

IRISH NATIONAL AUDIT OF STROKE NATIONAL REPORT 2022 APPENDICES



APPENDIX 1: IRISH NATIONAL AUDIT OF STROKE METHODOLOGY 2022

BACKGROUND

In 2012, the National Stroke Programme (NSP) developed the National Stroke Register (NSR) in partnership with the Health Research and Information Division of the Economic and Social Research Institute (ESRI) to measure the effect of the implementation of the Stroke Model of Care (Health Service Executive, 2012). The NSR was governed by the NSR Steering Group. In 2019, governance of the NSR was transferred to NOCA and it was renamed the Irish National Audit of Stroke (Figure 1).

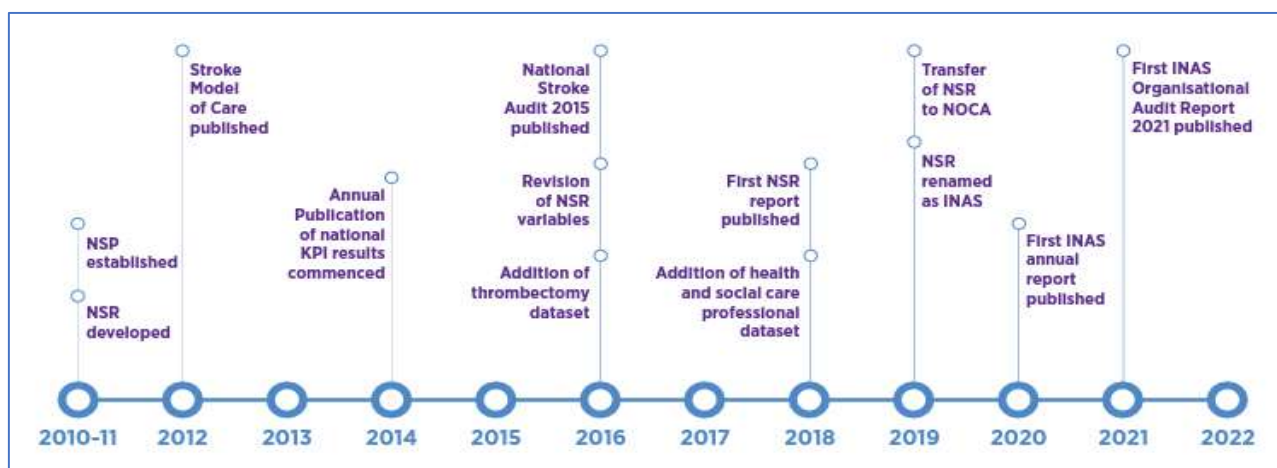


FIGURE 1: EVOLUTION OF THE IRISH NATIONAL AUDIT OF STROKE

THE IRISH NATIONAL AUDIT OF STROKE GOVERNANCE

The Irish National Audit of Stroke (INAS) is a clinically led, web-based audit that measures the care provided in hospital to patients with a stroke against the National Clinical Guideline for Stroke for the UK and Ireland (Intercollegiate Stroke Working Party, 2023). The INAS Governance Committee ([link to INAS Governance committee](#)) oversees the INAS. Its membership comprises clinical experts, public and patient interest representatives, the Healthcare Pricing Office (HPO), senior accountable healthcare management, and research and specialist bodies. The INAS Governance Committee also ensures that all relevant stakeholders are represented in order to verify that outputs of the audit findings are interpreted appropriately. The Clinical Lead, supported by the NOCA Executive Team, has operational responsibility for implementation of the INAS.

AIM AND OBJECTIVES OF THE IRISH NATIONAL AUDIT OF STROKE

Aim: To conduct audit of stroke care, including clinical care and service organisation	
Objectives	To maintain a database of all inpatients with a stroke in Ireland in order to drive continuous quality improvement and to deliver the best patient outcomes.
	To support the collection of high-quality data on all inpatient strokes in Ireland in order to permit local and national reporting of outcomes.
	To disseminate the outputs of the data in a timely manner to all relevant stakeholders.
	To benchmark stroke care and outcomes against national and international standards.
	To support/promote the use of stroke data for quality improvement initiatives at local and national level.
	To provide data to support and inform national policy for stroke and related conditions.

METHODS

All patients with ischaemic and haemorrhagic stroke who were treated in public hospitals that provide acute stroke care and that admitted more than 25 patients with a stroke are included in this audit.



DATA SOURCE

Data were sourced via the Hospital In-Patient Enquiry (HIPE) system. HIPE is the principal source of national data on discharges from acute hospitals in Ireland. It collects demographic, clinical and administrative data on discharges from, and deaths in, acute public hospitals nationally. Additional stroke-specific data ([link to INAS dataset](#)) were collected on patients with a stroke and were submitted from each hospital to the HIPE system via the stroke audit portal. The HIPE data and the INAS data were merged within HIPE to form a final dataset. The INAS dataset comprises clinical data collected on all patients with a stroke; these are known as core clinical data. These data have been collected since 2013 and have evolved, with amendments in 2016, 2020 and 2021. In 2016, additional thrombectomy data collected on patients who receive a thrombectomy in an EVT stroke centre were added to the INAS dataset. In 2018, additional discipline-specific data on health and social care professionals (HSCPs) were also added. The HSCP dataset was developed by the NSP in collaboration with the professional bodies for physiotherapy, occupational therapy, and speech and language therapy. The dataset was piloted in 2017 and the first publication of the data was in 2018 (NSP, 2019). The dataset remains in the implementation phase.



DATA COLLECTION

DATA COLLECTION: CORE CLINICAL DATASET

Each hospital has an audit coordinator and a clinical lead who lead on stroke service governance within the hospital. The audit coordinator, usually an experienced nurse specialising in stroke care, collects the core clinical data and submits them to the stroke audit portal. A list of cases eligible for inclusion can be identified by running a HIPE Discharge Report within the stroke audit portal. Additional cases may be identified manually. Most data are entered retrospectively.

DATA COLLECTION: THROMBECTOMY DATASET

The thrombectomy data are collected on all patients who receive a thrombectomy in an EVT stroke centre. Core clinical data and additional thrombectomy data are entered by the audit coordinators for each patient with a stroke who receives a thrombectomy in either of the two EVT stroke centres (Beaumont Hospital or Cork University Hospital).

DATA COLLECTION: HEALTH AND SOCIAL CARE PROFESSIONAL DATASET

Data are collected by therapists in each hospital and are presented in aggregate form. The HSCP dataset includes data from one hospital that is not eligible to participate in the core clinical dataset, as it provides rehabilitation services (not acute stroke care) to patients with a stroke.



DATA VALIDATION

In 2019, the NOCA Data Analytics and Research team developed a data validation process for the INAS, as follows:

1. The HPO issues monthly coverage reports and data extracts to NOCA.
2. The data analyst produces a Data Validation Report (DVR) quarterly of any missing information within the data and any data anomalies.
3. The DVR is sent to the audit coordinators, who amend the record.

In 2022, DVRs were sent to hospitals quarterly in order to reduce missing data and data anomalies, thus improving data quality.



DATA ANALYSIS

HIPE data and INAS data were merged within the HPO to form an anonymised stroke extract. NOCA received the full stroke extract for 2022 from the HPO in April 2023. The analysis was completed by the NOCA Data Analyst following data checks with the HPO. Data from the HIPE/INAS dataset were extracted by the NOCA analyst to form three separate datasets: the core clinical dataset, the thrombectomy dataset and the HSCP dataset. The inclusion and exclusion criteria for all three datasets are presented below. The analysis was conducted using Statistical Package for the Social Sciences (SPSS) V25.



COVERAGE AND COMPLETENESS ANALYSIS

Coverage was defined as the proportion of cases with a principal diagnosis of stroke that had additional clinical data submitted to the stroke audit portal. A final coverage report is collated by the HPO. Any hospital with less than 80% coverage is excluded in the report.

Completeness of variables is measured by the data analyst. All results including missing data and unknowns are included in the report



INCLUSION AND EXCLUSION CRITERIA

Core clinical dataset inclusion criteria are:

- I. patients discharged between 1 January 2022 and 31 December 2022
- II. cases reported on HIPE, using the International Classification of Diseases, Tenth Revision, Australian Modification (ICD-10-AM) codes I61, I63 or I64 as a principal diagnosis¹ (Independent Hospital Pricing Authority, 2017)
- III. patients aged 17 years and over
- IV. all cases with the 'in-hospital stroke' field populated with '2=No' within the stroke audit portal.
- V. all cases with the 'admission to stroke unit' field populated with either '1=Yes' or '2=No' within the stroke audit portal.

¹ The principal diagnosis on HIPE is defined as "the diagnosis established after study to be chiefly responsible for occasioning an episode of admitted patient care, an episode of residential care or an attendance at the health care establishment, as represented by a code" (Australian Consortium for Classification Development, 2017, p.1).



Core clinical dataset exclusion criteria are:

- I. patients aged 16 years and under
- II. patients with a HADx stroke code of I61, I63 or I64
- III. patients where the stroke occurred while in hospital with another condition
- IV. patients who had a thrombectomy in Beaumont Hospital or Cork University Hospital and were transferred back to the referring hospital on the same day.

The thrombectomy dataset inclusion criteria are:

- I. all cases with the 'thrombectomy' field populated with '1=Yes' within the stroke audit portal
- II. patients aged 17 years and over.

The thrombectomy dataset exclusion criterion is:

- I. patients aged 16 years and under.

HSCP dataset inclusion criteria are:

- I. all cases with '1=Yes' populated for the 'seen by physiotherapist', 'seen by occupational therapist', and/or 'seen by speech and language therapist' fields within the stroke audit portal
- II. patients aged 17 years and over.

HSCP dataset exclusion criterion is:

- I. patients aged 16 years and under.

NOTES ON INCLUSION AND EXCLUSION CRITERIA

Inclusion criterion IV and exclusion criteria III and IV refer to patients who had a stroke while already an inpatient with another condition (e.g. a stroke event following surgery); this is called 'in-hospital' stroke. The INAS dataset includes the collection of data on patients with in-hospital stroke, but these cases are not included in this report. These cases can be identified if the 'in-hospital stroke' field is populated as 'yes', but only those cases for which this field was populated with 'no' are included in this report. These in-hospital stroke cases can also be identified if a hospital acquired diagnosis (HADx) flag for stroke has been attached to the 'secondary diagnosis' field. These cases are also excluded from the core clinical dataset for this report.

Exclusion criterion IV refers to patients with a stroke who are transferred to an EVT stroke centre for thrombectomy and are then immediately transferred back to the referring hospital. These cases are excluded from the final denominator in the EVT stroke centre within the core clinical dataset, as this would negatively affect the results of the key quality indicators (KQIs) in the EVT stroke centre. For example, these cases would not be included in the analysis of the percentage of cases admitted to a stroke unit because they would not be expected to be admitted to the EVT stroke centre's stroke unit, as they were transferred back to the referring hospital immediately following thrombectomy.

Inclusion criterion V refers to cases where HSCP data were submitted with no associated core clinical data. This may occur if the audit coordinator did not submit data on a case or there was no audit coordinator due to a resourcing issue. In order to exclude these missing data from the core clinical dataset, any case that had no response in the 'admission to stroke unit' field was excluded.

APPENDIX 2: IRISH NATIONAL AUDIT OF STROKE: DATASET 2022

Key:		
Dataset	HIPE VARIABLES	National in-patient administrative dataset.
Dataset	INAS VARIABLES	Data submitted by clinical team on all cases with a stroke
Dataset	INAS THROMBECTOMY VARIABLES	Data submitted by clinical team in the National Thrombectomy centres on cases who had a thrombectomy
Dataset	INAS ATRIAL FIBRILLATION SPOTLIGHT AUDIT VARIABLES	Data submitted by clinical team on all cases with atrial fibrillation - data only collected in 2022.
Dataset	HSCP- PHYSIOTHERAPIST VARIABLES	Data submitted by physiotherapists on cases with stroke - implementation phase, not active in all hospitals
Dataset	HSCP- OCCUPATIONAL THERAPIST VARIABLES	Data submitted by occupational therapists on cases with stroke - implementation phase, not active in all hospitals
Dataset	HSCP- SPEECH AND LANGUAGE THERAPIST VARIABLES	Data submitted by speech and language therapists on cases with stroke - implementation phase, not active in all hospitals

Data set	Definition	Instructions for answering field	Codes and values
HIPE VARIABLE	NAME OF HOSPITAL		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	PATIENT HOSPITAL NUMBER ENCRYPTED	EG. A1234567	http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE ADMISSION DATE	DD/MM/YYYY	http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE DISCHARGE DATE	DD/MM/YYYY	http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE		http://www.hpo.ie/HIPE_Data_Dictionary.htm

HIPE VARIABLE	HIPE DISCHARGE DESTINATION		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	GENDER	MANDATORY FIELD CODES 1-2	http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	MARTIAL STATUS		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE IDENTIFYING AREA OF RESIDENCE		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE INDICATING MEDICAL SPECIALITY		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE DESCRIBING DISCHARGE STATUS		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE ADMISSION WARD		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE DISCHARGE WARD		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE SOURCE OF ADMISSION		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE PRIVATE DAYS		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE PUBLIC DAYS		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE SEMI-PRIVATE DAYS		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE ITU LENGTH OF STAY		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE WAITING LIST INDICATOR		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE MODE OF EMERGENCY ADMISSION		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE ADMISSION WEIGHT		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE WAS IN A DAY WARD		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE DAY WARD INDICATOR		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE TRANSFER HOSPITAL FROM		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE TRANSFER HOSPITAL TO		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE LENGTH OF STAY		http://www.hpo.ie/HIPE_Data_Dictionary.htm

HIPE VARIABLE	HIPE VARIABLE AGE		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE DIAGNOSIS RELATED GROUP		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE MAJOR DIAGNOSTIC CATEGORY		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE HAS MEDICAL CARD		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE NAME OF HEALTH INSURER		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE DIAGNOSIS 1		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE Diagnosis 2-30		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE VARIABLE PROCEDURE 1-20		http://www.hpo.ie/HIPE_Data_Dictionary.htm
HIPE VARIABLE	HIPE Variable Procedure date	DD/MM/YYYY	http://www.hpo.ie/HIPE_Data_Dictionary.htm
INAS VARIABLE	Which hospital was patient transferred from (if any)	0000 is auto populated to indicate that the patient was not transferred from another hospital.	0000 Not Applicable 0941 Children's Crumlin 0101 St Columcille's 0102 Naas General 0908 Mater Hospital 0910 SVUH 0925 Peamount Hospital 0955 Cappagh Orthopaedic 0940 Temple Street 0947 St Luke's Rathgar 0904 SJH Dublin 0108 Connolly Blanchardstown 0912 Michaels Dun Laoghaire 0950 RVEEH 0960 National Rehabilitation 0930 Coombe Hospital 0932 Rotunda Dublin 0931 National Maternity Hosp 1270 Tallaght Hospital 1762 Josephs Raheny 0954 Clontarf Orthopaedic 1001 Blackrock Hospice 0600 Waterford 0601 St Luke's KK 0605 Wexford 0602 Kilcreene 0607 Clonmel 0705 Finbar's Cork 0704 Bantry 0913 Mercy Cork 0915 South Infirmary 0703 Mallow 0724 CUH 0726 Kerry 0301 Limerick Maternity 0300 Limerick 0302 Croom Limerick 0918 St Johns Limerick 0305 Ennis 0304 Nenagh 0803 Roscommon 0919 Portiuncula 0800 Galway 0802 Mayo 0801 Merlin Park 0203 Tullamore 0202 Mullingar 0201 Portlaoise 0500 Letterkenny 0501 Sligo 0922 Drogheda 0402 Cavan 0400 Louth County 0404 Monaghan 0403 Navan 8888 Other
INAS VARIABLE	Why was the patient transferred		1 Thrombolysis 2 Thrombectomy 3 Neuro Surgery 8 Other
INAS VARIABLE	If other transfer reason, please specify		Free text
INAS VARIABLE	If other transfer hospital, please specify		Free text
INAS VARIABLE	Symptom onset date	DD/MM/YYYY	

INAS VARIABLE	Symptom onset time (enter 9999 if unknown)	Enter 9999 if unknown	
INAS VARIABLE	If symptom onset time is unknown, what date was the patient last known to be well	DD/MM/YYYY	
INAS VARIABLE	If symptom onset time is unknown, what time was the patient last known to be well	HH:MM	
INAS VARIABLE	Did the stroke occur while the patient was in hospital for treatment of another condition		1 Yes 2 No 9 Unknown
INAS VARIABLE	If no, date of presentation to hospital	DD/MM/YYYY	
INAS VARIABLE	If no, time of presentation to hospital	HH:MM	
INAS VARIABLE	If presentation time is unknown, was presentation to hospital within 4.5 hrs of symptom onset		1 Yes, 2 No 9 Unknown
INAS VARIABLE	Medical assessment date	DD/MM/YYYY	
INAS VARIABLE	Brain CT or MRI performed		1 Yes, 2 No 3 Performed pre adm / hosp transfer 9 Unknown
INAS VARIABLE	If yes, First Brain Imaging date	DD/MM/YYYY	
INAS VARIABLE	If yes, First Brain Imaging time	HH:MM	
INAS VARIABLE	Did the patient receive I.V. Thrombolysis		1 Yes, 2 No 5 Contraindicated
INAS VARIABLE	If yes, enter date	DD/MM/YYYY	
INAS VARIABLE	If yes, enter time	HH:MM	
INAS VARIABLE	If yes, was intracerebral bleed seen on scan within 36 hrs		1 Yes, 2 No 9 Unknown
INAS VARIABLE	If intracerebral bleed, was neuro deterioration associated with it		1 Yes, 2 No 9 Unknown
INAS thrombectomy	Did the patient have thrombectomy in this hospital (Beaumont / CUH only)		1 Yes, 2 No
INAS thrombectomy	NIHSS pre-thrombectomy	Freetext	

INAS thrombectomy	Date of performance of non contrast CT	DD/MM/YYYY	
INAS thrombectomy	Time of performance of non contrast CT	HH:MM	
INAS thrombectomy	Date of performance of non contrast CTA	DD/MM/YYYY	
INAS thrombectomy	Time of performance of non contrast CTA	HH:MM	
INAS thrombectomy	Date of contact with the endovascular stroke centre	DD/MM/YYYY	
INAS thrombectomy	Time of contact with the endovascular stroke centre	HH:MM	
INAS thrombectomy	Date of decision to transfer patient	DD/MM/YYYY	
INAS thrombectomy	Time of decision to transfer patient	HH:MM	
INAS thrombectomy	Date of arrival at the endovascular stroke centre	DD/MM/YYYY	
INAS thrombectomy	Time of arrival at the endovascular stroke centre	HH:MM	
INAS thrombectomy	Did the patient have repeat non invasive imaging in the endovascular stroke centre		1 Yes, 2 No 9 Unknown
INAS thrombectomy	If yes, please specify		1 Non contrast CT 2 CTA 3 Perfusion CT 4 MRI
INAS thrombectomy	Site of most proximal occlusion		1 MCA 1 2 MCA 2 3 Basilar 4 ICA carotid T/L 5 ICA cervical segment 6 PCA 7 Vertebro basilar
INAS thrombectomy	Second occlusion site	Free text	
INAS thrombectomy	Associated carotid stenosis greater than 50%		1 Yes, 2 No 9 Unknown
INAS thrombectomy	TICI pre thrombectomy	Free text	
INAS thrombectomy	TICI post thrombectomy	Free text	
INAS thrombectomy	Date of groin puncture	DD/MM/YYYY	
INAS thrombectomy	Time of groin puncture	HH:MM	
INAS thrombectomy	Date of first pass	DD/MM/YYYY	
INAS thrombectomy	Time of first pass	HH:MM	
INAS thrombectomy	Date of first reperfusion	DD/MM/YYYY	

INAS thrombectomy	Time of first reperfusion	HH:MM	
INAS thrombectomy	Date of final angio	DD/MM/YYYY	
INAS thrombectomy	Time of final angio	HH:MM	
INAS thrombectomy	Immediate complications		0 Not Applicable 1 Haemorrhage 2 Embolus into separate vascular territory 3 Dissection 8 Other 9 Unknown
INAS thrombectomy	NIHSS 24 hour post-thrombectomy	Free text	
INAS thrombectomy	Following procedure was patient transferred immediately back to primary receiving hospital		1 Yes, 2 No 9 Unknown
INAS thrombectomy	If no, when was patient admitted to the endovascular stroke centre		1 0-3 hrs 2 3-12 hrs 3 12-24 hrs 4 24+ hrs
INAS thrombectomy	Was the patient transferred from another hospital		1 Yes, 2 No 9 Unknown
INAS thrombectomy	If yes, what date did the patient arrive at the referring/first hospital	DD/MM/YYYY	
INAS thrombectomy	If yes, what time did the patient arrive at the referring/first hospital	HH:MM	
INAS thrombectomy	If yes, what date did the patient leave the referring/first hospital for transfer to the EVT centre	DD/MM/YYYY	
INAS thrombectomy	If yes, what time did the patient leave the referring/first hospital for transfer to the EVT centre	HH:MM	
INAS VARIABLE	Was a swallow screen completed		1 Yes, 2 No 9 Unknown
INAS VARIABLE	If yes, was swallow screen completed within 4 hours of presentation		1 Yes, 2 No 9 Unknown
INAS VARIABLE	Modified Rankin Scale pre stroke		0 Zero 1 One 2 Two 3 Three 4 Four 5 Five 6 Six 9 Unknown
INAS VARIABLE	Admitted to Stroke Unit (Key Performance Indicator)		1 Yes, 2 No
INAS VARIABLE	If yes, date admitted to Stroke Unit (Key Performance Indicator)	DD/MM/YYYY	

INAS VARIABLE	If yes, date discharged from Stroke Unit (Key Performance Indicator)	DD/MM/YYYY	
INAS VARIABLE	If no, reason why		1 No Stroke Unit, 2 Bed Not Available, 5 Infection Control Risk, 8 Other
INAS VARIABLE	If other reason, please specify		Free text
INAS VARIABLE	Allied Health Professional (AHP) Assessment		1 Yes, 2 No
INAS VARIABLE	If yes, Physiotherapy		1 Yes, 2 No 3 Not Indicated 9 Unknown
INAS VARIABLE	If yes, Occupational Therapy		1 Yes, 2 No 3 Not Indicated 9 Unknown
INAS VARIABLE	If yes, Speech and Language Therapy		1 Yes, 2 No 3 Not Indicated 9 Unknown
INAS VARIABLE	If yes, Dietetics		1 Yes, 2 No 3 Not Indicated 9 Unknown
INAS VARIABLE	If yes, Medical Social Worker		1 Yes, 2 No 3 Not Indicated 9 Unknown
INAS VARIABLE	If yes, Psychology		1 Yes, 2 No 3 Not Indicated 9 Unknown
INAS VARIABLE	Was the patient assessed by Stroke Nurse Specialist		1 Yes, 2 No, 9 Unknown
INAS VARIABLE	If no, reason why		Free text
INAS VARIABLE	Multidisciplinary Meeting Case assessment		1 Yes, 2 No 3 Not Indicated 9 Unknown
INAS VARIABLE	Was an assessment of mood completed and documented by a member of the multidisciplinary team		1 Yes, 2 No 3 Not Indicated 9 Unknown
INAS VARIABLE	Does the patient have Symptomatic Carotid Stenosis		1 Yes, 2 No 9 Unknown
INAS VARIABLE	If Symptomatic Carotid Stenosis, was the patient referred for Carotid Endarterectomy		1 Yes, 2 No 9 Unknown
INAS VARIABLE	If Symptomatic Carotid Stenosis, was the patient referred for Carotid Stenting		1 Yes, 2 No 9 Unknown
INAS VARIABLE	New or Altered Antithrombotic Therapy prescribed for acute treatment		1 Yes, 2 No 3 Contraindicated 9 Unknown

INAS VARIABLE	If yes, Antiplatelet Or Anticoagulant (for acute treatment) start date	DD/MM/YYYY	
INAS VARIABLE	Does the patient have Atrial Fibrillation		1 Yes, 2 No 4 Results Pending 9 Unknown
INAS VARIABLE	If Atrial Fibrillation, was atrial fibrillation known prior to stroke onset		1 Yes, 2 No 9 Unknown
INAS VARIABLE	If atrial fibrillation known prior to stroke onset, was Antiplatelet And/or Anticoagulant prescribed prior to Stroke onset		1 Yes, 2 No 9 Unknown
INAS VARIABLE	If yes, please specify Antiplatelet / Anticoagulant - prior to stroke		1 Warfarin 2 Dabigatran 3 Rivaroxaban 4 Apixaban 5 Aspirin 6 Clopidogrel 7 Other Antiplatelet 8 Dual Antiplatelet Therapy 9 Antiplatelet & Anticoagulant
INAS VARIABLE	If yes, please specify Antiplatelet / Anticoagulant - prior to stroke		0 NOAC 1 Warfarin 2 Dabigatran 3 Rivaroxaban 4 Apixaban 5 Aspirin 6 Clopidogrel 7 Other Antiplatelet 8 Dual Antiplatelet Therapy 9 Antiplatelet & Anticoagulant
INAS VARIABLE	If yes, please specify Antiplatelet / Anticoagulant - prior to stroke		0 NOAC 1 Warfarin 5 Aspirin 6 Clopidogrel 7 Other Antiplatelet 8 Dual Antiplatelet Therapy 9 Antiplatelet & Anticoagulant
INAS VARIABLE AF Spotlight audit until 31/1/22	Which anticoagulant was prescribed just before the stroke		1 Warfarin, 2 Dabigatran, 3 Apixaban, 4 Edoxaban, 5 Rivaroxaban, 6 Antiplatelet only
INAS VARIABLE AF Spotlight audit until 31/1/22	Was the correct DOAC dose prescribed, according to current guidance before the stroke		1 Yes, 2 No 9 Unknown
INAS VARIABLE AF Spotlight audit until 31/1/22	If no, was the dose too high or too low		1 Too high, 2 Too low
INAS VARIABLE AF Spotlight audit until 31/1/22	Was a DOAC level taken at time of presentation		1 Yes, 2 No 9 Unknown
INAS VARIABLE AF Spotlight audit until 31/1/22	If yes, what date was the last DOAC taken	DD/MM/YYYY	

INAS VARIABLE AF Spotlight audit until 31/1/22	If yes, what time was the last DOAC taken	HH:MM	
INAS VARIABLE AF Spotlight audit until 31/1/22	If yes, what was the level/result	Number	
INAS VARIABLE AF Spotlight audit until 31/1/22	Had the anticoagulant been paused or stopped before the stroke		1 Yes, 2 No 9 Unknown
INAS VARIABLE AF Spotlight audit until 31/1/22	If yes, why was it stopped		1 Pre-procedure, 2 Side effects, 3 Falls risk, 4 Poor patient compliance, 5 High bleed risk, 9 Unknown
INAS VARIABLE AF Spotlight audit until 31/1/22	If yes, how long had the anticoagulant been stopped for		1. 1 day, 2. 2 days, 3. 3-7 days, 4->10 days
INAS VARIABLE AF Spotlight audit until 31/1/22	If yes, who stopped it		1 Themselves, 2 A Healthcare Provider, 9 Unknown
INAS VARIABLE AF Spotlight audit until 31/1/22	Did the patient / carer report often forgetting to take a tablet (more than once per week)?		1 Yes, 2 No 9 Unknown
INAS VARIABLE AF Spotlight audit until 31/1/22	Who originally commenced the patient on an oral anticoagulant?		1 Primary Care, 2 Hospital, 3 Unknown
INAS VARIABLE AF Spotlight audit until 31/1/22	Does the patient attend a hospital-based anticoagulation clinic or atrial fibrillation clinic		1 Yes, 2 No 9 Unknown
INAS VARIABLE	If atrial fibrillation known prior to stroke onset, and on Warfarin, was INR (International Normalised Ratio) 2-3 at Stroke onset.		0 Not applicable 1 Yes, 2 No 9 Unknown
INAS VARIABLE	If Atrial Fibrillation, Anticoagulation prescribed for secondary prevention		1 Yes, 2 No 9 Unknown
INAS VARIABLE	If yes, please specify Antiplatelet / Anticoagulant - on discharge		0 NOAC 1 Warfarin 5 Aspirin 6 Clopidogrel 7 Other Antiplatelet 8 Dual Antiplatelet Therapy 9 Antiplatelet & Anticoagulant

INAS VARIABLE	If no, please enter reason documented		01 No reason documented 02 Major bleeding (prior history) 03 Severe illness (e.g. cancer, dementia) 04 Poor compliance (known or suspected) 05 Patient refused anticoagulation 06 Alcohol excess 07 Falls 08 Extreme frailty 09 Liver disease 10 Will commence anticoagulation as an out-patient.
INAS VARIABLE	Modified Rankin Scale on discharge		0 Zero 1 One 2 Two 3 Three 4 Four 5 Five 6 Six 9 Unknown
INAS VARIABLE	Discharge destination		1 Home 2 Patient died 3 Discharge to long term care 4 Discharge to off-site rehab 5 Transfer to referring hosp 6 Transfer to other hosp for on-going stroke care 7 Home with ESD 8 Other 9 Unknown
INAS VARIABLE	Case complete		1 Yes, 2 No, 9 Unknown
HSCP INAS	Was the patient referred to Physiotherapy?		1 Yes; 2 No; 3 Unknown
HSCP INAS	If yes, please provide date of referral	DD/MM/YYYY	
HSCP INAS	Was the patient seen by physiotherapy?		1 Yes 2 No 3 Discharged before seen 9 Unknown
HSCP INAS	If yes, date of initial contact by physiotherapy	DD/MM/YYYY	
HSCP INAS	Indoor mobility pre-admission		1 Indep no aid 2 Indep with an aid 3 S/V or assist of 1 person +/- aid 4 T/F only with assist +/- aid 5 Hoist transfer 9 Unknown
HSCP INAS	Were standardised outcome measures used?		1 Yes; 2 No; 9 Unknown
HSCP INAS	Was the intensity of Physiotherapy sufficient?		1 Yes 80-100% 2 Moderate 50-79% 3 No 0-49% 9 Unknown
HSCP INAS	Was intensity calculated on minutes of therapy?		1 Yes; 2 No; 9 Unknown
HSCP INAS	Did the patient require more than one therapist/PTA for more than half of their treatment sessions?		1 Yes; 2 No; 9 Unknown

HSCP INAS	Indoor mobility on discharge		0 N/A RIP 1 Indep no aid 2 Indep with an aid 3 S/V or assist of 1 person +/- aid 4 T/F only with assist +/- aid 5 Hoist transfer 9 unknown
HSCP INAS	Onward physiotherapy referral to		0 N/A RIP 1 In-patient rehab 2 Community Physio 3 ESD PT 4 Stroke specific OPD physio 5 Day hospital 8 Other 9 Unknown
HSCP INAS	Was the patient referred to Occupational Therapy?		1 Yes; 2 No; 3 Unknown
HSCP INAS	If yes, please provide date of referral	DD/MM/YYYY	
HSCP INAS	Was the patient seen by Occupational Therapy		1 Yes 2 No 3 Discharged before seen 9 Unknown
HSCP INAS	If yes, date of initial assessment by OT	DD/MM/YYYY	
HSCP INAS	Prior to admission, which would <u>best describe</u> the patient's ability to attend to their personal activities of daily living		1 Independent; 2 Indep with cues/aids; 3 Required S/V or set-up; 4 Required assist; 5 Dependent / full care; 9 Unknown
HSCP INAS	Was the patient a driver prior to admission?		1 Yes; 2 No; 9 Unknown
HSCP INAS	If yes, was the patient advised prior to discharge about driving limitations post stroke		1 Yes; 2 No; 9 Unknown
HSCP INAS	Did the patient work in paid employment prior to admission?		1 Yes; 2 No; 9 Unknown
HSCP INAS	If yes, was the person advised about return to work prior to discharge?		1 Yes; 2 No; 3 Onward referral made; 9 Unknown
HSCP INAS	Was the intensity of OT input sufficient?		1 Yes 80-100% 2 Moderate 50-79% 3 No 0-49% 9 Unknown
HSCP INAS	Was intensity calculated on minutes of therapy?		1 Yes; 2 No; 9 Unknown
HSCP INAS	Did the patient require more than one therapist/PTA for more than half of their treatment sessions?		1 Yes; 2 No; 9 Unknown

HSCP INAS	Were visual fields assessed during the admission?		1 Yes, using confrontation testing; 2 Yes, using perimetry testing; 3 Yes, using both confrontation and perimetry testing; 4 Attempted, but unable due to patient factors; 5 No; 9 Unknown
HSCP INAS	Was screening for cognitive impairment completed, using a valid screening measure?		1 Yes; 2 No; 3 Unable to complete due to patient factors; 9 Unknown
HSCP INAS	On discharge, which would best describe the patient's ability to attend to their personal activities of daily living		0 N/A RIP 1 Independent 2 Indep with cues/aids 3 Required S/V or set-up 4 Required assist 5 Dependent / full care 9 Unknown
HSCP INAS	Was an onward referral made for further Occupational therapy intervention		0 N/A RIP 1 Yes 2 No 9 Unknown
HSCP INAS	If yes, to what service?		1 Inpatient rehab (off-site); 2 Comm OT; 3 ESD OT; 4 Other
HSCP INAS	Was the patient referred to Speech & Language Therapy?		1 Yes; 2 No; 9 Unknown
HSCP INAS	If yes, please provide date of referral	DD/MM/YYYY	
HSCP INAS	Was the patient seen by Speech and Language Therapy?		1 Yes 2 No 3 Discharged before seen 9 Unknown
HSCP INAS	If yes, date of initial contact by SLT	DD/MM/YYYY	
HSCP INAS	Functional communication ability prior to admission.		1 No difficulties 2 Mild: Effective communication > 80% - Occasional breakdown in conversation 3 Moderate: Effective communication 50-79% - Frequent breakdown in conversation 4 Severe: Less than half (10-49%) of communication attempts are successful 5 Profound: No, or occasional (<10%) of communication attempts are successful 9 Unknown
HSCP INAS	Modified diet recommended prior to admission		1 Yes; 2 No; 9 Unknown

HSCP INAS	Modified fluids recommended prior to admission		1 Yes; 2 No; 9 Unknown
HSCP INAS	SLT Initial assessment diagnosis		1 Difficulties identified 2 No issues identified
HSCP INAS	Does the patient have swallowing difficulty		1 Yes; 2 No; 9 Unknown
HSCP INAS	Does the patient have dysarthria		1 Yes; 2 No; 9 Unknown
HSCP INAS	Does the patient have dyspraxia		1 Yes; 2 No; 9 Unknown
HSCP INAS	Does the patient have aphasia		1 Yes; 2 No; 9 Unknown
HSCP INAS	Does the patient have cognitive linguistic communication disorder		1 Yes; 2 No; 9 Unknown
HSCP INAS	Does the patient have voice difficulties		1 Yes; 2 No; 9 Unknown
HSCP INAS	Other difficulties, please specify		Free text
HSCP INAS	Was the patient NPO pending swallow assessment?		1 Yes; 2 No; 9 Unknown
HSCP INAS	Was videofluoroscopy completed during episode?		1 Yes 2 No 3 Indicated but not available 9 Unknown
HSCP INAS	Was FEES completed during episode?		1 Yes 2 No 3 Indicated but not available 9 Unknown
HSCP INAS	Was the intensity of SLT sufficient?		1 Yes 80-100% 2 Moderate 50-79% 3 No 0-49% 9 Unknown
HSCP INAS	Was intensity calculated on minutes of contact		1 Yes; 2 No; 9 Unknown
HSCP INAS	New enteral feeding required on discharge		0 N/A RIP 1 Yes 2 No 9 Unknown
HSCP INAS	Newly modified diet recommended at discharge		0 N/A RIP 1 Yes 2 No 9 Unknown
HSCP INAS	Newly modified fluids recommended at discharge		0 N/A RIP 1 Yes 2 No 9 Unknown
HSCP INAS	Functional communication ability at discharge		0 N/A RIP 1 No difficulties 2 Mild: Effective communication > 80% - Occasional breakdown in conversation 3 Moderate: Effective communication 50-79% - Frequent breakdown in conversation 4 Severe: Less than half (10-49%) of communication attempts are

			successful 5 Profound: No, or occasional (<10%) of communication attempts are successful 9 Unknown
HSCP INAS	Further SLT requirements		0 None indicated 1 Communication 2 Swallow 3 Communication and swallow
HSCP INAS	Onward SLT referral to		0 N/A RIP 1 Inpatient rehab 2 Comm SLT 3 ESD SLT 7 None 8 Other

APPENDIX 3: IRISH NATIONAL AUDIT OF STROKE GOVERNANCE COMMITTEE

Representative	Name	11.03.22	27.05.22	26.08.22	18.11.22
Healthcare Professional Expert: CNS Stroke	Glen Arrigan	x	x	✓	x
Senior Accountable Healthcare Manager	Sinead Brennan	✓	P	✓	x
Clinical Expert: Irish Gerontology Society	Dr Tim Cassidy	Chair	Chair	Chair	Chair
National Clinical Programme for Stroke: Programme Manager	Sinead Coleman	n/a	✓	x	✓
National Clinical Programme for Stroke: Clinical lead	Prof Ronan Collins	✓	✓	x	✓
Healthcare Professional Expert: Hospital Group Director of Nursing	Paul Gallagher	✓	✓	x	x
Clinical Lead: Irish National Audit of Stroke	Prof Joe Harbison	✓	✓	✓	✓
Cardiovascular Programme Audit Manager	Joan McCormack	✓	✓	✓	✓
Healthcare Professional Expert: ANP Stroke	Una Moffat	✓	✓	✓	✓
Healthcare Pricing Office	Marie Glynn	n/a	n/a	✓	✓
Clinical Expert: Clinical Advisory Group for Stroke	Dr Margaret O'Connor	✓	✓	✓	✓
National Health and Social Care Professions Office	Claire Prendergast	✓	✓	✓	✓
Public and Patient Interest Representative: Irish Heart Foundation	Martin Quinn	✓	✓	✓	✓
Clinical Expert: Rehabilitation Specialist	Dr Eugene Wallace	x	x	x	x
Patient/Public Interest Representative: Headway Ireland	Karen Kinsella	✓	✓	x	✓
Clinical Expert: National Thrombectomy Service Director	Prof John Thornton	✓	x	x	✓
Healthcare Pricing Office	Deirdre Murphy	✓	✓	R	n/a
Public Health Specialist	Breda Smyth	x	x	R	n/a
Public and Patient Interest Representative: Headway Ireland	Dr Marcia Ward	✓	R	n/a	n/a
Attended = ✓					
Did not attend = x					
Not Applicable = n/a					
Retired = R					
Proxy = P					

APPENDIX 4: IRISH NATIONAL AUDIT OF STROKE: AIMS AND OBJECTIVES

AIM	
To conduct audit of stroke care, including clinical care and service organisation.	
OBJECTIVES	
▶	To maintain a database of all inpatients with a stroke in Ireland in order to drive continuous quality improvement and to deliver the best patient outcomes.
▶	To support the collection of high-quality data on all inpatient strokes in Ireland in order to permit local and national reporting of outcomes.
▶	To disseminate the outputs of the data in a timely manner to all relevant stakeholders.
▶	To benchmark stroke care and outcomes against national and international standards.
▶	To support/promote the use of stroke data for quality improvement initiatives at local and national level.
▶	To provide data to support and inform national policy for stroke and related conditions.

APPENDIX 5: IRISH NATIONAL AUDIT OF STROKE: METADATA FOR COMPOSITE VARIABLES

FIGURE 4. 3: THE PROPORTION OF PATIENTS WITH A STROKE WHO RECEIVED BRAIN IMAGING WITHIN 1 HOUR OF HOSPITAL ARRIVAL, BY HOSPITAL

Out of all the patients, who had brain imaging performed, what was the proportion who received brain imaging within one hour of arrival to the hospital.

Analysis:

The difference in minutes between the date/time of hospital arrival and date/time of brain imaging – expressed as the percentage, per reported time frame (within 60 minutes/after 60 minutes/unknown).

Cases were included if:

- If patient had brain imaging performed

Cases were recorded as 'unknown':

- If the date/time of arrival to the hospital and/or brain imaging date/time was not recorded
- If the date/time of arrival to the hospital was recorded as after the brain imaging date/time. This indicates that wrong date was recorded
- If the interval between the hospital arrival date/time and the brain imaging date/time was one month or more. This indicates that wrong date/time was recorded.

FIGURE 4. 4: TIME INTERVALS BETWEEN HOSPITAL ARRIVAL TIME AND TIME OF THROMBOLYSIS, BY HOSPITAL

Out of all the patients who had thrombolysis performed what was the proportion of reported time frames between arrival to the hospital and thrombolysis.

Analysis:

The difference in minutes between the date/time of hospital arrival and date/time of thrombolysis – expressed as a percentage, per reported time frame.

Cases were included if:

- If patient was diagnosed with ischaemic stroke (I630, I631, I632, I633, I634, I635, I636, I637, I638, I639, I64)
- Patient had thrombolysis performed

Cases were excluded if:

- If patient was transferred to Beaumont Hospital or Cork University Hospital

Cases were recorded as 'not recorded correctly':

- If the date/time of arrival to the hospital and/or thrombolysis date/time was not recorded
- If the date/time of arrival to the hospital was recorded as after the thrombolysis date/time was performed
- If the interval between hospital arrival date/time and thrombolysis date/time was more than 24h apart.

FIGURE 4. 5: ADMISSION TO A STROKE UNIT, BY HOSPITAL

KQ1 1: Percentage of cases admitted to a stroke unit

Out of all the patients, what was the percentage that were admitted to stroke unit.

Analysis:

The total number of patients admitted to a stroke unit divided by the total number of patients – expressed as a percentage.

FIGURE 4. 6: SWALLOW SCREENING, BY HOSPITAL

KQ1 6: Percentage of cases who have a swallow screen completed

Out of all patients, what was the proportion who received a swallow screen.

Analysis:

The total number of patients who received a swallow screen divided by the total number of patients – expressed as a percentage.

FIGURE 4. 7: PROPORTION OF CASES ASSESSED BY A PHYSIOTHERAPIST, OCCUPATIONAL THERAPIST AND SPEECH AND LANGUAGE THERAPIST WITH ADDITIONAL HSCP DATA SUBMITTED, BY HOSPITAL

Physiotherapist

Out of all patients, who were assessed by a physiotherapist, what was the proportion who had additional physiotherapy specific HSCP data.

Analysis:

The total number of patients who were assessed by a physiotherapist divided by the total number of additional physiotherapy specific HSCP data – expressed as a percentage.

Occupational therapy

Out of all patients, who were assessed by an occupational therapist, what was the proportion who had additional occupational therapy specific HSCP data.

Analysis:

The total number of patients who were assessed by an occupational therapist divided by the total number of additional occupational therapy specific HSCP data – expressed as a percentage.

Speech and language therapy

Out of all patients, who were assessed by a speech and language therapist, what was the proportion who had additional speech and language therapy specific HSCP data.

Analysis:

The total number of patients who were assessed by a speech and language therapist divided by the total number of additional speech and language therapy specific HSCP data – expressed as a percentage.

FIGURE 4. 8: PERCENTAGE OF BED DAYS SPENT IN A STROKE UNIT FOR PATIENTS WHO SPENT ALL OR SOME OF THEIR HOSPITAL STAY IN A STROKE UNIT

KQ1 2: Percentage of time patients spent in a stroke unit

Out of the total number of bed days spend in a hospital, what was the percentage of bed days spent in a stroke unit.

Analysis:

The total stroke unit LOS (length of stay: bed days) divided by the total hospital LOS (bed days) – expressed as a percentage.

- For hospital LOS, the HIPE LOS variable was used

- For stroke unit LOS, the stroke unit admission date was subtracted from stroke unit discharge date to calculate the stroke unit LOS.

Cases are excluded if:

- Patient was not admitted to a stroke unit
- If date of admission and/or discharge to the stroke unit was not recorded
- If the year of admission and/or discharge to the stroke unit deviates from the reported year
- If stroke unit LOS is bigger than hospital LOS

FIGURE 5.3: DOAC PRESCRIPTION DATA FOR PATIENTS WITH ISCHAEMIC AND HAEMORRHAGIC STROKE

Out of all the patients, who had atrial fibrillation known before stroke and were prescribed a DOAC medication, what was the proportion who was prescribed correct dose, for each ischaemic and hemorrhagic stroke.

Analysis:

The total number of patients who had atrial fibrillation known before stroke and were prescribed a DOAC medication divided by the total number of patients who was prescribed correct dose – expressed as a percentage.

Cases were included if:

- If patient did not have an atrial fibrillation known before stroke
- If patient was not prescribed DOAC medication before stroke

FIGURE 5.4: ANTICOAGULATION ADHERENCE DATA FOR PATIENTS WITH ISCHAEMIC AND HAEMORRHAGIC STROKE

Forgetting to take medication

Out of all the patients, who had atrial fibrillation known before stroke and were prescribed an anticoagulant medication, what was the proportion who reported to often forget to take a tablet (more than once per week).

Analysis:

The total number of patients who had atrial fibrillation known before stroke and were prescribed an anticoagulant medication divided by the total number of patients who reported to often forget to take a tablet (more than once per week) – expressed as a percentage.

Cases were included if:

- If patient did not have an atrial fibrillation known before stroke
- If patient was not prescribed anticoagulant medication before stroke

Anticoagulant been paused or stopped, before stroke

Out of all the patients, who had atrial fibrillation known before stroke and were prescribed an anticoagulant medication, what was the proportion who reported to have paused or stopped the medication before the stroke.

Analysis:

The total number of patients who had atrial fibrillation known before stroke and were prescribed an anticoagulant medication divided by the total number of patients who reported to have paused or stopped the medication before the stroke – expressed as a percentage.

Cases were included if:

- If patient did not have an atrial fibrillation known before stroke
- If patient was not prescribed anticoagulant medication before stroke

Reason for pausing or stopping anticoagulant, before stroke

Out of all the patients, who had atrial fibrillation known before stroke and paused or stopped their anticoagulant medication, what was the reason for stopping or forgetting the anticoagulant medication.

Analysis:

The total number of patients who had atrial fibrillation known before stroke and paused or stopped their anticoagulant medication divided by the reported reason for stopping or forgetting the anticoagulant medication – expressed as a percentage per reason category¹.

Cases were included if:

- If patient did not have an atrial fibrillation known before stroke
- If patient was not prescribed anticoagulant medication before stroke
- If patient did not stop or forget to take their anticoagulant medication before stroke

How long was anticoagulant medication stopped for

Out of all the patients, who had atrial fibrillation known before stroke and paused or stopped their anticoagulant medication, what was the duration of the pause.

Analysis:

The total number of patients who had atrial fibrillation known before stroke and paused or stopped their anticoagulant medication divided by the reported duration – expressed as a percentage per duration category².

Cases were included if:

- If patient did not have an atrial fibrillation known before stroke
- If patient was not prescribed anticoagulant medication before stroke
- If patient did not stop or forget to take their anticoagulant medication before stroke

Who stopped anticoagulant medication

Out of all the patients, who had atrial fibrillation known before stroke and paused or stopped their anticoagulant medication, who stopped it.

Analysis:

The total number of patients who had atrial fibrillation known before stroke and paused or stopped their anticoagulant medication divided by the reported categories – expressed as a percentage per category³.

Cases were included if:

- If patient did not have an atrial fibrillation known before stroke
- If patient was not prescribed anticoagulant medication before stroke
- If patient did not stop or forget to take their anticoagulant medication before stroke

FIGURE 5.5: DISTRIBUTION OF PATIENTS IN THE FIVE ATRIAL FIBRILLATION GROUPS

For detailed specifications on how the atrial fibrillation groups were defined, see APPENDIX 7.

TABLE 5.2: ONSET TO HOSPITAL ARRIVAL AND HOSPITAL ARRIVAL TO BRAIN IMAGING TIMELINESS, AND THROMBOLYSIS, FOR EACH OF THE ATRIAL FIBRILLATION GROUPS

Time from stroke symptom onset to hospital arrival (minutes)

Within the defined 5 AF Groups⁴, what was the median time from stroke symptom onset to the arrival to the hospital.

Analysis:

The difference in minutes between the date/time of stroke symptom onset and arrival at the first hospital and date/time – expressed in median minutes per 5 AF Groups.

Cases were included if:

- If patient belonged to a defined 5 AF Group

Cases were excluded if:

- If patient did not belong to a defined 5 AF Group
- If the date/time of stroke symptom onset and/or arrival at the first hospital date/time was not recorded
- If the date/time of stroke symptom onset was recorded as after the arrival at the first hospital
- If the interval between stroke symptom onset and arrival at the first hospital was more than 12 months apart

Time between hospital arrival and brain imaging (minutes)

Within the defined 5 AF Groups⁵, what was the median time from the arrival to the hospital and brain imaging.

Analysis:

The difference in minutes between the date/time of the arrival to the first hospital and date/time of brain imaging – expressed in median minutes per 5 AF Groups.

Cases were included if:

- If patient belonged to a defined 5 AF Group
- If patient received CT or MRI scan

Cases were excluded if:

- If patient did not belong to a defined 5 AF Group
- If patient did not receive CT or MRI scan, or this information was unknown
- If the date/time of arrival at the first hospital and/or brain imaging date/time was not recorded
- If the date/time of the arrival at the first hospital was after brain imaging date/time
- If the interval between arrival at the first hospital and brain imaging was more than 30 days apart

Thrombolysis

Out of all the patients with ischaemic stroke, within the defined 5 AF Groups⁶, what was the proportion who received thrombolysis therapy.

Analysis:

The total number of patients with ischaemic stroke who received thrombolysis divided by the total number of patients with ischaemic stroke – expressed as a percentage.

Cases were included if:

- If patient had an ischaemic stroke (codes: I630, I631, I632, I633, I634, I635, I636, I637, I638, I639, I64)

Cases were excluded if:

- If patient was transferred to Beaumont Hospital or Cork University Hospital

TABLE 5:3: HOSPITAL AND STROKE UNIT LENGTH OF STAY, FOR EACH OF THE ATRIAL FIBRILLATION GROUPS
Stroke Unit LOS (days)

Within the defined 5 AF Groups⁷, what was the median number of days spent in a stroke unit

Analysis:

The difference in days between the date of admission to a stroke unit and date of discharge from a stroke unit – expressed in median number of days per 5 AF Groups.

Cases were included if:

- If patient belonged to a defined 5 AF Group

- If patient was admitted to a stroke unit

Cases were excluded if:

- If patient did not belong to a defined 5 AF Group
- If patient was not admitted to a stroke unit
- If the date of stroke unit admission and/or date of discharge from a stroke unit was not recorded
- If the date of stroke unit admission was after date of discharge from a stroke unit
- If the date of a stroke unit admission was before the date of admission to the hospital (HIPE)
- If the date of a stroke discharge was after the date of hospital discharge (HIPE)

Proportion of stay in a stroke unit

Within the defined 5 AF Groups⁸, out of the total number of bed days spend in a hospital, what was the percentage of bed days spent in a stroke unit.

Analysis:

The total stroke unit LOS (length of stay: bed days) divided by the total hospital LOS (bed days) – expressed as a percentage.

- For hospital LOS, the HIPE LOS variable was used
- For stroke unit LOS, the stroke unit admission date was subtracted from stroke unit discharge date to calculate the stroke unit LOS.

Cases are excluded if:

- Patient was not admitted to a stroke unit
- If date of admission and/or discharge to the stroke unit was not recorded
- If the year of admission and/or discharge to the stroke unit deviates from the reported year
- If stroke unit LOS is bigger than hospital LOS

Composite variables

KQ1 1: Percentage of cases admitted to a stroke unit

Out of all the patients, what was the percentage that were admitted to stroke unit.

Analysis:

The total number of patients admitted to a stroke unit divided by the total number of patients – expressed as a percentage.

KQ1 2: Percentage of time patients spent in a stroke unit

Out of the total number of bed days spend in a hospital, what was the percentage of bed days spent in a stroke unit.

Analysis:

The total stroke unit LOS (length of stay: bed days) divided by the total hospital LOS (bed days) – expressed as a percentage.

- For hospital LOS, the HIPE LOS variable was used
- For stroke unit LOS, the stroke unit admission date was subtracted from stroke unit discharge date to calculate the stroke unit LOS.

Cases are excluded if:

- Patient was not admitted to a stroke unit
- If date of admission and/or discharge to the stroke unit was not recorded

- If the year of admission and/or discharge to the stroke unit deviates from the reported year
- If stroke unit LOS is bigger than hospital LOS
-

KQI 3: The percentage of patients with ischaemic stroke who receive thrombolysis

Out of all the patients with ischaemic stroke what was the proportion who received thrombolysis therapy.

Analysis:

The total number of patients with ischaemic stroke who received thrombolysis divided by the total number of patients with ischaemic stroke – expressed as a percentage.

Cases were included if:

- If patient had an ischaemic stroke (codes: I630, I631, I632, I633, I634, I635, I636, I637, I638, I639, I64)

Cases were excluded if:

- If patient was transferred to Beaumont Hospital or Cork University Hospital

KQI 4: Median time between hospital arrival time and brain imaging time (minutes)

Out of all the patients, who had brain imaging performed, what was the median time between hospital arrival time and brain imaging time.

Analysis:

The difference in minutes between the date/time of hospital arrival and date/time of brain imaging – expressed as the median.

Cases were included if:

- If patient had brain imaging performed

KQI 5: Median time between hospital arrival time and time of thrombolysis (minutes)

Out of all patients who had thrombolysis performed, what was the median time to thrombolysis therapy.

Analysis:

The difference in minutes between the date/time of hospital arrival and date/time of thrombolysis – expressed as the median.

Cases were included if:

- If patient had an ischaemic stroke (codes: I630, I631, I632, I633, I634, I635, I636, I637, I638, I639, I64)
- Patient had thrombolysis performed

Cases were excluded if:

- If patient was transferred to Beaumont Hospital or Cork University Hospital
- If the date/time of arrival to the hospital and/or thrombolysis date/time was not recorded
- If the date/time of arrival to the hospital was recorded as after the thrombolysis date/time was performed
- If the interval between hospital arrival date/time and thrombolysis date/time was more than 24h apart.

KQI 6: Percentage of cases who have a swallow screen completed

- Out of all patients, what was the proportion who received a swallow screen.
- Analysis:
- The total number of patients who received a swallow screen divided by the total number of patients – expressed as a percentage.

○

KQ1 7: Percentage of cases who have a swallow screen completed within 4hr

Out of the patients who received a swallow screen, what was the proportion who received the swallow screen within four hours.

Analysis:

The total number of patients who received a swallow screen within four hours divided by the total number of patients who received a swallow screen – expressed as a percentage.

Cases are included if:

- If patients had a swallow screen performed

APPENDIX 6: IRISH NATIONAL AUDIT OF STROKE: ASSESSMENT OF DATA QUALITY

Audit	Irish National Audit of Stroke
Purpose	Illustrate the data quality processes which the audit/ national data collection will apply in the year ahead.
Effective from	01 /01/ 2022 - 31/12/2022
Developed by	Joan McCormack
Date	10/6/22
Approved by	QA and Operations Manager / Designee
Date	

Relevance

Relevant data meets the current and potential future needs of users.

Characteristic	Criteria	Assessment
Release and use of data	Are regular assessments carried out to determine whether all of the data that is being collected is being used?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
	Has a list of key users and their use of the data been compiled, including unmet user needs?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/>
	Is this reviewed annually?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/>
Value of data	Are data users consulted to establish if the data available assists them in achieving their objectives?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

	Are quality improvement plans in place to address required improvements in the data in order to ensure the data remains relevant to users?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/>
Adaptability of the data source	Are procedures in place to gather information on the potential future needs of data users?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/>
	Are data user needs prioritised as a result, of consultation undertaken with data users about how the data relates to their needs?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Additional comment Free text for additional supporting information		

Accuracy and Reliability

The accuracy of data refers to how closely the data correctly describes what it was designed to measure. Reliability refers to whether that data consistently measures, over time, the reality that it was designed to represent.

Characteristic	Criteria	Assessment
Coverage	Are details of the reference population explicitly stated in all information releases and is the coverage of the population quantified?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/>
	Are significant coverage issues that may impact analysis and interpretation of data documented and made available to users?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
	Are processes in place to identify and handle duplicate and potential duplicate records within the data?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

		Partially <input type="checkbox"/>
Data capture and collection	Are issues with the quality of data submitted that have the potential to impact significantly on analysis and interpretation of that data addressed and documented for users of the data?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
Data processing	Are data validation processes applied consistently and are the processes documented for data users?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/>
Completeness and validity	Are rates of valid, invalid, missing and outlier values documented and updated routinely and reported with each data release?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/>
Revisions	Are revisions or corrections made to the data regularly analysed to ensure effective statistical use of same?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Additional comment Attaching the IHI to the HIPE records is a recommendation of the 2021 report.		

Timeliness and Punctuality

Timely data is collected within a reasonable agreed time-period after the activity that it measures. Punctuality refers to whether data are delivered or reported on the dates promised, advertised or announced.

Characteristic	Criteria	Assessment
Submission timeliness	Are procedures in place to ensure the effective and timely submission of data from providers?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
	Are agreements in place with data providers, which detail planned dates for submission of data?	Yes <input checked="" type="checkbox"/>

		No <input type="checkbox"/>
	Are follow-up procedures in place to ensure timely receipt of data, including procedures to address necessary improvements?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Processing timeliness	Are data processing activities regularly and systematically reviewed to improve timeliness and has an associated action plan been developed and implemented?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Release timeliness and punctuality	Has a data release policy and procedures document, which includes targets for timeliness, been developed, published and implemented? Does the policy describe revisions for key outputs that are subject to scheduled revisions?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partially <input checked="" type="checkbox"/>
	Do planned releases occur within a specified period of time from the end of the reference period?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
	In the event of delays affecting a planned release, are delays and causes documented and made available to data users?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/>
	Is an up-to-date release calendar publicly available?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Additional comment Free text for additional supporting information		

Coherence and Comparability

Coherent and comparable data is consistent over time and across providers and can be easily combined with other sources.

Characteristic	Criteria	Assessment
Standardisation	Is data collected in line with national and international standards and classifications?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/>
	Is a data dictionary available?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
	If yes, is it publicly available?"	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Coherence	Is aggregated data compared with other sources of data, for example, administrative data, that provide the same or similar information on the same phenomenon?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
	Are divergences identified and clearly explained to data users?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Historical comparability	Are historical changes/trends in the data documented and publicly available for data users?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
	Are any changes in the data/trends that can potentially have a significant impact on interpretation and analysis of data, that is, changes to key elements of the data set, documented and available for data users?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/>
Regional comparability	Is the impact of any identified differences in data across regions documented?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A <input type="checkbox"/>
Additional comment Free text for additional supporting information		

Accessibility and Clarity

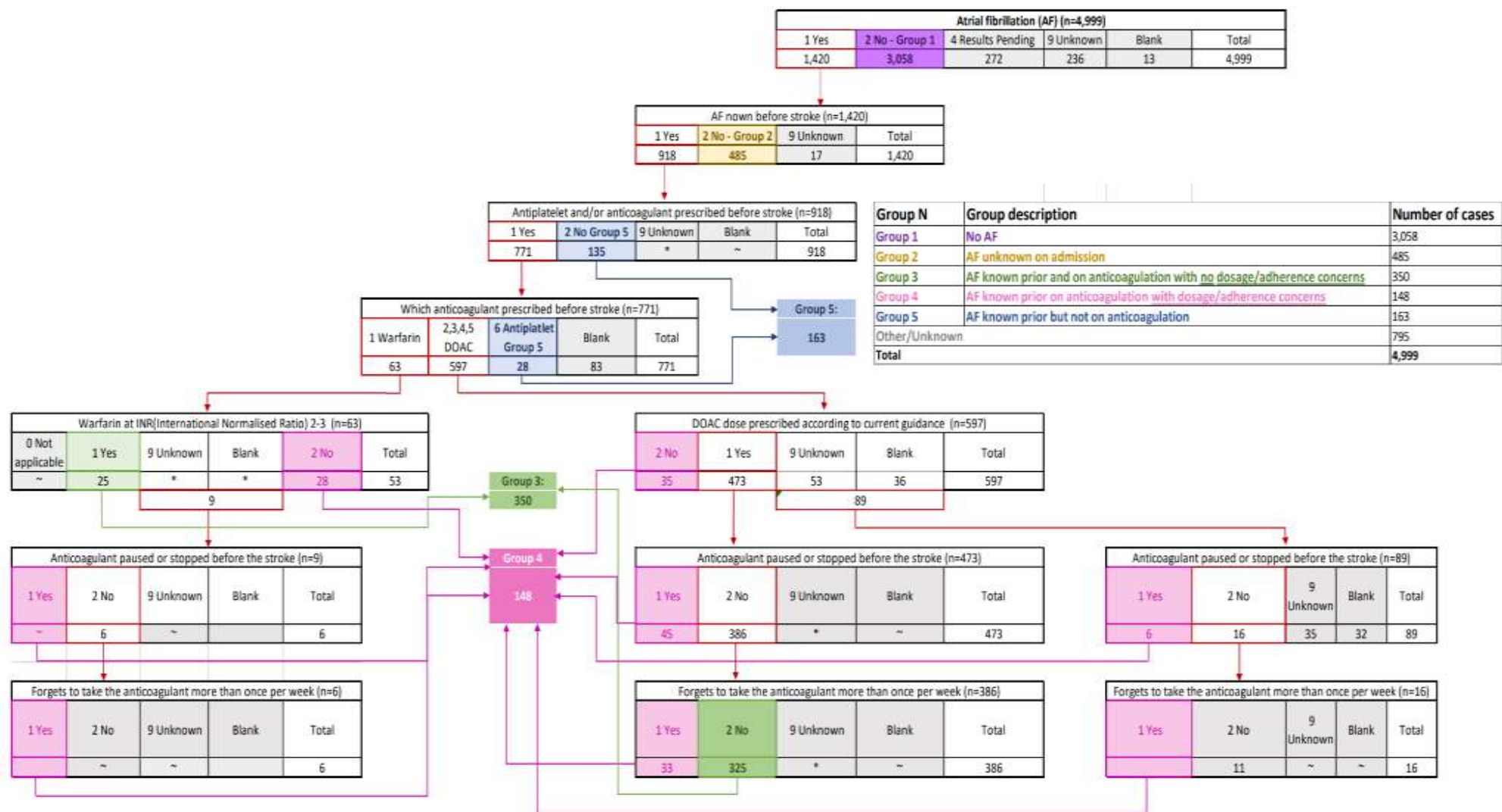
Data are easily obtainable and clearly presented in a way that can be understood.

Characteristic	Criteria	Assessment
Accessibility	Are data available to users in a form that facilitates proper interpretation and meaningful comparisons?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
	Is ICT effectively used to disseminate data and information?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Interpretability	Are supporting documents, for example, metadata, publicly available to facilitate clarity of interpretation for data users?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Partially <input type="checkbox"/>
	Does a revision policy exist which covers all data and is it available to data users	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Partially <input type="checkbox"/>
Additional comment Free text for additional supporting information		

Reference

Health Information and Quality Authority (2018) Data Quality Assessment Tool for health and social care. Available from: <https://www.hiqa.ie/reports-and-publications/health-information/guidance-data-quality-framework-health-and-social-care> [Accessed on: 31st August, 2021]

APPENDIX 7: IRISH NATIONAL AUDIT OF STROKE: AF GROUP SPECIFICATIONS



~ Denotes five cases or fewer

* Further suppression required in order to prevent disclosure of five cases or fewer

National Quality Improvement Stroke Service project 2022: Data collection for the Irish National Audit of Stroke (INAS) & National Office of Clinical Audit (NOCA) and QI Thrombectomy Audit.

An important role of the stroke CNS is data collection for Audit purposes.

The development of the stroke CNS assessment form aimed to capture audit data while remaining patient focused in delivering international/national standard stroke care, meeting International/national investigation criteria and achieving National Key Performance Indicators (KPI).

Patient focused
stroke history &
stroke diagnosis
Data collection for
INAS/NOCA and
QI Thrombectomy
Audit

FAST / Team Ref **Stroke CNS Assessment UHK**

Ref: IHF Y/N ___ B. Mhuire Y/N ___ Smoke Cess Y/N ___ ABI Y/N ___ NRH Y/N ___

Presentation:

Medical R/V:

Onset date: ___ Wake up Y/N ___ Inpatient: Y/N ___
Onset Time: ___ Found time: ___ ED Ward: ___
ADM date: ___ LSW date: ___ Inpatient Fast Call
Time: ___ Call time: ___
NIHSS: baseline mRS B. Sugar: GCS: BP:
CTB / CTA MRI CTB/A: ___
DATE: ___
CTB: ___
CTA: ___
Time: ___
Decision/ Report
time: ___

STROKE TYPE & INTERVENTIONS

Ischaemic stroke / TIA
Loading dose: YES / NO Date c/o: ___
ASA and c/o ASA DAPT and c/o DAPT
NOAC: Hold ___ Adm DOAC & dose ___
Continue: ___
STATIN: HTN
Investigations
Swallow screen: Y/N 4hrs of Adm Y/N
Telemetry form: Y/N
Stroke blood form: Y/N
IPC's Charted: Y/N
Pain relief charted: Y/N
Thrombolysis Yes / No / Contraindicated
Reason: ___
NIHSS: pre ___
Thrombolysis date: ___ Time: ___
24 hr CTB: Y/N Bled on scan: Y/N
Associated neuro deterioration: Y/N
Day 1 date & NIHSS: ___
Day 2 date & NIHSS: ___

Haemorrhagic stroke
D/C anticoagulation: Y/N
Tranexamic Acid: Y/N
Ref to neurosurgery: Y/N
Repeat CTB x 24hrs: Y/N
If extension of bleed with neuro deterioration: Y/N
HTN meds: ___

Admission to Stroke Unit: Yes / No
Admission date: ___
Discharge date: ___
Reason: ___
Ward: ___

Thrombectomy Pre Thrombectomy NIHSS: ___
EVT contacted date: ___ Time: ___
Decision time: ___ Delay: ___
EVT time out of UHK: ___
EVT time: ___ Return UHK: ___
Day 1 date & NIHSS: ___
Day 5 date & NIHSS: ___
Date & mRS Day 30: ___ Day 90: ___

Patient centered information
collection & ensuring current
evidence based best practice
in stroke treatment is
achieved
Meeting KPI's and Data
collection for INAS/NOCA &
QI Thrombectomy Audit

Identifying the patients potential
stroke cause & risk factors
Data collection for INAS/NOCA
and
A.Fib spot check National Audit

Identifying baseline
ability & home
circumstances
information,
preparing for patient
centered discharge

Meeting KPI's by ensuring
patients have HSCP team
assessment & required therapy
Data collection for INAS/NOCA

Record of stroke education and
details for referral to stroke
community services &
QI Thrombectomy service follow up

Ensuring necessary
investigations to
meeting national
stroke criteria &
Data for
INAS/NOCA

Discharge info for
local Audit &
INAS/NOCA

Risk factors:

A.Fib on DOAC/ Warfarin / ASA / Nil New A.Fib
HTN Stroke/MI TIA IHD DM +ve FH
Hyper lipids Valvular disease
Other: ___
DOAC: ___ if known A.Fib not on DOAC Why: ___

a) Therapeutic dose: Yes / No. b) Too high / Too Low c) Was DOAC stopped Yes / No.
d) Stopped for Days: 1 / 2 / 3-4 / >10 e) Pattern of missing DOAC: Y/N > 1 Tablet/ Wkly.
f) Who c/o DOAC: ___ g) Attend anti co-ag/ HF/ A/Fib clinic Y/N
h) If Warfarin is INR 2-3 i) If A.F. and co-ag 2nd prevent: Yes / No
j) If no reason: ___ k) Specify which anti co-ag on discharge

LifeStyle Risk:
Smoker
Poor meds compliance
+BMI/ poor diet
Alcohol/Drug: ___

Mobility Independent Living Alone With spouse Child Carer child Nursing Home
Stick Frame Assist x 1 or 2 Hoist
Cognition Normal MCI Dementia: Mild Moderate Severe
Home help None Day care Weekly: /? No of visits No of carers
Home Level 2 story Adapted Family support M on W Driver:

Did the patient see: CNS PT OT SLT Dietician MSW Psychologist
MDM Discussion: Yes / No Mood Assessment: Yes / No C/O on SSRI Yes/No
Symptomatic Carotid Stenosis: Yes / No Carotid Endarterectomy: Yes / No
EVT Stenting: Yes/ No

Investigations:
Telemetry: S. Rhythm A. Fibrillation / A. Flutter Known A.Fib
Echo: NAD LVH Dilated LA Thrombus
C. Doppler: ___ CTA: ___
Stroke Bloods: HbA1c: ___ F. Glucose: ___ Cholesterol: ___ LDL: ___

NEXT OF KIN Relationship: ___ Phone: ___ Carer: Y/N
Patient's contact: For thrombectomy Agreed call in 90 days Yes / No
Patient education: Patient understanding: Good / Fair / Poor MOCA: ___
Education session & booklets: Yes / No Driving information: Yes / No / N/A
A. Fib information / Video / Booklets NOAC information / Video / Booklets Family information: ___

Young Stroke additional work up (<65yrs)
Young bloods date: ___ Toxicology Yes / No Ref cardiology re: TOC Bubble
Discharge date: ___
Destination: Home Off site rehab LTC ESD Referring Hospital RIP
Discharge mRS: ___ Return to baseline Yes / No
Needing new home care package: ___
Needing Nil: ___

Benefits:

Structuring data collection in real time allowing for more time with direct patient care.

Mary Donovan Stroke CNS, with thanks to the Stroke Service Governance Committee

March 2023



Blood Pressure & Hypertension Management in Acute Stroke A Quality Improvement Initiative to enhance Stroke Management pathways

Background: It was identified that the acute stroke pathway was limited in its guide to BP & HTN management.

With the publication from the European Stroke Organisation (2021) in guidelines for Stroke care BP & HTN management

The stroke service decided to incorporate the evidence based best practice guidelines into the UHK Time is Brain document.

Bringing the Acute stroke management pathway in line with European Standards and with National centre of excellence.

Aims & Objectives:

To incorporate acute BP & HTN management in:

1. Interventional Ischaemic strokes
2. Non-interventional Ischaemic strokes
3. Haemorrhagic stroke
4. Hypotension management

Project Description: The Stroke Governance Team

- Reviewed the existing document and identified the gaps in the pathway.
- Set up a sub group of the stroke governance team, this Stroke QI sub group including input from stroke consultant, medical registrar, Stroke CNS & pharmacy support.
- Reviewed the evidence based ESO (2021) guidelines.
- After the review was complete, the governance group decided on the appropriate changes and
- Decided the guidelines would be best placed in the Time is Brain document thereby allowing easy access to all clinical staff.
- The additions were made and the changes were agreed & approved by the UHK drug safety & medical governance council.

Outcome/Results:

UHK are now using more defined BP & HTN management for the varied stroke diagnosis - providing clear parameters and guidance in treatment pathways thus improving Person centered stroke care

Conclusion: The Time is Brain document with the incorporated Blood pressure & Hypertension management in acute stroke was launched hospital wide in Q4 2022.

“Establishing a PFO Pathway for Acute Stroke Patients with a Positive Bubble Study”

Lisa Donaghy (Stroke RANP CHB), Dr. Lavanya Saiva (Cardiologist CHB), Prof. Ivan Casserly (Cardiologist MMUH), Jamie Byrne (Structural CNS MMUH), Dr. Patricia Guilfoyle (Stroke Consultant CHB), Dr. Orla Sheehan (Stroke Consultant CHB), Dr. Eamon Dolan (Stroke Consultant CHB)



Connolly Hospital Blanchardstown 2023

Introduction and background

A bubble study is performed routinely on patients under the age of 65 years of age with a confirmed diagnosis of either acute ischaemic stroke or TIA in order to assist with the presence of a PFO/ASD as an aetiology for the stroke event. Connolly Hospital Blanchardstown has a higher number of stroke survivors <65 years (Nationally = 26%, CHB 36%) (INAS, 2021). Historically, a referral letter would be written to a hospital who specialises in cardiac structural surgeries, requesting a review of a patient with a positive bubble study and acute stroke. Patients were not triaged and closure would typically exceed 9 months.

Aim

To reduce the PFO closure time from 12 months to 3 months.

What is a PFO?

- ❖ Patent Foramen Ovale
- ❖ Tunnelled defect in the inter atrial septum.
- ❖ Normally closes during infancy.
- ❖ It does not close in approximately 25%.
- ❖ Most patients are asymptomatic.
- ❖ Problems can arise when a blood clot passes from venous to arterial system through the PFO.

(Kotthoor & Arora, 2018)

Risk of Paradoxical Embolism (RoPE) score

TABLE 1. RoPE SCORE CALCULATOR	
Patient Characteristic	Points
No history of hypertension	+1
No history of diabetes	+1
No history of stroke or TIA	+1
Nonsmoker	+1
Cortical infarct on imaging	+1
Age (y)	
18-29	+5
30-39	+4
40-49	+3
50-59	+2
60-69	+1
≥ 70	+0
Total RoPE score	0-10

RoPE score 0-3 = 0% chance that stroke is due to PFO.

RoPE score 4 = 38% chance that stroke is due to PFO.

RoPE score 5 = 34% chance that stroke is due to PFO.

RoPE score 6 = 62% chance that stroke is due to PFO.

RoPE score 7 = 72% chance that stroke is due to PFO.

RoPE score 8 = 84% chance that stroke is due to PFO.

RoPE score 9 & 10 = 88% chance that stroke is due to PFO.

Prior to pathway

- ✓ Positive bubble study
- ✓ TOE performed
- ✓ Letter of referral to Cardiology in MMUH on discharge. Patients not triaged. RoPE score not calculated.
- ✓ Reviewed in Cardiology Clinic in MMUH (6-9 months)
- ✓ Stroke recovery update and outstanding results
- ✓ Booked for surgery

- RANP performed 92 bubble studies with Cardiac Technicians (January '21-May '22).
- 18 positive bubble studies (20% positivity rate).
- 7 positive studies from January 2021 – August 2021 (pre pathway).
- 72% (5/7) had a TOE.

Audit of time frame from referral to closure

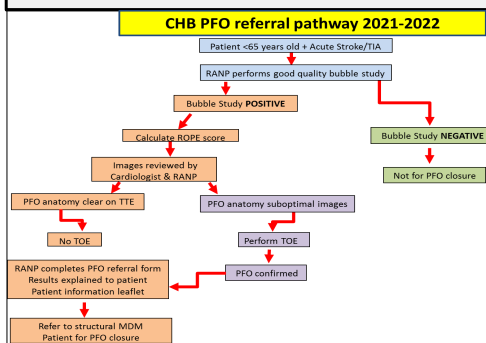
- 7 positive bubble studies Jan 2021 – Aug 2021
- Ages ranged between 37-57
- 3x – ROPE score <5 +/- TIA
- 4/7 TOE performed
- 1/7 referred for closure

Time to closure = 9 months

Method

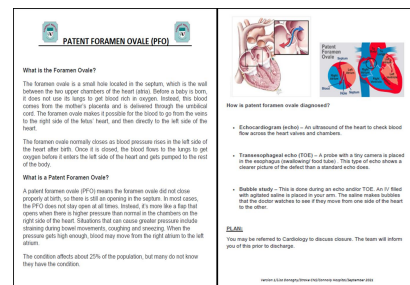
Pathway introduced September 2021

The Stroke RANP led out on the project as she performs all bubble studies with the technician. A designated Cardiologist, who also works in a hospital where PFO closures takes place, is notified by the RANP or team about a positive bubble study and the images are reviewed. It is then decided if the patients requires a TOE or not. A 2 page PFO referral form was created which contains all relevant information.



PFO Referral Form

CHB PFO Patient Information Leaflet



Results post pathway

Stroke RANP performed 92 bubble studies between January 2021 and May 2022. There were 18 positive studies (20% positivity rate): 7 positive studies from January to August 2021 (pre-pathway) and 11 positive studies from September 2021 to May 2022 (post-pathway).

72% (5/7) of patients had a TOE performed following a positive bubble study result pre pathway, whereas only 1 TOE was performed out of 11 cases (9%) post pathway.

The time from positive bubble study to closure time reduced from 9months on average to 3 months.

Conclusion

There was a 63% reduction in the number of TOEs being performed for patients with a positive bubble study with the introduction of this PFO pathway. Additionally, there was a 6 month reduction time from the positive bubble study result to closure. This pathway has improved patient outcomes for this young group of stroke survivors and assists with the reduction of further stroke events in the future.

Key Results

6 month reduction time from positive bubble study to closure.

63% reduction in TOE's

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Irish National Audit for Stroke (2021) <https://www.noca.ie/documents/irish-national-audit-of-stroke-national-report-2021> Accessed on 7th October 2022.
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Clinical Audit of Mood Screen and Delirium Screen in Stroke in UHL

V. McCarthy¹, E. Breen², A. Cullinane³, E. Vaughan⁴, N. Anish⁵, S. Paulose⁶, Dr C. Quinn⁷, Pr. M. O'Connor⁷

¹ Snr Clinical psychologist, ² Snr Occupational Therapist, ³ Snr Physiotherapist, ⁴ Speech and Language Therapist, ⁵ Snr nurse, ⁶ Stroke Clinical Nurse Specialist, ⁷ Clinical Leads

Introduction

Mood

- NICE guidelines advocate the stepped care approach for the identification and alleviation of mood issues following stroke.
- The whole team (Level 1) should be skilled in identifying psychological difficulties; and ensuring these difficulties are addressed appropriately.

Delirium

- 25% stroke patients present with delirium.
- No evidence-based recommendations have been established to date on how stroke patients should be routinely screened for delirium or which particular tool should be used.

Purpose

- To improve (Level 1) mood screening; in line with stroke standards.
- To establish a standard of practice in delirium screen for stroke patients during their inpatient stay on the stroke ward in UHL.

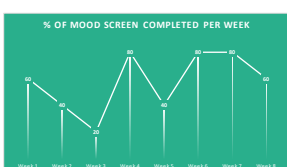
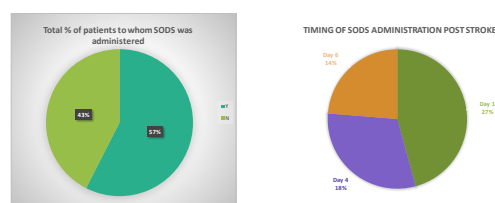
Methodology



Objectives

- To establish the screening rate for mood on the stroke ward.
 - The national standard required that all patients (100%) be screened for mood during their inpatient stay or before discharge home or transfer to another facility (NICE Guidelines, 2011).
 - Our target was for 80% of stroke patients to be mood screened.
- To establish the screening rate for delirium on the stroke ward.
 - In the absence of any national or international standard for delirium in stroke, a target of 80% of stroke patients to be screened for delirium was selected.

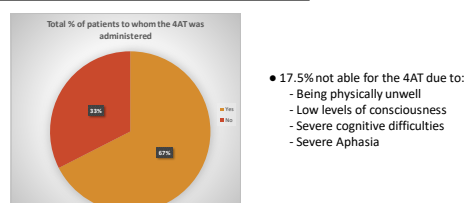
Mood Screen Results



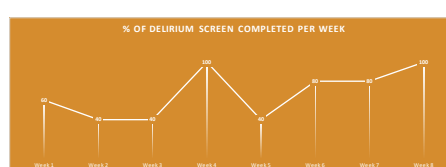
Referral to Psychology

- 35% of the audited cohort received a psychology referral
- 13% were not screened but were referred to psychology

Delirium Screen Results



- 17.5% not able for the 4AT due to:
 - Being physically unwell
 - Low levels of consciousness
 - Severe cognitive difficulties
 - Severe Aphasia



REFERENCES

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- Lees, R., & al. (2013). Tests accuracy of short screening tests for diagnosis of delirium or cognitive impairment in an acute stroke unit setting. Stroke AHA, Volume 44, Issue 11, November 2013; Pages 3078-3083.
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Outcome 1

Obstacles

- ICU/HDU transfer
- Medically unwell
- Staff rotation

Actions

- Modify the pro forma (Y/N section)
- Training on the proforma at induction for staff rotations

Outcome 2

Obstacles

- Query validity of a mood screen if completed too early
- SODS only screening for mood not for anxiety

Actions

- To repeat the mood screen at a later stage in the inpatient stay
- To consider a tool which includes a screen for anxiety

Outcome 3

Observations

- Referral to psychology not dependent on SODS score
- Reduced repeat assessment of 4AT for score of ≥ 4 (within 24 hrs) due to staffing levels

Actions

- To resume training on emotional changes post stroke, to develop skills for all the staff on the ward and increase number of staff able to recognise and screen for emotional needs.
- To resume training on delirium and teach staff how to administer 4AT. To increase number of staff able to recognise delirium and administer the screening tool.

APPENDIX 12: INAS NATIONAL REPORT 2022 FREQUENCY TABLES

FIGURE 4. 2: DISTRIBUTION OF TIME FROM WITNESSED STROKE SYMPTOM ONSET TO HOSPITAL ARRIVAL (n=3,040)

	N	%
<3 hours	1508	49.6%
3–4.5 hours	319	10.5%
4.5–12 hours	536	17.6%
>12 hours	677	22.3%
Total	3040	100.0%

FIGURE 4. 3: THE PROPORTION OF PATIENTS WITH A STROKE WHO RECEIVED BRAIN IMAGING WITHIN 1 HOUR OF HOSPITAL ARRIVAL, BY HOSPITAL (n=4646)

	Within 60 minutes		After 60 minutes		Unknown		Total	
	N	%	N	%	N	%	N	%
Bantry General Hospital	41	58.6%	29	41.4%	0	0.0%	70	100.0%
Beaumont Hospital	183	52.9%	*	*	~	0.6%	346	100.0%
Cavan General Hospital	*	*	96	59.6%	~	0.6%	161	100.0%
Connolly Hospital	59	38.1%	96	61.9%	0	0.0%	155	100.0%
Cork University Hospital	254	54.6%	200	43.0%	11	2.4%	465	100.0%
Letterkenny University Hospital	95	47.7%	104	52.3%	0	0.0%	199	100.0%
Mater Misericordiae University Hospital	175	66.0%	90	34.0%	0	0.0%	265	100.0%
Naas General Hospital	102	56.4%	*	*	~	0.6%	181	100.0%
Our Lady of Lourdes Hospital Drogheda	113	48.3%	121	51.7%	0	0.0%	234	100.0%
Portiuncula University Hospital	~	*	62	89.9%	~	5.8%	69	100.0%
Sligo University Hospital	58	33.7%	114	66.3%	0	0.0%	172	100.0%
Tipperary University Hospital	71	55.5%	57	44.5%	0	0.0%	128	100.0%
St James's Hospital	*	*	118	52.2%	~	0.4%	226	100.0%
St Luke's General Hospital, Carlow/Kilkenny	*	*	71	58.7%	~	3.3%	121	100.0%
St Vincent's University Hospital	264	61.4%	*	*	~	0.9%	430	100.0%
Tallaght University Hospital	148	50.7%	*	*	~	0.3%	292	100.0%
University Hospital Galway	154	62.9%	85	34.7%	6	2.4%	245	100.0%
University Hospital Kerry	69	51.5%	*	*	~	2.2%	134	100.0%
University Hospital Limerick	219	52.3%	200	47.7%	0	0.0%	419	100.0%
University Hospital Waterford	*	*	104	59.8%	~	1.1%	174	100.0%
Wexford General Hospital	*	*	121	75.6%	0	0.0%	160	100.0%
Total	2332	50.2%	2274	48.9%	40	0.9%	4646	100.0%

~ Denotes five cases or fewer

* Further suppression required in order to prevent disclosure of five cases or fewer

FIGURE 4. 4: TIME INTERVALS BETWEEN HOSPITAL ARRIVAL TIME AND TIME OF THROMBOLYSIS, BY HOSPITAL (n=419)

	Less than 45 minutes		46 to 60 minutes		More than 60 minutes		Unknown		Total	
	N	%	N	%	N	%	N	%	N	%
Bantry General Hospital	~	*	0	0.0%	~	*	0	0.0%	~	100.0%
Beaumont Hospital	30	61.2%	6	12.2%	13	26.5%	0	0.0%	49	100.0%
Cavan General Hospital	~	*	~	*	11	64.7%	0	0.0%	17	100.0%
Connolly Hospital	9	100.0%	0	0.0%	0	0.0%	0	0.0%	9	100.0%
Cork University Hospital	11	32.4%	6	17.6%	17	50.0%	0	0.0%	34	100.0%
Letterkenny University Hospital	16	53.3%	*	*	~	*	0	0.0%	30	100.0%
Mater Misericordiae University Hospital	*	*	12	28.6%	18	42.9%	~	*	42	100.0%
Naas General Hospital	9	52.9%	~	*	~	*	0	0.0%	17	100.0%
Our Lady of Lourdes Hospital Drogheda	9	42.9%	~	*	*	*	0	0.0%	21	100.0%
Portiuncula University Hospital	0	0.0%	0	0.0%	0	0.0%	~	*	~	100.0%
Sligo University Hospital	~	*	~	*	0	0.0%	0	0.0%	~	100.0%
Tipperary University Hospital	~	*	~	*	7	53.8%	0	0.0%	13	100.0%
St James's Hospital	~	*	~	*	11	64.7%	0	0.0%	17	100.0%
St Luke's General Hospital, Carlow/Kilkenny	~	*	~	*	~	*	0	0.0%	9	100.0%
St Vincent's University Hospital	12	54.5%	6	27.3%	~	*	0	0.0%	22	100.0%
Tallaght University Hospital	10	50.0%	~	*	*	*	0	0.0%	20	100.0%
University Hospital Galway	13	56.5%	~	*	~	*	~	*	23	100.0%
University Hospital Kerry	~	*	~	27.3%	7	63.6%	0	0.0%	11	100.0%
University Hospital Limerick	8	19.0%	6	14.3%	28	66.7%	0	0.0%	42	100.0%
University Hospital Waterford	~	*	~	5.3%	13	68.4%	~	*	19	100.0%
Wexford General Hospital	~	*	~	33.3%	8	53.3%	0	0.0%	15	100.0%
Total	162	38.8%	85	20.3%	168	40.2%	~	*	419	100.0%

~ Denotes five cases or fewer

* Further suppression required in order to prevent disclosure of five cases or fewer

FIGURE 4. 5: ADMISSION TO A STROKE UNIT, BY HOSPITAL (N=4999)

	Yes		No		Total	
	N	%	N	%	N	%
Bantry General Hospital	50	69.4%	22	30.6%	72	100.0%
Beaumont Hospital	433	83.8%	84	16.2%	517	100.0%
Cavan General Hospital	127	78.4%	35	21.6%	162	100.0%
Connolly Hospital	58	29.0%	142	71.0%	200	100.0%
Cork University Hospital	397	77.8%	113	22.2%	510	100.0%
Letterkenny University Hospital	160	79.6%	41	20.4%	201	100.0%
Mater Misericordiae University Hospital	224	79.7%	57	20.3%	281	100.0%
Naas General Hospital	110	57.9%	80	42.1%	190	100.0%
Our Lady of Lourdes Hospital Drogheda	185	77.7%	53	22.3%	238	100.0%
Portiuncula University Hospital	20	27.4%	53	72.6%	73	100.0%
Sligo University Hospital	156	88.1%	21	11.9%	177	100.0%
Tipperary University Hospital	110	84.0%	21	16.0%	131	100.0%
St James's Hospital	147	64.5%	81	35.5%	228	100.0%
St Luke's General Hospital, Carlow/Kilkenny	104	86.0%	17	14.0%	121	100.0%
St Vincent's University Hospital	214	48.9%	224	51.1%	438	100.0%
Tallaght University Hospital	249	83.8%	48	16.2%	297	100.0%
University Hospital Galway	169	66.3%	86	33.7%	255	100.0%
University Hospital Kerry	89	65.9%	46	34.1%	135	100.0%
University Hospital Limerick	292	68.4%	135	31.6%	427	100.0%
University Hospital Waterford	105	59.7%	71	40.3%	176	100.0%
Wexford General Hospital	56	32.9%	114	67.1%	170	100.0%
Total	3455	69.1%	1544	30.9%	4999	100.0%

FIGURE 4. 6: SWALLOW SCREENING, BY HOSPITAL (N=4999)

	Yes—had swallow screen performed		No—did not have swallow screen performed		Unknown		Total	
	N	%	N	%	N	%	N	%
Bantry General Hospital	62	86%	10	14%	0	0%	72	100%
Beaumont Hospital	461	89%	*	*	~	*	517	100%
Cavan General Hospital	*	*	82	51%	~	*	162	100%
Connolly Hospital	200	100%	0	0%	0	0%	200	100%
Cork University Hospital	435	85%	62	12%	13	3%	510	100%
Letterkenny University Hospital	52	26%	149	74%	0	0%	201	100%
Mater Misericordiae University Hospital	207	74%	68	24%	6	2%	281	100%
Naas General Hospital	68	36%	80	42%	42	22%	190	100%
Our Lady of Lourdes Hospital Drogheda	169	71%	53	22%	16	7%	238	100%
Portiuncula University Hospital	32	44%	31	42%	10	14%	73	100%
Sligo University Hospital	160	90%	*	*	~	*	177	100%
Tipperary University Hospital	66	50%	65	50%	0	0%	131	100%
St James's Hospital	147	64%	81	36%	0	0%	228	100%
St Luke's General Hospital, Carlow/Kilkenny	*	*	65	54%	~	*	121	100%
St Vincent's University Hospital	224	51%	*	*	~	*	438	100%
Tallaght University Hospital	280	94%	*	*	~	*	297	100%
University Hospital Galway	137	54%	108	42%	10	4%	255	100%

University Hospital Kerry	100	74%	*	*	~	*	135	100%
University Hospital Limerick	381	89%	*	*	~	*	427	100%
University Hospital Waterford	107	61%	44	25%	25	14%	176	100%
Wexford General Hospital	114	67%	56	33%	0	0%	170	100%
Total	3532	71%	1320	26%	147	3%	4999	100%

~ Denotes five cases or fewer

* Further suppression required in order to prevent disclosure of five cases or fewer

FIGURE 4. 7: PROPORTION OF CASES ASSESSED BY A PHYSIOTHERAPIST, OCCUPATIONAL THERAPIST AND SPEECH AND LANGUAGE THERAPIST WITH ADDITIONAL HEALTH AND SOCIAL CARE PROFESSIONAL DATA SUBMITTED, BY HOSPITAL

	Physiotherapy (PT)			Occupational therapy (OT)			Speech and language therapy (SLT)		
	Cases referred to PT	Cases with PT data	%	Cases referred to OT	Cases with OT data	%	Cases referred to SLT	Cases with SLT data	%
Naas General Hospital	162	113	70%	162	117	72%	116	75	65%
St James's Hospital	194	159	82%	193	177	92%	143	0	0%
Tallaght University Hospital	259	156	60%	234	0	0%	193	93	48%
Mater Misericordiae University Hospital	226	179	79%	233	186	80%	174	142	82%
St Luke's General Hospital Kilkenny	105	*	*	105	60	57%	75	66	88%
St. Vincent's University Hospital	394	196	50%	388	95	24%	267	95	36%
Wexford General Hospital	144	0	0%	112	0	0%	116	0	0%
Beaumont Hospital	390	261	67%	380	305	80%	326	224	69%
Cavan General Hospital	133	0	0%	104	0	0%	79	0	0%
Connolly Hospital	168	105	63%	165	54	33%	106	92	87%
Our Lady Of Lourdes Hospital, Drogheda	173	118	68%	191	148	77%	147	106	72%
Letterkenny university hospital	191	0	0%	169	0	0%	126	0	0%
Portiuncula University Hospital	50	0	0%	44	0	0%	26	0	0%
Sligo University Hospital	130	~	*	139	18	13%	76	0	0%
University Hospital Galway	221	129	58%	215	0	0%	163	10	6%
Bantry General Hospital	40	0	0%	37	0	0%	33	0	0%
Cork University Hospital	403	220	55%	388	296	76%	330	268	81%
Tipperary University Hospital	117	0	0%	67	20	30%	107	~	*
University Hospital Kerry	129	33	26%	121	15	12%	102	*	*
University Hospital Waterford	143	0	0%	134	0	0%	91	0	0%
University Hospital Limerick	391	239	61%	375	146	39%	302	224	74%
Total	4163	1943	47%	3956	1637	41%	3098	1426	46%

~ Denotes five cases or fewer

* Further suppression required in order to prevent disclosure of five cases or fewer

FIGURE 4. 8: PERCENTAGE OF BED DAYS SPENT IN A STROKE UNIT FOR PATIENTS WHO SPENT ALL OR SOME OF THEIR HOSPITAL STAY IN A STROKE UNIT (n= 69257)

	N of patients	Total LOS in hospital	Total LOS in stroke unit	%
Naas General Hospital	110	3100	2684	87%
St James's Hospital	147	1740	990	57%
Tallaght University Hospital	249	4277	2020	47%
Mater Misericordiae University Hospital	224	3532	2464	70%
St Luke's General Hospital, Carlow/Kilkenny	104	1770	1090	62%
St Vincent's University Hospital	206	6240	3961	63%
Wexford General Hospital	56	1521	923	61%
Beaumont Hospital	433	6733	4579	68%
Cavan General Hospital	126	1908	1244	65%
Connolly Hospital	55	1518	735	48%
Our Lady of Lourdes Hospital Drogheda	185	3379	2790	83%
Letterkenny University Hospital	148	4035	1203	30%
Portiuncula University Hospital	15	103	86	83%
Sligo University Hospital	156	2097	1934	92%
University Hospital Galway	165	4294	1846	43%
Bantry General Hospital	50	1836	1782	97%
Cork University Hospital	395	9700	8048	83%
Tipperary University Hospital	109	2004	1332	66%
University Hospital Kerry	86	944	574	61%
University Hospital Waterford	105	2051	1344	66%
University Hospital Limerick	292	6475	5287	82%
Total	3416	69257	46916	68%

FIGURE 4. 9: MODIFIED RANKIN SCALE SCORES IN PATIENTS WITH ISCHAEMIC STROKE, PRE-STROKE AND ON DISCHARGE FROM ACUTE HOSPITAL (n=4272)

		N	%
Modified Rankin Score - before stroke	No disability (0)	2723	63.7%
	Mild disability (1, 2)	789	18.5%
	Moderate to severe disability (3, 4, 5)	633	14.8%
	Died (6)	0	0.0%
	Unknown	127	3.0%
	Total	4272	100.0%
Modified Rankin Scores on discharge	No disability (0)	939	22.0%
	Mild disability (1, 2)	1441	33.7%
	Moderate to severe disability (3, 4, 5)	1408	33.0%
	Died (6)	328	7.7%
	Unknown	156	3.7%

	Total	4272	100.0%
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FIGURE 4. 10: MODIFIED RANKIN SCALE SCORES IN PATIENTS WITH HAEMORRHAGIC STROKE, PRE-STROKE AND ON DISCHARGE FROM ACUTE HOSPITAL (n=727)

		N	%
Modified Rankin Score - before stroke	No disability (0)	409	56.3%
	Mild disability (1, 2)	151	20.8%
	Moderate to severe disability (3, 4, 5)	140	19.3%
	Died (6)	0	0.0%
	Unknown	27	3.7%
	Total	727	100.0%
Modified Rankin Scores on discharge	No disability (0)	59	8.1%
	Mild disability (1, 2)	152	20.9%
	Moderate to severe disability (3, 4, 5)	277	38.1%
	Died (6)	219	30.1%
	Unknown	20	2.8%
	Total	727	100.0%

FIGURE 4. 11: PHYSIOTHERAPY MOBILITY OUTCOMES (N=2307)

		N	%
Indoor mobility pre-admission	Independent, with no aid	1751	75.9%
	Independent, with aid	336	14.6%
	Supervision or assistance of one person, with or without aid	128	5.5%
	Transfer only with assistance	33	1.4%
	Hoist transfer	23	1.0%
	Unknown	36	1.6%
	Total	2307	100.0%
indoor mobility on discharge	Independent, with no aid	998	43.3%
	Independent, with aid	283	12.3%
	Supervision or assistance of one person, with or without aid	434	18.8%
	Transfer only with assistance	182	7.9%
	Hoist transfer	221	9.6%
	Died	122	5.3%
	Unknown	67	2.9%
	Total	2307	100.0%

FIGURE 4. 12: OCCUPATIONAL THERAPY ACTIVITIES OF DAILY LIVING OUTCOMES (N=2012)

		N	%
Activities of living pre-admission	Independent	1490	74.1%
	Independent with cues/aids	82	4.1%
	Required supervision or set-up	107	5.3%
	Required assistance	200	9.9%
	Dependent/full care	50	2.5%
	Unknown	83	4.1%
	Total	2012	100.0%
Activities of living on discharge	N/A RIP	92	4.6%
	Independent	803	39.9%
	Independent with cues/aids	134	6.7%
	Required supervision or set-up	214	10.6%
	Required assistance	417	20.7%
	Dependent/full care	262	13.0%
	Unknown	90	4.5%
	Total	2012	100.0%

FIGURE 4. 13: SPEECH AND LANGUAGE THERAPY PRE AND POST STROKE COMMUNICATION ABILITY OUTCOMES (N=1660)

		N	%
Functional communication ability prior to admission	No difficulties	1293	77.9%
	Mild: >80% effective communication; occasional breakdown in conversation	217	13.1%
	Moderate: 50–79% effective communication; frequent breakdown in conversation	85	5.1%
	Severe: Less than half (10–49%) of communication attempts are successful	19	1.1%
	Profound: No, or occasional (<10%), communication attempts are successful	8	0.5%
	Unknown	38	2.3%
	Total	1660	100.0%
Functional communication ability at discharge	Died	134	8.1%
	No difficulties	539	32.5%
	Mild: >80% effective communication; occasional breakdown in conversation	510	30.7%
	Moderate: 50–79% effective communication; frequent breakdown in conversation	277	16.7%
	Severe: Less than half (10–49%) of communication attempts are successful	123	7.4%

	Profound: No, or occasional (<10%), communication attempts are successful	51	3.1%
	Unknown	26	1.6%
	Total	1660	100.0%

FIGURE 4. 14: DISCHARGE DESTINATION FROM ACUTE HOSPITAL FOR ALL PATIENTS WITH A STROKE (N=4999)

	N	%
Home	2483	49.7%
Home with ESD	489	9.8%
Discharged to long term care	364	7.3%
Discharge to off-site rehabilitation	580	11.6%
Transferred	398	8.0%
Died	540	10.8%
Other/unknown	145	2.9%
Total	4999	100.0%

FIGURE 4. 15: ONWARD REFERRAL, BY DISCIPLINE (N=3256)

	Physiotherapy		Occupational therapy		Speech and language therapy	
	N	%	N	%	N	%
No onward referral	1035	44.9%	930	46.2%	885	53.3%
Inpatient rehabilitation	433	18.8%	318	15.8%	203	12.2%
Community rehabilitation	162	7.0%	174	8.6%	246	14.8%
ESD	263	11.4%	233	11.6%	122	7.3%
Other	312	13.5%	166	8.3%	182	11.0%
Unknown	102	4.4%	191	9.5%	22	1.3%
Total	2307	100.0%	2012	100.0%	1660	100.0%

FIGURE 5.1: PROPORTION OF PATIENTS WITH ISCHAEMIC AND HAEMORRHAGIC STROKE WHO HAD ATRIAL FIBRILLATION, BY YEAR (N=39629)

		Ischaemic Stroke		Haemorrhagic Stroke		Total	
		N	%	N	%	N	%
2013	Yes	783	31.30%	62	21.60%	845	30.30%
	No	1499	59.90%	179	62.40%	1678	60.10%
	Results Pending	*	*	~	*	48	1.70%
	Unknown	174	7.00%	*	*	219	7.80%
	Total	2503	100.00%	287	100.00%	2790	100.00%
2014	Yes	887	31.20%	66	15.80%	953	29.20%
	No	1722	60.60%	300	71.60%	2022	62.00%
	Results Pending	*	*	~	*	42	1.30%
	Unknown	190	6.70%	*	*	242	7.40%
	Total	2840	100.00%	419	100.00%	3259	100.00%
2015	Yes	971	33.60%	97	22.20%	1068	32.10%
	No	1680	58.20%	280	64.10%	1960	58.90%
	Results Pending	*	*	~	*	65	2.00%
	Unknown	175	6.10%	*	*	233	7.00%
	Total	2889	100.00%	437	100.00%	3326	100.00%
2016	Yes	981	31.60%	88	19.00%	1069	30.00%
	No	1826	58.80%	341	73.80%	2167	60.70%
	Results Pending	*	*	~	*	166	4.70%
	Unknown	137	4.40%	*	*	167	4.70%
	Total	3107	100.00%	462	100.00%	3569	100.00%
2017	Yes	982	32.20%	106	23.60%	1088	31.10%
	No	1753	57.40%	298	66.20%	2051	58.60%
	Results Pending	*	*	~	*	151	4.30%
	Unknown	168	5.50%	*	*	212	6.10%
	Total	3052	100.00%	450	100.00%	3502	100.00%
2018	Yes	951	29.50%	106	20.90%	1057	28.30%
	No	1843	57.20%	340	67.10%	2183	58.50%
	Results Pending	*	*	~	*	190	5.10%
	Unknown	244	7.60%	*	*	300	8.00%
	Total	3223	100.00%	507	100.00%	3730	100.00%
2019	Yes	1096	30.30%	141	23.40%	1237	29.30%
	No	2079	57.40%	377	62.50%	2456	58.10%
	Results Pending	*	*	~	*	223	5.30%
	Unknown	229	6.30%	*	*	310	7.30%
	Total	3623	100.00%	603	100.00%	4226	100.00%
2020	Yes	1217	28.70%	142	18.80%	1359	27.20%
	No	2718	64.20%	537	71.20%	3255	65.20%
	Results Pending	*	*	~	*	108	2.20%
	Unknown	193	4.60%	*	*	267	5.40%
	Total	4235	100.00%	754	100.00%	4989	100.00%
2021	Yes	1191	26.50%	149	20.20%	1340	25.60%
	No	2917	64.80%	543	73.70%	3460	66.00%
	Results Pending	*	*	~	*	202	3.90%
	Unknown	195	4.30%	*	*	237	4.50%
	Total	4502	100.00%	737	100.00%	5239	100.00%
2022	Yes	1270	29.73%	150	20.63%	1420	28.41%
	No	2540	59.46%	518	71.25%	3058	61.17%
	Results Pending	261	6.11%	11	1.51%	272	5.44%
	Unknown	201	4.71%	48	6.60%	249	4.98%
	Total	4272	100.00%	727	100.00%	4999	100.00%
Total	Yes	10329	30.16%	1107	20.56%	11436	28.86%
	No	20577	60.09%	3713	68.98%	24290	61.29%
	Results Pending	1434	4.19%	33	0.61%	1467	3.70%
	Unknown	1906	5.57%	530	9.85%	2436	6.15%
	Total	34246	100.00%	5383	100.00%	39629	100.00%

~ Denotes five cases or fewer

* Further suppression required in order to prevent disclosure of five cases or fewer

FIGURE 5.3: DIRECT ORAL ANTICOAGULANT PRESCRIPTION DATA FOR PATIENTS WITH ISCHAEMIC AND HAEMORRHAGIC STROKE (n=597)

		Ischaemic stroke	Haemorrhagic stroke	Total
Yes	N	401	72	473
	%	79.4%	78.3%	79.2%
No	N	*	~	35
	%	*	*	5.9%
Unknown	N	70	*	89
	%	13.9%	*	14.9%
Total	N	505	92	597
	%	100.0%	100.0%	100.0%

~ Denotes five cases or fewer

* Further suppression required in order to prevent disclosure of five cases or fewer

FIGURE 5.5: DISTRIBUTION OF PATIENTS IN EACH OF THE FIVE ATRIAL FIBRILLATION GROUPS (N=4999)

	N	%
Group 1: No atrial fibrillation	3058	61.2%
Group 2: Atrial fibrillation not known prior to stroke	485	9.7%
Group 3: Atrial fibrillation known prior to stroke, on anticoagulation and no dosage/compliance concerns	350	7.0%
Group 4: Atrial fibrillation known prior to stroke, on anticoagulation and with dosage/compliance concerns	148	3.0%
Group 5: Atrial fibrillation known prior to stroke, not on anticoagulation	163	3.3%
Other/unknown	795	15.9%
Total	4999	100.0%

FIGURE Error! No text of specified style in document..1: SEX DISTRIBUTION FOR EACH OF THE FIVE ATRIAL FIBRILLATION GROUPS (n=4204)

	Male		Female		Total	
	N	%	N	%	N	%
Group 1: No atrial fibrillation	1749	57.2%	1309	42.8%	3058	100.0%
Group 2: Atrial fibrillation not known prior to stroke	253	52.2%	232	47.8%	485	100.0%
Group 3: Atrial fibrillation known prior to stroke, on anticoagulation and no dosage/compliance concerns	208	59.4%	142	40.6%	350	100.0%
Group 4: Atrial fibrillation known prior to stroke, on anticoagulation and with dosage/compliance concerns	98	66.2%	50	33.8%	148	100.0%
Group 5: Atrial fibrillation known prior to stroke, not on anticoagulation	97	59.5%	66	40.5%	163	100.0%
Total	2405	57.2%	1799	42.8%	4204	100.0%

FIGURE 5.7: AGE DISTRIBUTION FOR EACH OF THE FIVE ATRIAL FIBRILLATION GROUPS (n=4204)

		50 years or less	51-65	66-80	81-90	91 or more	Total
Group 1: No atrial fibrillation	N	355	729	1240	624	110	3058
	%	11.6%	23.8%	40.5%	20.4%	3.6%	100.0%

Group 2: Atrial fibrillation not known prior to stroke	N	11	58	223	155	38	485
	%	2.3%	12.0%	46.0%	32.0%	7.8%	100.0%
Group 3: Atrial fibrillation known prior to stroke, on anticoagulation and no dosage/compliance concerns	N	0	19	149	157	25	350
	%	0.0%	5.4%	42.6%	44.9%	7.1%	100.0%
Group 4: Atrial fibrillation known prior to stroke, on anticoagulation and with dosage/compliance concerns	N	~	*	61	64	*	148
	%	*	*	41.2%	43.2%	*	100.0%
Group 5: Atrial fibrillation known prior to stroke, not on anticoagulation	N	~	*	54	65	*	163
	%	*	*	33.1%	39.9%	*	100.0%
Total	N	370	835	1727	1065	207	4204
	%	8.8%	19.9%	41.1%	25.3%	4.9%	100.0%

~ Denotes five cases or fewer

* Further suppression required in order to prevent disclosure of five cases or fewer

FIGURE 5.8: MODIFIED RANKIN SCALE SCORES IN PATIENTS WITH ISCHAEMIC STROKE, PRE-STROKE AND ON DISCHARGE, FOR EACH OF THE FIVE ATRIAL FIBRILLATION GROUPS (n=4204)

		Modified Rankin Score - before stroke		Modified Rankin Scores on discharge	
		N	%	N	%
Group 1: No atrial fibrillation	No disability (0)	2024	66.2%	684	22.4%
	Mild disability (1, 2)	559	18.3%	1054	34.5%
	Moderate to severe disability (3, 4, 5)	394	12.9%	947	31.0%
	Died (6)	0	0.0%	292	9.5%
	Unknown	81	2.6%	81	2.6%
	Total	3058	100.0%	3058	100.0%
Group 2: Atrial fibrillation not known prior to stroke	No disability (0)	330	68.0%	77	15.9%
	Mild disability (1, 2)	66	13.6%	157	32.4%
	Moderate to severe disability (3, 4, 5)	69	14.2%	184	37.9%
	Died (6)	0	0.0%	46	9.5%
	Unknown	20	4.1%	21	4.3%
	Total	485	100.0%	485	100.0%
Group 3: Atrial fibrillation known prior to stroke, on anticoagulation and no dosage/compliance concerns	No disability (0)	160	45.7%	42	12.0%
	Mild disability (1, 2)	79	22.6%	82	23.4%
	Moderate to severe disability (3, 4, 5)	102	29.1%	163	46.6%
	Died (6)	0	0.0%	57	16.3%
	Unknown	9	2.6%	6	1.7%
	Total	350	100.0%	350	100.0%
Group 4: Atrial fibrillation known prior to stroke, on anticoagulation and with dosage/compliance concerns	No disability (0)	72	48.6%	19	12.8%
	Mild disability (1, 2)	38	25.7%	39	26.4%
	Moderate to severe disability (3, 4, 5)	31	20.9%	59	39.9%
	Died (6)	0	0.0%	21	14.2%
	Unknown	7	4.7%	10	6.8%
	Total	148	100.0%	148	100.0%
Group 5: Atrial fibrillation known prior to stroke, not on anticoagulation	No disability (0)	*	*	*	*
	Mild disability (1, 2)	38	23.3%	35	21.5%
	Moderate to severe disability (3, 4, 5)	62	38.0%	78	47.9%
	Died (6)	0	0.0%	33	20.2%
	Unknown	~	*	~	*
	Total	163	100.0%	163	100.0%
Total	No disability (0)	2647	63.0%	836	19.9%
	Mild disability (1, 2)	780	18.6%	1367	32.5%

	Moderate to severe disability (3, 4, 5)	658	15.7%	1431	34.0%
	Died (6)	0	0.0%	449	10.7%
	Unknown	119	2.8%	121	2.9%
	Total	4204	100.0%	4204	100.0%

~ Denotes five cases or fewer

* Further suppression required in order to prevent disclosure of five cases or fewer

FIGURE 5.9: DISCHARGE DESTINATION OF THE FIVE ATRIAL FIBRILLATION GROUPS (n=4204)

	Home		Home with ESD		Discharged to long term care		Discharge to off-site rehabilitation		Transferred		Died		Other/unknown		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Group 1: No atrial fibrillation	1623	53.1%	331	10.8%	182	6.0%	358	11.7%	192	6.3%	288	9.4%	84	2.7%	3058	100%
Group 2: Atrial fibrillation not known prior to stroke	225	46.4%	55	11.3%	52	10.7%	71	14.6%	24	4.9%	44	9.1%	14	2.9%	485	100%
Group 3: Atrial fibrillation known prior to stroke, on anticoagulation and no dosage/compliance concerns	150	42.9%	34	9.7%	34	9.7%	48	13.7%	20	5.7%	57	16.3%	7	2.0%	350	100%
Group 4: Atrial fibrillation known prior to stroke, on anticoagulation and with dosage/compliance concerns	63	42.6%	*	*	20	13.5%	21	14.2%	11	7.4%	21	14.2%	~	*	148	100%
Group 5: Atrial fibrillation known prior to stroke, not on anticoagulation	62	38.0%	6	3.7%	24	14.7%	20	12.3%	12	7.4%	33	20.2%	*	*	163	100%
Total	2123	50.5%	434	10.3%	312	7.4%	518	12.3%	259	6.2%	443	10.5%	115	2.7%	4204	100%

~ Denotes five cases or fewer

* Further suppression required in order to prevent disclosure of five cases or fewer