



Lessons Learned from review of Endocarditis deaths

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Mortality Alert due to “Heart Valve disorders”

- Routine surveillance at the Learning from Deaths Group identified in the September data an increase in mortality associated with “Valve disorders”
- There was some triangulation around coroner’s cases and complaints
- A review was commissioned from Acute Medicine/Cardiology/Consultant Anti-microbial Pharmacist

Heart Valve Disorders

1. One of two significantly high trusts
2. Increasing trend

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

Diagnosis group: **Heart valve disorders**

Patients: **111** Superspells: **121 (109.0)** First / Last: **Jul 2017 / Jun 2018** Deaths: **11 (9.1%)** LOS: **9.4**

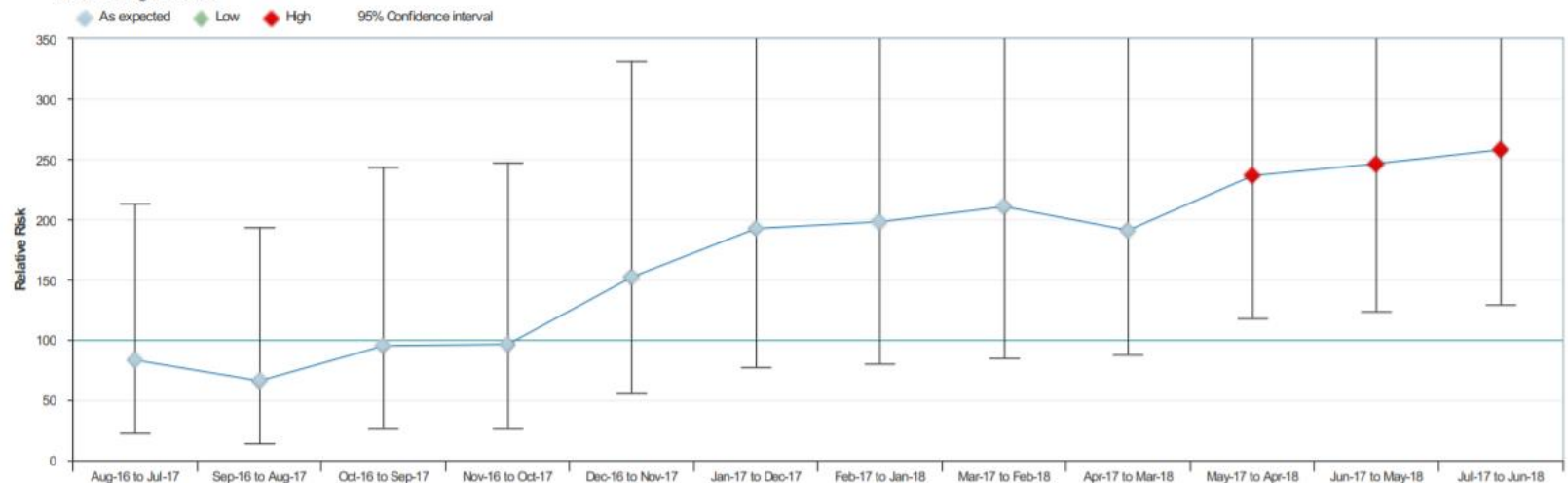
Expected: **4.3 (3.5%)** O-E: **6.7 (5.6%)** Relative Risk: **257.7 (128.5â€”461.2)** Model: **Month: Mar 2018** C-Statistic: **0.81 (High)** Model cases: **191152** Model deaths: **7825** Adjustment: **Variables**

Mid Yorks Regional Group	Superspells	% of All	Spells Observed	Crude rate (%)	Expected	Expected rate (%)	Observed-expected	Relative risk	95% lower confidence limit	95% upper confidence limit	
All	2,971	100.0%	3,030	68	2.3%	60.1	2.0%	7.9	113.1	87.8	143.4
Sheffield Teaching Hospitals NHS Foundation Trust	828	27.9%	841	21	2.5%	11.7	1.4%	9.3	179.0	110.7	273.6
Leeds Teaching Hospitals NHS Trust	784	26.4%	810	8	1.0%	16.2	2.1%	-8.2	49.5	21.3	97.5
Hull and East Yorkshire Hospitals NHS Trust	304	10.2%	314	12	3.9%	9.2	3.0%	2.8	129.8	67.0	226.8
York Teaching Hospital NHS Foundation Trust	147	4.9%	149	****	****	****	****	****	127.7	41.1	298.0
Calderdale and Huddersfield NHS Foundation Trust	128	4.3%	130	****	****	****	****	****	84.4	17.0	246.7
Mid Yorkshire Hospitals NHS Trust	121	4.1%	121	11	9.1%	4.3	3.5%	6.7	257.7	128.5	461.2
Bradford Teaching Hospitals NHS Foundation Trust	117	3.9%	118	0	0.0%	0.7	0.6%	-0.7	0.0	0.0	510.4
Barnsley Hospital NHS Foundation Trust	115	3.9%	115	****	****	****	****	****	140.4	15.8	507.0
Doncaster and Bassetlaw Teaching Hospitals NHS Foundation Trust	110	3.7%	110	****	****	****	****	****	115.2	23.2	336.7
Northern Lincolnshire and Goole NHS Foundation Trust	102	3.4%	104	****	****	****	****	****	64.7	7.3	233.6
Airedale NHS Foundation Trust	84	2.8%	86	0	0.0%	1.3	1.5%	-1.3	0.0	0.0	281.7
Harrogate and District NHS Foundation Trust	75	2.5%	75	0	0.0%	1.6	2.1%	-1.6	0.0	0.0	232.5
The Rotherham NHS Foundation Trust	56	1.9%	57	****	****	****	****	****	188.4	2.5	1048.4

Heart valve disorders | Mortality (in-hospital) | Jul 2017 - Jun 2018 | Trend (rolling 12 months)

Diagnosis group: Heart valve disorders

Period: Rolling 12 months



Heart Valve Disorders – Non-Elective

National Peer

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* *Pinderfield has 9 out of 10 deaths and 8 spells*

Admission type	Superspells	% of All Spells	Spells Observed	Crude rate (%)	Expected	Expected rate (%)	Observed-expected	Relative risk	95% lower confidence limit	95% upper confidence limit
All	121	100.0%	121	9.1%	4.3	3.5%	6.7	257.7	128.5	461.2
Elective	72	59.5%	72	1.4%	3.1	0.6%	0.6	245.4	3.2	1965.8
Non-elective	49	40.5%	49	20.4%	3.9	7.9%	6.1	259.0	124.0	476.4

1. Significant relative risk within the Non-Elective cohort
2. For the Non-Elective service, the trust is one of three nationally with a significantly high relative risk and **Mid Yorks has the highest crude rate nationally**

National Extract

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

Diagnosis group: **Heart valve disorders**

Admission type: **Non-elective**

Patients: **47** Superspells: **49 (104.3)** First / Last: **Jul 2017 / May 2018** Deaths: **10 (20.4%)** LOS: **10.8**

Expected: **3.9 (7.9%)** O-E: **6.1 (12.5%)** Relative Risk: **259.0 (124.0â€”476.4)** Model: **Month: Mar 2018** C-Statistic: **0.81 (High)** Model cases: **191152** Model deaths: **7825** Adjustment: **Variables**

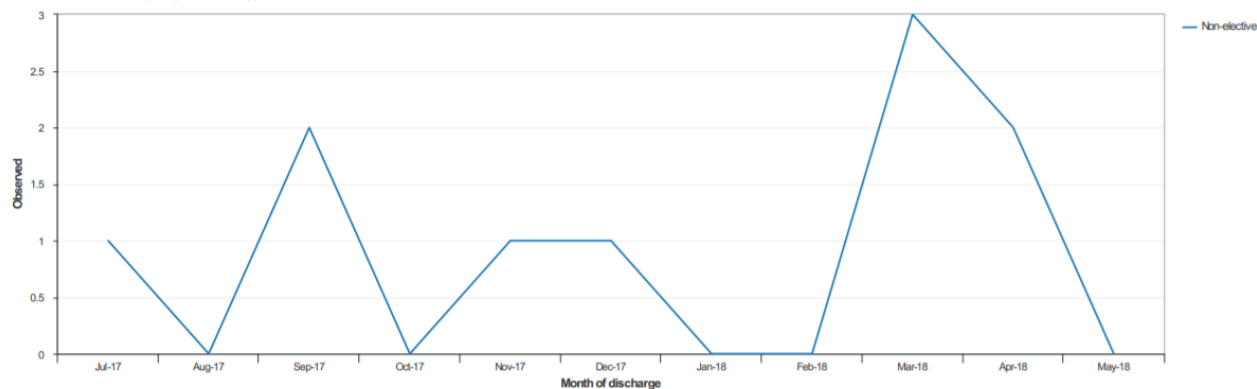
ALL (acute, non-specialist)	Superspells	% of All	Spells Observed	Crude rate (%)	Expected	Expected rate (%)	Observed-expected	Relative risk	95% lower confidence limit	95% upper confidence limit	
All	8,515	100.0%	9,361	492	5.8%	516.7	6.1%	-24.7	95.2	87.0	104.0
Northumbria Healthcare NHS Foundation Trust	76	0.9%	76	13	17.1%	5.2	6.9%	7.8	248.0	131.9	424.1
Mid Yorkshire Hospitals NHS Trust	49	0.6%	49	10	20.4%	3.9	7.9%	6.1	259.0	124.0	476.4
Royal United Hospitals Bath NHS Foundation Trust	58	0.7%	61	7	12.1%	2.8	1.8%	1.2	258.3	181.3	581.8
North Bristol NHS Trust	54	0.6%	55	7	13.0%	2.9	5.3%	4.1	244.4	97.9	503.5
Derby Teaching Hospitals NHS Foundation Trust	69	0.8%	72	8	11.6%	3.6	5.2%	4.4	221.9	95.5	437.2
The Dudley Group NHS Foundation Trust	49	0.6%	52	6	12.2%	2.4	4.8%	3.6	253.1	92.4	550.9
Sheffield Teaching Hospitals NHS Foundation Trust	113	1.3%	126	10	8.8%	5.4	4.8%	4.6	185.7	88.9	341.5
East Lancashire Hospitals NHS Trust	64	0.8%	68	8	12.5%	4.3	6.7%	3.7	187.7	80.8	369.9
Portsmouth Hospitals NHS Trust	98	1.2%	104	8	8.2%	4.7	4.8%	3.3	171.0	73.6	336.9
Medway NHS Foundation Trust	51	0.6%	53	****	****	****	****	****	217.8	70.2	508.2
Luton and Dunstable University Hospital NHS Foundation Trust	51	0.6%	51	****	****	****	****	****	246.4	66.3	630.9
Mid Cheshire Hospitals NHS Foundation Trust	41	0.5%	42	****	****	****	****	****	202.5	65.3	472.7
Surrey and Sussex Healthcare NHS Trust	57	0.7%	60	8	14.0%	5.3	9.3%	2.7	150.1	64.7	295.9
Gloucestershire Hospitals NHS Foundation Trust	110	1.3%	115	8	7.3%	5.3	4.9%	2.7	149.8	64.5	295.3
University Hospitals Bristol NHS Foundation Trust	153	1.8%	201	12	7.8%	9.8	6.4%	2.2	123.0	63.5	214.9
Wye Valley NHS Trust	36	0.4%	40	****	****	****	****	****	187.2	60.3	436.9
Blackpool Teaching Hospitals NHS Foundation Trust	129	1.5%	148	12	9.3%	10.7	8.3%	1.3	112.4	58.0	196.3

Heart Valve Disorders – Trend analysis

Heart valve disorders | Mortality (in-hospital) | Jul 2017 - Jun 2018 | Trend (month)

Diagnosis group: Heart valve disorders | Admission type: Non-elective

Period: Month Analyse by: Admission type Measure: Observed



Key months: March & April 18

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Trend (month)	Superspells	% of All Spells	Observed	Crude rate (%)	Expected	Expected rate (%)	Observed-expected	Relative risk	95% lower confidence limit	95% upper confidence limit
All	49	100.0%	49	20.4%	3.9	7.9%	6.1	259.0	124.0	476.4
Jul-17	7	14.3%	7	14.3%	0.5	7.6%	0.5	189.1	2.5	1052.1
Aug-17	4	8.2%	4	0.0%	0.1	2.8%	-0.1	0.0	0.0	3260.7
Sep-17	6	12.2%	6	33.3%	0.3	5.5%	1.7	607.3	68.2	2192.5
Oct-17	5	10.2%	5	0.0%	0.2	4.5%	-0.2	0.0	0.0	1616.7
Nov-17	4	8.2%	4	25.0%	0.2	5.4%	0.8	465.6	6.1	2590.5
Dec-17	1	2.0%	1	100.0%	0.0	1.9%	1.0	5374.5	70.3	29903.2
Jan-18	4	8.2%	4	0.0%	0.2	6.2%	-0.2	0.0	0.0	1489.9
Feb-18	2	4.1%	2	0.0%	0.1	4.7%	-0.1	0.0	0.0	3902.0
Mar-18	8	16.3%	8	37.5%	1.7	21.0%	1.3	179.0	36.0	522.9
Apr-18	4	8.2%	4	50.0%	0.2	5.4%	1.8	917.9	103.1	3314.0
May-18	4	8.2%	4	0.0%	0.2	4.9%	-0.2	0.0	0.0	1881.0
Jun-18	0	0.0%	0	-	0.0	-	-	-	-	-

Patient Records (March & April) <https://one.drfooster.com/Query/?id=1000242>

Reviews

- 4 fatal cases were reviewed
- Structured Judgment methodology applied
- Themes drawn out

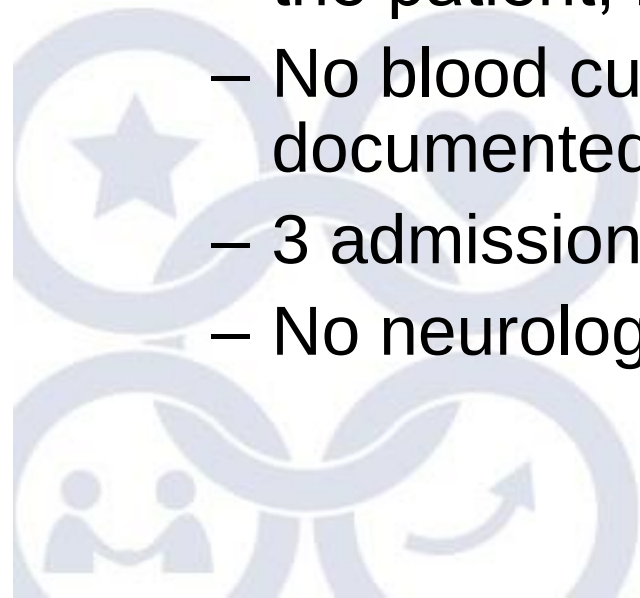


Themes

- Multiple admissions
- “Specialist blindspots” :
 - Respiratory thought night sweats/raised inflammatory markers were probably sarcoid
 - Community cardiology thought the abnormal valve was “old” because they were not informed of the night sweats and CRP 232
 - Ambulatory Emergency Care thought worsening SOB was probably sarcoid and p-wave inversion was probably known to the cardiology team, did CTPA (normal), discharged patient
 - Admitted with MI/endocarditis 1 week later

Specialist Blindspots

- Patient with abnormal blood film, raised CRP and ESR, night sweats referred to Haematology
 - Atypical CML
 - Remote Neurosurgery MDT advice (never saw the patient, intracranial “bleeds” - abscesses)
 - No blood cultures (night sweats but no documented pyrexia)
 - 3 admissions over 3 months
 - No neurology/general medical consult



Blood cultures

- There was a theme that blood cultures were not done in apyrexial patients despite abnormal inflammatory markers and a history of night sweats – with tachycardia in a number of cases

Consider Blood cultures in patients with night sweats



Think Endocarditis

- Unusual general symptoms (malaise, lethargy, night sweats)
- Repeated admissions
- Consider Blood cultures – even without fever if the other criteria are met
- If cultures grow :
 - Alpha-haemolytic streptococcus species
 - Staphylococcus species
 - Enterococcus species

Trust Guidance on Blood cultures

Should be performed if there are focal signs of infection, or the patient has chills or rigors, and there are 2 or more of the following symptoms present:

- Core temperature $>38^{\circ}\text{C}$ or $<36^{\circ}\text{C}$.
- Raised heart rate (>90 beats/min).
- Raised respiratory rate (>20 breaths/min) or $\text{PaCO}_2 <4.3\text{kPa}$.
- Abnormal white blood cell count.
- Blood pressure (low or raised): a systolic of $<90\text{mm Hg}$ or a reduction of $>40\text{mmHg}$ from baseline in the absence of other causes.
- Acute altered mental state or confusion.
- Poor urine output.
- Evidence of hypo-perfusion on blood gas (lactate > 2 or metabolic acidosis).

Antibiotic Course length

- In 1 reviewed case there had been a positive culture for Enterococcus faecium
- A course duration of < 1 week was given (2 week courses for proven bacteraemia is the recommended minimum in the absence of Microbiology advice to the contrary)
- Little evidence of discussion with Microbiology about choice or duration of antibiotics

Speak to Micro if in doubt