

Supplementary material S1

CT USE IN PATIENTS WITH EPILEPTIC SEIZURES ADMITTED ACUTELY TO HOSPITAL: A POPULATION LEVEL ANALYSIS OF ROUTINELY COLLECTED HEALTHCARE DATA

DATA ANALYSIS PROCEDURE

DATASETS USED – IP Data C&M 13-17 (Episode) and OP_CHC_CM1317. These datasets were linked based on pseudo NHS number.

ALGORITHM FOR IDENTIFYING PATIENTS AS HAVING DEFINITE AND PROBABLE SEIZURE ADMISSIONS:

- 1) Spell recorded in 2013-2017 period AND
- 2) Age greater than or equal to 16 years at first spell AND
- 3) Admission method is in the list:

Emergency Admission , when admission is unpredictable and at short notice because of clinical need:	
21	Accident and emergency or dental casualty department of the Health Care Provider
22	GENERAL PRACTITIONER : after a request for immediate admission has been made direct to a Hospital Provider , i.e. not through a Bed bureau, by a GENERAL PRACTITIONER or deputy
23	Bed bureau
24	Consultant Clinic , of this or another Health Care Provider
28	Other means, examples are: - admitted from the Accident and Emergency Department of another provider where they had not been admitted - transfer of an admitted PATIENT from another Hospital Provider in an emergency - baby born at home as intended

AND

- 4) Main specialty one of the following:

180	A&E
192	CRITICAL CARE MEDICINE
300	GENERAL MEDICINE
301	GASTROENTEROLOGY
302	ENDOCRINOLOGY
303	CLINICAL HAEMATOLOGY
314	REHABILITATION

315	PALLIATIVE MEDICINE
320	CARDIOLOGY
330	DERMATOLOGY
340	RESPIRATORY MEDICINE
361	NEPHROLOGY
370	MEDICAL ONCOLOGY
400	NEUROLOGY
410	RHEUMATOLOGY
430	GERIATRIC MEDICINE
820	GENERAL PATHOLOGY
823	HAEMATOLOGY

AND

4) Where hospital trust code is in the list

RBL	WIRRAL UNIVERSITY TEACHING HOSPITAL NHS FOUNDATION TRUST
RBN	ST HELENS AND KNOWSLEY HOSPITALS NHS TRUST
RBT	MID CHESHIRE HOSPITALS NHS FOUNDATION TRUST
REM	AINTREE UNIVERSITY HOSPITAL NHS FOUNDATION TRUST
RJN	EAST CHESHIRE NHS TRUST
RJR	COUNTESS OF CHESTER HOSPITAL NHS FOUNDATION TRUST
RQ6	ROYAL LIVERPOOL AND BROADGREEN UNIVERSITY HOSPITALS NHS TRUST
RWW	WARRINGTON AND HALTON HOSPITALS NHS FOUNDATION TRUST

Dataset produces a file containing 440,150 admissions (914,520 spells, 1,507,048 episodes) over the 4 year period.

Validation complete on main datasets, to ensure level of discharges are consistent over the 4 year dataset period.

Year	% of dataset
2013/2014	23.77%
2014/2015	25.03%
2015/2016	25.21%
2016/2017	26.00%
(blank)	0.00%
Grand Total	100.00%

This main dataset referenced above was then queried to produce a list of ICD-19 diagnosis codes. This then allowed for the data to be categorised into the following groups:

- 1) **ADMISSION SECONDARY TO DEFINITE OR PROBABLE EPILEPTIC SEIZURE:**
 - a. SEIZURE CODE in position 1 with relevant SECONDARY CODE OR
 - b. R568* in position 1 with a SEIZURE CODE in later position OR
 - c. Seizure code in later position and a probable linked diagnosis in position 1
- 2) **NON-SEIZURE ADMISSION**
 - a. Seizure code in later position but no linked diagnosis in position 1 OR
 - b. no seizure code in ICD string.

* R568 code = OTHER AND UNSPECIFIED CONVULSIONS

SEIZURE CODES

G400 LOCAL-RELATED (PART) IDIOPATH EPILEP/EPILEP SYND WITH SEIZ...
G401 LOCAL-RELATED (PART) SYMPTOM EPILEPSY/EPILEPTIC SYND WITH SI...
G402 LOCAL-RELATED (PART) SYMPTOM EPILEPSY/ EPILEP SYND W/ COMPLE...
G403 GENERALIZED IDIOPATHIC EPILEPSY AND EPILEPTIC SYNDROMES
G404 OTHER GENERALIZED EPILEPSY AND EPILEPTIC SYNDROMES
G405 SPECIAL EPILEPTIC SYNDROMES
G406 GRAND MAL SEIZURES, UNSPECIFIED (WITH OR WITHOUT PETIT MAL)
G407 PETIT MAL, UNSPECIFIED, WITHOUT GRAND MAL SEIZURES
G408 OTHER EPILEPSY
G409 EPILEPSY, UNSPECIFIED
G410 GRAND MAL STATUS EPILEPTICUS
G411 PETIT MAL STATUS EPILEPTICUS
G412 COMPLEX PARTIAL STATUS EPILEPTICUS
G418 OTHER STATUS EPILEPTICUS
G419 STATUS EPILEPTICUS, UNSPECIFIED

SECONDARY CODES

F019 VASCULAR DEMENTIA, UNSPECIFIED
F100 MENTAL AND BEHAVIOURAL DISORDERS DUE TO ACUTE INTOXICATION...
F101 MENTAL AND BEHAVIOURAL DISORDERS DUE TO HARMFUL USE OF ALCOH...
F102 MENTAL AND BEHAVIOURAL DISORDERS DUE TO ALCOHOL DEPENDENCE...
F103 MENTAL AND BEHAVIOURAL DISORDERS DUE TO WITHDRAWAL OF ALCOHO...
F104 MENTAL AND BEHAVIOURAL DISORDERS AND DELIRIUM DUE TO WITHDRA...
F419 ANXIETY DISORDER, UNSPECIFIED
G439 MIGRAINE, UNSPECIFIED
H538 OTHER VISUAL DISTURBANCES
J690 PNEUMONITIS DUE TO FOOD AND VOMIT
K292 ALCOHOLIC GASTRITIS
R402 COMA, UNSPECIFIED
R410 DISORIENTATION, UNSPECIFIED
R418 OTHER & UNSPEC SYMPTOMS & SIGNS INVOLVING COGNITIVE FUNCTION
R42X DIZZINESS AND GIDDINESS

R451 RESTLESSNESS AND AGITATION
R51X HEADACHE
R55X SYNCOPE AND COLLAPSE
R600 LOCALIZED OEDEMA
R798 OTHER SPECIFIED ABNORMAL FINDINGS OF BLOOD CHEMISTRY
S000 SUPERFICIAL INJURY OF SCALP
S001 CONTUSION OF EYELID AND PERIOcular AREA
S008 SUPERFICIAL INJURY OF OTHER PARTS OF HEAD
S009 SUPERFICIAL INJURY OF HEAD, PART UNSPECIFIED
S010 OPEN WOUND OF SCALP
S018 OPEN WOUND OF OTHER PARTS OF HEAD
S019 OPEN WOUND OF HEAD, PART UNSPECIFIED
S099 UNSPECIFIED INJURY OF HEAD
S308 OTHER SUPERFICIAL INJURIES OF ABDOMEN, LOWER BACK AND PELVIS
Z038 OBSERVATION FOR OTHER SUSPECTED DISEASES AND CONDITIONS
Z739 PROBLEM RELATED TO LIFE-MANAGEMENT DIFFICULTY, UNSPECIFIED

IDENTIFYING PATIENTS KNOWN TO NEUROLOGY (ACTIVE FOLLOW UP)

Where NHS number is the same in both IP Data C&M 13-17 (Spell) and OP_CHC_CM1317 datasets:

- a. KNOWN PATIENT – identified if outpatient clinic in year prior to seizure admission and the outpatient treatment function is recorded as '400' (neurology).
- b. UNKNOWN PATIENT – identified if no recorded outpatient clinic with treatment function recorded as '400' (neurology) prior to seizure admission.

IDENTIFYING PATIENTS ADMITTED WITH CONCOMITANT HEAD AND / OR NECK TRAUMA

Where patient has an **ADMISSION SECONDARY TO DEFINITE OR PROBABLE EPILEPTIC SEIZURE** as outlined above plus any of the following trauma codes in P1, P2 or P3:

S0** INJURIES TO THE HEAD
S1** INJURIES TO THE NECK
V*** EXTERNAL CAUSES OF MORBIDITY (including road traffic accidents)
W*** SLIPPING, TRIPPING, STUMBLING AND FALLS AND EXPOSURE TO
INANIMATE AND ANIMATE MECHANICAL FORCES
X9** ASSAULT
Y*** ASSAULT

IDENTIFYING LIKELY CT HEAD SCAN

Patient identified as having CT head when one or more of the following OPCS codes recorded for an episode within a spell where the patient had an **ADMISSION SECONDARY TO DEFINITE OR PROBABLE EPILEPTIC SEIZURE**:

OPCS codes

U011 COMPUTED TOMOGRAPHY OF WHOLE BODY

U051 COMPUTED TOMOGRAPHY OF HEAD

U212 COMPUTED TOMOGRAPHY NEC

MRI head codes such as "U052 - Magnetic resonance imaging of head" were NOT included.