group 1, deceased donor cardiothoracic transplants in the UK between 1 January 2013 and 31 December 2016 for adult and paediatric transplants. Heterotopic heart, heart/lung bloc and multi-organ transplants are excluded from the analysis as well as domino donor heart transplants. DCD heart transplants are only included in the monitoring period and not the expected mortality rates. Patient mortality is defined as patient death within 30 days of first heart transplant.
- 4 **Table 1** shows the current centre specific rates and confidence intervals for adult and paediatric heart transplants along with the corresponding rate for the updated time period, 1 January 2015 to 31 December 2018. The national 30-day mortality rate for adult heart transplants performed during the current baseline time period (2013-2016) was 8.9%. During the more recent time period (2015-2018), the national 30-day mortality rate was 8.7%. The majority of the 95% confidence intervals for the centre-specific rates included the corresponding national rate, suggesting that individual centre specific rates may just be a manifestation of the inherent variability in outcomes. Thus, this time period (2015-2018) will be used as the baseline period in future CUSUM monitoring.

Table 1 Revised expected thirty day mortality rates based on DBD heart only transplants performed between 1 January 2013 and 31 December 2018

	Expected mortality (95% CI)			Baseline comparison		
	Current rate (2013-2016)	Revised rate (2015-2018)	Centre rate change (%)	Current	Revised	Revised rate change (%)
ADULT						
Newcastle	10.2 (6.3, 14.0)	8.9 (5.1, 12.7)	-1.3	National	National	-0.2
Papworth	5.2 (2.8, 7.5)	6.1 (3.5, 8.7)	0.9	Centre	Centre	0.9
Harefield	14.6 (9.9, 19.4)	12.5 (8.5, 16.5)	-2.1	National	National	-0.2
Birmingham	10.0 (6.4, 13.6)	9.3 (5.5, 13.1)	-0.7	National	National	-0.2
Manchester	5.2 (2.6, 7.8)	5.8 (2.6, 9)	0.6	Centre	Centre	0.6
Glasgow	14.0 (7.9, 20.2)	10.8 (5, 16.6)	-3.2	National	National	-0.2
National	8.9 (7.5, 10.4)	8.7 (7.2, 10.2)	-0.2			
PAEDIATRIC						
Newcastle	8.6 (4.4, 12.7)	6.4 (2.5, 10.2)	-2.2	National	National	-2.5
GOSH	3.2 (0.4, 5.9)	0.7 (0, 2)	-2.5	Centre	Centre	-2.5
National	6.0 (3.4, 8.5)	3.5 (1.5, 5.6)	-2.5			

Note: centres with a lower expected mortality rate than the national rate will receive two CUSUMs; one comparing against the national rate and one comparing against their own expected rate. Only signals in the national rate chart are considered formal signals.

- 5 The latest CUSUMs using the current expected mortality rates were run on the 24 February 2021 for transplants performed between 1 January 2017 and 31 December 2020. There have been two signals during this time period.
- 6 Retrospective analysis of transplants performed since 1 January 2019, using the revised expected mortality rates, indicated there would have been one signal at Harefield in March 2020 for adult heart transplants compared with the national rate. This signal replaces a signal at Harefield from April 2020, and there is one less signal at Harefield from March 2019.
- 7 For paediatric patients, retrospective analysis of transplants performed since 1 January 2019, using the revised expected mortality rates, indicated there would have been no additional signals.

PROPOSAL

- 8 The proposal is to move the expected baseline to 1 January 2015 to 31 December 2018 for heart transplants. Retrospective analysis of transplants since January 2019, using the revised mortality rates, indicated there would have been one signal at Harefield in March 2020 for adult heart transplants on the national rate.

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