Better Tomorrow
learning from deaths, learning for lives

NHS
The Shrewsbury and Telford Hospital
NHS Trust

Supporting The Shrewsbury and Telford Hospital NHS Trust (SaTH) to assure their mortality review processes and evidence their learning from deaths

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Executive summary

This report presents the findings of an external peer review of the quality of the Trust's Structured Judgement Reviews and the way in which it can use these to learn from deaths and improve care. The aim was to assure the Trust about their SJR skills and processes and to identify any areas for improvement.

The peer review was designed to be in two parts:

1. A desk-based exercise to look through sixty of the Trust's recent SJRs and provide comment on their quality in terms of their depth and comprehensiveness, learning identified and escalation (if appropriate)
2. An onsite external SJRs of thirty of the same deaths. The aim of the review was to compare overall findings between the two sets of SJRs, both of which had been done on SJR*Plus*.[1]

In summary, the findings are as follows:

- The Trust has made significant improvements in the way it learns from deaths. It now uses an electronic SJR and has several reviewers trained to use it. This provides consistency of approach as well as a method for identifying and reporting on learning.
- The Trust should review the way it allocates deaths for SJR as their current system creates duplication with investigations (internal and Coronial) and limits review of the everyday care provided to the broad spectrum of patients. This will mean that lessons are missed due to biased selection.
- Generally, Trust SJRs are well done, and reviewers do appear comfortable in describing poor or good patient care and experience.
- There is potential to increase capture of lessons learned, positive and negative, from reviews. Areas for improvement including variance in approach, can be addressed through training/masterclasses plus the established multi-professional discussion of cases.

[1] A data collection tool expanded from that used in the NMCRR programme (RCP data collection tool). SJR*Plus* is currently hosted on the NHSEI ORIS cloud-based platform.

1 Introduction

The Better Tomorrow team have been supporting SaTH since July 2020, initially in conjunction with the Quality Compliance and Patient Safety Lead provided by NHSEI. This early interaction facilitated the review and establishment of a Learning from Deaths Group within the overall Trust Governance Framework. The group meets monthly and is chaired by the Medical Lead for Mortality and supported by the Trust Mortality Lead.

In December 2020, the lead undertook a desktop review of the Trust's systems and processes for learning from deaths. This included a review of key documents such as the Trusts' learning from deaths strategies and end-of-life care plans. Since then, Better Tomorrow's support has included:

- An awareness-raising session for senior managers in January 2021
- Participation in monthly Learning from Deaths meetings
- Co-production, with the Trust Mortality Lead, of a process map to clarify roles and responsibilities in the Trust, including the Medical Examiner. This has been adopted as a good practice process map and shared with other Trusts
- The introduction of an e-SJR (SJR*Plus*), accompanied by training for clinical staff to develop engagement in learning from deaths and skills in structured judgement review. To date, more than seventy clinicians have been trained and 261 SJR's have been completed on the system.
- Masterclasses for clinical reviewers, new to using SJR*Plus*, to share experiences and learn from each other
- Co-production of a mortality report to help identify trends, good practice, and opportunities for improvement
- Regular ad hoc support for the Medical and Trust Mortality Leads, including networking opportunities afforded by the new national Mortality Leads network meeting, facilitated by the Better Tomorrow team
- Support to produce the revised Learning from Deaths Policy to comply with national requirements and ensure Trust processes can withstand external scrutiny April 2022.

In December 2021, it was recognised that, despite the evident progress made and the significant work of the Mortality Leads, the Better Tomorrow team felt that the Learning from Deaths programme in SaTH was stalling. Despite the large numbers of reviewers trained, few were using SJR*Plus* and there remained confusion amongst clinicians about process due to the ongoing presence of the CESDI form used by some consultants. This coincided with the embedding of the Medical Examiner role and the need for clarity about the processes and governance. There was an obvious need to harness the development work done and help the Trust move onto a distinct operationalisation phase.

The Trust has introduced two key elements to help this agenda:

1. A proposal for the Learning from Deaths Operational Process incorporating online screening and Structured Judgement Review (SJR*Plus*) tool was presented to the Quality Governance Group in December 2021.

2. The introduction, in October 2021, of a weekly Mortality Triangulation Meeting to provide oversight and triangulation of deaths. The aim of the group is to facilitate the operational Learning from Death processes and ensure that the appropriate pathway to manage individual cases is agreed. It also aims to avoid duplication of reviews or investigations, ensure appropriate referral, and facilitate clarity for the bereaved.

3. The withdrawal of the CESDI form, replacing this with the pilot of a screening tool and adoption of SJR*Plus*.

Structured Judgement Review data collection is based on principles and methods previously established within the NMCRR programme. [2][3] SaTH uses web based SJR*Plus*; the dataset and collection tool developed from that used in the NMCRR programme (RCP data collection tool). [4]

2 Terms of reference

This review was part of an agreed programme of work to support SaTH to review and improve its mortality processes and evidence its learning from deaths.

The Trust wanted to confirm that their reviewers were completing robust reviews of the notes and not missing key information, including nursing and AHP notes. The terms of reference for this piece of work were as follows:

1. There would be two phases to the work

Step one would be a desktop review, by the Better Tomorrow team, of a sample of 60 SJRs across three divisions: 34 medicine, 10 surgery, 12 cross divisional, and seven cancer care. A survey was developed for phase one, which was undertaken by the joint leads of the Better Tomorrow team.

2. A multi-professional panel of external reviewers would be recruited for phase two, which would be carried out over three days on the Trust site. The external reviewers would complete new SJRs on 50% of those previously reviewed, without seeing what the Trust reviewers had written.

[2]The AHSN Network 2018: Implementing Structured Judgement Reviews for Improvement
[3] Royal College of Physicians 2016: Using the structured judgement review method. A clinical governance guide to mortality case record reviews (NMCRR programme)
[4] Royal College of Physicians 2016: Using the structured judgement review method. A clinical governance guide to mortality case record reviews (NMCRR programme)

This report describes the lessons learned from both the desk top review of 60 cases and the detailed external mortality review of 30 cases. It aims to help the Trust identify and replicate what it does well and make improvements where needed. It provides both quantitative findings and qualitative information with case studies to illustrate specific learning. As well as commenting on the quality of the SJRs, the report is written to offer reflections on exemplar and weaker aspects of care and encourage forward action for quality improvement – Better Tomorrow.

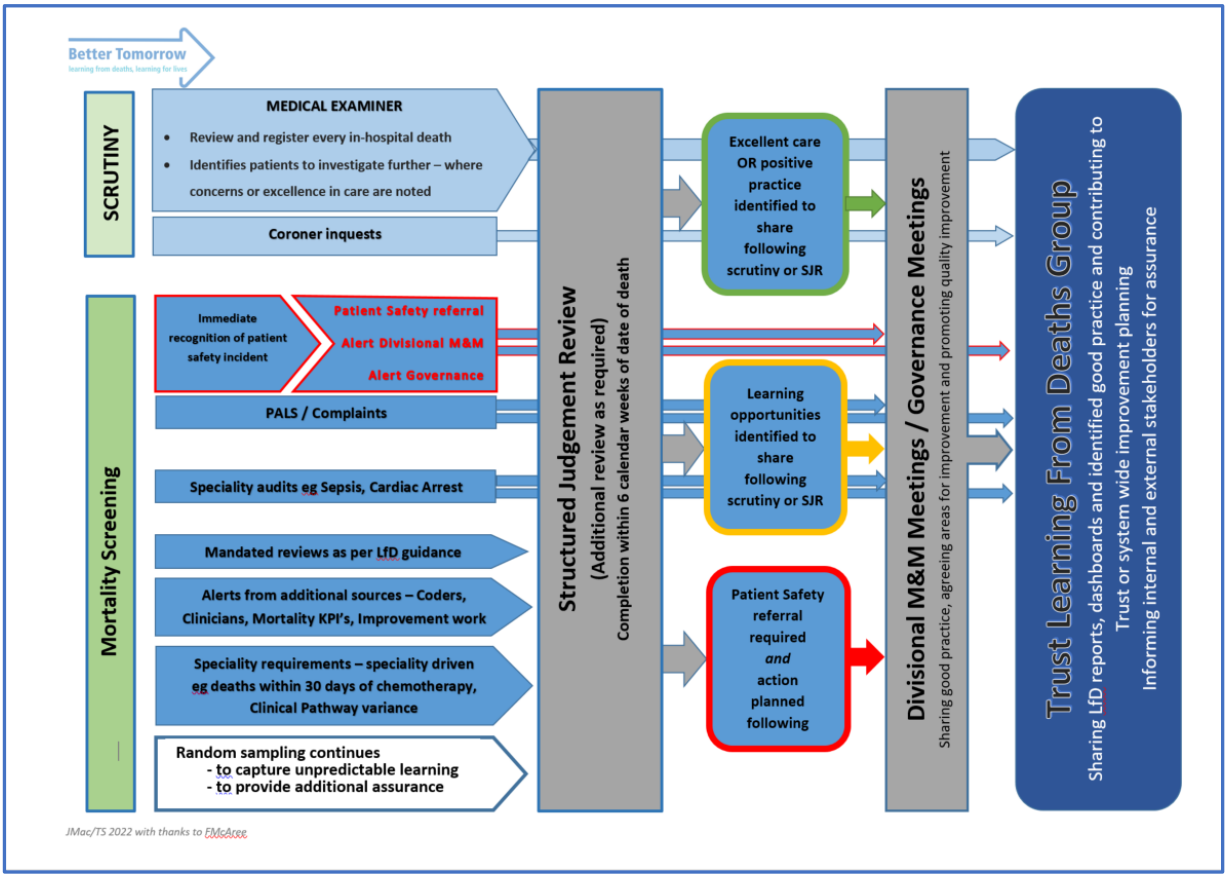
SJR methodology is evidence based and used in practice across numerous NHS settings. It is based upon trained clinicians using explicit statements to comment on the quality of healthcare in a way that facilitates reproducible judgements. The principles of SJR are that it:

- Combines traditional, clinical, judgement based, review methods with a standardised format
- Is usable across services, multi-professional teams and specialties
- Relies upon trained reviewers looking at the patient record in a critical and holistic manner and commenting on specific phases of clinical care
- Requires safety and quality judgements and a score for phases of care
- Uses free text and categorical variables to capture the quality of care delivered

The result is a relatively short but rich set of information about each case, in a form that can also be aggregated for cohorts to produce intelligence about clinical services and systems of care. SJRs are not investigations but are tools for understanding care through case review. Their purpose is to identify both positive and negative learning through thematic analysis. With a well-established incident reporting mechanism and implementation of Duty of Candour procedures it is unlikely that an SJR would highlight a serious incident that had not already been identified by the Trust through other means, particularly now that the scrutiny of all deaths by the Medical Examiner is established and pre-dates any SJR. Figure 1 presents the process of scrutiny to SJR to put this into context.[5]

[5] Developed in collaboration with Shrewsbury and Telford Hospital NHS Trust and updated 2022

Figure 1: Scrutiny to SJR



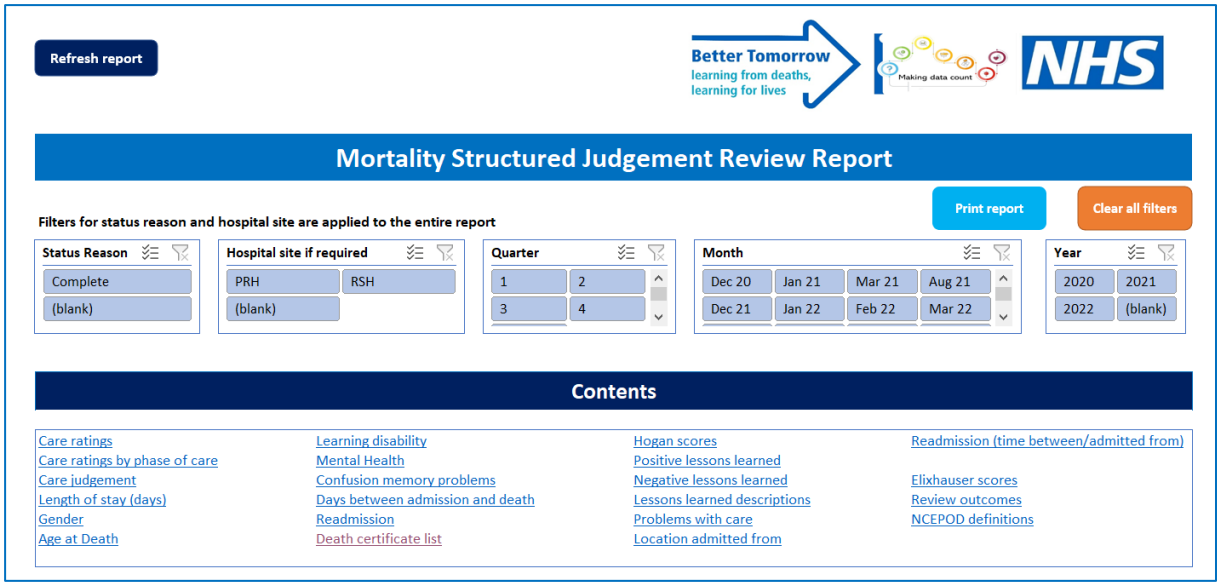
Reviewers work to the principles established and endorsed by RCP and AHSN in undertaking SJRs. SJR*Plus*:

1. Includes three established and well-researched outcome descriptors. These enable reviewers to use standardised terminology for their overall judgements.
2. Extends the investigation in the NMCRR programme to include sections on readmission and nutrition
3. Includes the Elixhauser co-morbidity score[6] to understand the potential increases in length of stay and mortality of the cohort reviewed (Appendix 1 i + ii).

SJR*Plus* has a detailed interactive reporting function, which presents patient profile, aggregated care ratings and themes identified from problems in care as well as qualitative information from the judgements reviewers are asked to make.

[6] van Walraven, C. et al, June 2009: *A Modification of the Elixhauser Comorbidity Measures into a Point System for Hospital Death Using Administrative Data*. Medical Care, vol 47, Number 6

Figure 2: Front page of interactive SJR*Plus* report



3 Part 1 – Peer review of Trust SJRs

A key question for this report was whether the Trust SJRs reflected the care given and fully identified any opportunities for learning, and therefore improvement. This section of the report presents comparisons between the Trust SJRs and external SJRs.

It is noted that SJRs are based on subjective clinical opinion so final judgements between clinicians may differ. However, it is unlikely that judgements at the extremes would be far awry, and that harm would be noted, even if this led to a different assessment of care.

For this part of the review, the Better Tomorrow leads read through sixty of the Trust's SJRs and assessed the following:

- Completion of judgements and ratings for all phases of care (as required) and overall care
- Completion of problems in care section
- Outcomes section completed and whether the score reflected the judgements made
- Completion of the lessons learned section, both positive and negative
- Whether the outcome reflected the content of the review

3.1 Completion of judgements and ratings for all phases of care (as required) and overall care

Trust reviewers are not always writing judgements to support their ratings. This means that there will be gaps in the identified learning as well as context to support the ratings. SJR*Plus* invites reviewers to write a judgement and provide a rating for four phases of care:

- First 24-hour care
- Ongoing care
- Care during a procedure
- End of life care

Completion of the first 24-hour judgements and ratings sections were made in 59 of the 60 cases reviewed. The one case with no information in first 24 hours did include ongoing care judgement and was rated as excellent care. However, the information only related to blood tests and in no way validated a rating of excellent care. There was no information included about problems in care and no End-of-Life information. It was concluded that this was far from an adequate SJR and should have been investigated as a near miss or failure of action on results, using an incident investigation approach to identify learning.

Completion of both the ongoing care judgements and ratings sections were made in 14 of the 60 cases reviewed. It is appropriate to record N/A when a patient has died within the

first 24 hours. However, in two cases, the Trust reviewers rated the ongoing care (both rated as good care) but did not provide judgements to support their ratings. In the other case, both judgement and rating were left blank, despite clinical information being available. Inclusion of incomplete SJRs like this one in any cohort report would bias findings.

Completion of the care during a procedure judgements and ratings sections were made in 43 of the 60 cases reviewed. This question was marked N/A in most cases. In one case, the Trust reviewer completed the rating but did not make a judgement to support their rating. It was clear that this box was not always being used even when a procedure had been performed.

Completion of the end-of-life care ratings section was made in 100% of cases reviewed. However, the Trust reviewers recorded N/A or left blank their judgement to support their rating in 20% of cases reviewed.

The overall care ratings section was also complete in 100% of cases reviewed. However, the Trust reviewers recorded N/A or left blank their judgement to support their rating in 8% of cases reviewed.

The Trust may want to consider offering more training to ensure reviewers support their ratings with judgements to identify the learning. Seeing the output from the SJRs, in the form of the SJR*Plus* report may also encourage the reviewers to complete these sections.

3.2 Completion of problems in care section

SJR*Plus* asks reviewers to identify whether there were any problems in care, to categorise the problems using a predefined list, and to note if any of those problems had led to harm. These can then be aggregated to identify themes for learning and improvement and is key to the way SJR can be used for learning and improvement. The predefined list of problems covers a wide range of possible scenarios, from clinical assessment and treatment, including medication as well as communication and organisational problems. Therefore, even if care has been good, it is unusual not to identify some areas for improvement from this list.

Trust reviewers identified problems in care in 37 of the 60 cases reviewed (62%). This is relatively low compared to what we see in external reviews. It is important to remember that this section of the review allows reviewers to identify situations where harm is not documented but could be assumed. Collated over time, that information can act as “smoke signal” and allow proactive solutions rather than reacting to harm events. Again, that was low in reviewer responses.

The Trust may want to consider how to encourage reviewers to use this list. Again, this may be a training issue that should be supported by sharing the SJR*Plus* report with reviewers. A

change in the wording in the planned update to SJR*Plus* from “probably” to “maybe” should be more comfortable for reviewers to use.

3.1 Outcomes section completed, and scores reflect the judgements made

Accuracy of outcome scores generally reflected the judgements made by Trust reviewers (see table 1).

SJR*Plus* uses three standard outcome descriptors to assess overall care. These provide a consistent way for reviewers to make their overall conclusion about whether the death was expected, preventable and if there was room for improvement, stratify into clinical or organisational categories.

An SJR which identifies preventability of greater than 50:50 needs further investigation. The middle ranging scores can be challenging for reviewers, but in most cases, it was clear to see how the reviewers had reached these scores. It should be encouraging for the Trust to note that the higher scores – greater than 50:50 and definitely preventable clearer reflected the judgements made in the review.

NCEPOD includes useful descriptors about organisational as well as clinical learning. The only issue to note from this review is the inappropriate use of “unable to grade” in two cases. In both, there was sufficient information within the review for the reviewer to use one of the other descriptors.

Table 1: Correlation of Trust SJR outcome scores with judgements made (n = 60)

Outcome scale	Descriptor	Number of times used	Number of times score reflect the judgements
Preventability	• Definitely not preventable	35	30
	• Slight evidence for preventability	15	13
	• Possibly preventable less than 50-50	5	2
	• Possibly preventable greater than 50-50[7]	2	2
	• Strong evidence for preventability	0	N/A
	• Definitely preventable	1	1
	• Unable to grade	2	1
NCEPOD	• Good practice	18	4
	• Room for improvement in clinical care	16	2
	• Room for improvement in organisational care	4	4
	• Room for improvement in clinical and organisational care	15	15
	• Less than satisfactory	4	4
	• Unable to grade	2	2

3.4 Completion of the lessons learned section, both positive and negative

There is scope for the trust to encourage reviewers to increase the use the lessons learned section in SJR*Plus*.

One of the key elements of SJR*Plus* is to identify lessons so that these can lead to change. In the NHS, we are used to identifying things that have gone wrong to learn and improve. However, improvements can also be made by describing and repeating what works well. Therefore, SJR*Plus* has been designed to encourage reviewers to highlight the positive lessons for affirmative learning and consolidation of good practice.

Considering these 60 records, SaTH reviewers identified that there were - or maybe were - lessons to learn in 80% of cases. Positive lessons were identified in 55% of cases and negative lessons in 70% of cases.

[7] Patient Safety Incident Response Framework supporting guidance: Guide to responding proportionately to patient safety incidents. Appendix A NHSE PAR1465 22

3.5 Did the overall SJR outcome reflect the content of the review?

Although the outcomes of the Trust SJRs reflected the content of 72% of the reviews studied, there is an opportunity for the Trust to help reviewers ensure that their reviews are comprehensive and that their outcomes reflect what they have written.

In eleven cases, it was felt that the outcome did not reflect the content and a further 6 of cases, it was unclear from what was written.

There were some common reasons for this – in four cases, the patient had died in ED and some of the lessons learned or problems in care sections were incomplete or only partially completed. In other cases, it was unclear whether nursing as well as medical notes had been used for the review as some key information was missing.

A complete list of those cases and the reasons why it was concluded that outcomes did not reflect the content of the review can be seen in Appendix 2.

Common themes for the majority of SJRs whose outcomes *did* reflect the content of the reviews, were clear inclusion of nursing and AHP notes on reaching judgements.

3.6 Conclusions regarding peer review of Trust SJRs

Our feedback for the patient care section of this report is listed below but these are not intended as firm recommendations. Any action planning and next steps arising from these should fit into on-going Trust objectives, improvement plans and training programmes.

Positive aspects identified	• Trust reviewers are developing expertise in using SJR*Plus* • Trust reviewers are not afraid to identify poor care and negative lessons in their SJRs • Many SJRs are well-articulated and comprehensive • Good correlation between outcome scores and judgements made

Questions to consider	• Could reviewers be encouraged to:
	  ○ always write judgements to reflect ratings
	  ○ make better use of the problems and lessons learned sections
	  ○ think about and record positive lessons

Reflections on possible solutions	• Consider additional training/masterclass to ensure the maximum benefit from SJRs in terms of identifying learning for improvement

4 Part 2 - External mortality review

4.1 Patient profile

This section of the report presents a profile of the overall patient cohort. The final number of completed reviews was 30.

Table 2 lists the cause of death, which was was recorded in 22 (73%) of the cases reviewed.

Table 2: MCCD (n = 22)

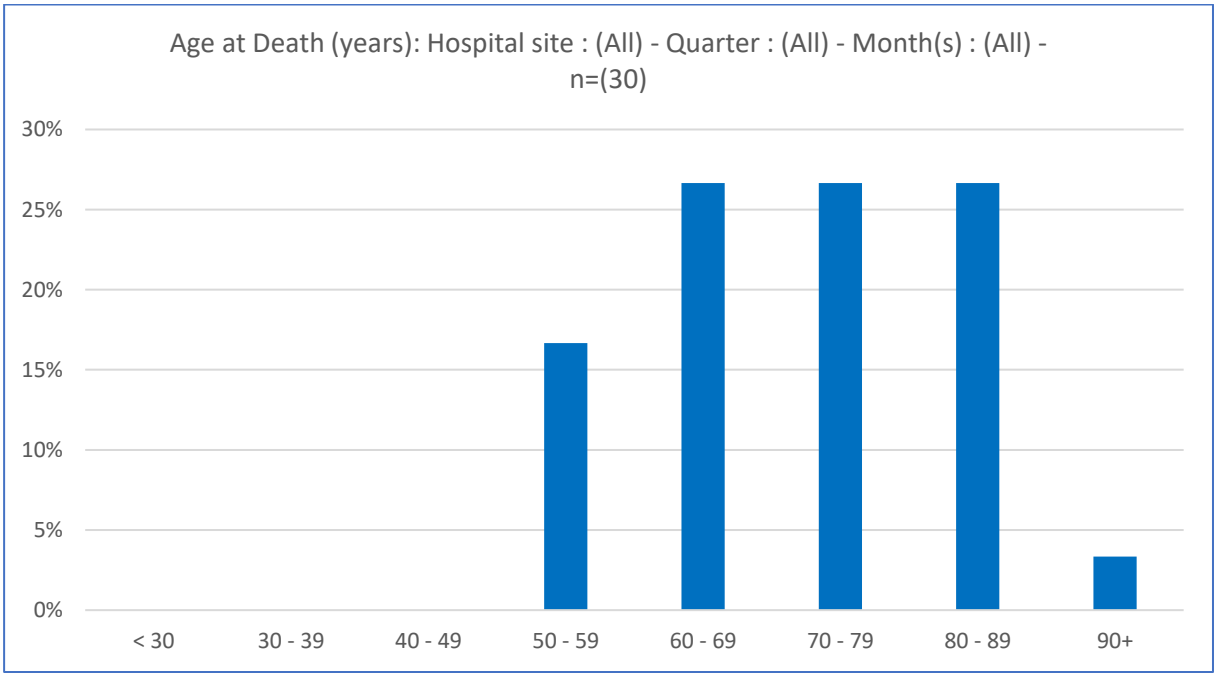
Certified Cause of Death (n = 22)
1a) Myocardial Infarction 1b) Ischaemic Heart Disease 2. Lung Cancer
1a High grade lymphoma
1a CCF, 1b Dilated cardiomyopathy
Lymphoma
1a) Bronchopneumonia 1b) Metastatic carcinoma (breast) 2. Sever aortic stenosis. Acute on chronic KD
Metastatic adenocarcinoma of caecum
1a pericarditis, 2 Hypertrophic heart disease
1a Bronchopneumonia 1b chronic obstructive airways disease & obesity hypoventilation syndrome 2 CKD
Exacerbation COPD.
1a Pneumonia, 2 Long term tetraplegia secondary to spinal injury
1. Metastatic Lung Cancer 2. Pancreatitis and Covid Pneumonia
1a MOF 1b PE 1c Rectal adenocarcinoma (operated 2/3/21)
1a Decompensated T2RF 1b LRTI 1c Frailty 2 Asthma HTN AF
1. a) Cardiogenic shock 1. b) Myocardial infarction 1. c) Ischaemic heart disease
1a metastatic upper gastrointestinal malignancy, 2 COVID infection
1a CCF 1b HTN
1a multi organ failure 1b intraabdominal sepsis
1a Pneumonia 2 Frailty Learning disability Epilepsy
1. Bronchopneumonia 2. Epilepsy
1.Metastatic colon cancer
1a Acute renal failure 1b Multiple myeloma 2 CCF

Fourteen of those reviewed had died at Princess Royal site and sixteen had died at Royal Shrewsbury Hospital.

It should be noted that this selection of patients not only had local SJR, but a third of those reviewed had also been subject to an incident investigation or referral to the Coroner. Ideally only one mode of interrogative review should be applied to an individual case, ensuring that positive and negative lessons are captured with context[8]. The aim is to reduce the information collection burden and where possible, use meaningful data from existing data streams[9]. SJR findings should *complement* not duplicate other sources of information, including Medical Examiner scrutiny, incident investigation, complaint responses, bereavement feedback and Coronial judgements for a broad understanding and learning.

Chart 2 provides a breakdown of the age of the patients when they died. Mortality indicators group all above 90 in one category so that convention is used. This shows that all the patients reviewed were over 50 years old and that there was an even spread between those in their 60s, 70s and 80s.

Chart 2: Age at time of death all admissions (30)



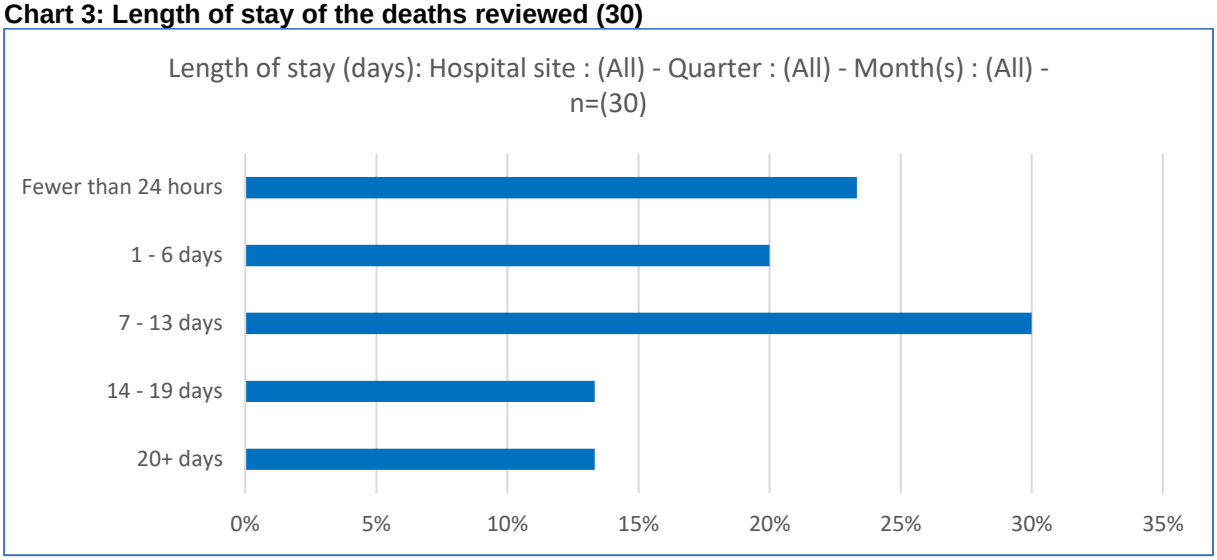
It was only possible for the reviewers to identify ethnicity in 5 of the 30 of the cases they reviewed. Those five were listed as White British. The review team discussed this missing information with the Trust leads and it was noted that ethnicity information is held on a separate system.

[8] National Guidance on Learning from Deaths NQB 2017 Appendix H

[9] Patient Safety Incident Response Framework: Oversight rules and responsibilities specification NHSE 2022 PAR1465

Chart 3 shows that there was a relatively even spread of length of stay before those reviewed died.

Chart 3: Length of stay of the deaths reviewed (30)



Around 75% had died within the first 13 days of their stay. Chart 4 shows that 29% of these died on day 1.

Chart 3: Length of stay of the deaths reviewed when the stay was less than 14 days (24)

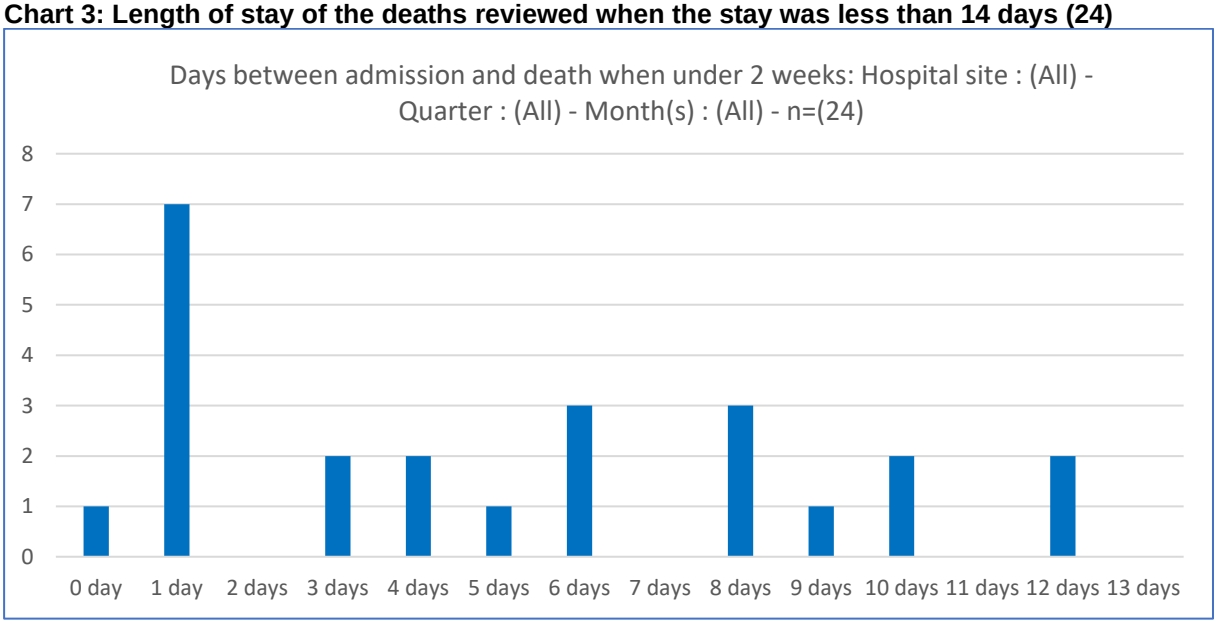
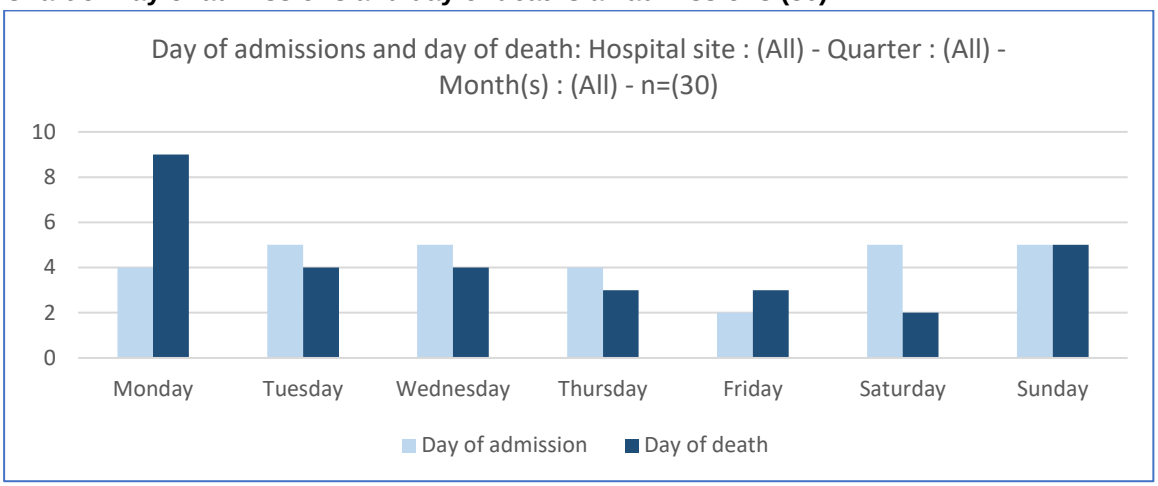


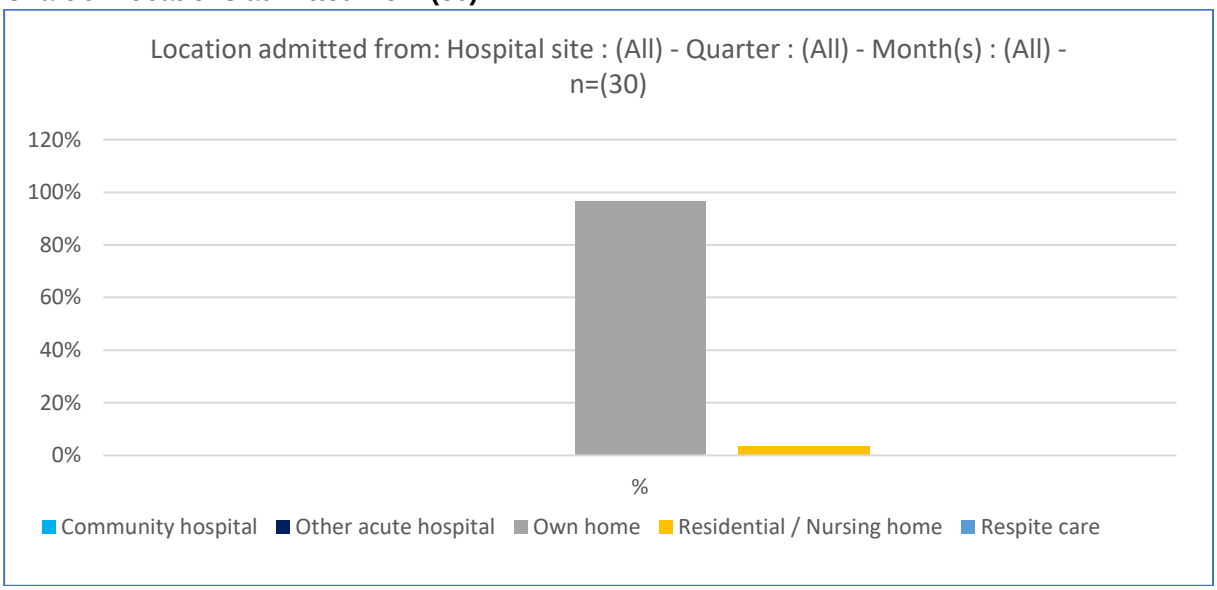
Chart 5 shows that there was no significant difference in terms of day of admission but that 30% of those reviewed died on a Monday. The Trust may want to explore this further to see if this cohort is representative of performance data and explore underlying contributory factors, including case selection.

Chart 5: Day of admissions and day of deaths all admissions (30)



Most of those reviewed had been admitted from their own home (97%). See chart 6.

Chart 6: Locations admitted from (30)



Five of the patients reviewed (17%) had been readmitted within 30 days of discharge. This question was not answered in two cases. See chart 7.

Chart 7: Readmissions (28)

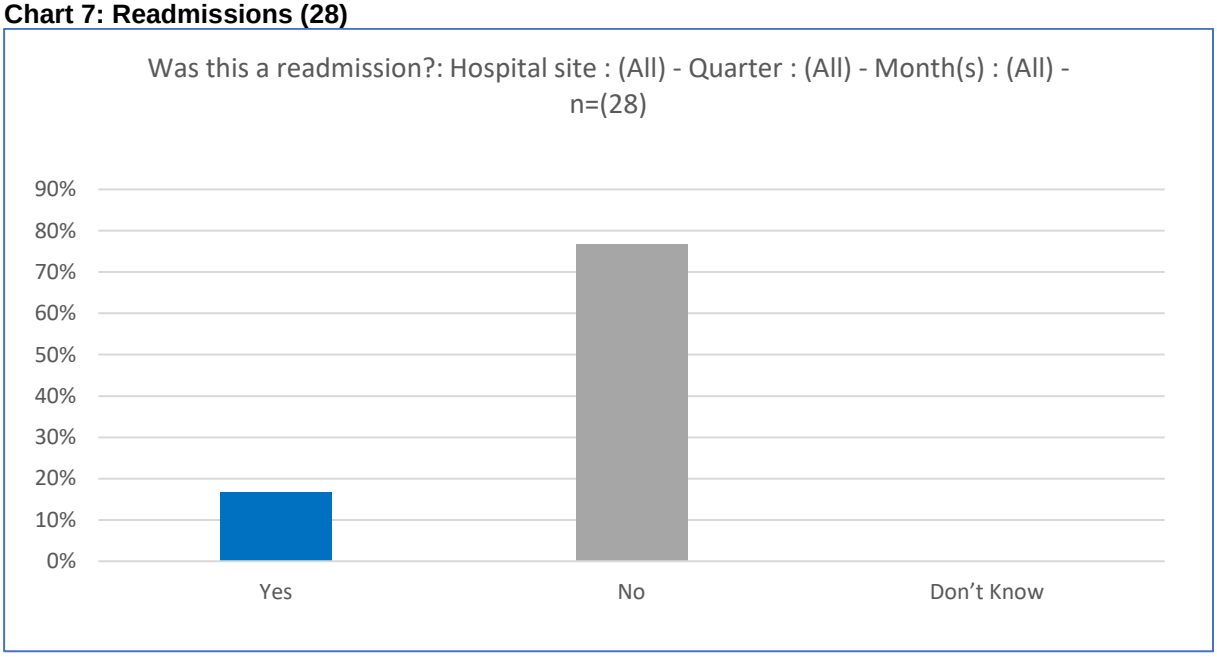


Table 3 presents the reasons for the five readmissions. Three of these were due to breathlessness/shortness of breath.

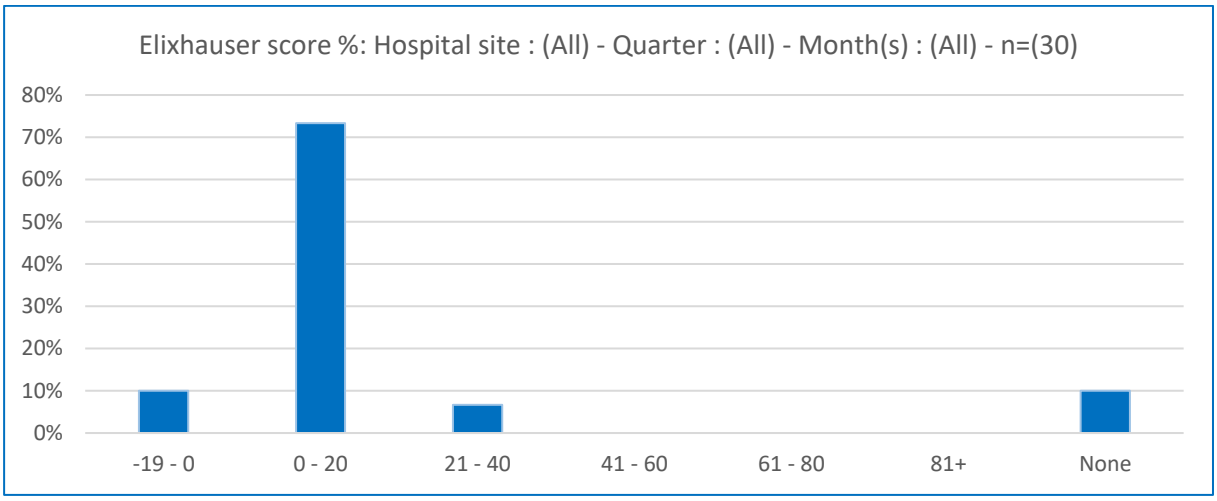
Table 3: Reason for readmission and lengths of stay (5)

Readmission reason	Length of stay
Abdominal pain	7 - 13 days
Right leg tenderness and swelling	7 - 13 days
Shortness of breath, confusion	14 - 19 days
Shortness of breath	Fewer than 24 hours
Breathlessness	20+ days

Chart 8 show that those reviewed were a complex group of patients. In their reviews, the reviewers captured co-morbidities from the information in the clinical notes; these were analysed using the Elixhauser scoring[6]. Elixhauser ranges from negative to positive once comorbidities are aggregated for individual cases. The higher the score, the more and/or the more complex the co-morbidities. Higher scores are associated with an increased risk of mortality in an acute hospital admission, but some comorbidities confer little risk and generate a negative score. The Elixhauser groupings of co-morbidity factors do not include palliative care descriptors, which are relevant to HSMR in increasing the expected number of deaths but give another way to understand and compare cohorts.

The Trust may wish to look for patterns and themes in the different risk groups identified by Elixhauser scoring, particularly where death was unanticipated or unexpected, as their data accrues.

Chart 8: Elixhauser comorbidity scores (30)



Tables 4 and 5 illustrate the profile of the patients reviewed in terms of their mental health needs. Table 4 shows that 6.7% had a mental illness; this includes those with a documented diagnosis of Alzheimer's or another dementia.

Table 4: Did the patient have a significant mental illness? (28)

	n.	%
Yes	2	6.7%
No	26	94%
Grand Total	**28**	**93.3%**

Table 5 shows that 16.7% showed signs of confusion, including delirium, during their stay (without a significant mental illness). There was a perception among the external reviewers that the number of patients with confusion/memory problems among of the 30 cases reviewed was lower in SaTH than in other Trusts they had reviewed. To test out this perception, we have compared SaTH's total number of SJR*Plus* reviews on ORIS (which include SaTH's). Table 6 supports this perception. Compared to the reviews of deaths from all Trusts using SJR*Plus*, the percentage of patients with delirium identified in the notes were much lower at SaTH (30.1% compared to 16.7%). The Trust may want to consider whether this is due to SJR case selection or improving the way that clinicians recognise and record delirium.

Table 5: Did the patient experience confusion/memory problems at any point during their stay (SaTH)? (26)

	n.	%
Yes	5	16.7%
No	21	70%
Grand Total	**26**	**86.7%**

Table 6: Did the patient experience confusion/memory problems at any point during their stay (ORIS)? (1585)

	n.	%
Yes	478	30.1%
No	1107	69.9%
Grand Total	**1585**	**100%**

Five of the patients reviewed had a learning disability. The ratings for the care of the patient with learning disabilities are as follows:

Table 7: Overall summary of care ratings for those with a learning disability (5)

	First 24-hour Care Rating	Ongoing Care Rating	End of Life Care Rating
1 (Very Poor)			1
2 (Poor)	1	2	1
3 (Adequate)	1		
4 (Good)	2	2	
5 (Excellent)	1		2
Grand Total	**5**	**4**	**4**

The Trust may wish to compare these reviews with those carried out by LeDeR and to work together to identify learning. From the experience documented for these 5 cases, it appears that are both positive and negative lessons to learn to improve care for people with learning disabilities.

4.2 Conclusions regarding patient profile

Analysis of this cohort is subject to the caveats and potential biases from a limited sample of deaths. It does however raise some questions the Trust may wish to consider going forward:

- How to create and maintain clarity among the various methods of case interrogation to minimise duplication – scrutiny, coronial investigation, incident investigation framework, and SJR
- How to ensure that ethnicity is recorded and available to clinical reviewers. We have anecdotal evidence that there are variations in the experiences of care according to ethnic group and deprivation. The new version of SJR*Plus* includes postcode and this, with ethnicity, will help Trusts identify whether there are health inequalities.
- How to improve documentation of delirium in the clinical notes and in SJRs.
- How to use mortality data to promote understanding and recording of special groups, such as those with delirium, dementia, learning difficulties and mental health conditions, to offer best practice in care and understand workforce implications for support.
- How to use mortality data to understand patterns in day of death.

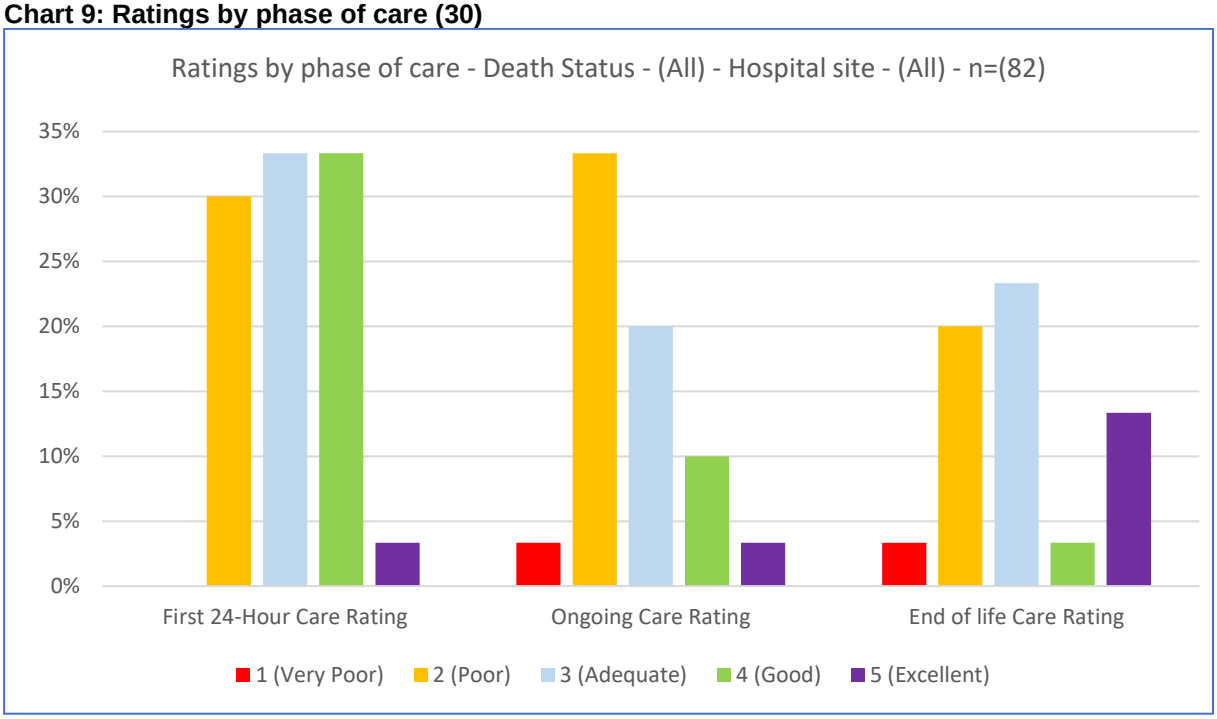
4.3 Care ratings by phase of care

The following section describes the care ratings for all 30 cases reviewed and highlights the extremes of care using the reviewers' own notes

Chart 9 shows the care ratings by phase of care; those made by reviewers once they have considered all the notes and made individual judgements about phases of care. This shows that first 24-hour care was more likely to be rated as good compared to ongoing care and end-of-life care. However,

The first 24-hour care was rated as excellent for one patient and poor for nine patients. There were no very poor cases identified in the first 24 hours of care.

Chart 9: Ratings by phase of care (30)



The case rated as excellent was described as follows in the case study below. (Case1) The comments have been taken verbatim from the reviews, so include abbreviations and shortened sentences with medical jargon.

Case 1 – excellent first 24-hour care

Excellent initial care and management. Rapid medical review and treatment for ? sepsis, comprehensive nursing assessments and care, nursed in ED but on hospital bed, pressure care given. Regular obs and ED patient safety checklist completed. Discussions with family, Respect form completed, MCA assessment completed and in notes (assessed as no capacity).

Patient, with LD (autism) and epilepsy admitted from NH - where she had been since December, following an inpatient stay with Sepsis. previously lived in sheltered housing with a carer. Sent to NGH for respite three months previously. Found by carers to have low GCS and off her food. Tachycardic, temp 38.8, sats on air - 88%, resp 40. Notes say has been bed bound in NH. Non-verbal.

Arrived in ED at 13.24 and triaged completed at 13.40. Nursing assessments in ED - safeguarding, falls, pressure sore risk. Noted to have moisture lesions on neck and red blanching on sacrum. Seen by Reg at 14.10 - ? sepsis, ? aspiration pneumonia. Plan - bloods, ABG, CXR, ECG, antibiotics and IV fluids (given at 14.10).

Regular nursing assessments and obs throughout stay in ED. EWS reduced with treatment - to 10 and then 7.

Clerked by medics at 23.05. Discussion with patient's sister, who was concerned that she had experienced a seizure as missed evening dose of antiepileptics (in NH or in hospital - not clear). Diagnosis: 1. ? seizure activity due to missed dose of anti epileptic meds, 2. Chest infection ? aspiration or LRTI 3. Hypernatremia 4. Deteriorating patient. Plan: IV antibiotics and fluids with dextrose due to raised Na. Respect form discussed with sister - preferred place of care is with her family. Side room as exposed to Covid. Review by consultant for discharge plan once off O2. SPO = 94-98. IV phenytoin as patient too drowsy to swallow."

Three of the cases rated as poor in the first 24-hours were due to delays in offloading patients from ambulances.

Case study 2 presents an example of one of the other cases of poor 24-hour care.

Case 2 – Very poor first 24-hour care

"Attended ED with chest pain - arrival 21.49.
Triage documented 23.28, ?observations done 23.47 NEWS 0.
From triage entry: Aspirin 20.10 Morphine 10mg 22.00
Chest pain, going into neck, no cardiac history. ECG ticked on investigations at this point.
CXR not ticked on triage - should be considered early with chest pain.
ED Medical student review 00.53 21/3/22: Central chest pain - 2/10 at assessment
Notes recent cold – improving 6/52 history left chest pain and across shoulders, others aches elsewhere and has made an appointment with GP for this. Notes excess alcohol (6 bottles wine/week), some cardiac family history, never smoker, poor diet. Full examination - good pulse and no radio-radial delay but R>L in radial pulse strength.
ED doctor review 03.30 21/3/22: Hx and Ex agreed with - don't think repeated. Notes ECG changes. Notes given fundoparinox (02.15) and GTN (02.10) - no improvement in pain. States given aspirin and morphine pre-admission. D/W med reg - advise posterior ECG's and discuss with angioplasty centre given ongoing pain. D/W team at Stoke: - dual anti-platelets suggested. To consider transfer if pain not settling after GTN infusion.
- ECG transfer system not working - ECG's sent by WhatsApp.
- Plan to give further IV morphine (02.40), clopidogrel stat (04.00), monitor and if further pain - IV GTN
Transferred to cubicle 6 at 03.00 - nursing entry - observations done and noted to pain free at this time.
Increasing pain 03.59 - doctor informed and treatment being given.
Emergency Medical Assessment proforma completed by SHO 05.00 in ED: ECG reviewed - lateral ST depression. Slight rise in troponin. Fundarparinox prescribed 21/3/22 for evening 21/3/22 - not given Aspirin and b-blocker prescribed as routine for morning 21/3/22.Morphine, GTN spray prescribed PRN - no doses given Examination chest clear, normal heart sounds, abdo soft and non tender, JVP down.
No comment on strength/character of pulse. "Initial clinical assessment: Suspected ACS" completed - intermediate risk.
ECG 21/3/22 00.42 - ? first ECG slight anterio-lateral ST changes. ECG 21/3/22 00.56 - Ongoing ST depression - noted ongoing pain ECG 21/3/22 02.07 - ongoing CP - minimal change on ECG
ECG 21/3/22 02.11 with post lead placement. ECG 21/3/22 04.07 -ST depression slight improvement documented Comments on ECG, notes raised and increasing troponin.
CXR - Nil acute (Note first time CXR mentioned and NOT normal in my opinion)
Diagnosis/problem list NSTEMI PLAN - start ACS, cardiology review, monitor pain and consider GTN infusion
Emergency alarm 06.18 Collapsed, transferred to resus - peri-arrest. Resuscitation commenced. Scribe making entries during arrest to ensure correct timings - excellent practice.
Well led and subsequently documented arrest. Reversible causes considered.
Dissection not considered. Note - no evidence CXR reviewed.

Reviewer Opinion
No alternative diagnoses considered at any point, only IHD investigated. Whilst this is a strong possibility from the story and investigations for NSTEMI there are pointers to an alternative diagnosis. Severity, site and radiation of pain suggest possibility of dissection.
Differential strength of radial pulses noted in med student examination at 00.53. Observations on clinical portal show 2 previous admissions diastolic BP above 100. No history of hypertension given. This gives a pre-existing risk for aneurysm. The ongoing pain and its lack of response to GTN and need for morphine is concerning for dissection. On review, I would have put dissection as a strong possibility in a differential diagnosis.
CXR performed 21/3/22 03.27 - Unsure when CXR requested - should have been at triage so potential delay here. However, CXR still performed in a timely manner. There is a widened mediastinum and abnormal cardiac shadow. PA film. Very concerning for aortic dissection. (Note CXR not reported as deceased) Previous CXR December 2020 markedly different. This CXR should have made dissection the main diagnostic possibility.
Good management of UA/NSTEMI with liaison with specialist team for consideration of transfer. Repeated ECG's looking for dynamic changes is good practice.

Chart 9 also shows that ongoing care was rated as good or excellent in 13% of cases reviewed, adequate in 20% and poor in 33% of cases. There was one very poor rating and one excellent rating. The skew of ratings towards the poorer end of the scale is unusual compared to other external reviews and is likely to have been affected by the high number of SJRs that had also been flagged as investigations or Coroner referrals. It presents the Trust with a clear opportunity to use SJRs to demonstrate an accurate picture of the quality of ongoing care by reconsidering case selection to include random cases and potential exemplars alongside those where MEs or clinicians identify potential for improvement.

The one case rated as excellent was described as follows:

Case 3 – excellent ongoing care

Ongoing care on ITU - morning review says that patient is realistically at ceiling of care. Not for CPR (noted that this is patient's wishes). On NIV for three days with no improvement and increased O2 requirement. Discussed with patient and her daughter that she is exhausted. Patient asked for a glass of whisky - to which the doctor consented. Plan agreed with patient - to continue NIV for as long as patient feels she can manage.

The one case rated as very poor was described as follows. (Case 4) The Trust is aware of this case and have undertaken a detailed review.

Case 4 – very poor ongoing care

26.3.21 is next R/W, possibly with the consultant in General Surgery. He notes BP is 101/58 with grossly raised WCC. Tests requested but no management plan instigated. Further daily ward rounds and 29.3.21 it is noted the Bp is 112/60 still but now with a tachycardia of 104. CRP and WCC have reduced but patient has been on light diet with a functioning stoma and no tenderness at the parastomal hernia. Also, past 3 days there has been requests for the supervising consultant to review and conservative management has been continued. There have been routine blood tests but no other investigations such as another CT-AP.

NOK are requesting for contact with the supervising consultant. Later that day, BP drops to 89/51 and NEWS 3 so escalation sticker in notes. Another one for the same day about 5 hours later, now with a NEWS of 9 and there is no evidence of a doctor review from the first to the second request. Finally seen by the ""Twilight FY1"" 6 hours after first escalation. Good review but fails to recognise stage 2 shock (Tachycardia with low bp) even though they record the Bp as 82/50 and 117 bpm. They fail to recognise the danger here and fail to escalate the situation to a senior, record issue as dehydration and prescribe ""IV fluids stat and maintenance"" continue obs and to escalate if there is further deterioration.

There is a more senior r/v in the morning with an UGI of unknown grade who records the obs as NEWS 2, 97 bpm systolic Bp as 102. Patient is falling into stage 3 shock, low Bp and HR starts to fall. Oral intake encouraged and discharge planning initiated. A further escalation request made at 20:30 pm on the 30.3.21 resulted in a review at 0600 on the 31.3.21! The twilight FY1 recognises the shock, queries a bleed and escalates for senior review. They initiate bloods and IVI resuscitation. CT2 initiates the practicalities for resuscitation and calls for help from the surgical & Medical SpR. Resuscitation is fully ongoing with a ll the expected specialities but is too late to change the course of events and she is certified as dead @ 09:45 on the 31.3.21.

NOK are not happy and insist on a Coroner PM.

Care during a procedure was recorded for six out of the 30 patients reviewed. Four were rated as good, two rated as adequate and one rated as poor (see case study 5).

Case 5 – Poor care during a procedure

Laparotomy, query the time of the procedure. Peri-operative notes are sparsely filled in with no time recorded. Anaesthetic notes show intubation from 0400 hours. Patient unstable through procedure and required additional support to IV fluids.

End of life care was rated as good or excellent in 16% of cases and poor or very poor in 23% of cases. For end-of-life care, the reviewers identified four excellent cases and one very poor case. The four cases rated as excellent (Cases 6-9) were described as follows:

Case 6 – Excellent end-of-life care

Approaching end of life recognised even if he were to survive this admission SW and carers involved in discussions Comfort prioritised. Investigations and interventions minimal Carers allowed to visit Midazolam used for distress

Case 7 – Excellent end-of-life care

Excellent end of life care on ITU at RSH.

Patient became ""fed up"" as in pain and wanting NIV mask off. Had IV paracetamol and diamorph with good effect. Daughter called. Patient reassured that team will be guided by her wishes. Family present. Diamorph and midazolam given to manage pain and agitation. Palliative care review in the morning - for symptom management and end of life care. Chaplain support offered and declined. 24-hour syringe pump with morphine sulphate and midazolam prescribed. Mouth care with whisky if wanted. Excellent notes and communication by palliative care nurse - with contact numbers both in and out of hours. Died later that day.

Case 8 – Excellent end-of-life care

Excellent end of life care. EoLC plan in place. Regular discussion with next of kin, who was given option of changing plan and re-escalating every day. Patient kept comfortable. Good nursing care and input from palliative care team

EoLC plan put in place in discussion with sister. Keen to get her back to her assisted living home. Second ppc is hospital. Plan to ask palliative care team if can have anti-epileptics sub-cut. Seen by LD nurse - noted interventions (nothing else written).

Day 10 - SaLT review - noted on EoLC since the previous day. Discharged - advised mouth care and tastes for pleasure. Seen by palliative care nurse, who spoke to ward staff and sister. Understood that sister was dying and that moving her would now not be in her best interest. End of life seizure control - midazolam in a syringe driver with additional prn doses as required. Advised discussion with epilepsy nurse re: tapering down of current IV anti seizure meds.

EoLC plan fully completed and used by nurses and medics. Patient kept comfortable and seizures controlled with meds.

Case 9 – Excellent end-of-life care

Clear move to palliation
SPC CNS involved
Family included and present
PPOC discussed and symptoms better controlled
Urine catheter inserted ""for comfort""
Family supported including refreshments and knitted heart keepsake
No nurse verification of death but medical verification within 90 minutes of witnessed death.

The very poor end-of-life case (Case 10) was described as follows with evidence of failure to follow internal policies and best practice in use of wristbands and action on resuscitation decisions.

Case 10 – Very poor end-of-life care

Respect form in notes dated 13/04/2020 - CPR not recommended - ward based ceiling of care - however patient underwent full CPR

Evidence in notes patient should have had a red wristband in place, however wristband can be found in the notes.

Patient underwent CPR unnecessarily and the associated trauma despite the respect form stating CPR not recommended.

4.4 Review outcomes

SJR*Plus* uses three standard outcome descriptors to assess overall care. These provide a consistent way for reviewers to make their overall conclusion about whether the death was expected, preventable and if there was room for improvement, stratify into clinical or organisational categories. See table 8.

Table 8: Standard outcome descriptors used in SJR*Plus* to assess overall care

1. Review outcome[2]	Expected death Unexpected death Unable to grade
2. Hogan scale definitions[10]	Definitely not preventable Slight evidence for preventability Possibly preventable less than 50-50 Possibly preventable greater than 50-50[11] Strong evidence for preventability Definitely preventable Unable to grade
3. NCEPOD definitions[12]	Good practice Room for improvement in clinical care Room for improvement in organisational care Room for improvement in clinical and organisational care Less than satisfactory Unable to grade

[10] Hogan et al (2015); Avoidability of hospital deaths and association with hospital-wide mortality ratios: retrospective case record review and regression analysis BMJ 2015;351:h3239

[11] Patient Safety Incident Response Framework supporting guidance: Guide to responding proportionately to patient safety incidents. Appendix A NHSE PAR1465 22

[12] NCEPOD (2009) Deaths in Acute Hospitals: Caring to the End?

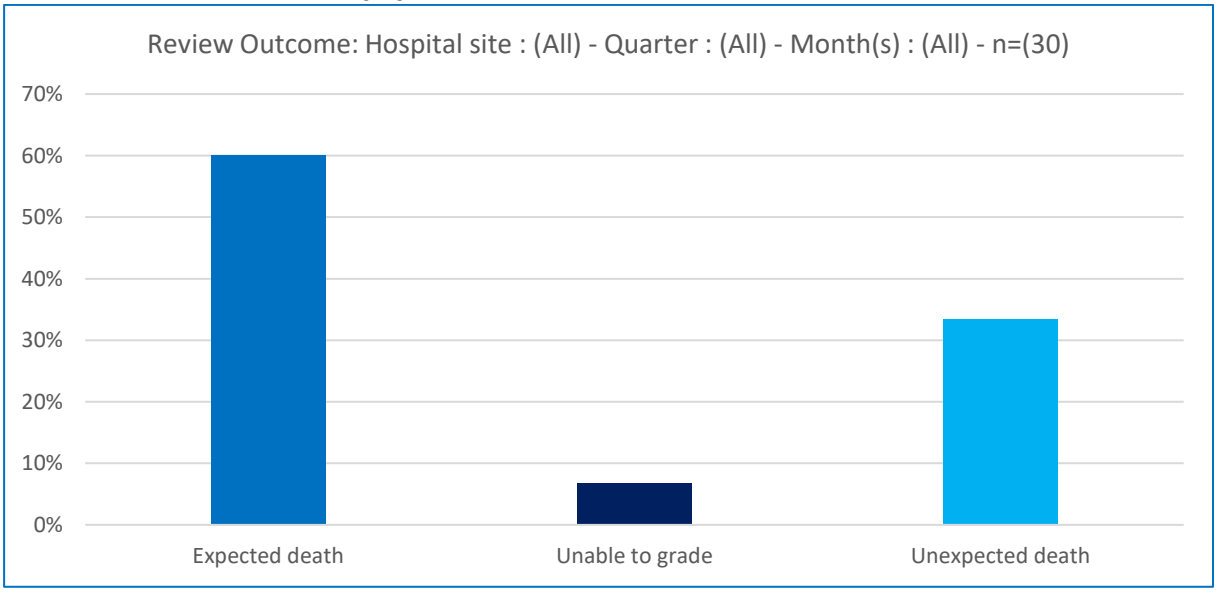
In scrutiny, Medical Examiners also capture Expected/Unexpected deaths. They will already have considered preventability in terms of the need for Coronial referral. Organisations should also be open to use of Duty of Candour with that specific process of investigation. Cases going through different investigations would not feature in the cohort for SJR, therefore outcomes *Strong evidence for preventability or Definitely preventable* described by Hogan et al should be low in number in routine mortality reviews. If found in review, they should trigger a further patient safety incident investigation along with any graded as *Possibly preventable greater than 50-50.*[8,9]

Those graded as *Possibly preventable less than 50-50* should generate either second review or team discussion as the learning is likely to be fruitful in such cases. Cases may well be of such complexity that death would not be a surprise, but it may be preventable in time, even if only a few weeks could be gained with differences in care for a given individual.

Using those standard definitions, the outcomes from the external review are as follows:

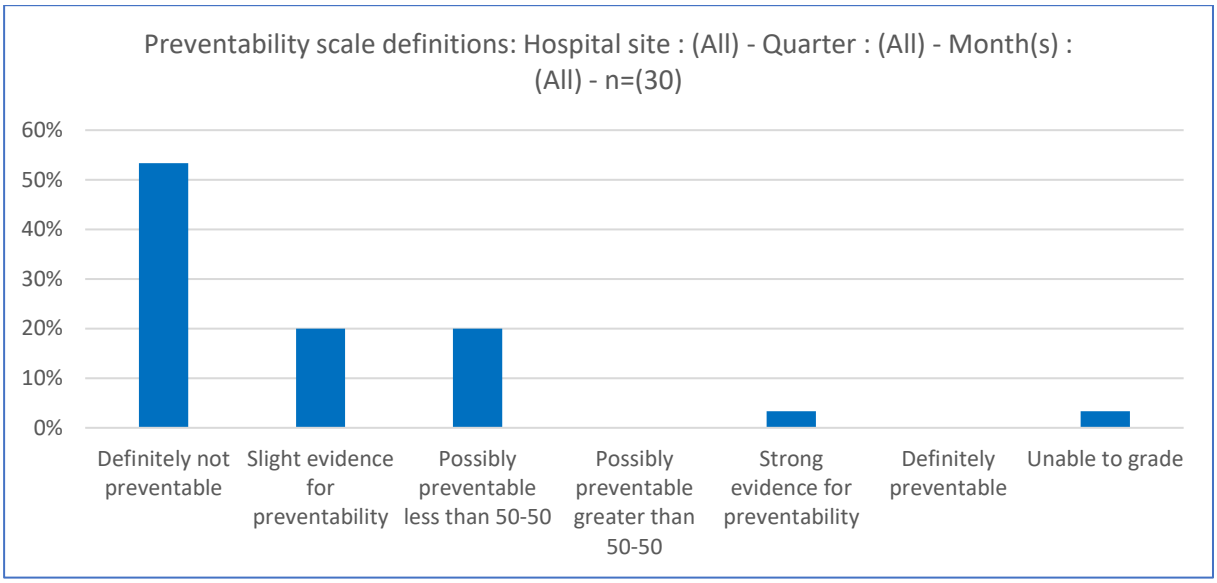
- Sixty percent of the 30 cases reviewed were judged to be expected deaths (see chart 10).

Chart 10: Review outcomes (30)



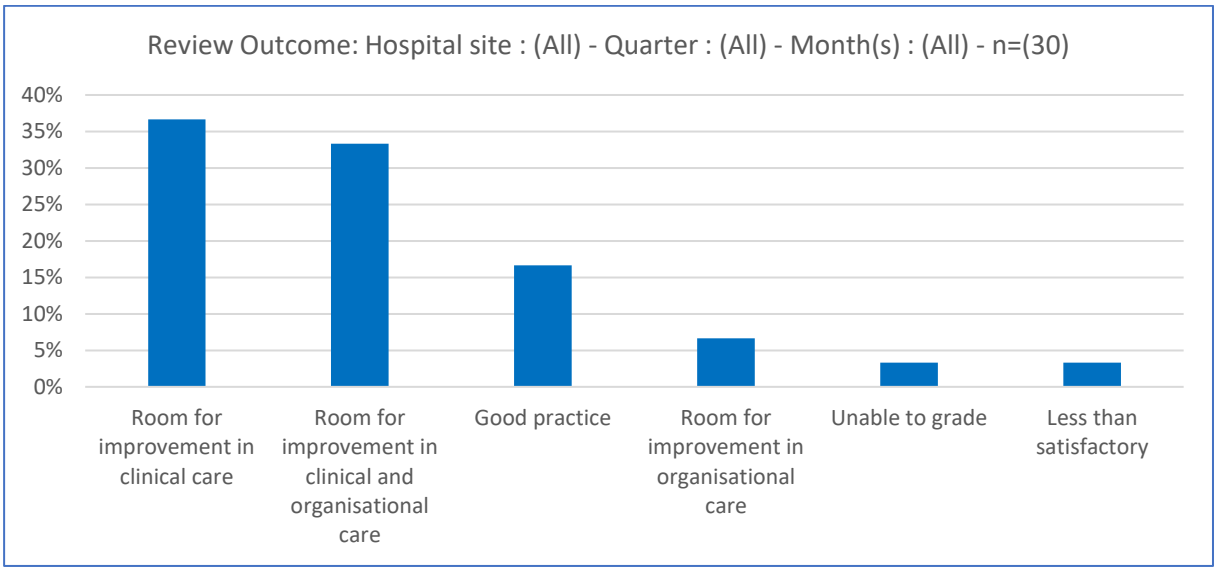
- Fifty-three percent of the cases reviewed were judged as definitely not preventable, and 20% as having slight evidence for preventability, using the Preventability scale (see chart 11). Six cases were judged to be possibly preventable (less than 50:50) and one case was assessed as being definitely preventable. The Trust was aware of this case and had undertaken a separate investigation.

Chart 11: Preventability scale outcomes (30)



- Seventeen percent of cases were judged to demonstrate good practice, using the NCEPOD grading. Room for improvement in clinical and/or organisational care was identified in 76% of the cases reviewed (see chart 12)
- One case was judged to be less than satisfactory (Case 11)

Chart 12: NCEPOD outcomes (30)



Case 11 – NCEPOD less than satisfactory

Patient not seen by a senior clinician for over 5 days of admission. Not recognised on admission how unwell the patient was - pancytopenia and rapid decline with associated sepsis. Lymphoma rapid and aggressive but delay in recognition. Very poor initial documentation following transfer out of ED. Poor fluid management likely resulting in symptomatic harm.

4.5 Problems in care

Preventability scores and NCEPOD categories do not identify the lessons learned and therefore improvements that can be made, so are limited in their implications. SJR*Plus* asks reviewers to identify whether there were any problems in care, to categorise the problems using a predefined list, and to note if any of those problems had led to harm. These can then be aggregated to identify themes for learning and improvement and is key to the way SJR can be used for learning and improvement.

In this review, problems in care were identified in 80% of the 30 cases reviewed. See chart 13.

Chart 13: Problems in care (30)

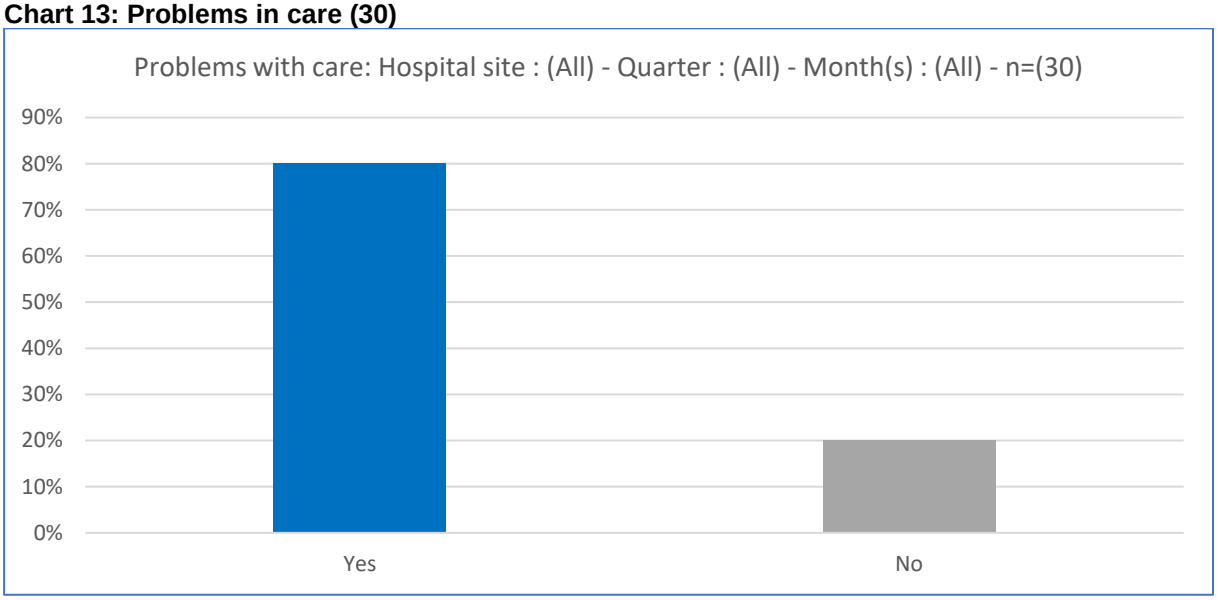


Table 8 shows the problem categories that appeared ten times or more and whether the reviewers felt they had led to harm. It is important to note that those categories with high incidences of "probably" may be smoke signals ahead of future harms.

Table 9: Problem area

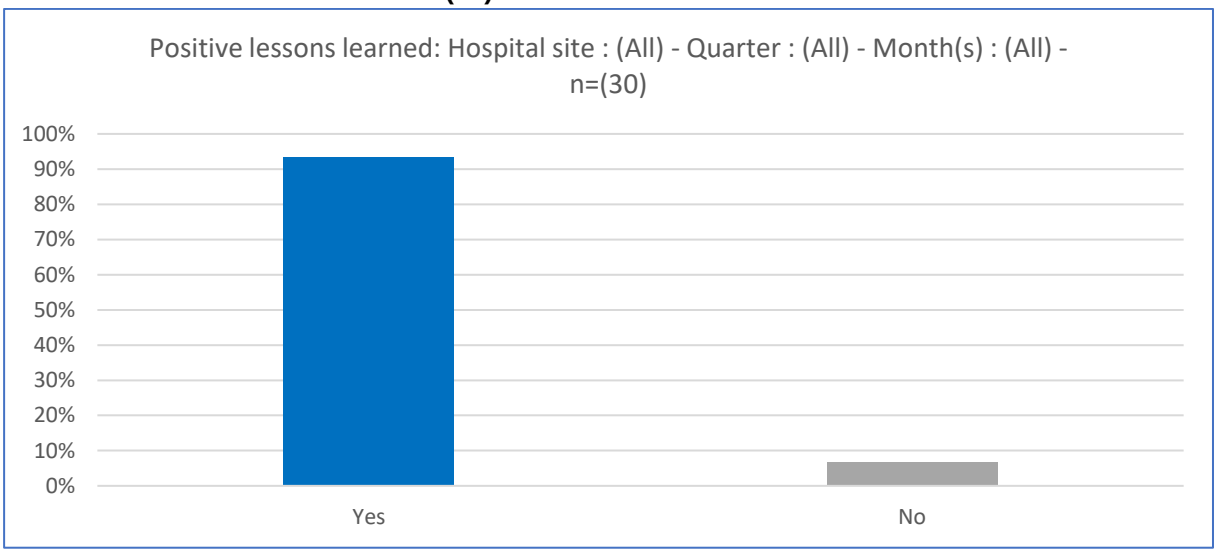
Problem area	How often recorded	Led to harm? Yes	Led to harm? Probably
Problem related to Treatment	15	4	9
Problems in Clinical Monitoring	14	7	5
Problem in Communication	12	1	6
Problems with Medication	10	4	4
Problem in Assessment	10	5	4
Problem of any other type	10	2	7

4.6 Lessons learned

One of the key elements of SJR*Plus* is to identify lessons so that these can lead to change. In the NHS, we are used to identifying things that have gone wrong to learn and improve. However, improvements can also be made by describing and repeating what works well. Therefore, SJR*Plus* has been designed to encourage reviewers to highlight the positive lessons that can be repeated.

Chart 14 shows that the reviewers identified positive lessons in 93% of the cases reviewed. In only two cases were the reviewers unable to identify positive lessons.

Chart 14: Positive lessons learned (30)



Lessons are listed as free text in SJR*Plus.* These have been grouped into themes with representative examples. The top themes are presented in table 10. Again, the comments have been taken verbatim from the reviews, so include abbreviations and shortened sentences.

Table 10: Top positive lessons identified

Category and number of times featured		Representative comment from notes or reviewer
Involvement of specialist teams/AHPs and MDT working	17	*Sensitivity of SaLT team to patient's communication needs* *Excellent involvement of physio during stay* *Initial surgical SpR review very comprehensive and set out a plan which never changed during the admission* *Vascular support of general surgeon in theatre* *Stamp used by radiology in notes to indicate investigation undertaken (time and date)* *When resuscitation was attempted, there was a good multidisciplinary response* *CT service from A&E referral very timely* *Good liaison with the acute oncology nurse* *Good liaison with transfusion nurse and haematologist*
Nursing assessment, management, and documentation	15	*Excellent nursing management over initiation of NIV with multiple techniques to improve tolerance* *Good nursing assessments and documentation – adult impatient admission and evaluation of care booklet, height and weight documented and MUST score documented on admission* *Nursing staff using stamps with name and NMC number* *Very supportive care planning*
Handover, triage and assessment in ED	11	*ED patient safety checklist is excellent* *Timely consultant review in ED* *Good initial triage in ED* *Ambulance handover form clear and gives a good picture of patient's background* *Very rapid assessment in both EDs, with timely transfusion*

Category and number of times featured		Representative comment from notes or reviewer
Communication with family/patient	9	*Good evidence of regular discussion with NoK* *Family enabled to be involved in fathers' care while in hospital* *Good supportive nursing care and communication with family following medical decision to palliate*
Senior medical review	9	*There were regular middle grade or senior reviews almost daily during both admissions*
End-of-life care	7	*Medical SpR clear record of discussion of patient's wishes and concerns, which was then captured in ReSPECT form (out of hours)* *Excellent written documentation of concerns and solutions for comfort with clear best interest approach* *Excellent end of life care on ITU – plenty of discussion with family, progressing according to her wishes. Excellent input from palliative care nurse. Spiritual as well as physical needs considered*

Chart 15 shows that the reviewers identified negative lessons in 93% of cases. Table 11 groups these into themes, with representative comments from reviewers.

Chart 15: Negative lessons learned (30)

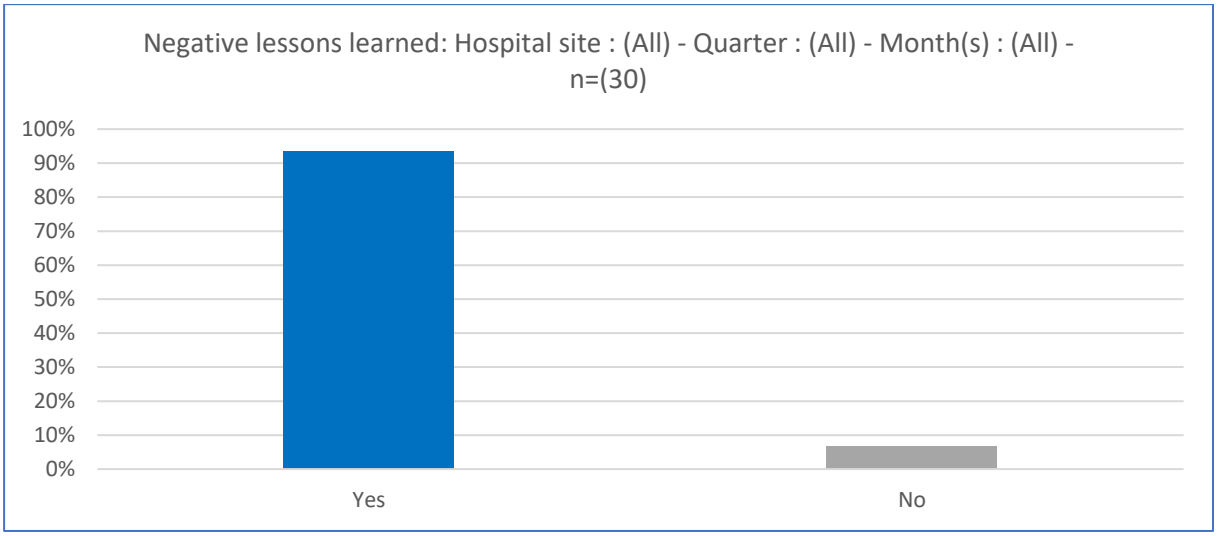


Table 11: Top negative lessons identified

Category and number of times featured		Representative comment from notes or reviewer
Problems with documentation, sharing, duplication or capture of relevant information	13	*Skin assessment, pressure ulcer prevention and wound care booklet partially completed.* *Pressure ulcer booklet partially completed; repositioning schedule not completed* *No inductor of learning disability on clinical portal or ED triage sheet* *Body map in ED not completed – as states "patient states skin intact, refused to check"* *Difficult to work out which site or ward patient admitted to* *Input into notes from LD nurse was limited to "interventions noted. Did they do more than they wrote down? How did they liaise with the ward team?* *Delays in sharing CT results with physician as could not find NHS number*
Problems with fluid management	12	*Fluid balance chart not completed or totalled* *Fluid management and monitoring was inconsistent* *Fluid balance charts partially completed* *Missing weight recording and lack of targets for expected weight loss – and how this was joined up with fluid management* *Importance of post renal component of AKI/CKD and need to consider catheterisation for comfort/agitation*

Category and number of times featured		Representative comment from notes or reviewer
Poor end of life care, including recognition, planning, and communication with family	10	*Patient received CPR, despite having a ReSPECT form completed 8 months before stating that he was not for CPR* *Known to oncology, with referral made to SPCT but no ReSPECT in place until seen by Med Reg* *Recognised in being in last weeks of life but "as not overtly dying," son's request to visit his mother refused. Bearing in mind she had a ReSPECT discussion that day and was weepy the following day* *Communication around DNAR seems to place onus on family, potentially causing upset when medical decision to take* *Opportunity for earlier referral to Hospice, even for assessment* *Lack of involvement of oncology or palliative care in planning end of life*
Problems relating to prescribing, including O2 prescribing	9	*Opiate management not idea (toxicity constipation risk of encephalopathy)* *Oxygen prescription in notes has only target sats documented, no daily administration but could be because oxygen administration is also recorded by nursing staff on VitalPac* *Learning needed around oxygen ranges* *Prescription chart unclear of date and time of pharmacy reconciliation*
Poor nutrition and weight monitoring	8	*MUST inaccurate on admission and nutrition monitoring was variable* *Initial plan was for patient to have regular weights. However, there were no weights recorded on VitalPac for this admission* *No evidence of dietetic input* *No food chart completed* *No weight or height documented in the assessment, care plan and evaluation of care continuation booklet*

Category and number of times featured		Representative comment from notes or reviewer
Observations and escalation	5	*NEWS scoring to be reviewed and thresholds for escalation to be assessed for medical and surgical teams* *The need to recognise and escalate deterioration in a patient in a timely fashion, In this case, the laparotomy could have occurred around midnight if the parameters were recognised, and the consultant surgeon informed* *Need to improve understanding and interpretation of observations, use the observation chart more and not NEWS scores or single observations in isolation*
VTE management	4	*VTE management from assessment through prophylaxis treatment and use of thrombolysis does not seem to have been in keeping with best practice* *No thrombolysis at RSH* *Clinical evidence of DVT in high-risk situation (bruising causing external pressure and ligated vein) but delay in recognition of DVT+PE despite rhythm change and changing O2 requirements.*

Finally, for this section, throughout their time at the Trust, the external reviewers captured their thoughts and questions about the themes they were identifying while doing the reviews. These are grouped into themes as listed below.

Things we noticed…….

Learning from deaths process

Inappropriate use of SJR to review cases that have been referred to the Coroner

Filing of ME scrutiny in notes is not good practice

Good practice

Adult inpatient booklet is very good

Consultant review in ED

Resuscitation scribe

Nursing notes within medical notes

Theatre documentation

ED patient safety checklist

For development (quick fixes)

Body maps in ED not completed

Need more recognition of the importance of MUST and weights

Recording of ethnicity

Grade/speciality of doctor not always recorded in ward round notes

Ward name/number not always recorded in notes

For development/consideration (longer term)

Transfers to Stoke – how are referrals made? How are decisions made?

Are SaTH patients disadvantaged by this arrangement?

Accuracy of NEWS scores – some variation between VitalPak and what's written in notes

Better use of observations charts to recognise trends over time

Specific learning re: 1. declining BP over time and 2. recognition of a dissection

4.7 Conclusions regarding patient care (from the external reviews)

Our feedback for the patient care section of this report is listed below but these are not intended as firm recommendations. Any action planning and next steps arising from these should fit into on-going Trust objectives, improvement plans and training programmes.

Positive aspects identified	• Numerous examples of good assessment, treatment, and care in ED • Comprehensive nursing assessments and good recording • Several examples of sensitive communication with relatives • Very good MDT working • Most deaths were expected and unpreventable • Good involvement of speciality teams and AHPs
Questions to consider	• Could all phases of care move to “good” or “excellent” ratings (shift curve to right)? • Is there an opportunity to focus on the recognition and care for patients experiencing delirium? • Is there an opportunity to improve fluid management? • Is there an opportunity to focus on nutrition? • How can case selection of SJRs ensure that the everyday is reviewed and that the same cases are not subject to more than one type of review/investigation?
Reflections on possible solutions	• Consider use of positive lessons for reinforcement of practice • Consider use of negative lessons as map for skills training • Review learning from deaths case selection process to reduce duplication and encourage learning from the everyday.

Next steps

The aim in learning from deaths is both to have assurance in the quality of care offered, but also to develop improvements in care and services based on the lessons captured.

While the external review has identified areas of good practice and given some assurance in levels of care, there are identifiable areas for improvement evidenced by the care ratings.

The Trust has already adopted and is actively using the e-SJR*Plus* tool and producing reports from it. It plans to compare internal with these external reviews to reflect on quality of reviews in the Trust. Better Tomorrow can offer additional training and support as required to help with this.

The Trust is encouraged to consider the questions and possible solutions discussed in the report to decide on the next steps. The report is shared in the expectation of presentation and discussion with key stakeholders including the Board.

Better Tomorrow learning from deaths, learning for lives

Describing complexity with Elixhauser

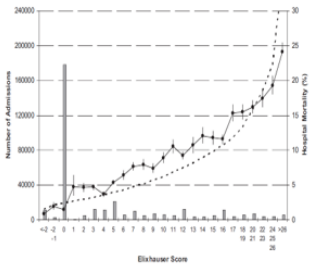
Comorbidity measures are necessary to describe patient populations and understand the potential burden of care.

Classifications

The Charlson and Elixhauser[1] comorbidity classification systems are the 2 most commonly used in health research. Studies have found them to be significantly associated with various outcomes including in-hospital mortality, post-discharge all-cause mortality, and healthcare expenditures.

Why Elixhauser?

In direct comparisons, studies have found the Elixhauser comorbidity system to be statistically slightly superior to the Charlson system at adjusting for comorbidity.



Calibration curve of Elixhauser comorbidity index for predicting risk of hospital death. The plot presents the number of admissions having each score (columns, left vertical axis). For each score (horizontal axis), the graph presents the predicted hospital mortality (broken line, right vertical axis) and observed hospital mortality (solid line, right vertical axis) with 95% CIs.

Are all co-morbidities included?

No. Anne Elixhauser and colleagues reported on 1.8M adult, nonmaternal inpatients from 438 acute care California hospitals. A comprehensive set of comorbidity measures was developed. These were associated with substantial increases in length of stay, hospital costs, and mortality.

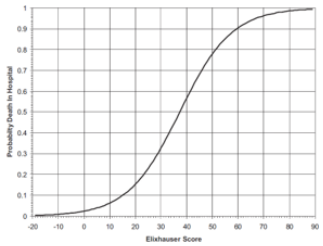
Several comorbidities are described that are important predictors of outcomes. These include mental disorders, drug and alcohol abuse, obesity, coagulopathy, weight loss, and fluid and electrolyte disorders.

What about diagnoses during an admission or treatment complications?

Restricting the analysis to point of admission diagnoses ensures that all data required to calculate the index are available if or when the patient is admitted to the hospital, or available within a community record at a specified time point.

How is it scored?

Carl van Walraven and colleagues analysed 12 years of records on 345,795 patients in Ottowa[2]. From that data, the Elixhauser comorbidity system was condensed to a single numeric score that summarises disease burden.



Expected risk of hospital death by total Elixhauser comorbidity score. This figure presents all possible Elixhauser comorbidity scores (horizontal axis) along with their expected probability of death in hospital (vertical axis).

So is this the only information we need to understand complexity?

No, we need more of the story. Other factors, including admission urgency and diagnosis and patient age influence predictions of risk of hospital death[3].

Complexity of needs and inequalities of access

The case mix (including age ethnicitiy gender) and evolving conditions (including unexpected or anticipated deteriorations) can be captured separately to describe access or use of resources.

Patients require more resources and access more care in the last 2 years of life so recognising approaching end of life and increasing frailty is particularly useful. The narrative describing context and events is just as important, whether the patient is in hospital or the community.

[1]*Elixhauser, Anne, et al. "Comorbidity measures for use with administrative data." Medical care (1998): 8-27.*
[2]*van Walraven, Carl, et al. "A modification of the Elixhauser comorbidity measures into a point system for hospital death using administrative data." Medical care (2009): 626-633*
[3]*Escobar GJ, Greene JD, Scheirer P, et al. Risk-adjusting hospital inpatient mortality using automated inpatient, outpatient, and laboratory databases. Med Care. 2008;46:232–239.*

Better Tomorrow learning from deaths, learning for lives

Elixhauser Comorbidity: calculating and using the scores

Elixhauser Comorbidity Index Summary

For those using SJR*Plus* with the standard report
the cumulative scores are calculated automatically

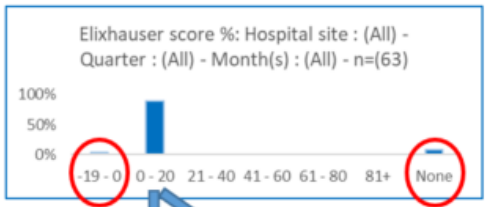
Congestive heart failure	7	Lymphoma	9
Cardiac arrhythmias	5	Metastatic cancer	12
Valvular disease	-1	Solid tumour without metastasis	4
Pulmonary circulation disorders	4	Rheumatoid arthritis / collagen vascular diseases	0
Peripheral vascular disorders	2	Coagulopathy	3
Hypertension	0	Obesity	-4
Paralysis	7	Weight loss	6
Neurodegenerative disorders *Note this does not include stroke*	6	Fluid and electrolyte disorders	5
Chronic pulmonary disease	3	Blood loss anaemia	-2
Diabetes	0	Deficiency anaemia	-2
Hypothyroidism	0	Alcohol abuse	0
Renal Failure	5	Drug abuse	-7
Liver disease	11	Psychosis	0
Peptic ulcer disease, no bleeding	0	Depression	-3
AIDS/HIV	0	Each individual has a cumulative score ranging from -19 to 89	

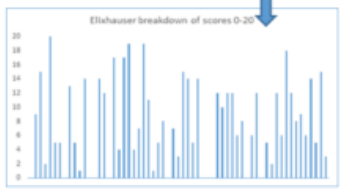
https://orthotoolkit.com/elixhauser-comorbidity-index will calculate for you

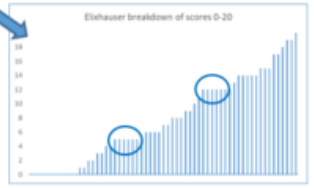
Reflecting on the scores

Remember:
This is not intended as a full list of co-existing conditions. The scores generate further questions to consider or can be used to compare different cohorts.

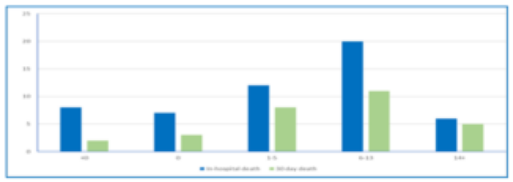
Within a cohort some will score negatively or have no conditions recorded: they could be low risk groups to consider







Individual scores within 0-20 group or potential groups to consider?



Comparing cohorts: comorbidity scores for in-hospital or community deaths

Appendix 2 – Peer review – outcomes did not reflect content of review (n = 11)

Over-detailed and includes 3 admissions - completed in response to concerns and investigative; NG commented on but not included in procedures; EoL missed opportunity to rate reflecting nursing actions and interventions and death expected; Hogan arguably >50-50; multiple investigation routes inappropriate use of SJR; details suggest overall Poor
First 24 hours rating not supported by info as deficiencies noted (Q29); Ongoing care info too minimal to support rating, unclear if nursing notes included EoL blank yet IP few days and death graded as expected; Overall rating seems generous from info recorded. Indicates how concerns should be shared
First 24 hours includes ongoing; Rating seems generous given issues in assessment and care "task fixation" and ITU interactions/decisions; catheterisation and cannulation could have been captured in Procedure so issues clear. Second review but Q48 No. Given all concerns noted arguable that this worsens NCEPOD and DoC relevant - option for Coroner PM as doubt in CoD captured in SJR
NCEPOD grade does not match comments regarding practice No problems (Q27) and care rating. Clinician names in text
No information in first 24 hours; ongoing care information only relates to blood tests and in no way validates a rating of Excellent care; Q30 ignored (inc electrolytes); no EoL information. This is so far from adequate SJR I would recommend it is not included in any aggregate reporting. Suspect this should have been investigated as a Near Miss or Failure of action on results using incident investigation approach to identify learning.
In draft? Minimal information but indicates review of medical and nursing notes. Refers to previous admission - readmission noted. Problems with healthcare + Yes but all Q No. This is not a useful review as minimal information to inform any learning or to indicate rationale for ratings. Grading incomplete yet clearly clinical information was available. It may be that this is incomplete as a second reviewer question is unanswered but as is it does not meet standards for SJR and inclusion in any cohort report would bias findings
This was a death in ED. Should the NCEPOD have been room for improvement in clinical care as the reviewer has ticked problem with medication.
Really well articulated review. Ongoing care reads like poor more than adequate due to lack of communication with family and between teams, and lack of planning for discharge
This was an ED death. Negative lesson noted in positive lesson section. Problem with CPR not noted (patient was DNAR but had CPR until they found the respect form)
This was an ED death. Negative lesson noted in positive lesson section.
LD. Referred to LeDeR?