

Report In Response To The Health Care Commission
Letter of 18th February 2009 –
Mortality Outlier Alert For HRG (Version 3.5)
A31 ‘Head Injury With Brain Injury’,
With S0650 ‘Traumatic Subdural Haemorrhage’ As The Primary Diagnosis.

23rd February 2009

Direct Line: 0121 627 8515 – Internal: 8515
Email: Daniel.ray@uhb.nhs.uk
Document: Response to HCC letter regarding mortality in patients whose HRG code is A31 and Primary Diagnosis or S065
Our Ref: DR_2009-02-23_HCC_A31_Response
Your Ref: 441

23rd February 2009,

Report Contents:

Section	Title	Page
1.0	Introduction	2
2.0	Data Validation and Concurrence	2
3.0	UHB Patient Mortality Profile	3
4.0	UHB Trend Analysis of Patient Group	4
5.0	Benchmarking Analysis to Neighbouring SHA Trusts	5-6
6.0	Conclusion	7
	Appendix 1	7

1.0 Introduction

This document presents investigative analysis into the patients University Hospital Birmingham and neighbouring West Midlands trusts have treated who have a Primary Diagnosis of ‘Traumatic Subdural Haemorrhage’ resulting in the health care resource group ‘Head Injury with Brain Injury’. The report attempts to show that there has been no significant change in the service of care delivered to these patients, indicating no need to review the service or for worse than expected outcomes to occur for this group of patients.

2.0 Data Validation and Concurrence

In analysing our records for 200708 as detailed in your documentation we have identified 9 patients that have a HRG code of A31 and a primary diagnosis code of S065. In your report you detail 10 patients, we believe there maybe two possibilities for the difference. The first possibility is that a different version of the HRG grouper has been used as we have identified patients who have had a primary diagnosis of S065 and died with other HRG codes within the HRGv3.5 A chapter. The second possibility is that 1 patient within the 9 we have identified had two episodes all other patients had one finished consultant episode so it could be that the 10, are episodes of the 9 patients who died.

3.0 UHB Patient Mortality Profile

The below section of this report details patient profiles of those who died having the HRG A31 and Primary Diagnosis S065. The reason for detailing the information below is to demonstrate the significant level of complexity and injury that exists within the casemix of these patients. Each case must be considered and whilst statistical values give indications of trends it is incredibly difficult to truly assess this particular level care given to these patients using statistical process control.

1st patient:

70 years of age, as well as traumatic subdural haemorrhage the patient also had left ventricular failure, along with Systemic lupus erythematosus. The patient also had asthma, diabetes and polyarthrosis.

2nd patient:

75 years of age, as well as traumatic subdural haemorrhage the patient also had intra-abdominal and pelvic swelling, mass and lumps, ascites, anaemia and hypothyroidism.

3rd patient:

64 years of age, as well as traumatic subdural haemorrhage the patient also had a fracture to the base of the skull and required ventilation support.

4th patient:

23 years of age, as well as traumatic subdural haemorrhage the patient also had a fracture to the base of the skull at home had mental & behavioural disorders, with dependence syndromes to the use of opioids and alcohol.

5th patient:

28 years of age, as well as traumatic subdural haemorrhage the patient also had fractures to the malar, maxillary, and facial bones, along with fractures to the skull and pubis. The patient also had injuries to their lungs and suffered all of this in a road traffic accident.

6th patient:

31 years of age, as well as traumatic subdural haemorrhage the patient also had a fracture to the base of the skull and open wounds to other parts of the head.

7th patient:

71 years of age, as well as traumatic subdural haemorrhage the patient also had multiple injuries to intrathoracic organs, along with traumatic pneumothorax. The patient also suffered a fractured rib and cervical vertebra all of which was obtained during a road traffic accident. The patient also had a respiratory distress syndrome.

8th patient:

39 years of age, as well as traumatic subdural haemorrhage the patient also had fractures to the skull and facial bones, aquired from a road traffic accident and suffered hypertension.

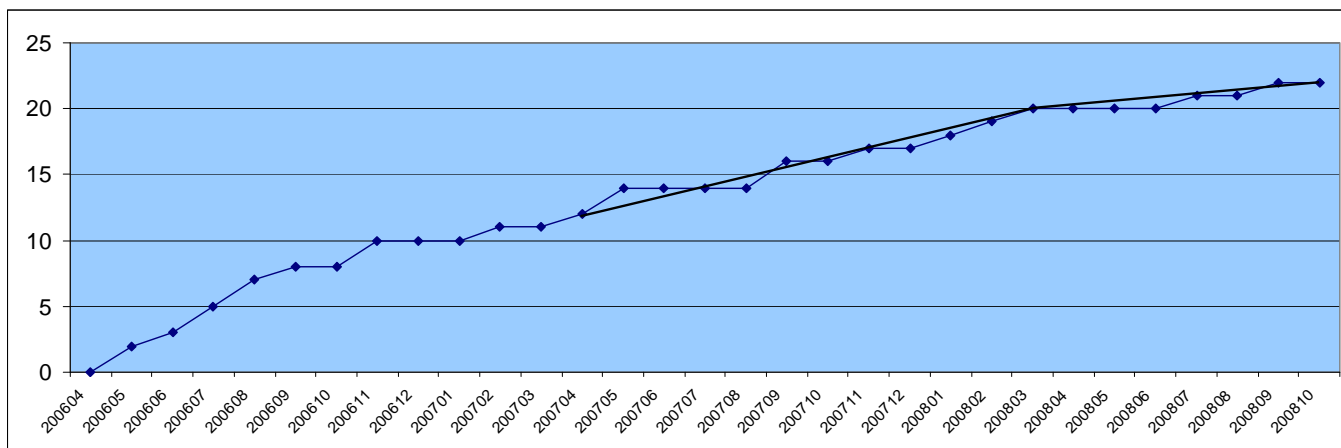
9th patient:

71 years of age, as well as traumatic subdural haemorrhage the patient also had fractures to the skull, thoracic vertebra, scapula, clavicle, and ribs.

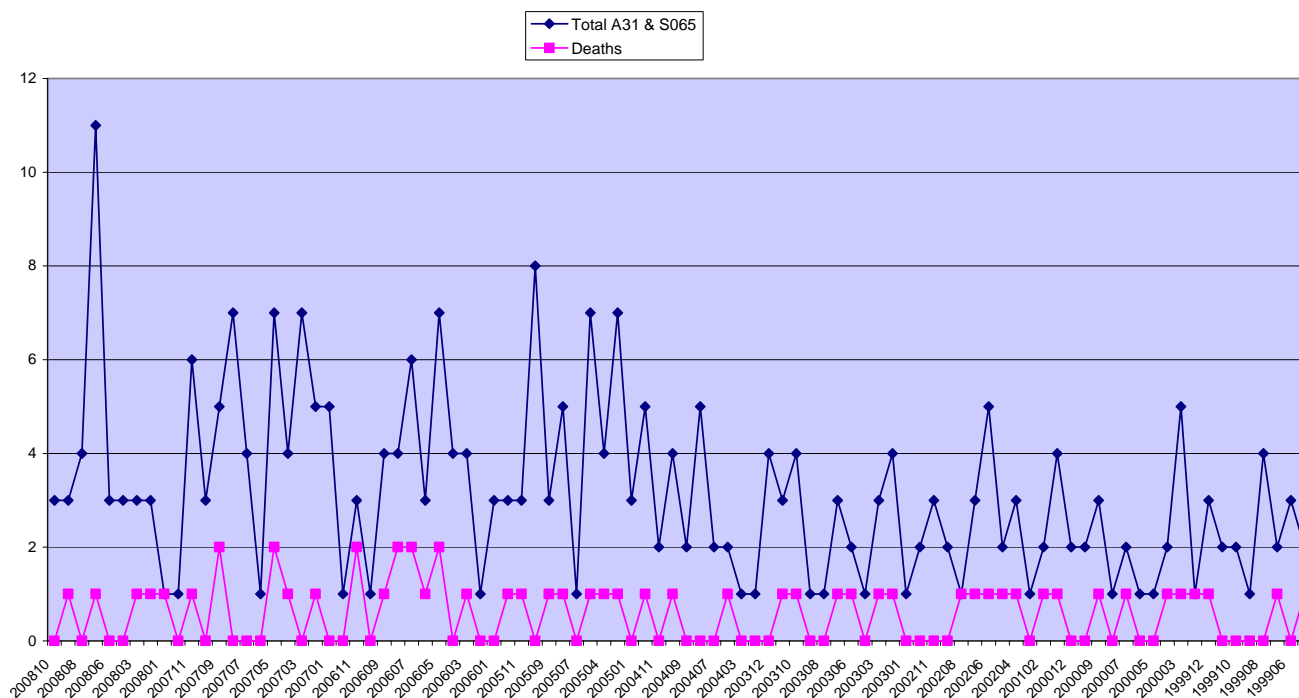
4.0 UHB Trend Analysis of Patient Group

During 200708 University Hospital Birmingham had 1,975 deaths 5.4 on average per day. The 9 patient deaths the trust has had with this particular Primary Diagnosis and HRG code (9 / 1,975 x 100) represents 0.45% of its total mortality.

Graph 1 below details the cumulative monthly mortality trend for this particular patient group. The line drawn through 200708 shows a higher gradient of positive correlation than the line through the cumulative 200809 months. This shows that the mortality rate for this particular patient group has seen a decline.



Graph 2 below details analysis of this group over a much longer period of time showing how activity is both extremely variable and has seen a significant increase and yet mortality has remained fairly static. This certainly does not show that there has been any significant increases in mortality that would indicate problems within a service for this patient group.



5.0 Benchmarking Analysis to Neighbouring SHA Trusts

The below table 1 details analysis of patients at other West Midlands trusts during 200708, where their care has been purchased by West Midlands PCTs. One patient who died at UHB had their care purchased by the specialised services agency which rarely happens in this category and is why University Hospital Birmingham's deaths total figure is 8 in the table below, rather than 9. This table shows that with a rate of 25.81% University Hospital Birmingham is only 3.55% above the West Midlands average mortality rate for S065 Primary Diagnosis and HRG A31.

Organisation Name	Primary Diagnosis	HRG 3.5	Deaths	Admissions	Percentage
BURTON HOSPITALS NHS TRUST	S065	A31	2	15	13.33%
DUDLEY GROUP OF HOSPITALS NHS TRUST	S065	A31	9	20	45.00%
GEORGE ELIOT HOSPITAL NHS TRUST	S065	A31	1	7	14.29%
HEART OF ENGLAND NHS FOUNDATION TRUST	S065	A31	7	34	20.59%
HEREFORD HOSPITALS NHS TRUST	S065	A31	2	9	22.22%
ROYAL FREE HAMPSTEAD NHS TRUST	S065	A31	1	1	100.00%
SANDWELL AND WEST BIRMINGHAM HOSPITALS NHS TRUST	S065	A31	5	26	19.23%
SHREWSBURY AND TELFORD HOSPITAL NHS TRUST	S065	A31	4	19	21.05%
THE ROYAL WOLVERHAMPTON HOSPITALS NHS TRUST	S065	A31	5	5	100.00%
UNIVERSITY HOSPITAL BIRMINGHAM NHS FOUNDATION TRUST	S065	A31	8	31	25.81%
UNIVERSITY HOSPITAL OF NORTH STAFFORDSHIRE NHS TRUST	S065	A31	3	26	11.54%
UNIVERSITY HOSPITALS COVENTRY AND WARWICKSHIRE NHS	S065	A31	11	59	18.64%
WALSALL HOSPITALS NHS TRUST	S065	A31	3	6	50.00%
WORCESTERSHIRE ACUTE HOSPITALS NHS TRUST	S065	A31	4	34	11.76%
Total	S065	A31	65	292	22.26%

5.1 West Midlands Trusts Case-mix Comparison

We identified all of the co-morbidities that were attributed to all of the patients who died from the combination of the Primary Diagnosis S065 and HRG code A31 from our neighbouring trusts across the West Midlands. We then engaged with a consultant who has expertise in this area and shared only the list of co-morbidity diagnoses with him, and asked him to score each co-morbidity into category 1, 2 or 3. With each of the values rating the relationship of the co-morbidity to the death of the patient with S065 Primary Diagnosis and A31 HRG code. For example if a patient has tobacco use but dies from a traumatic subdural haemorrhage it is very unlikely that this is related. However if the patient has open head wounds there is clearly a strong link between this co-morbidity and the primary diagnosis of traumatic subdural haemorrhage. Please refer to Appendix 1, this details each of the co-morbidities and then a score that has been assigned by the consultant clinician stating whether the co-morbidity /diagnosis is related, using the below key: (any codes relating to site of occurrence ie home were obviously excluded).

Key	Summary Key	Detail Description
1	Severe	Likely to seriously complicate illness or indicate marked increase in severity of trauma
2	Link to condition	Related to condition severity or may complicate illness and recovery
3	Virtually unrelated	Unlikely to be directly related to trauma or to indicate a worse severity of injury

This scoring mechanism was then used to score the co-morbidities of each of the diagnosis codes of the patients who died. The values were then summed and then divided by the total deaths to give a rate. Therefore the lower the score the more related diagnoses/co-morbidities patients suffered that related to their death. The table 2 on the next page shows how compared to the West Midlands neighbouring trusts, University Hospital Birmingham had the third lowest score out of the 14 trusts used for comparison.

Organisation Name	2nd Diag	3rd Diag	4th Diag	5th Diag	6th Diag	7th Diag	Deaths	Complexity Score
ROYAL FREE HAMPSTEAD NHS TRUST							1	0.00
HEREFORD HOSPITALS NHS TRUST		1	3				2	2.00
UNIVERSITY HOSPITAL BIRMINGHAM NHS FOUNDATION TRUST	8	9	11	10	5	4	8	5.88
BURTON HOSPITALS NHS TRUST	3	5		3	1		2	6.00
THE ROYAL WOLVERHAMPTON HOSPITALS NHS TRUST	3	12	9	3	3		5	6.00
UNIVERSITY HOSPITAL OF NORTH STAFFORDSHIRE NHS TRUST		7	7	4			3	6.00
DUDLEY GROUP OF HOSPITALS NHS TRUST	13	15	10	14	7	8	9	7.44
WORCESTERSHIRE ACUTE HOSPITALS NHS TRUST	4	6	6	7	8	3	4	8.50
SANDWELL AND WEST BIRMINGHAM HOSPITALS NHS TRUST	4	11	9	6	9	5	5	8.80
UNIVERSITY HOSPITALS COVENTRY AND WARWICKSHIRE NHS	17	36	27	13	4	1	11	8.91
HEART OF ENGLAND NHS FOUNDATION TRUST	8	9	18	14	8	6	7	9.00
SHREWSBURY AND TELFORD HOSPITAL NHS TRUST	4	4	9	12	6	6	4	10.25
GEORGE ELIOT HOSPITAL NHS TRUST	3	6	3				1	12.00
WALSALL HOSPITALS NHS TRUST	6	8	5	12	12	7	3	16.67

5.2 Fractures analysis of deceased UHB patients compared to other midlands trusts:

In looking at Appendix 1 in more detail it shows that one of the most frequent diagnoses with a score of 1 is fractures. This section therefore details and compares the rate of fractures deceased patients have sustained that were admitted to University Hospital Birmingham, compared to other West Midlands trusts to further demonstrate the increased level of complexity.

The below formula demonstrates the single strength between two variables with -1 indicating no link whatsoever and 1 meaning that the two are 100% entirely inter-dependent. With n = 14 for the number of trusts, Y = 65 the number of deaths and x = 29 number of fractures.

$$\frac{n\sum XY - \sum X \sum Y}{\sqrt{(n\sum x^2 - (\sum X)^2) - (n\sum Y^2 - (\sum Y)^2)}}$$

The outcome value is 0.26 demonstrating that for fractures alone there is a positive correlation between the two variables.

Detailed in table 3 below University Hospital Birmingham has circa double the rate of fractures to deaths compared to any other trust.

Organisation Name	Diagnosis Codes Per Record With Fractures	Total Deaths	Deaths Fractures Ratio
BURTON HOSPITALS NHS TRUST	0	2	0.00
DUDLEY GROUP OF HOSPITALS NHS TRUST	5	9	0.56
GEORGE ELIOT HOSPITAL NHS TRUST	0	1	0.00
HEART OF ENGLAND NHS FOUNDATION TRUST	0	7	0.00
HEREFORD HOSPITALS NHS TRUST	0	2	0.00
ROYAL FREE HAMPSTEAD NHS TRUST	0	1	0.00
SANDWELL AND WEST BIRMINGHAM HOSPITALS NHS TRUST	1	5	0.20
SHREWSBURY AND TELFORD HOSPITAL NHS TRUST	1	4	0.25
THE ROYAL WOLVERHAMPTON HOSPITALS NHS TRUST	0	5	0.00
UNIVERSITY HOSPITAL BIRMINGHAM NHS FOUNDATION TRUST	11	8	1.38
UNIVERSITY HOSPITAL OF NORTH STAFFORDSHIRE NHS TRUST	2	3	0.67
UNIVERSITY HOSPITALS COVENTRY AND WARWICKSHIRE NHS	6	11	0.55
WALSALL HOSPITALS NHS TRUST	0	3	0.00
WORCESTERSHIRE ACUTE HOSPITALS NHS TRUST	3	4	0.75

6.0 Conclusion

In conclusion it is felt that this document demonstrates that this is a highly complex group of patients and through benchmarking and analysis over a long period of time the trust does not feel that there are any concerns of the level of service provided to this patient group.

Appendix 1:

ICD Description	Category	ICD Description	Category
Essential (primary) hypertension	3	Fracture of clavicle	1
Fracture of base of skull	1	Occurrence on street/highway	3
Atrial fibrillation and flutter	3	Enterocolitis due to Clostridium difficile	3
Other forms of chronic ischaemic heart disease	3	Nausea and vomiting	3
Epilepsy, unspecified	2	Fracture of scapula	1
Pure hypercholesterolaemia	3	Disorientation, unspecified	2
Fracture of vault of skull	1	Fractures of other skull and facial bones	1
Fracture of rib	1	Gastrointestinal haemorrhage, unspecified	2
Chronic ischaemic heart disease, unspecified	3	Vascular dementia, unspecified	3
Cerebrovascular disease, unspecified	3	Hyperlipidaemia, unspecified	3
Hypokalaemia	3	Hyperplasia of prostate	3
Pleural effusion, not elsewhere classified	3	Presence of prosthetic heart valve	3
Left ventricular failure	2	Unstable angina	3
Asthma, unspecified	3	Unspecified injury of shoulder and upper arm	2
Angina pectoris, unspecified	3	Unspecified injury of hip and thigh	2
Peripheral vascular disease, unspecified	3	Unspecified dementia	3
Traumatic subarachnoid haemorrhage	1	Unspecified acute lower respiratory infection	3
Urinary tract infection, site not specified	3	Traumatic pneumothorax	1
Fracture of malar and maxillary bones	1	Traffic accident	2
Fracture of mandible	1	Tobacco use	3
Driver injured in traffic accident	2	Syncope and collapse	3
Cellulitis of other parts of limb	3	Senility	3
Ulcer of lower limb, not elsewhere classified	3	Alcoholic liver disease, unspecified	3
Anaemia, unspecified	2	Open wound of scalp	2
Open wound of other parts of head	1	Presence of aortocoronary bypass graft	3
Ascites	3	Palliative care	2
Blindness, one eye, low vision other eye	3	Atherosclerotic heart disease	3
Adult respiratory distress syndrome	1	Other cervical disc degeneration	3
Dilated cardiomyopathy	3	Other physical therapy	3
Crohn-s disease, unspecified	3	Other specified disorders of white blood cells	3
Cardiac arrest with successful resuscitation	1	Essential (haemorrhagic) thrombocythaemia	3
Chronic obstructive pulmonary disease, unspecified	3	Intra-abdominal and pelvic swelling, mass and lump	3
Epistaxis	3	Acquired absence of leg above knee	1
Bronchopneumonia, unspecified	3	Alzheimer-s disease, unspecified	3
Open wound of head, part unspecified	2	Acute myeloid leukaemia	3
Faecal incontinence	3	Hydrocephalus, unspecified	1
Sarcoidosis, unspecified	3	Cerebral infarction, unspecified	2
Systemic lupus erythematosus, unspecified	3	Chronic renal failure, unspecified	3
Unspecified urinary incontinence	3	Chronic viral hepatitis C	3
Pneumonitis due to food and vomit	2	Creutzfeldt-Jakob disease	3
Injury of other specified intrathoracic organs	1	Coma, unspecified	1
Fracture of nasal bones	1	Bone marrow donor	3
Fracture of orbital floor	1	Post-traumatic hydrocephalus, unspecified	1
Fracture of pubis	1	Other injuries of lung	2
Fracture of second cervical vertebra	1	Other specified medical care	3
Fracture of thoracic vertebra	1	Parkinson-s disease	3
Hemiplegia, unspecified	2	Personal history of other specified conditions	3
Other cerebral infarction	2	Pneumonia due to Streptococcus pneumoniae	2
Hypothyroidism, unspecified	3	Injury of liver or gallbladder	3
Other and unspecified abdominal pain	3	Polyarthrosis, unspecified	3
Malignant neoplasm of breast, unspecified	3	Osteoporosis, unspecified	3
Multiple fractures of lumbar spine and pelvis	1	Presence of coronary angioplasty implant and graft	3
Oedema, unspecified	3	Presence of other heart-valve replacement	3
Old myocardial infarction	3	Reduced mobility	3