

# MORTALITY SUMMARY REPORT

LIVERPOOL HEART AND CHEST NHS FOUNDATION TRUST

TRUST LEVEL – JULY 2019

<b>Report Date</b>	17 <sup>th</sup> July 2019
<b>Healthcare Intelligence Specialist</b>	Anna Roger
<b>Area</b>	North West
<b>Contact details</b>	<a href="mailto:anna.roger@health.telstra.com">anna.roger@health.telstra.com</a>
<b>Data Period</b>	April 2018 to March 2019

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## EXECUTIVE SUMMARY: DATA PERIOD: APRIL 2018 TO MARCH 2019

Metric	Result
HSMR	<b>106.2</b> 'within expected' range
HSMR position vs. peers	The Trust is 1 of 3 Trusts (within the specialist peer group) with an HSMR 'within the expected' range. The crude rate is 1.8% (vs 1.2 % for the peer group).
CUSUM alerts	<p><b><u>CUSUM diagnosis alerts</u></b></p> <p>Acute myocardial infarction  Coronary atherosclerosis and other heart disease  Epilepsy, convulsions  Nonspecific chest pain  Other upper respiratory disease  Syncope  CABG (other)  Contrast radiology or catheterisation of heart  Extraction of tooth  Rest of Miscellaneous operations</p> <p><b><u>CUSUM procedure alerts</u></b></p> <p>CABG (other)  Contrast radiology or catheterisation of heart  Extraction of tooth  Rest of Miscellaneous operations</p> <p><b>No new CUSUM alerts have been triggered in the last 3 months.</b></p>

Outlying diagnosis  
groups

**4 outlying diagnosis groups:**

Acute myocardial infarction,  
Epilepsy, convulsions,  
Nonspecific chest pain,  
Other upper respiratory disease

**No new outlying diagnosis groups during the last 3 months.**

## REPORT OUTLINE

### Background

This report was commissioned by the trust as part of a suite of reports to provide an analysis of the trusts mortality, specifically to examine any CUSUM alerts or diagnosis groups with statistically high mortality.

The objective of the report is to assess using the available data any emerging issues which might be influencing the trusts mortality. The analysis includes a review of the trusts case mix and assesses the potential impact of the specialist nature of the services delivered. This report should be used as an adjunct to supplement other pieces of work completed within the Trust and not used in isolation.

### Methods

Using routinely collected hospital administrative data derived from Hospital Episode Statistics (HES) and analysing in the Healthcare Intelligence Portal tool, this report examines in-hospital mortality, for all inpatient admissions for the 12 month time period April 2018 to March 2019. The benchmark is based on risk modelled using data to the end of December 18. A comparable peer group was used to compare the Trust at a diagnosis group level. A table in Appendix 1 shows the peers used.

### Key Findings

This report provides an overview of the trusts HSMR, trends in coding and also an analysis of the two CUSUM alerts for the procedures of CABG (other) and Contrast radiology or catheterisation of heart. The remaining CUSUM alerts and statistically significant diagnosis groups have been reviewed and assessed in detail within previous reports.

During the period from April 2018 to March 2019 the relative risk for the HSMR basket has reduced, the trusts overall crude mortality has also demonstrated a similar pattern. Of note however is the Trusts rate of comorbidity recording, which is notably lower than the national average for England. Given the specialist nature of services delivered, the Trust may want to assess how robustly comorbidities are being documented and subsequently coded.

Analysis of mortality for patients undergoing a procedure for CABG (other) reveals a raised relative risk and one of the highest crude rates of mortality, when compared to their cardiac peers (3.3% versus a peer average of 2.3%). Of particular note is the crude mortality rate for patients admitted electively (2.7% versus 1.4% expected). Further analysis of the elective admission type reveals that patients referred from Betsi Cadwaladr health board stand out as having a particularly high crude rate of mortality at 6.6%. The Trust might want to investigate further with Betsi Cadwaladr whether there are delays referring patients for treatment, which is subsequently causing patients to deteriorate and subsequently leading to poorer outcomes for patients.

The Trust has the highest crude rate of mortality for patients undergoing contrast radiology or catheterisation of heart procedures, when compared to their peers (1.8% vs 0.9%). Detailed analysis of this procedure group reveals a rise in mortality during the last two years. The Trust might want to consider whether this is as a result of changes to their admitting thresholds, and a subsequent increase in the acuity of patients treated.

The analysis of length of stay reveals that 61% of their crude mortality arose from those patients with a zero day length of stay. The trust might want to consider whether there have been any local changes to the trusts cardiac pathways, including a change in the threshold for admitting patients who may previously have died outside of hospital.

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## HOSPITAL STANDARDISED MORTALITY RATIOS (HSMR) ANALYSIS

### Key Highlights:

- HSMR = 106.2, 'as expected' range
- Trust crude rate within HSMR basket when compared to their cardiac peers = 1.8% (specialist peers = 1.2%,
- The analysis reveals that the trusts rolling twelve month relative risk figure has reduced from a statistically significantly high position to an 'as expected' position during the twelve month period. The trust's crude rate also appears to have shown a similar pattern to the relative risk and reduced over both the last 24 and 12 month periods assessed.

### HSMR Monthly Trends

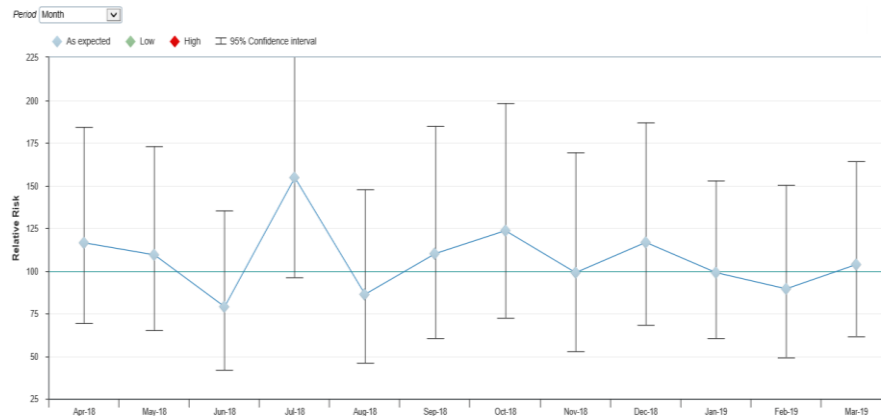
#### Diagnoses - HSMR | Mortality (in-hospital) | Apr 2018 - Mar 2019 | Trend (month)

Analyse by  Measure  Show

Trend (month)	Superspells	% of All	Spells	Observed	%	Expected	%	O-E	RR	LO	HI
All	9,450	100.0%	9,469	196	2.1%	184.5	2.0%	11.5	106.2	91.9	122.2
<input type="checkbox"/> Apr-18	788	8.3%	789	18	2.3%	15.5	2.0%	2.5	116.4	68.9	184.0
<input type="checkbox"/> May-18	851	9.0%	851	18	2.1%	16.5	1.9%	1.5	109.3	64.8	172.8
<input type="checkbox"/> Jun-18	815	8.6%	819	13	1.6%	16.5	2.0%	-3.5	78.9	42.0	135.0
<input type="checkbox"/> Jul-18	794	8.4%	795	21	2.6%	13.6	1.7%	7.4	154.6	95.7	236.3
<input type="checkbox"/> Aug-18	760	8.0%	762	13	1.7%	15.1	2.0%	-2.1	86.2	45.9	147.4
<input type="checkbox"/> Sep-18	743	7.9%	745	14	1.9%	12.7	1.7%	1.3	110.0	60.1	184.7
<input type="checkbox"/> Oct-18	800	8.5%	802	17	2.1%	13.8	1.7%	3.2	123.5	71.9	197.8
<input type="checkbox"/> Nov-18	837	8.9%	838	13	1.6%	13.1	1.6%	-0.1	98.9	52.6	169.2
<input type="checkbox"/> Dec-18	700	7.4%	702	17	2.4%	14.6	2.1%	2.4	116.6	67.9	186.8
<input type="checkbox"/> Jan-19	809	8.6%	812	20	2.5%	20.2	2.5%	-0.2	98.9	60.4	152.8
<input type="checkbox"/> Feb-19	753	8.0%	753	14	1.9%	15.7	2.1%	-1.7	89.4	48.9	150.1
<input type="checkbox"/> Mar-19	800	8.5%	801	18	2.3%	17.4	2.2%	0.6	103.7	61.4	163.9

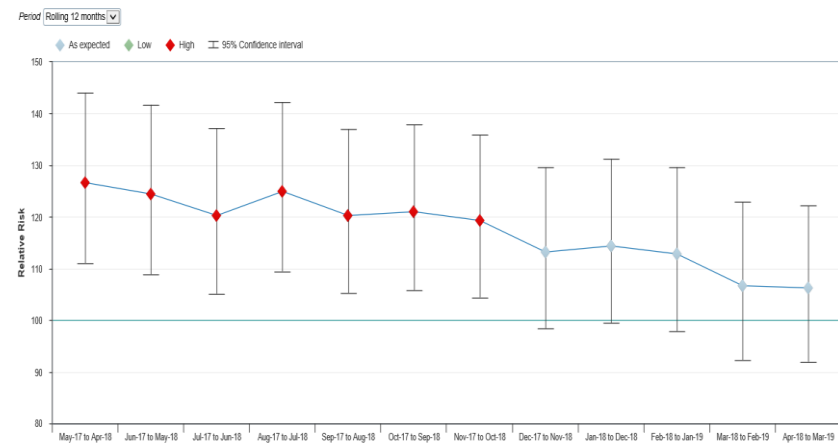
## HSMR 12 month trend by month:

Diagnoses - HSMR | Mortality (in-hospital) | Apr 2018 - Mar 2019 | Trend (month)



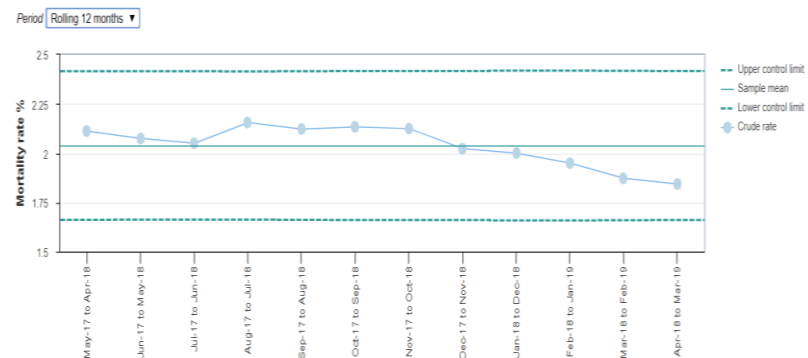
## HSMR Rolling 12 months:

Diagnoses - HSMR | Mortality (in-hospital) | Apr 2018 - Mar 2019 | Trend (rolling 12 months)



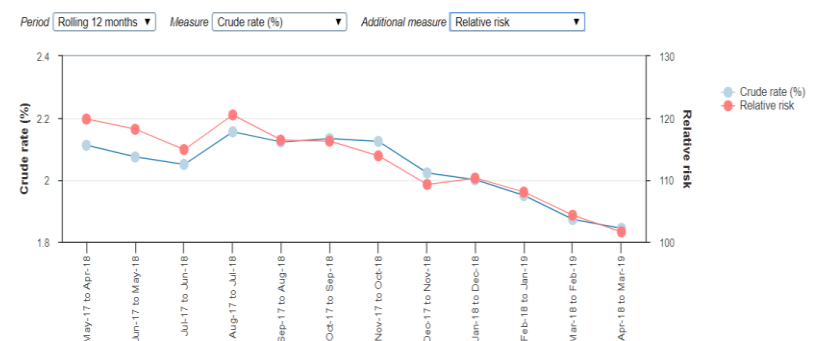
## Crude rate 12 month trend by month (HSMR Basket):

Diagnoses | Mortality (in-hospital) | Apr 2018 - Mar 2019 | Trend (rolling 12 months)



## Crude rate vs. expected rate Rolling 12 months (HSMR Basket):

Diagnoses | Mortality (in-hospital) | Apr 2018 - Mar 2019 | Trend (rolling 12 months)

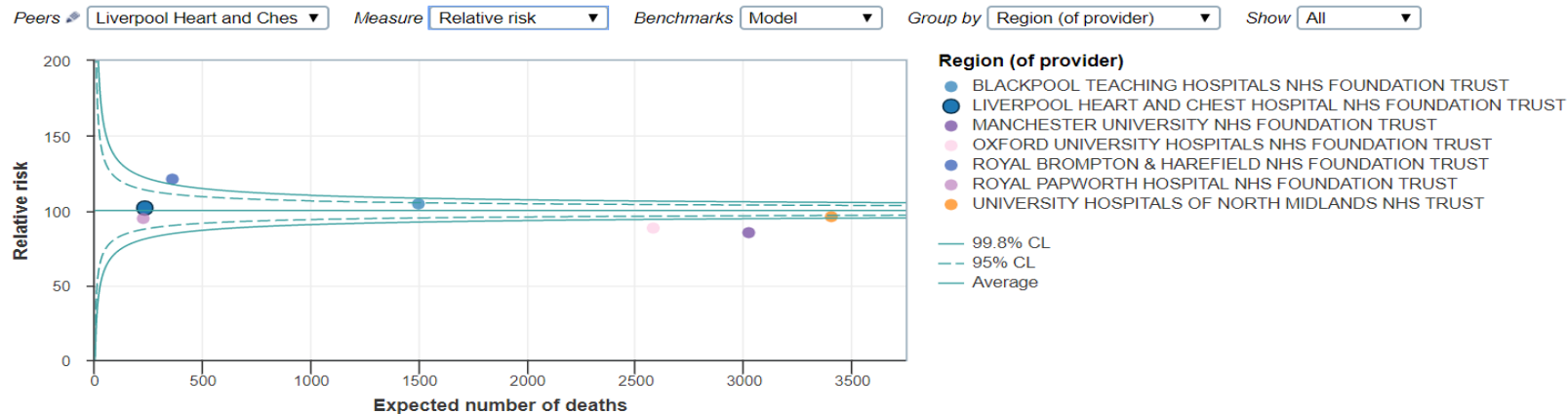




## HSMR Peer Comparison

The Trust is 1 of 7 Trusts (within the specialist cardiac peer group) with an HSMR 'within the expected' range. The crude rate is 1.8%, (vs 1.2% for the peer group).

### Diagnoses | Mortality (in-hospital) | Apr 2018 - Mar 2019 | Liverpool Heart and Chest (2019)



Basket: **Diagnoses** Metric: **Mortality (in-hospital)** Time period: **Last available 12 months**

Patients: **10,774** Superspells: **12,801 (118.8)** First / Last: **Apr 2018 / Mar 2019** Deaths: **236 (1.8%)** LOS: **5.8**

Expected: **232.2 (1.8%)** O-E: **3.8 (0.0%)** Relative Risk: **101.6 (89.1-115.4)** Model: **Month: Dec 2018** C-Statistic: **Multiple**

Liverpool Heart and Chest (2019)	Superspells	% of All	Spells	Observed	Crude rate (%)	Expected	Expected rate (%)	Observed-expected	Relative risk	95% lower confidence limit	95% upper confidence limit
All	900,677	100.0%	903,632	10,568	1.2%	11330.8	1.3%	-762.8	93.3	91.5	95.1
MANCHESTER UNIVERSITY NHS FOUNDATION TRUST	298,467	33.1%	299,475	2,577	0.9%	3026.9	1.0%	-449.9	85.1	81.9	88.5
UNIVERSITY HOSPITALS OF NORTH MIDLANDS NHS TRUST	233,907	26.0%	234,424	3,263	1.4%	3404.7	1.5%	-141.7	95.8	92.6	99.2
OXFORD UNIVERSITY HOSPITALS NHS FOUNDATION TRUST	193,902	21.5%	194,997	2,276	1.2%	2579.8	1.3%	-303.8	88.2	84.6	91.9
BLACKPOOL TEACHING HOSPITALS NHS FOUNDATION TRUST	98,675	11.0%	98,845	1,562	1.6%	1496.3	1.5%	65.7	104.4	99.3	109.7
ROYAL BROMPTON & HAREFIELD NHS FOUNDATION TRUST	40,326	4.5%	40,395	436	1.1%	360.6	0.9%	75.4	120.9	109.8	132.8
ROYAL PAPWORTH HOSPITAL NHS FOUNDATION TRUST	22,599	2.5%	22,659	218	1.0%	230.4	1.0%	-12.4	94.6	82.5	108.1
LIVERPOOL HEART AND CHEST HOSPITAL NHS FOUNDATION TRUST	12,801	1.4%	12,837	236	1.8%	232.2	1.8%	3.8	101.6	89.1	115.4

## TRENDS IN CODING

### Key Highlights:

- The Trust codes 2.25% of HSMR (Non-Elective) superspells with palliative care vs. 4.15% national average and 4.5% for similar peers
- The Trust has an upper quartile Charlson co-morbidity rate of 22.2% vs. 25% nationally. Their comorbidity index is 89, which is also lower than the national index of 100. Given the specialist nature of the services provided by the Trust they might want to assess whether patient comorbidities are being robustly recorded and subsequently coded.

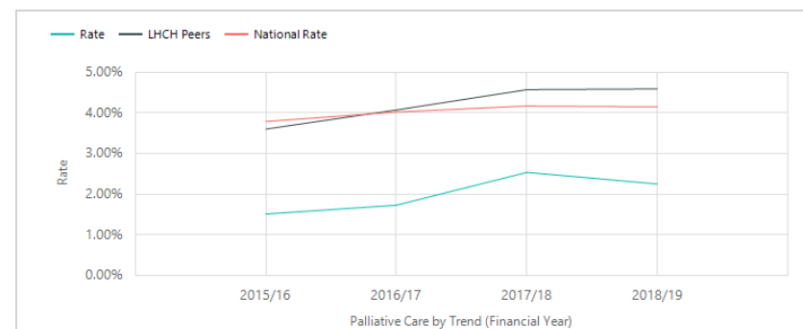
### Palliative Care Coding Rate Vs National (HSMR Basket)

#### Palliative Care Profile ⓘ

Organisation: Liverpool Heart and Chest Hospital NHS Foundation Trust Report Date: 19 July 2019

Basket: Diagnoses - HSMR Peer group: LHCH Peers

Trend (Financial Year)	Non-elective spells	Palliative care	Rate	National Rate	Peer Group Rate
2015/16	3,695	56	1.52%	3.79%	3.61%
2016/17	3,634	63	1.73%	4.03%	4.08%
2017/18	3,661	93	2.54%	4.17%	4.57%
2018/19	3,816	86	2.25%	4.15%	4.59%



### Charlson Index Co-morbidity Coding Rates Vs National

	2015/16	2016/17	2017/18	2018/19
Upper-quartile comorbidity	22.1%	21.5%	22.7%	22.2%
as index of national (100)	88	86	91	89



## CUSUM ALERTS

CUSUM is a cumulative sum statistical process control chart that plots patients' actual outcomes against their expected outcomes sequentially over time. The chart has upper and lower thresholds and breaching of the threshold triggers a CUSUM alert. When a fixed threshold is breached, the variation in death rate is greater than we can confidently explain by random variation. Following an alert the line is reset to half the starting position and plotting of patient outcomes continues.

The following diagnosis groups generated CUSUM alerts during the 12 month period from April 2018 to March 2019

- Acute myocardial infarction (November 18)
- Coronary atherosclerosis and other heart disease (June 18)
- Epilepsy convulsions (April 18)
- Non-specific chest pain (April and November 18)
- Other upper respiratory disease (June 18)
- Syncope (May 18)

The following procedures also triggered CUSUM alerts.

- CABG (other) (May 2018)
- Contrast radiology or catheterisation of heart (June 2018, February 2019)
- Extraction of tooth (March 2019)
- Rest of Miscellaneous operations (September 2018).

No new CUSUM alerts have been triggered during the last quarter (January to March 2019), all of the above diagnosis CUSUM alerts have been investigated within previous Trust reports. Therefore this report will examine the CUSUM alerts for the procedures of CABG (other), Contrast radiology or catheterisation of heart, extraction of tooth and rest of miscellaneous operations.

## CABG (other)

The procedure group of 'CABG (other)' breached the CUSUM threshold in May 2018.

The CUSUM chart below reveals ongoing plotting of the CUSUM chart following the initial alert, but no further breaches since May 2018.



## Peer comparison

Mortality within the diagnosis group of 'CABG (other)' is statistically as expected when compared to the national benchmark, however the relative risk is raised at 156.8. Within the specialist peer group the trusts crude rate of mortality is marginally higher than their peers at 3.3%, compared to a peer average rate of 2.3%.

The only trust highlighted with a similar crude mortality rate is Blackpool at 3.3%.

### CABG (other) | Mortality (in-hospital 30 days) | Apr 2018 - Mar 2019 | Liverpool Heart and Chest (2019)

Procedure group: CABG (other)

Peers Liverpool Heart and Che Measure Relative risk Show All

	Liverpool Heart and Chest (2019)	Superspells	% of All	Spells	Observed	%	Expected	%	O-E	RR	LO	HI
	All	4,230	100.0%	4,230	96	2.3%	86.7	2.0%	9.3	110.8	89.7	135.3
	LIVERPOOL HEART AND CHEST HOSPITAL NHS FOUNDA...	547	12.9%	547	18	3.3%	11.5	2.1%	6.5	156.8	92.9	247.8
	ROYAL BROMPTON & HAREFIELD NHS FOUNDATION TR...	847	20.0%	847	19	2.2%	16.7	2.0%	2.3	113.6	68.3	177.4
	BLACKPOOL TEACHING HOSPITALS NHS FOUNDATION T...	399	9.4%	399	13	3.3%	10.1	2.5%	2.9	128.2	68.2	219.2
	MANCHESTER UNIVERSITY NHS FOUNDATION TRUST	731	17.3%	731	15	2.1%	13.6	1.9%	1.4	110.5	61.8	182.3
	ROYAL PAPWORTH HOSPITAL NHS FOUNDATION TRUST	946	22.4%	946	18	1.9%	19.1	2.0%	-1.1	94.3	55.9	149.1
	UNIVERSITY HOSPITALS OF NORTH MIDLANDS NHS TR...	431	10.2%	431	***	***	***	***	***	95.3	43.5	180.9
	OXFORD UNIVERSITY HOSPITALS NHS FOUNDATION TR...	329	7.8%	329	***	***	***	***	***	64.5	17.4	165.1

### Mortality by admission type

The analysis of mortality by admission type reveals that it is elective patients who gave rise to the highest relative risk. The crude mortality rate amongst these patients is 2.7%, compared to an expected rate of 1.4%.

### CABG (other) | Mortality (in-hospital 30 days) | Apr 2018 - Mar 2019 | Admission type

Procedure group: CABG (other)

Analyse by Admission type Measure Relative risk Show All

	Admission type	Superspells	% of All	Spells	Observed	%	Expected	%	O-E	RR	LO	HI
	All	547	100.0%	547	18	3.3%	11.5	2.1%	6.5	156.8	92.9	247.8
<input type="checkbox"/>	Elective	333	60.9%	333	9	2.7%	4.6	1.4%	4.4	194.4	88.7	369.0
<input type="checkbox"/>	Non-elective	214	39.1%	214	9	4.2%	6.8	3.2%	2.2	131.4	60.0	249.5

### Tier 3 CCG

Further analysis of elective admissions by their referring CCG demonstrates that the highest crude mortality (6.6%) was from patients referred from Betsi Cadwaladr health board. Despite the volume of deaths being relatively low, the trust might want to consider whether delays referring patients, potentially as a result of funding decisions could be having an adverse effect on patient outcomes.

The trust may want to undertake a review of all of their elective deaths, to assure themselves that their pre-operative processes are robust and that patients are clinically fit for surgery.

T	Tier 3 - Clinical commissioning group (CCG)	Code	Superspells	% of All	Spells	Observed	%	Expected	%	O-E	RR	LO	HI
	All		333	100.0%	333	9	2.7%	4.6	1.4%	4.4	194.4	88.7	369.0
<input type="checkbox"/>	Betsi Cadwaladr University Lhb	7A1	61	18.3%	61	4	6.6%	0.8	1.3%	3.2	493.6	132.8	1263.7
<input type="checkbox"/>	NHS Liverpool CCG	99A	43	12.9%	43	1	2.3%	0.5	1.2%	0.5	186.9	2.4	1039.7
<input type="checkbox"/>	NHS West Cheshire CCG	02F	42	12.6%	42	0	0.0%	0.5	1.2%	-0.5	0.0	0.0	740.0
<input type="checkbox"/>	NHS Wirral CCG	12F	39	11.7%	39	2	5.1%	0.7	1.8%	1.3	280.1	31.5	1011.3
<input type="checkbox"/>	NHS St Helens CCG	01X	23	6.9%	23	1	4.3%	0.6	2.5%	0.4	171.1	2.2	952.1
<input type="checkbox"/>	NHS Southport and Formby CCG	01V	21	6.3%	21	0	0.0%	0.2	1.0%	-0.2	0.0	0.0	1719.9
<input type="checkbox"/>	NHS Warrington CCG	02E	21	6.3%	21	0	0.0%	0.3	1.5%	-0.3	0.0	0.0	1184.8
<input type="checkbox"/>	Unknown	10000	18	5.4%	18	0	0.0%	0.2	1.2%	-0.2	0.0	0.0	1636.5
<input type="checkbox"/>	NHS Knowsley CCG	01J	17	5.1%	17	1	5.9%	0.2	0.9%	0.8	627.2	8.2	3489.9
<input type="checkbox"/>	NHS South Sefton CCG	01T	16	4.8%	16	0	0.0%	0.2	1.5%	-0.2	0.0	0.0	1497.8
<input type="checkbox"/>	NHS Halton CCG	01F	12	3.6%	12	0	0.0%	0.2	1.4%	-0.2	0.0	0.0	2256.3
<input type="checkbox"/>	NHS West Lancashire CCG	02G	10	3.0%	10	0	0.0%	0.1	0.8%	-0.1	0.0	0.0	4344.7

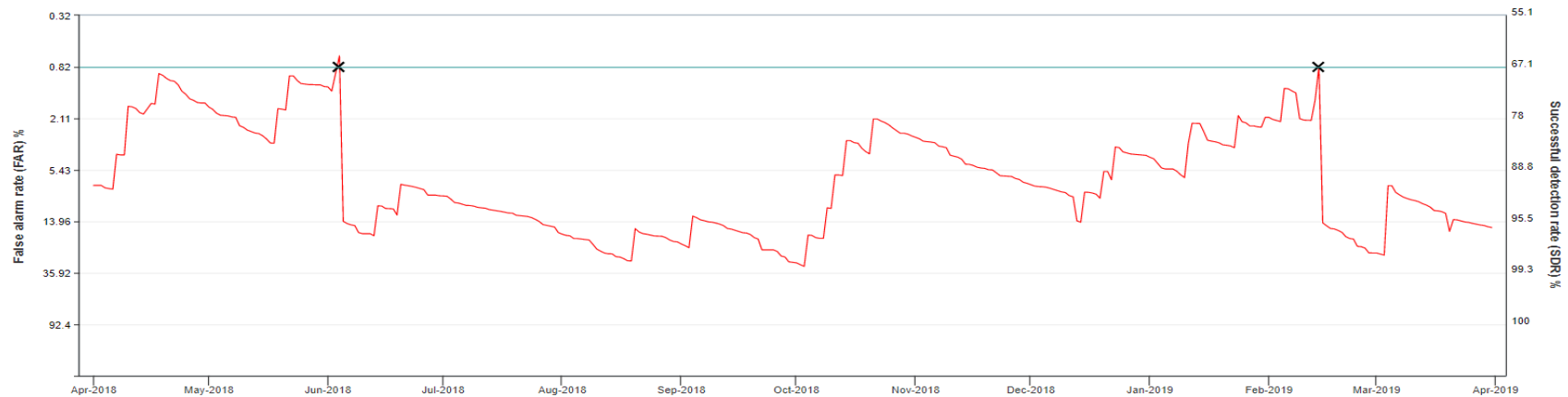
## Contrast radiology or catheterisation of heart

The procedure group of contrast radiology or catheterisation of heart breached the CUSUM threshold in June 2018 and subsequently in February 2019.

### Contrast radiology or catheterisation of heart | Mortality (in-hospital 30 days) | Apr 2018 - Mar 2019

Procedure group: Contrast radiology or catheterisation of heart

View:    Start:  2015









## Peer comparison

Mortality within the procedure group of 'Contrast radiology or catheterisation of heart' is statistically significantly higher than expected, with a relative risk of 180.3. Within the peer group the trusts crude rate is the highest within the group at 1.8%, compared to a peer average rate of 0.9%.

Royal Papworth also stands out as an outlier amongst the group, with a statistically significant relative risk of 166.8. The Trust might want to review further their current pathways and structures of care to better understand why their crude rate of mortality appears to be the highest within their peer group.

### Contrast radiology or catheterisation of heart | Mortality (in-hospital 30 days) | Apr 2018 - Mar 2019 | Liverpool Heart and Chest (2019)

Procedure group: Contrast radiology or catheterisation of heart

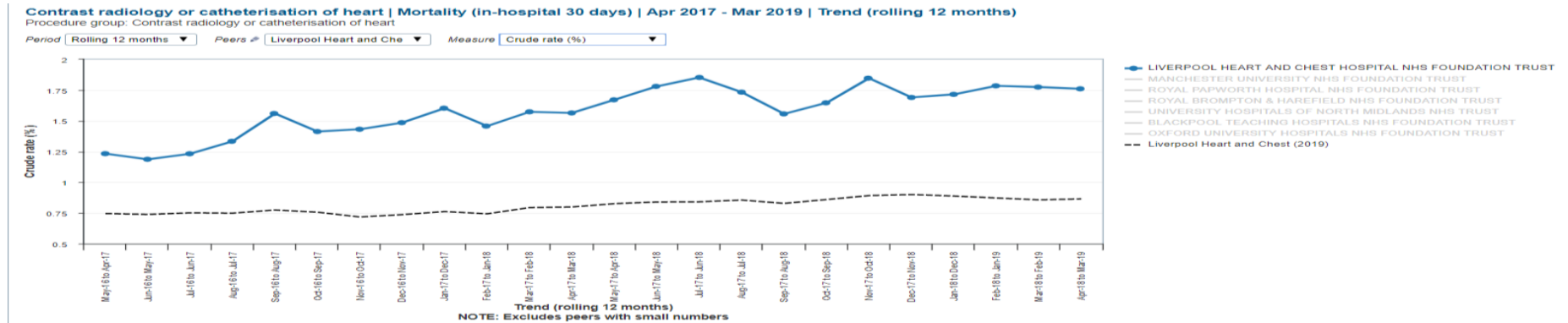
Peers  Liverpool Heart and Che  Measure  Relative risk  Show  All 

T	Liverpool Heart and Chest (2019)	Superspells	% of All	Spells	Observed	%	Expected	%	O-E	RR	LO	HI
	All	13,303	100.0%	13,306	115	0.9%	94.9	0.7%	20.1	121.2	100.1	145.5
	LIVERPOOL HEART AND CHEST HOSPITAL NHS FOUND...	1,761	13.2%	1,761	31	1.8%	17.2	1.0%	13.8	180.3	122.5	256.0
	ROYAL PAPWORTH HOSPITAL NHS FOUNDATION TRUST	2,397	18.0%	2,397	20	0.8%	12.0	0.5%	8.0	166.8	101.8	257.6
	BLACKPOOL TEACHING HOSPITALS NHS FOUNDATION T...	1,395	10.5%	1,395	20	1.4%	13.3	1.0%	6.7	150.3	91.8	232.2
	ROYAL BROMPTON & HAREFIELD NHS FOUNDATION TR...	2,283	17.2%	2,283	17	0.7%	12.7	0.6%	4.3	133.8	77.9	214.2
	UNIVERSITY HOSPITALS OF NORTH MIDLANDS NHS TR...	1,644	12.4%	1,645	14	0.9%	12.7	0.8%	1.3	110.4	60.3	185.3
	MANCHESTER UNIVERSITY NHS FOUNDATION TRUST	2,799	21.0%	2,801	****	****	****	****	****	53.6	26.7	95.9
	OXFORD UNIVERSITY HOSPITALS NHS FOUNDATION TR...	1,024	7.7%	1,024	****	****	****	****	****	30.9	3.5	111.6

## Trend analysis (24 months)

The time series analysis demonstrates a consistent rise in the trusts crude mortality over the last two years. When compared to their peers the Trusts crude rate has risen more sharply than the average for their specialist cardiac peers. Have there been any changes to the trusts pathways or structures of care during this period? Have there been any local changes to their admitting thresholds, which means the Trust is now operating on more complex patients?

Given the earlier comorbidity analysis the trust might want to assess whether they are adequately capturing the case mix complexity of their patients.

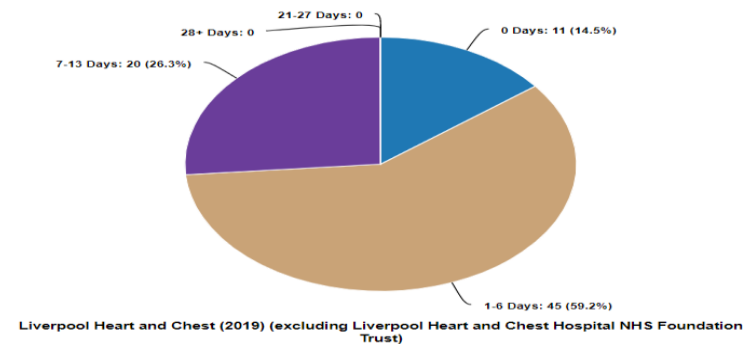
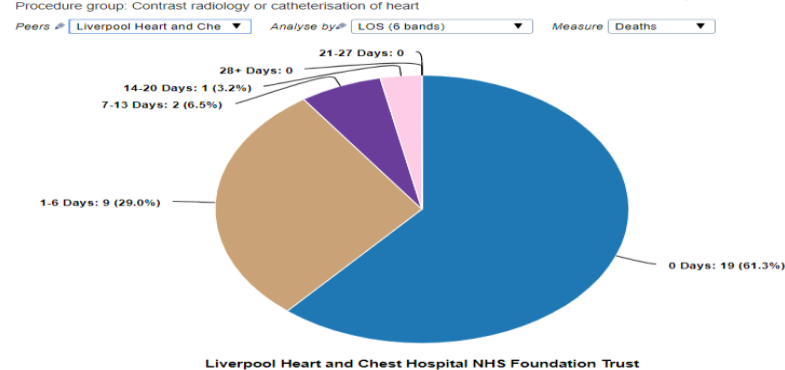


### Case-mix explorer – length of stay

The case mix analysis reveals a notable variation in the trusts crude mortality rate within the zero day length of stay band. For their zero day admissions the trust has a crude rate of mortality of 61.3%, compared to an average crude rate of 14.5% amongst their peers.

This might raise a number of potential questions, including whether the admission thresholds are notably different compared to their peers and the trust is treating more acutely ill patients. The trust may also want to consider whether their clinical pathways are different when compared to their peers, and if so whether this could be impacting on patient outcomes. The trust might want to further review this group of patients to better understand the root cause of the high crude mortality rate for patients within the zero day length of stay band.

**Contrast radiology or catheterisation of heart | Mortality (in-hospital 30 days) | Apr 2018 - Mar 2019 | Liverpool Heart and Chest (2019)**





## Mortality by admission type

The analysis of mortality by admission type reveals that it is those patients admitted non-electively, who stand out as having a statistically high relative risk of 171.4. The crude rate of mortality amongst these patients is 3.1%, compared to an expected figure of 1.8%.

### Contrast radiology or catheterisation of heart | Mortality (in-hospital 30 days) | Apr 2018 - Mar 2019 | Admission type

Procedure group: Contrast radiology or catheterisation of heart

Analyse by:  Measure:  Show:

Admission type	Superspells	% of All	Spells	Observed	%	Expected	%	O-E	RR	LO	HI
All	1,761	100.0%	1,761	31	1.8%	17.2	1.0%	13.8	180.3	122.5	256.0
<input type="checkbox"/> Non-elective	928	52.7%	928	29	3.1%	16.9	1.8%	12.1	171.4	114.8	246.2
<input type="checkbox"/> Elective	833	47.3%	833	2	0.2%	0.3	0.0%	1.7	738.1	82.9	2665.0

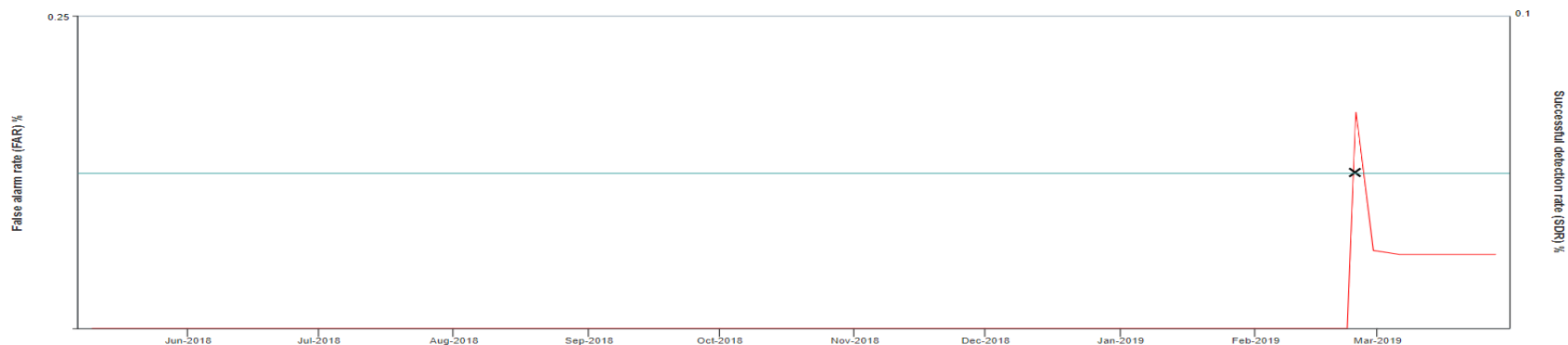
## Extraction of tooth

The CUSUM chart was breached in February 2018, however this relates to very small volumes of spells (7) and one patient death. Given the single death within this diagnosis group no further investigation of the underlying data has been carried out. Using the Dr Foster tool the trust may want to review further this single patient death using the following link to the patient records: <https://one.drfooster.com/Query/?id=1426312>.

### Extraction of tooth | Mortality (in-hospital 30 days) | Apr 2018 - Mar 2019

Procedure group: Extraction of tooth

View:  Reset on alert:  Start:   Threshold:



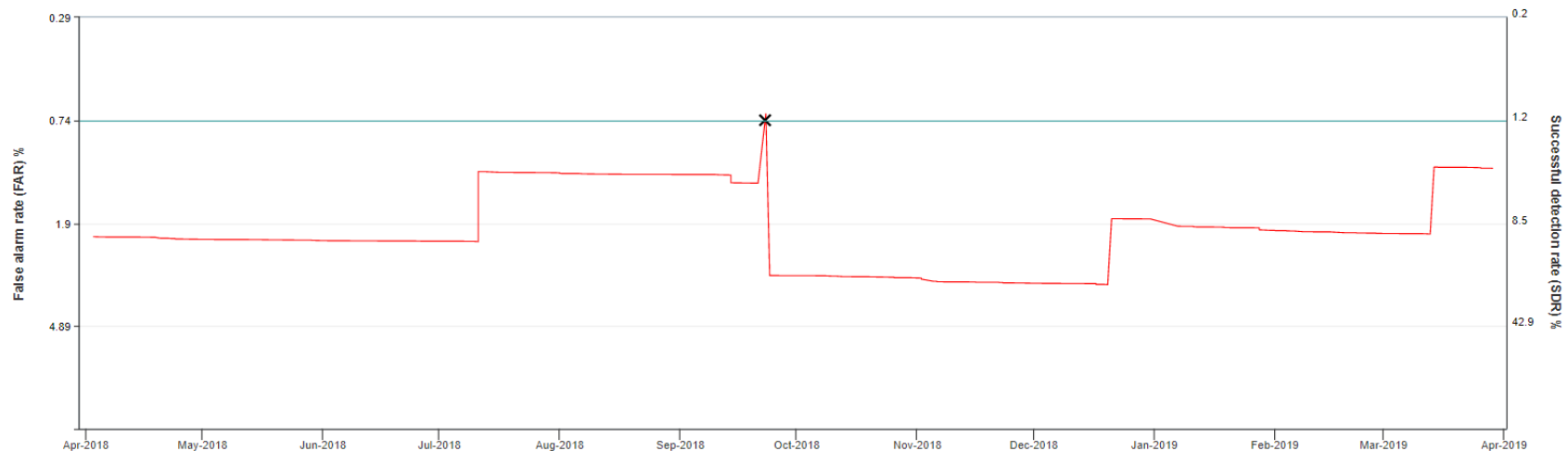
## Rest of Miscellaneous operations

The CUSUM alert occurred in September 2018 and relates to 4 patient deaths. Given the low volume of mortality associated with this procedure group no further review of the underlying data has been carried out. Using the Dr Foster tool the trust may want to examine further the deaths associated with this procedure group using the following link <https://one.drfooster.com/Query/?id=1426236>.

### Rest of Miscellaneous operations | Mortality (in-hospital 30 days) | Apr 2018 - Mar 2019

Procedure group: Rest of Miscellaneous operations

View **Negative** ▼ Reset on alert **To threshold / 2** ▼ Start **Apr** ▼ **2015** ▼ Threshold **High (99%)** ▼



## REFERENCES

### Relative risk

The ratio of the observed number of negative outcomes to the expected number of negative outcomes. This is multiplied by 100 by convention.

The benchmark figure (usually the national average) is always 100, hence values greater than 100 represent performance "worse" than the benchmark, and values less than 100 represent performance "better" than the benchmark.

### SMR

A calculation used to monitor death rates. The standardised mortality ratio is the ratio of observed deaths to expected deaths, where expected deaths are calculated for a typical area with the same case-mix adjustment. The SMR may be quoted as either a ratio or a percentage. If the SMR is quoted as a percentage and is equal to 100, then this means the number of observed deaths equals that of expected. If higher than 100, then there is a higher reported mortality ratio.

### HSMR

The Hospital Standardised Mortality Ratio is the ratio of observed deaths to expected deaths for a basket of 56 diagnosis groups, which represent approximately 80% of in hospital deaths. It is a subset of all and represents about 35% of admitted patient activity. Further information can be found at <http://www.drfooster.com/about-us/our-approach/metrics-methodologies-and-models-library/>

### Benchmark

The benchmark used in this analysis is the monthly benchmark available within Healthcare Intelligence Portal.

### CUSUM

A cumulative sum statistical process control chart plots patients' actual outcomes against their expected outcomes sequentially over time. The chart has upper and lower thresholds and breaching this threshold triggers an alert. If patients repeatedly have negative or unexpected outcomes, the chart will continue to rise until an alert is triggered. The line is then reset to half the starting position and plotting of patients continues.

### HSMR Comparison

In order to give an indication of how performance for the current incomplete year compares to the national average we show a rebased HSMR for the current year. This is estimated for each of the 56 diagnoses by dividing the trust's SMR (using the existing benchmark) by the national SMR and multiplying by 100. The 56 rebased SMRs are then aggregated to produce the estimated rebased HSMR.

### Charlson Index of Comorbidities

The original Charlson weights were derived 25 years ago in the USA. We have updated them (e.g. HIV had the highest weight then but its mortality has fallen greatly since) and calibrated them on English data due to differences in coding practice and hospital patient population characteristics. We had advice from some clinical coders on current English coding practice and, where possible, also assessed the consistency of comorbidity recording among admissions for the same patient.

### Charlson Upper-Quartile Rate

For each financial year we calculate the proportion of a trust's HSMR spells where the Charlson index for the diagnosis-dominant episode is in the national upper quartile for that diagnosis and admission type, this is the observed value. The expected value is the equivalent proportion nationally i.e. 25%. The trust's index value is calculated as the observed/expected x 100.

### Palliative Care Coding Rate

For each financial year we calculate the proportion of a trust's HSMR superspells excluding day cases which are coded as having palliative care, this is the observed value shown. The expected value is the proportion nationally for the equivalent mix of diagnosis and admission type. The trust's index value is calculated as observed/expected x 100.

### Liverpool Heart and Chest Hospital NHS Foundation Trust Peers

Manchester University NHS Foundation Trust
University Hospitals Of North Midlands NHS Trust
Blackpool Teaching Hospitals NHS Foundation Trust
Oxford University Hospitals NHS Foundation Trust
Royal Brompton & Harefield NHS Foundation Trust
Liverpool Heart and Chest Hospital NHS Foundation Trust
Royal Papworth Hospital NHS Foundation Trust