

NHS BLOOD AND TRANSPLANT

CARDIOTHORACIC ADVISORY GROUP – LUNG

ERROR IN CARDIOTHORACIC ANNUAL REPORT

INTRODUCTION

- 1 An error was detected on 18 October 2018 in the calculation of the 5 year risk-adjusted centre-specific survival rates post-lung transplantation. The error has been present since the start of the production of the NHSBT Annual Report on Cardiothoracic Transplantation in 2013.
- 2 The error was detected while investigating queries from Birmingham regarding the particularly large drop in their risk-adjusted rate in relation to their unadjusted rate. The error was unfortunately not picked up when it was originally coded in 2013 or during subsequent internal and external reviews.

THE ERROR

- 3 The report is created using a total of 20 computer (SAS) programs which vary in length from 200 lines of code to 1500 lines of code. On line 146 of the program which generates the risk-adjusted rates post-lung transplantation, an incorrect line of code was being applied which meant that the same cohort was being used for the 90 day, 1 year and 5 year rates, rather than using a more historic cohort for the 5 year rates. This same error is not present in the heart code. It is also not present in the survival from listing code, or in routine code used for other outcome reporting (e.g. CUSUMs).
- 4 The formula for the Risk Adjusted Survival Rate is:

$$\text{RASR} = 1 - \{(\text{observed no. deaths}/\text{expected no. deaths}) * \text{national mortality rate}\}$$

The error in the code meant that the observed and expected number of deaths at 5 years were calculated from 1 April 2013 – 31 March 2017 transplants while the national mortality rate was calculated from 1 April 2009 – 31 March 2013 transplants (the correct cohort, which allows time for 5 year follow up to be reported).

REMEDIAL ACTION

- 5 The code has been corrected and the amended results are shown in the **Appendix** (note that the 5 year risk-adjusted rates by lung disease group were also affected – not shown). The correction has very little impact for three out of five centres (<3% difference), while for Birmingham their corrected 5 year rate is much higher than the incorrect rate (54.7% instead of 29.9%) and for Manchester, their corrected rate is lower than the incorrect rate (47.4% instead of 62.0%), however all centres now lie within the funnel.
- 6 The Annual Report is being amended and the erroneous report on the ODT Clinical Site will be replaced as soon as possible. NHS England are also being informed. Historic reports that are also online and are subject to this error will also be amended (it is likely that the risk-adjusted results will be removed as it may not be possible to generate the results as they would have been at the time). **The short-term survival rates and survival from listing rates have all been double checked and run through independent code, and we have verified that these are correct and not subject to this error.**
- 7 Rachel Johnson, Assistant Director - Statistics & Clinical Studies, will be writing to all centres to apologise for this error. Birmingham, in particular, will be contacted due to the impact this error has had on their results. We wish to apologise sincerely for any inconvenience caused.

APPENDIX – INCORRECT AND CORRECTED RESULTS

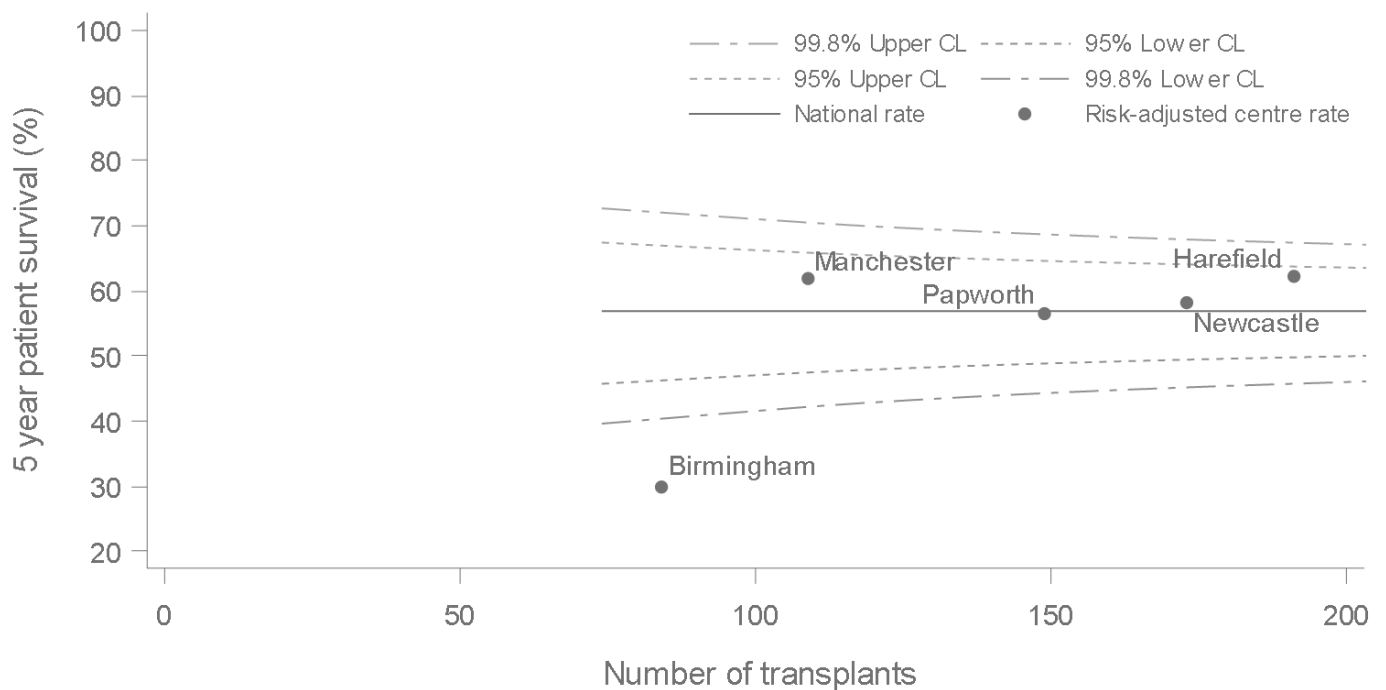
INCORRECT:

Table 12.3 5 year patient survival rates after first adult lung transplant, by centre, 1 April 2009 to 31 March 2013

Centre	Number of transplants	% 5 year survival (95% CI)			
		Unadjusted	Risk-adjusted		
Birmingham	48	50.8	(35.6 - 64.1)	29.9	(2.3 - 49.7)
Harefield	188	61.3	(53.9 - 67.9)	62.3	(50.8 - 71.1)
Manchester	97	44.2	(34.1 - 53.8)	62.0	(46.8 - 72.8)
Newcastle	183	62.0	(54.3 - 68.8)	58.1	(44.9 - 68.2)
Papworth	126	56.0	(46.9 - 64.2)	56.4	(42.0 - 67.3)
UK	642	56.9	(52.9 - 60.7)		

Centre has reached the lower 99.8% confidence limit
 Centre has reached the lower 95% confidence limit
 Centre has reached the upper 95% confidence limit
 Centre has reached the upper 99.8% confidence limit

Figure 12.3 Risk-adjusted five year patient survival rates for adult lung transplants, by centre, 1 April 2009 to 31 March 2013



CORRECTED:

Table 12.3 5 year patient survival rates after first adult lung transplant, by centre, 1 April 2009 to 31 March 2013					
Centre	Number of transplants	% 5 year survival (95% CI)			
		<u>Unadjusted</u>		<u>Risk-adjusted</u>	
Birmingham	48	50.8	(35.6 - 64.1)	54.7	(31.8 - 69.9)
Harefield	188	61.3	(53.9 - 67.9)	59.5	(49.0 - 67.8)
Manchester	97	44.2	(34.1 - 53.8)	47.4	(31.3 - 59.7)
Newcastle	183	62.0	(54.3 - 68.8)	60.0	(49.1 - 68.6)
Papworth	126	56.0	(46.9 - 64.2)	57.6	(44.8 - 67.5)
UK	642	56.9	(52.9 - 60.7)		

Centre has reached the lower 99.8% confidence limit
 Centre has reached the lower 95% confidence limit
 Centre has reached the upper 95% confidence limit
 Centre has reached the upper 99.8% confidence limit

Figure 12.3 Risk-adjusted five year patient survival rates for adult lung transplants, by centre, 1 April 2009 to 31 March 2013

