



National Thrombectomy Service  
Annual Report 2020

## OVERVIEW

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Emergency endovascular thrombectomy (EVT: clot retrieval) is a procedure performed by interventional neuroradiologists to remove blood clots from an occluded intracranial vessel in patients with an acute stroke, restoring blood supply to the affected brain tissue. In Ireland, this is performed in Beaumont Hospital and Cork University Hospital (CUH).

Following multiple international randomised trials and subsequent meta-analysis, thrombectomy has become the standard of care for patients with large vessel occlusion (LVO) leading to acute ischemic stroke up to 24hrs following the onset of symptoms, as long as the patients meet certain clinical and radiological criteria. Every patient with such a stroke should expect to have the opportunity to receive this treatment. It is estimated that up to 15% of ischaemic stroke patients would have an LVO potentially suitable for EVT. The remainder of strokes are due to smaller vessel occlusion, beyond reach of clot retrieval devices.

The year 2020 and continuing into 2021 will be remembered by this generation and for a long time to come for the onslaught of the COVID 19 pandemic, throwing up unprecedented global challenges and immense physical, emotional and financial hardships. I am full of respect and admiration for all of my colleagues in the healthcare system that have had to play their role in this crisis.

Of course, all of the other medical conditions continued and needed to be managed. Stroke is no different and the management of acute stroke could not be delayed or would add to the significant secondary knock on effects of a global pandemic. You can see from the brief overview of our metrics from the National Thrombectomy Service (NTS) and from the much greater detail provided in the report below that the number of patients presenting and being treated for acute large vessel ischemic stroke remains stable and that the critical time metrics in the acute care pathway have remained reasonably stable, albeit with interhospital variability, with some improvements but also with prolongation of some performance time metrics. I believe we should be very proud of the metrics in the presence of the pandemic, which, could only have been achieved by the presence of a pre-existing high quality standardised system of care and of course the ongoing dedication and commitment of all healthcare workers, involved in the acute stroke care pathway. In this report, we have included some of the summary data and metrics from previous years, 2017 onwards, in order to demonstrate the pattern of change.

In 2020, 458 patients were transferred for emergency thrombectomy to Beaumont Hospital (357) and CUH (101). 392 of these patients underwent thrombectomy (307 Beaumont Hospital, 89 CUH). In 2020 there were 4764 ischemic stroke discharges from public hospitals that refer patients to the National Thrombectomy Service in Beaumont Hospital/CUH, giving a thrombectomy rate of 8.2%. This is a small decrease from a rate of 8.3% in 2019.

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*In 2020, 458 patients were transferred for emergency thrombectomy, Beaumont Hospital (357) and CUH (101).8.2% of patients discharged with diagnosis of ischaemic stroke underwent thrombectomy*

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In 2020, the National Thrombectomy Service in Ireland was provided by Beaumont Hospital 24/7 and CUH 8am – 8pm Monday to Friday. All patients presented to their acute hospital and were assessed clinically and radiologically, received thrombolysis if appropriate and if suitable, were transferred for thrombectomy following consultation with Beaumont Hospital/CUH. Patients within a 90 minute drive from Beaumont Hospital were repatriated immediately following treatment. Patients from further afield were admitted to Beaumont Hospital for 24hrs or more and repatriated as clinically appropriate. Patients transferred to CUH were admitted for 24hrs or more prior to repatriation.

The National Thrombectomy Service performs continuous data collection and service audit for quality improvement (registered with Beaumont Hospital Clinical Audit Department, CA210). Information is collected on all patients referred to the National Thrombectomy Service, including those for whom a decision is made not to transfer. Additional data is available on patients presenting with suspected acute stroke, from hospitals around the country through a national QI programme, regardless of whether Beaumont Hospital/CUH are contacted. This gives a very good overall evaluation of patients who are FAST positive presenting to almost all hospitals in Ireland.

Time is Brain and every minute does actually count. Every small incremental delay from the onset of symptoms results in reduced likelihood of the patient being suitable for thrombectomy, or reduced likelihood of a good outcome following thrombectomy, due to permanent tissue damage. Every patient must be treated as fast as possible.

The National Thrombectomy Service measures time intervals in the patient care pathway between onset of symptoms and patient treatment. Time metrics are reflective of the efficiency of the emergency stroke service in individual primary stroke centers (PSCs).

In patients who underwent thrombectomy the median times for key steps are as follows:

- Time between onset\*\* and arrival at PSC: 1hr 30mins (n=143)
- Door\* to CT time: 24 minutes (n=329)
- Door\* to needle time (DTN): 48 minutes (n=137)
- Door\* to EVT centre contact time: BH 1hr (n=212)/ CUH 59minutes (n=15)
- Door in Door out\*\* (DIDO): 1 hour 43 minutes (n = 212. Patients referred to Beaumont Hospital only. (This time metric is not currently collected in CUH)
- Onset\*\*to groin puncture: 4hours 33minutes (n=238)
- Onset\*\* to reperfusion time: 4hours 51minutes (n=223)
- Onset\*\*\* to groin puncture: 8hours 27minutes (n=150)
- Onset\*\*\* to reperfusion time: 8hrs 47minutes (n=141)

Please see a full breakdown of these time metrics per hospital below in the body of the report.

\* Excludes inpatients at time of stroke.

\*\*Witness onset only (excludes patients who have unknown time of onset)

\*\*\*Unknown onset time (last seen well & wake up group).

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*Median door to needle times is 48 minutes nationally for all patients who underwent thrombectomy and also received thrombolysis.*

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DTN times are 48 minutes nationally for all patients who underwent thrombectomy. This figure is slightly improved from 2019 & 2018 figures (DTN of 50 minutes). Data from the Helsinki Stroke Thrombolysis Registry have reported a reduction in the DTN times to 20 minutes in 2011. In a recent paper from Stockholm regarding LVO bypass and pre-notification the DTN was 13 minutes in the endovascular centre

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*The DIDO time is the time between arrival in the PSC and departure for Beaumont Hospital/CUH and reflects efficiency of acute stroke services in each centre. This remains stable at 1hr 43minutes for the 3<sup>rd</sup> year.*

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A new protocol commenced in Naas General Hospital in 2018 in which the ambulance crew that brought the FAST positive patients into the hospital, wait for the decision and when appropriate immediately transferred to Beaumont Hospital. This resulted in a decrease in DIDO from 96 minutes to 45 minutes. It is an excellent achievement with very efficient work flows and positive feedback from ambulance services. The National Thrombectomy Service QI Project has been working towards the aim of achieving door to decision in 30 minutes, for all hospitals so that the ambulance waiting protocol could be extended. The protocol is ongoing in Naas where they continue to achieve excellent turnaround times. The protocol now known as PITSTOP (Protocol for Improving Times for Stroke patients requiring Onward transfer from Primary stroke centre to thrombectomy centre) has been extended from October 2020, to include Midland Regional Hospital Mullingar (MRHM) and Tallaght University Hospital (TUH).

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*It required a fundamental change in practice in conjunction with the National Ambulance Service to reduce DIDO from 96 to 45 mins in one hospital. This is now extended to 2 additional sites and can be extended further.*

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I am happy to say that after a long battle for funding, the new biplane angiographic equipment required for performing thrombectomy procedures was installed in Beaumont Hospital and in CUH. The addition of the second unit in Beaumont as well as the replacement of the existing unit provides for continuity of service provision 24/7, without delay and without disruption to other services.

Good news also came for CUH with the appointment of a third Interventional Neuroradiologist to facilitate moving to a full 24/7 service for the region, which this commenced on 1<sup>st</sup> April 2021. Patients who suffer acute LVO stroke in this region outside of normal working hours may now be treated in CUH, rather than having to travel the extra distance to get to Beaumont Hospital. Additionally, a very significant amount of HSE funding has been allocated for the much needed expansion of the CUH stroke service, recruitment of additional staff and exciting developments are underway.

The National QI Programme ‘Door to Decision in under 30’ has continued involving all bar one of the hospitals acutely admitting stroke patients. In advance of the pandemic, hospitals agreed to continue the process. The programme looked quite different in 2020 with the reallocation of resources, particularly the Clinical Nurse Specialists in Stroke, who are usually the leaders of the QI process in each hospital, as their services were required to assist with the management of the COVID crisis. However, teams continued to make their best efforts to collect the data reflecting the activities of their service, Dr. Naomi Nowlan QI Lead was available to collate and analyse the data and to offer assistance, tackle any particular issues related to QI which may have occurred from time to time within the acute stroke services. In fact, although each hospital varied in their ability to continue to collect the data, in total we achieved an increase in the volume of patients for whom data was collected compared to previous years, a remarkable achievement in itself. This year’s report has an additional focus in the QI section on the impact of COVID and associated restrictions on the acute stroke pathway in terms of the number of patients and the time metrics achieved. It is testament to the success of the progress and sustainability of the QI process that the standard of acute stroke care was maintained in many ways.

Last year I mentioned that the Clinical Advisory Group (CAG) and National Stroke Programme (NSP) had agreed in principle that it is appropriate for patients in Dublin with LVO stroke to go directly to Beaumont for thrombectomy and that outside Dublin/Cork, patients would benefit from not moving away from Beaumont Hospital/CUH for initial assessment. Subsequent to this in the first annual report of the Irish National Audit of Stroke (INAS) from the National Office of Clinical Audit (NOCA), one of the key recommendations is the establishment of a pilot LVO bypass in Dublin and Cork, recognizing the difference between time of onset to arrival at EVT centre for patients presenting directly to endovascular centre (1hr 33mins) versus those treated by the drip and ship model first attending their PSC (4hrs). This is the first time that the thrombectomy data has been included in the stroke registry as well as in our own annual report and is a significant positive step. In a model, which was implemented in Stockholm, very similar to that being proposed in Dublin, they achieved a reduction in onset to commencement of thrombectomy of 69 mins (from 206 mins to 137 mins. Onset to thrombolysis time was stable at 115 mins). To date a training programme has been developed with the National Ambulance Service (NAS) (not yet Dublin Fire Brigade), discussions are ongoing within Beaumont Hospital and within the wider stroke community in Dublin, but as yet no substantial progress has been made.

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*Recommendation from NOCA/INAS from the National Report 2019:  
“Pilot a large vessel occlusion ambulance bypass to the  
endovascular thrombectomy stroke centers in Dublin and Cork”*

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As you know from previous descriptions and in the current report, a large volume of data is collated on patients presenting as FAST positive with possible acute stroke and in particular on those who are referred for thrombectomy. Over the last few years we have been working with Beaumont Hospital IT Department to develop a standalone database for data entry and collection. I am pleased to say that the new electronic database went live in early 2020.

As usual at the end of this year's report, I include any publications which have occurred during the year which have arisen out of activities within the NTS, including those in collaboration with international colleagues. I am happy to say that one of the papers published in 2020 in the Journal of Neuro Interventional Surgery with first author Dr. Emma Griffin, regarding our system of care with early repatriation post thrombectomy, won a prestigious award from the European Society of Minimal Invasive Neuro Interventional Therapy (ESMINT) for the Best European publication in this journal. The judges recognised potential contribution of this model of care to the ability to provide a thrombectomy service in other medical jurisdictions.

Finally, clinical outcomes obtained through the National Thrombectomy Service continue to match those of best international practice in the patients who are fortunate enough to access the service. 49% of the patients treated by thrombectomy recovered to full independence (modified Rankin Score 0-2) following their LVO stroke. The mortality rate was 18%. This real world experience matches that achieved in multinational randomised controlled trials. However, I believe there is definite room for improvement and we continue with our aim to treat more patients and to treat them faster. We look forward to the time when we wonder why we were pleased with 49% good outcome, 8.2% thrombectomy rate, DTN of 48 mins, DIDO of 1hr 43 mins and onset to reperfusion of 4hrs 51mins. Learning from our relatively stable metrics over the last 3 years with minor improvements and our Naas project DIDO experience, we appreciate that further significant improvements will require fundamental changes to our service and appropriate investment as proposed by the Stroke CAG, NOCA (INAS Annual Report 2019) and NSP(Stroke Strategy 2021 to 2026)

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*We look forward to a time when we can wonder why we were pleased with 49% good outcome, 8.2% thrombectomy rate, door to needle times of 48 mins, DIDO of 1hr 43mins and onset to reperfusion of 4hrs 15mins. Learning from our relatively stable metrics over the last 3 years with minor improvements and our Naas project DIDO experience, we can see that further significant improvements will require fundamental changes to our service and appropriate investment all as proposed by the stroke CAG, NOCA (INAS Annual Report 2019) and Stroke Programme (Stroke Strategy 2021 – 2026)*

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As always, I am delighted to sign off on this year's annual report. The service is provided by many amazing people who have done a fantastic job particularly in the challenging circumstances of 2020. Of course, this includes staff members across many disciplines, from the moment someone calls for the ambulance with a suspected acute stroke patient, to their management in the PSC and if

appropriate referral to the endovascular centers, their management by the thrombectomy teams and their subsequent stroke care. For the purpose of this report, each step along the way is noted, collated, analysed and reported, requiring tireless dedication and effort. It is hugely important that we continue our great work, to demonstrate our achievements and identify how to make further improvements. All of this work has a huge impact on individual patients. I am proud to say this year The National Thrombectomy Service was the joint winner along with our colleagues in Cardiac Rehabilitation in Beaumont Hospital, of the Irish Medical Times National Healthcare Award for Excellence in Healthcare Management, giving formal peer recognition to the National Thrombectomy Service and in particular the ongoing drive and commitment for quality improvement.

A handwritten signature in dark ink, appearing to read 'John Thornton', written in a cursive style.

John Thornton  
Director of National Thrombectomy Service





# Annual Report 2020 Overview

Emergency endovascular thrombectomy (EVT) is considered standard of care for up to 24hrs following the onset of acute ischaemic stroke. In Ireland, this procedure is carried out in two thrombectomy centers, Beaumont Hospital and Cork University Hospital. In 2020, of the 4764 patients discharged with acute ischaemic stroke, 392 patients underwent thrombectomy.

## Time matters

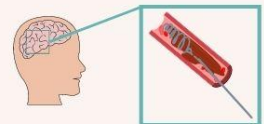
*"Time is Brain" every minute saved from onset of symptoms to treatment restores one week of healthy life (Meretoja et al, 2017)*

*"Every second counts" from hospital arrival to EVT start, every 1 second of delay was associated with the loss of 2.2 hours of healthy life (Almekhlafi et al, 2021)*

## Thrombectomy – Standard of Care

Emergency endovascular thrombectomy is a procedure performed by interventional neuroradiologists for treating acute ischaemic stroke. It involves mechanically removing the obstructing blood clot from arteries within the brain, restoring blood flow and minimising permanent tissue damage (NICE, 2018)

Thrombectomy is standard of care for patients with acute large vessel occlusion stroke as per multiple international guidelines. Studies show that only 26% of patients would recover without thrombectomy versus 46% with (HERMES Collaboration, 2016)



### 612 Referrals



EVT centers received 612 referrals from 26 public hospitals.

### 392 Thrombectomies



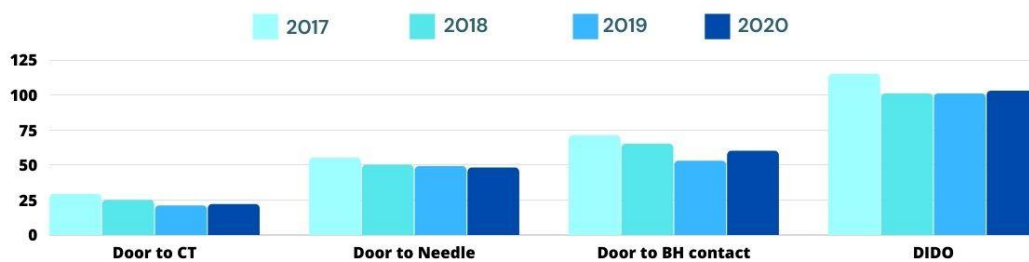
In 2020, 392 patients underwent emergency thrombectomy, 307 at Beaumont Hospital and 85 at Cork University Hospital.

### 49% Functional Independence



49% of patients had a modified Rankin Score of 0-2 indicating achievement of full functional independence after thrombectomy.

## Median Values for Thrombectomy patients At Beaumont Hospital



### 24 mins Door to CT



Median time from arrival at hospital to CT Brain was 24 mins for patients undergoing thrombectomy.

### 48 mins Door to Needle Time



Median time from arrival at hospital to receiving IV thrombolysis was 48 mins for patients undergoing thrombectomy.

### 60 mins Door to EVT Referral



Median time from arrival in hospital to contacting the EVT centre to make a decision about transfer for thrombectomy was 60 mins to Beaumont and 59mins to CUH.

### Door In Door Out 1hr 43mins



Median time from arrival in PSC to departure for Beaumont was 1hr 43mins. A project between Naas & Beaumont saw a reduction to 45mins. This protocol is now extended to Tallaght and Mullingar Hospitals.

### Onset to Reperfusion 4hr 51mins

In patients with a witnessed onset stroke the median time from onset of symptoms to establishment of reperfusion was 4hrs 51mins in patients undergoing thrombectomy in 2020.



**For more information** please contact The National Thrombectomy Service



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## INTRODUCTION

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Emergency thrombectomy is considered standard care for up to 24 hours following the onset of acute ischemic stroke following multiple RCT's. Based on this evidence, our inclusion criteria for thrombectomy includes all patients with LVO within 24 hours of onset of symptoms, with ASPECTS of  $\geq 5$  and good (>50%) collateral circulation on multiphase CTA. We employ a drip-and-ship model for the transfer of patients for thrombectomy, and in most cases a drip, ship, retrieve and leave model for those patients coming from hospitals within a 90 min drive - meaning immediate repatriation to the PSC.

The National Thrombectomy Service Governance Group has developed a pathway for the transfer of patients for thrombectomy. The group meets quarterly to discuss the service, monitor activity and consider future development.

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## DESCRIPTION OF AUDIT PROCESS FOR ANNUAL REPORT

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A prospective database is maintained for suspected stroke patients who are admitted to any of the PSCs. Patients are evaluated clinically and radiologically and if deemed suitable for endovascular thrombectomy are transferred to Beaumont Hospital/CUH. We collect information about all patients admitted with suspected acute stroke (FAST Positive). The majority of these will not require any consultation with thrombectomy centers at Beaumont Hospital/CUH. These patients are picked up in the national QI program. For others there is a phone conversation with Beaumont Hospital/CUH and the patient may or may not be transferred. Once transferred most patients undergo thrombectomy but some become unsuitable for treatment. When a phone call is made to the National Thrombectomy Service, details are kept regarding clinical presentation and the metrics in the acute care pathway, forming part of the patient record.

All data for this 2020 annual report has been extracted from our new purpose built database which is housed on the Beaumont network. This replaces the previous method using an excel spreadsheet. In 2020 we had overlap of the two systems, but from Jan 2021 we have switched fully to the electronic database.

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## OVERVIEW OF DATASETS

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### FAST POSITIVE (SUSPECTED STROKE PATIENTS) DATASET

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Through the National Thrombectomy Service QI programme, data is captured by local stroke teams on any patients who present to any stroke centre with symptoms suggestive of acute stroke.

Data points include:

- Onset date/time
- Arrival date/time at PSC
- Time of CTB/CTA/CTP
- IV lysis time

- If EVT centre was contacted
- Time EVT centre contacted
- Time of decision re thrombectomy (regardless of whether or not EVT centre was contacted, or if the decision is not for thrombectomy).
- Departure time if transferred for thrombectomy.
- Final diagnosis

The decision time regarding need for thrombectomy is applicable to all patients and reflects how long an ambulance crew would need to wait before being released or taking the patient for transfer to Beaumont Hospital or CUH.

This data is used for QI purposes to assess the performance of each stroke service and forms the basis for identifying service quality improvements required (see below for further discussion). The ability of each team to capture this information varies from hospital to hospital. There is overlap of this data with the datasets below and the outcomes are presented separately in this report.

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## REFERRALS DATASET

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Once a call is made to Beaumont Hospital National Thrombectomy Service regarding possibility of thrombectomy, we record a minimum dataset for all of these external referral calls. A decision is made between the referring clinician and the neuroradiologist whether or not to transfer the patient for thrombectomy.

All patients have baseline data collected (as per QI programme). If a patient is not accepted for transfer the reason for this is recorded.

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## PATIENTS TRANSFERRED TO THE THROMBECTOMY CENTRE BUT UNSUITABLE FOR EVT DATASET

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On arrival at Beaumont Hospital from PSC for thrombectomy patients are re-evaluated. If >2hrs since original imaging, this is repeated. Some patients are found to be unsuitable for treatment. Relevant data points and reasons for no treatment are noted. Unsuitability for EVT is mostly due to vessel recanalisation or establishment of infarct and therefore lack of perceived benefit from EVT. Avoiding unnecessary transfers and improving efficiency of transfer are targeted with this information.

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## THROMBECTOMY PATIENT DATASET

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The most extensive and largest data set is of the patients who proceed to thrombectomy. There are approximately 65 data points on each patient, allowing detailed analysis of the service from onset of stroke to point of recanalisation and final clinical outcome.

Patients who were transferred for thrombectomy are presented and discussed at the monthly stroke MDM held in Beaumont Hospital. We have WebEx video conferencing system which allows referring sites to join this meeting remotely and have an input to the discussion regarding their patients. Monthly reports regarding thrombectomy service are presented at this meeting.

Clinical follow up for patients post thrombectomy is given to us by the relevant clinical team. Our audit approval includes capturing the final outcome data and going forward we are collecting enough patient demographics to facilitate direct contact with patients / families to assess outcome if this is not otherwise available.

For this annual report, we analyse the above datasets. Data quality is checked by reviewing patient entries soon after input and again in preparation for the report. Outlying metrics are reviewed for accuracy of data. Imaging pre and post procedure, the procedure details and images including final revascularisation scores are reviewed by neuroradiology SPRs and consultants so that each study is reviewed by a different neuroradiologist to the one who performed the procedure.

QI data is collected by individual hospitals and sent to QI lead; Naomi Nolan or Roisin Walsh. The data is collated and fed back to stroke teams intermittently through the year. Each team has had an opportunity to review their end of year data prior to submission in the annual report.

Completion of the report can only occur after the 90 day follow up assessments and the number of stroke discharges from all hospitals are available from HIPE. This report is compiled by members of the National Thrombectomy team in Beaumont Hospital.

## RESULTS

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According to HIPE data, 4764 patients were discharged with primary diagnosis of cerebral infarctions in 2020 (i63 & i64) from hospitals with acute stroke services. 357 patients were transferred to Beaumont Hospital with a view to thrombectomy & 307 underwent thrombectomy, including 50 patients who presented directly to Beaumont Hospital. 50 patients were transferred but did not undergo thrombectomy as they were deemed unsuitable after clinical evaluation, repeat imaging or following catheter angiogram on arrival.

Furthermore, there were 101 patients transferred to CUH with a view to thrombectomy and 85 underwent thrombectomy, including 59 patients who presented directly to CUH. 16 patients were transferred but did not undergo thrombectomy.

In addition, the thrombectomy service in Beaumont hospital received a further 210 external referral calls regarding potential thrombectomy, who were not transferred. CUH received an additional 53 external call referrals regarding patients who were not transferred (data is not yet collected for this final group of patients).

## THROMBECTOMY PATIENT DEMOGRAPHICS (N=392)

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- Male: 204 (52%)
- Female: 188 (48%)

Median Age: 72 (17-96)

≤65 years: 129 (33%)

>65 years: 263 (67%)

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*One third of patients treated are younger than 65 years of age.*

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## NIHSS & ASPECTS PRE EVT

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Pre NIHSS: 16 (1-33)

Pre ASPECTS: 9 (4-10)

## VESSEL OCCLUSION SITES

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64 (16%) patients had more than 1 vessel occlusion site or had additional significant carotid stenosis.

*Table 1: Occlusion sites*

Occlusion site	2020 N (%)
ACA:	7 (2)
Basilar/PCA:	25 (5)
ICA cervical/carotid T/L:	92 (20)
MCA (M1&M2):	332 (73)

## THROMBECTOMY DATASET

*The total thrombectomy rate for 2020 was 391\*/4764 (8.2%). In 2019 the rate was 378/4533 (8.3%). 8/25 hospitals increased their rate of referral.*

*Table 2: Thrombectomy Rate 2020 vs 2019 & 2018*

Hospital	2020 Referral N (%)	2020 Total N Of Ischaemic Strokes	2019 Referral N (%)	2018 Referral N (%)
Beaumont	50 (12)	411**	40 (13)	41 (19)
Mater Misericordiae University Hospital	44 (17)	258	47 (15)	36 (11)
St. James Hospital	22 (10)	210	23 (10)	26 (11)
Naas General Hospital	12 (7)	170	19 (10)	19 (11)
Mullingar Regional Hospital	16 (12)	135	11 (10)	9 (9)
Navan General Hospital	2 (3)	64	3 (4)	6 (9)
St. Lukes Hospital Kilkenny	11 (9)	123	9 (9)	7 (7)
Tallaght University Hospital	18 (7)	244	21 (10)	17 (7)
OLOL	14 (6)	222	17 (9)	11 (6)
CUH	59 (14)	408**	43 (10)	37 (9)
SVUH	34 (10)	351	28 (8)	19 (5)
Letterkenny General Hospital	2 (1)	166	6 (4)	5 (3)
Cavan General Hospital	4 (3)	125	4 (4)	2 (1)
University Hospital Waterford	7 (5)	139	14 (9)	9 (8)
University Hospital Limerick	31 (8)	367	13 (5)	16 (5)
JCMH	4 (2)	196	5 (3)	7 (4)
Sligo General Hospital	5 (3)	167	6 (4)	10 (6)
Mayo University Hospital	9 (5)	191	11 (6)	8 (6)
Galway University Hospital	24 (11)	210	21 (8)	14 (5)
Wexford General Hospital	10 (10)	99	10 (9)	3 (2)
Midland Regional Hospital Tullamore	1 (1)	93	2(3)	1(1)
University Hospital Kerry	3 (2)	126	11 (9)	2 (1)
South Tipperary General Hospital	3 (4)	77	6 (6)	4 (4)
Portiuncula University Hospital	0	64	2 (4)	0 (0)
Mercy University Hospital	3 (4)	84	7 (9)	2 (2)
Bantry General Hospital	2 (3)	64	2 (2)	1 (1)
Belfast	1	N/A	N/A	N/A
<b>TOTAL</b>	<b>392</b>	<b>4764</b>	<b>384</b>	<b>317</b>

\*This number excludes one patient who was referred from Belfast, which is not included in the HIPE dataset

\*\*This number excludes external referrals; it reflects no. of patients admitted directly to Beaumont Hospital or CUH

## TIME METRICS

*Table 3: Door metrics of patients who underwent thrombectomy procedures at Beaumont Hospital*

Hospital	Total (IP) {2019 N}	Door To CT Median (Hr:Min) {Range}	Door To Needle Median (Hr:Min) {Range}	Door To BH Contact Median (Hr:Min) {Range}	DIDO Median (Hr:Min) {Range}
Beaumont Hospital	50 (7) {↑10}	00:20 ↓1min {00:04-02:04}	00:43 ↓1min {00:20-01:58}	N/A	N/A
Belfast	1	00:30	00:64	03:45	05:00
Cavan	4 (0)	00:26 ↑13mins {00:16-01:02}	01:06 ↑36mins {00:37-01:35}	01:03 ↑19mins {00:42-03:48}	02:31 ↑37mins {01:06-05:35}
Galway	24 (1) {↑3}	00:23 ↑4mins {00:08-00:37}	00:34 ↓20mins {00:20-01:25}	00:56 ↓8mins {00:34-02:44}	02:05 ↑9mins {00:50-03:20}
Connolly	4 (2) {↓1}	00:26 ↑6mins {00:19-00:34}	00:36 ↑8mins (n=1)	00:44 ↑9mins {00:39-00:49}	01:23 ↑33mins {01:20-01:26}
Kerry	0	N/A	N/A	N/A	N/A
Kilkenny	11 (1) {↑2}	00:26 ↓13mins {00:16-00:47}	00:42 ↑8mins (00:25-00:55)	00:54 ↑8mins {00:34-01:13}	01:32 ↓3mins {01:10-01:51}
Letterkenny	2 (1) {↓4}	00:23 ↑16mins (n=1)	N/A	01:14 ↑6mins (n=1)	02:30 ↑20mins (n=1)
Limerick	18 (5) {↑11}	00:30 ↓12mins {00:03-02:30}	01:02 ↓18mins {00:46-01:39}	01:15 ↓20mins {00:38-06:30}	02:48 ↑33mins {01:45-06:58}
Mater	44 (4) {↓3}	00:17 ↓1min {00:03-00:40}	00:44 ↓3min {00:16-01:15}	00:51 ↑7mins {00:11-01:59}	01:24 ↑22mins {00:45-02:39}
Mayo	9 (1) {↓2}	00:46 ↑10mins {00:25-06:37}	01:16 ↑11mins {02:07-03:07}	01:41 ↑42mins {01:05-07:29}	02:25 ↑8mins {01:40-08:22}
Mullingar	16 (1) {↑5}	00:30 ↑15mins {00:10-12:10}	00:48 ↑1min {00:22 – 01:10}	01:32 ↑41mins {00:53-12:40}	02:00 ↑11mins {01:05-13:50}



Naas	12 (1) {↓7}	00:17 ↑7mins {00:04-00:42}	00:35 ↑12mins {00:31-01:00}	00:45 ↑13mins {00:15-01:26}	01:00 ↑4mins {00:30-01:55}
Navan	2 (1) {↓1}	00:22 ↓2mins (n=1)	N/A	00:52 ↓27mins (n=1)	01:22 ↓63mins (n=1)
OLOL	14 (2) {↓3}	00:18 ↑4mins {00:08-03:35}	00:54 ↓4mins {00:20-04:25}	00:58 ↑7mins {00:31-05:14}	01:43 ↑12mins 00:55-05:45}
Portiuncula	0	N/A	N/A	N/A	N/A
Sligo	5 (0) {↓1}	00:14 ↓8mins {00:10-00:42}	00:33 ↓4mins {01:00-01:33}	00:40 ↓19mins {00:25-01:05}	01:23 ↓30mins {01:00-02:15}
South Tipperary	3 {↑1}	00:59 ↑1min {00:43-01:02}	01:50 ↑26mins (n=1)	01:39 ↑10mins {01:30-01:43}	03:00 ↑55mins {02:42-03:12}
St James	22 (9) {↓1}	00:28 ↑3mins {00:03-01:05}	01:23 ↑19mins {00:35-04:13}	01:02 ↑7mins {00:25-01:40}	01:35 {01:00-02:20}
SVUH	34 (6) {↑6}	00:27 ↑11mins {00:08-02:28}	00:50 ↑10mins {00:17-01:31}	00:57 ↓1min {00:14-03:54}	01:33 ↓12mins {00:25-04:30}
Tallaght	18 (2) {↓3}	00:18 ↓2mins {00:08-01:51}	00:39 ↑14mins {00:20-02:37}	00:43 ↓2mins {00:19-02:43}	01:19 ↓15mins {00:36-02:05}
Tullamore	1	01:08	N/A	06:38	07:48
Waterford	3 (0) {↓5}	00:10 ↓27mins (00:09-00:23)	01:16 ↑15mins {00:42-01:50}	01:18 ↓38mins {00:38-01:25}	02:05 ↓23mins {01:20-03:10}
Wexford	10 (1) {↑2}	00:45 ↓2mins {00:23-01:32}	00:52 ↑18mins {00:30-01:10}	01:13 ↑6mins {00:47-02:41}	02:02 ↑5mins {01:21-03:26}
<b>TOTAL</b>	<b>307 (53)</b>	<b>00:22 ↑1min</b> <b>{00:03-12:10}</b>	<b>00:48 ↓1min</b> <b>{00:16-12:47}</b>	<b>01:00 ↑7mins</b> <b>{00:11-12:40}</b> <b>(n=212)</b>	<b>01:43 ↑2mins</b> <b>{00:25-13:50}</b> <b>(n=212)</b>

Figure 1: Median values for thrombectomy patients at Beaumont Hospital

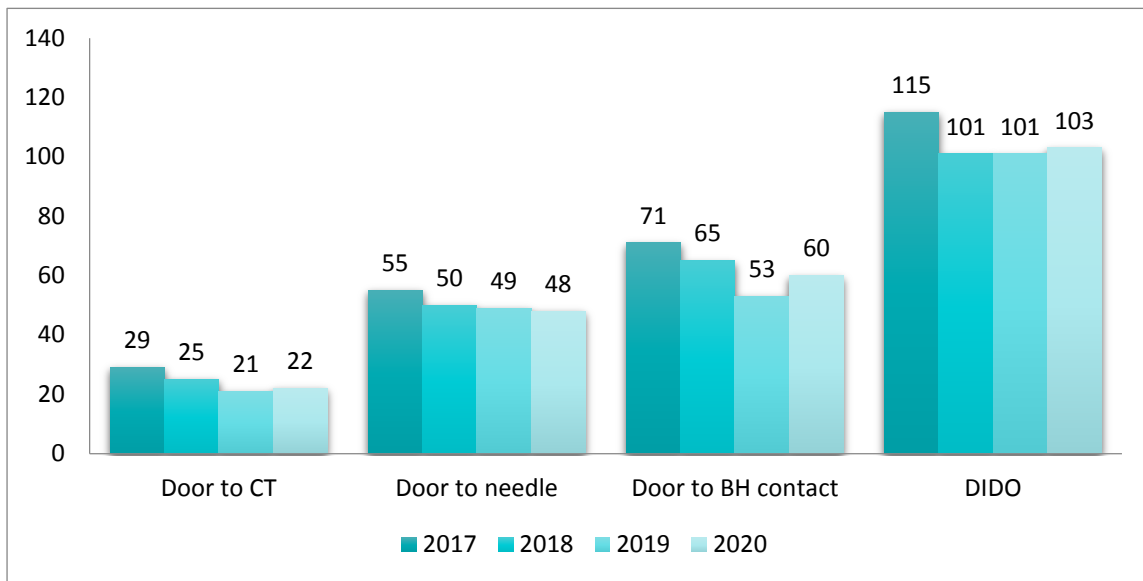


Figure 2: Hospitals ranked left to right by EVT volume. DIDO times only available for patients transferring to Beaumont hospital. No DIDO for EVT centers – CUH (1) or Beaumont Hospital (2)

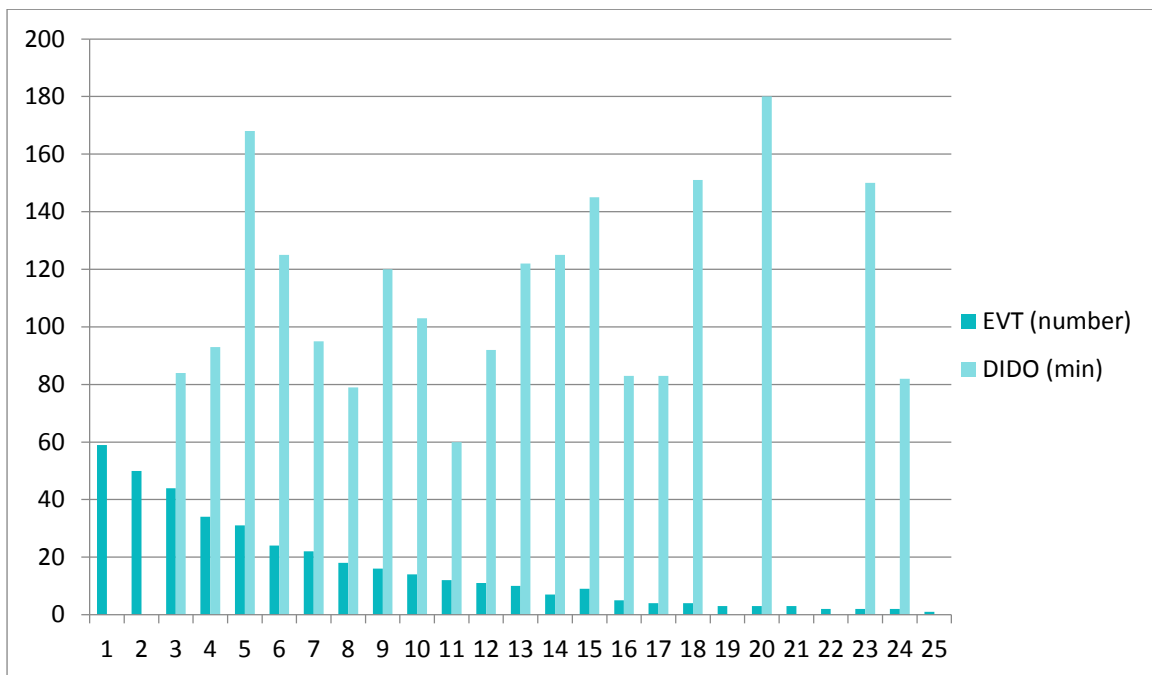


Table 4: Door metrics of patients who underwent thrombectomy procedures at Cork University Hospital

Hospital	Total (IP)	Door To CT Median {Range}	Door To Needle Median {Range}	Door To CU Contact Median {Range}
Cork University Hospital	59 (8) {↑16}	00:29 ↑5mins {00:04–05:20}	00:30 {00:09–00:48}	N/A
Bantry General	2	01:01 ↑24mins (n=1)	00:06 ↓59mins (n=1)	N/A
Kerry General Hospital	3 {↓6}	00:20 ↔ {00:19–00:23}	00:55 ↑5mins (n=1)	01:05 ↑13mins {00:59–01:11}
Mercy University Hospital	3 (1) {↓4}	00:15 ↓5mins (n=1)	00:15 ↓33mins (n=1)	N/A
South Tipperary General Hospital	1 {↓3}	00:30 ↓20mins	N/A	00:43 ↓42mins
University Hospital Limerick	13 {↑5}	00:43 ↑18mins {00:18–06:45}	00:52* {00:24–02:31}	00:55 ↑1min {00:28–02:25}
University Hospital Waterford	4 {↓1}	00:26 ↓14mins {00:08–00:51}	00:23 ↓49mins (n=1)	01:08 ↓2mins {00:20–01:35}
<b>Total</b>	<b>85 (9)</b>	<b>00:30</b> <b>{00:04–06:45}</b>	<b>00:42</b> <b>{00:06–02:31}</b>	<b>00:59</b> <b>{00:20–02:25}</b>

\*no comparison as no University Hospital Limerick patients transferred to CUH had IV lysis in 2019.

Door to CT and DTN times reflect internal hospital processes related to early patient clinical and radiological evaluation with a view to intravenous thrombolysis which is standard of care for over 20 years, following the pivotal NINDS trial in 1995. American Heart Association guidelines recommend DTN times of less than 60 mins, aiming for less than 45 mins. The most efficient hospitals in the world achieve DTN times of approximately 15mins. Every minute counts. Save a minute, save a week!!

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*The median door to CT is 24mins and the door to needle is 48mins (n=137) for patients receiving thrombectomy in BH and CUH.*

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The fastest DTN time in the Beaumont Hospital group was recorded in the Mater at 16 mins, Sligo have the shortest median DTN at 33 mins.

The fastest DTN time in the CUH group was recorded in Bantry at 6 mins. For more than 1 patient receiving IV lysis, CUH have the shortest median DTN time at 30mins.

In the overall group, the most improved median DTN time was in Galway with an impressive 20 min improvement to a median of 34 mins.

The overall IVT rate for the Beaumont thrombectomy group in 2020 was 43% (n=131). This is compared to 42% (n=130) in 2019, 50% (n=131) in 2018 and 52% (n=130) in 2017. IVT remains the standard of care for all eligible patients with large vessel occlusion, in addition to thrombectomy. It is noteworthy that the absolute number of IVT cases has not increased since 2017.

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*In 2020 the median door to Beaumont Hospital contact is 60 mins  
and the DIDO time is 1 hour 43 mins.*

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The interval between CT and Beaumont Hospital contact remains too long and could be significantly shortened by improved communication between radiology and the referring physician. We have seen that this is improved in hospitals using software Apps facilitating immediate transfer of imaging and an automated interpretation to the phone of relevant personnel.

Door to contacting Beaumont Hospital times as well as DIDO times reflect the ability to process patients for a decision about thrombectomy and get them transferred. This is due to a combination of internal processes and the time taken to get an ambulance transfer.

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*If the door to contact time was <30 mins the ambulance crews could  
be asked to wait and bring the patient immediately potentially  
achieving a DIDO of 30-40 mins.*

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In 2018, a new protocol was introduced in Naas General Hospital in conjunction with the National Ambulance Service (NAS) and Beaumont Hospital/National Thrombectomy Service QI. The Ambulance crew which brings the FAST Positive patient to Naas waits for a decision for thrombectomy and can immediately make the transfer. This resulted in reduction of DIDO during a period between Oct 2018 and Jan 2021, from 96 minutes to 45 mins. (Gaynor et al., 2021)

This protocol, now known as PITSTOP, was extended in October 2020 to include Mullingar Midland Regional Hospital (MRHM) and Tallaght University Hospital (TUH). The combined efforts of the NAS and the participating hospitals have significantly improved the patient's journey with preliminary data showing a faster DIDO and Door to CT times compared with the national median times of all EVT patients (table 7). However, the times achieved in Naas have not yet been matched, which demonstrates the difficult challenges that this process provides.

*Table 5: Median DIDO time for PITSTOP patients referred to Beaumont from TUH and MRHM for EVT (n=153)*

PITSTOP Pts N	Median Door to CT time	Median DIDO time
PITSTOP pts (n153)	20mins	78mins
All EVT pts for 2020	24mins	103mins

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## HOSPITAL RANKINGS

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The median rate of thrombectomy nationally based of ischaemic stroke discharges is 8.2%. Nine hospitals had a rate of referral for thrombectomy of more than 8.2% and 16 hospitals referred less than 8.2%. To rank the time metrics for these hospitals reflecting their efficiency, we have split them into two groups for more appropriate comparison. This data includes referrals to both Beaumont Hospital and Cork University Hospital.

*Table 6: Hospital rankings where referral rate >8.2%*

Hospital	Ref Rate	Door To Ct Rank	Door To Needle Rank	Door To Contact Rank	DIDO Rank
Mater	17%	1	5	1	1
Cork University Hospital	14%	7	1	N/A	N/A
Beaumont Hospital	12%	2	4	N/A	N/A
Mullingar	12%	8	6	7	5
Galway	11%	3	2	3	7
St James	10%	6	9	5	4
SVUH	10%	5	7	4	3
Wexford	10%	9	8	6	6
Kilkenny	9%	4	3	2	2

Table 7: Hospital where referral rate ≤8.2%

Hospital	Referral Rate	Door to CT rank	Door to needle rank	Door to contact rank	DIDO rank
Limerick	8%	12	9	10	11
Naas	7%	4	4	4	1
Tallaght	7%	5	6	2	2
Mayo	5%	13	11	13	8
Waterford	5%	1	11	11	7
South Tipperary	4%	14	13	12	12
Mercy University Hospital	4%	3	2	N/A*	N/A**
Navan	3%	8	N/A***	5	3
Cavan	3%	10	10	7	10
Sligo	3%	2	3	1	4
Bantry General	3%	15	1	N/A*	N/A**
Connolly	2%	10	5	3	4
OLOL	2%	5	7	6	6
Kerry	2%	7	8	8	N/A**
Letterkenny	1%	9	N/A***	9	9
Tullamore	1%	16	N/A***	14	13

\*Missing contact time

\*\* Missing departure times

\*\*\*No IV lysis administered

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### DOOR TO GROIN PUNCTURE

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Time from arrival in Beaumont Hospital & CUH to groin puncture reflects efficiency in interventional stroke services and all time intervals, affects patient outcome. In-patient strokes are excluded from this analysis. It is analysed (table 8) separately for those presenting directly to Beaumont Hospital & CUH and for those on a Drip & Ship model transferred from elsewhere versus direct presentation to Beaumont Hospital and CUH.

*Table 8: Time from arrival to groin puncture*

Beaumont Door to Groin (n=43) {↑13}	01:05 ↑1min
Drip & Ship Model (n=256) {↓7}	00:15 ↑1min
Cork University Hospital Door to Groin (n=50) {↑30}	01:34 ↑15mins
Drip & Ship Model (n=21) {↓13}	00:41 ↓5mins

*Table 9: Time metrics for thrombectomy procedures carried out in Beaumont Hospital*

Median length of procedure (hr:min)	00:27 ↓5mins
Median time groin puncture to 1 <sup>st</sup> reperfusion (hr:min)	00:19 ↓1min

*Table 10: Time metrics for thrombectomy procedures carried out in Cork University Hospital*

Median length of procedure (hr:min)	00:47 ↑4mins
Median time groin puncture to 1 <sup>st</sup> reperfusion (hr:min)	00:23<→

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## Outcomes

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### *TICI RECANALISATION*

TICI recanalisation reflects the technical success of the Thrombectomy procedure for anterior circulation strokes only. Rates of 2b, 2c & 3 are considered good and expected rates internationally are 80% for 2b-3 inclusive. Thrombectomy can be performed using aspiration technique or stentriever. Randomised trials have shown equivalence. We have published our experience using a standardised aspiration first approach which in our experience gives better recanalisation in a shorter time. Evidence also suggests that the fewer passes performed, the better the likely clinical outcome. First pass effect is a measure of the success of recanalisation after a single pass.

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*In 2020 we achieved TICI 2b or better in 91% in anterior circulation strokes.*

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## Techniques Used\*

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1<sup>st</sup> pass aspiration device: n=195

1<sup>st</sup> pass stentriever: n=106

Single pass only: n=134

\*Excludes CUH procedural techniques (n=85)



Table 11: First pass TICI Recanalisation rates

TICI Scores post 1 <sup>st</sup> pass	2020 N (%)
2c-3:	105 (37)
2b:	49 (17)
2a:	61 (21)
0-1:	72 (25)

Table 12: Final TICI recanalisation rates

TICI Post Scores 2020	2020 N (%)	2019 N (%)	2018 N (%)
2c-3:	192 (66)	183 (63)	182 (73)
2b:	74 (25)	68 (24)	46 (19)
2a:	11(4)	25 (7)	12 (5)
0-1	14 (5)	12 (6)	6 (3)

The above 2020 TICI scores do not include the posterior circulation and basilar occlusions (n=16) all of which had good recanalisation rates, as they do not have the same scoring system.

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## THE NIH STROKE SCALE

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The NIH Stroke Scale (NIHSS) measures stroke related neurologic deficit. This assessment is carried out when a patient presents to their PSC with stroke symptoms, before patients proceed to endovascular thrombectomy, at 24hrs & Day 5 post endovascular thrombectomy. When measured at 24hrs a score of  $\leq 8$  is highly predictive of long term functional outcome for anterior circulation stroke (Meyer *et al.*, 2020).

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*In 2020, 24hr NIHSS of  $\leq 8$  was achieved in 49%.*

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The median 24hr NIHSS was 9 (n=379)

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## MODIFIED RANKIN SCALE

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The Modified Rankin Score (mRS) is a 6 point scale reflecting the level of disability/dependence in daily activities of people who have suffered a stroke. 90 day mRS indicates the 90 day clinical outcome and is an international standard in stroke literature reporting. A mRS score of 0-2 indicates the achievement of functional independence. The Hermes meta-analysis of the main five randomised controlled trials (RCT) of Thrombectomy reported 90day mRS of 0-2 was achieved in 46% of patients treated with thrombectomy versus 26.5% in the control population. However, real life experience is

not as good as that achieved in large RCTs due to more variability, lack of standardization of clinical care and treating patients who would not meet the strict inclusion criteria of RCTs.

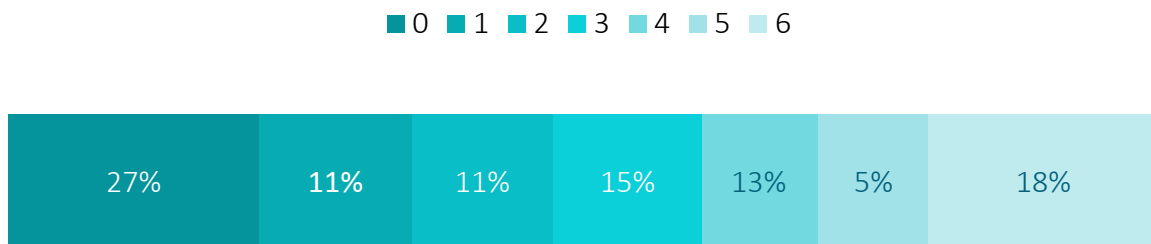
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*In 2020, 90 day mRS of  $\leq 2$  indicating achievement of functional independence was achieved in 49%.*

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In 2020, 90 day mRS of  $\leq 2$  was achieved in 49% (n=168) of patients who underwent thrombectomy at Beaumont Hospital and CUH. 90 day mRS outcome was available in 89% (n=348) of patient who underwent thrombectomy.

*Figure 3: Modified Rankin Score at Day 90*



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#### PATIENTS TRANSFERRED TO THROMBECTOMY CENTRE BUT UNSUITABLE FOR EVT

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*Some patients will not be suitable for thrombectomy despite being referred. Some patients will improve with thrombolysis or spontaneously. Other patients will deteriorate rapidly with or without thrombolysis. Factors involved in patients becoming unsuitable include; the time from stroke onset, the type of artery blocked, the collateral score and the distance between their PSC and the endovascular centre, 50 patients were unsuitable for thrombectomy on arrival to Beaumont Hospital*

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Table 13: Patients transferred for thrombectomy to Beaumont Hospital but deemed unsuitable on arrival.

Hospital	Total (IP)	Door To Ct Median {Range}	Door To Needle Median {Range}	Door To BH Contact Median {Range}	DIDO (Hr:Min) Median {Range}
BRC	1 (1)	Inpatient	Inpatient	Inpatient	Inpatient
Cavan	3	00:39 {00:17–01:18}	N/A	01:35 {01:30–01:56}	02:47 {01:50–02:50}
Connolly	3 (1)	00:31 {00:19–00:44}	00:44 (n=1)	01:08 {01:01–01:16}	01:35 {01:34–01:37}
Galway	5	00:27 (n=4) {00:15–01:03}	00:42 {00:24–01:00}	00:40 {00:18–02:18}	02:27 {01:10–04:54}
Kilkenny	2	00:28 {00:14–00:43}	N/A	01:32 {01:10–01:54}	02:39 {02:29–02:50}
Letterkenny	1	00:41	01:28	01:12	02:45
Limerick	5	00:41 {00:11–01:02}	01:38 {00:30–02:06}	01:41 {01:02–05:27}	02:45 {01:50–07:00}
Mater	2	00:38 {00:15–01:02}	00:45 (n=1)	00:53 {00:30–01:17}	02:01 {01:50–02:12}
Mayo	1 (1)	Inpatient	Inpatient	Inpatient	Inpatient
Mullingar	5	00:21 {00:12–00:36}	01:00 {00:44–02:51}	00:39 {00:36–01:00}	01:17 {01:02–01:41}
Naas	1	00:42	00:48	01:18	01:36
OLOL	4 (1)	00:40 {00:16–01:12}	01:34 {00:39–02:30}	01:15 {00:59–02:03}	02:09 {01:50–03:50}
Sligo	5	00:36 (n=4) {00:16–01:04}	01:22 {00:32–02:13}	01:27 (n=4) {00:32–02:18}	02:25 (n=4) {01:03–03:28}
St. James	3	00:25 {00:20–00:31}	01:25 (n=1)	00:59 {00:45–01:14}	01:15 {01:05–01:25}

SVUH	3	00:19 {00:13-01:08}	N/A	00:41 {00:33-02:48}	01:29 {01:13-03:53}
Tallaght	2 (1)	00:43 (n=1)	N/A	01:40 (n=1)	02:10 (n=1)
Wexford	4 (2)	00:34 {00:15- 00:53}	00:25 (n=1)	01:16 {01:05 – 01:27}	02:52 {02:05 – 03:40}
<b>TOTAL</b>	<b>50 (7)</b>	<b>00:35</b> <b>{00:11-01:18}</b>	<b>00:51</b> <b>{00:24-02:51}</b>	<b>001:12</b> <b>{00:18-05:27}</b>	<b>02:04</b> <b>{01:04-07:00}</b>

*Table 14: Reasons for unsuitability for thrombectomy*

Unsuitability Reason	N (%)
Clinical Improvement	11 (22)
No LVO	18 (36)
Established infarct	12 (24)
Haemorrhagic transformation	1 (2)
Other	8 (16)

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## REFERRALS DATASET

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There were 612 calls to the two endovascular centers in 2020, 517 to Beaumont & 95 to CUH. Of these, 210 (41%) were not transferred to Beaumont and 53 (56%) not transferred to CUH. Time metrics for external referrals for thrombectomy but not transferred are recorded (in Beaumont only). A high rate of non-transfer in a particular hospital perhaps reflects a lack of availability of decision making expertise in spite of good workflow. Nonetheless, the data gives good additional information about the quality of service in each hospital. For the majority of patients, the local radiology and stroke teams make these decisions. We do not hear about these patients. However, they will be included in the QI data which includes all FAST positive patients.

We know from previous analysis that patients with delayed onset to arrival times, those from the remote region group of hospitals (>90 minute drive from Beaumont Hospital), or those presenting out of hours are less likely to be transferred for thrombectomy.

Table 15: External Referrals Not Transferred To Beaumont Hospital

Hospital	Total Calls	Calls not transferred	% of calls not transferred	Door to CT median Hr:Min {Range}	Door to needle median Hr:Min {Range}	Door to BH contact median Hr:Min {Range}
Beacon	1	1	100%	Inpatient	Inpatient	Inpatient
Belfast	2	1	50%	N/A	N/A	N/A
Cavan	16	9	56%	00:43 {00:08 – 01:59}	00:40 (n=1)	01:31 {00:20–04:26}
Galway	47	18	38%	00:36 {00:10–12:57}	01:12 (n=1)	01:18 {00:14-13:27}
Kerry*	7	7	100%	00:25 {00:11– 00:38}	01:17 {01:05-01:29}	01:20 {00:58–03:26}
Kilkenny	16	3	19%	00:08 {00:03– 00:13}	00:58 (n=1)	00:59 {00:58–1:00}
Letterkenny	15	12	80%	00:48 {00:16 – 04:34}	00:44 (n=1)	01:49 {01:00– 05:49}
Limerick*	35	12	27%	00:31 {00:20–01:22}	01:45 (n=1)	01:27 {00:24–04:25}
Mater	63	17	27%	00:22 {00:16–00:47}	01:07 {00:44–01:25} (n=4)	01:16 {01:00–01:45}
Mayo	25	15	60%	00:45 {00:31–02:48}	N/A	01:39 {00:32–04:45}
Mullingar	42	21	50%	00:36 {00:31–02:48}	01:42 {01:22-01:42} (n=2)	01:37 {00:30–04:45}
Naas	16	3	19%	00:13 (n=1)	N/A	01:01 (n=1)
Navan	5	3	60%	00:36 {00:31–02:48}	01:37 (n=1)	02:27 {01:10–03:32}
OLOL	38	20	53%	00:16 {00:11–00:44}	00:54 {00:14–01:35}	01:40 {00:38–02:42}
Portlaoise	1	1	100%	01:43	N/A	02:48
Sligo	20	10	50%	01:49 {00:28-06:07} (n=7)	N/A	03:06 {00:15-06:50} (n=7)
South Tipp*	8	5	63%	00:42 {00:30-01:31}	N/A	01:50 {01:20-02:46}
St James	32	7	22%	00:39 {00:12–00:44}	01:46 (n=1)	01:08 {00:37-01:40}

SVUH	55	18	33%	00:20 {00:13–00:32} (n=6)	00:30 {00:17–01:05} (n=3)	00:54 {00:30–01:52} (n=8)
Tallaght	28	8	29%	00:21 {00:16–00:41}	00:52 {00:45–01:00} (n=2)	01:10 {00:45–01:25}
Waterford	11*	8	73%	00:45 {00:21–01:52}	01:00 (n=1)	01:22 {00:31–04:13}
Wexford	25	11	44%	00:51 {00:32–02:01}	00:51 {00:47–00:55} (n=2)	01:30 {01:05–09:51}
<b>Total</b>	<b>508</b>	<b>210</b>	<b>41%</b>	<b>00:33</b> <b>(00:01–12:37)</b>	<b>01:00</b> <b>(00:14–02:02)</b>	<b>01:22</b> <b>(00:15–13:27)</b>

\*It is possible that some of these patients were diverted to CUH out of hours and are included in those figures.

*Table 16: Reasons for not transferring for thrombectomy*

Reason	Count	%
No LVO	50	24%
Clinical Improvement	10	5%
Large or established Infarct	39	18%
Poor collaterals	28	13%
Poor Baseline	2	1%
Unknown	82	39%

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OVERALL DATASET

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Comparing these data groups we get a better picture for larger number of stroke patients. We note that patients with shorter door to CT, DTN and DIDO times are more likely to be transferred and treated.

*Table 17: Overview of Beaumont Hospital Group Figures*

Beaumont Hospital Group	Year	Door to CT median	Door to needle median	Door to BH contact median	DIDO (hr:min) median
EVT	2020	00:22	00:48	01:00	01:43
	2019	00:21	00:49	00:53	01:41
	2018	00:25	00:50	01:05	01:41
Transferred but deemed unsuitable on arrival at Beaumont Hospital	2020	00:35	00:51	01:12	02:04
	2019	00:30	00:57	01:17	02:08
	2018	00:31	01:00	01:27	02:20
External referral call – no transfer	2020	00:33	01:00	01:22	N/A
	2019	00:35	00:54	01:24	N/A
	2018	00:43	01:07	01:48	N/A
TOTAL	2020	00:27	00:52	01:10	N/A
	2019	00:26	00:50	01:09	N/A
	2018	00:30	00:52	01:20	N/A





# National Thrombectomy Service 2020–2021 Projects

The National Thrombectomy Service is committed to improving patient outcomes through the initiation, leadership and support of projects that improve pre-hospital and in-hospital pathways, processes and the infrastructure that supports the delivery of care.

## PitStop Protocol

**Protocol for Improving Times for STroke patients requiring Onward transfer from Primary stroke centre to thrombectomy centre.**

In 2018, a new protocol was introduced in Naas General Hospital in conjunction with the National Ambulance Service and Beaumont Hospital/National Thrombectomy Service QI. This was extended in Oct 2020 to include Mullingar Midland Regional Hospital and Tallaght University Hospital.

In this protocol, the ambulance crew wait for a decision regarding thrombectomy and then make the transfer, if appropriate. Door in Door out times have been reduced to 45mins, saving 100mins compared to the national average. This requires a fundamental change in how we work with the ambulance service and is very challenging to replicate.

## Door to Decision in 30!

**To Sustain & Spread the improvements made to date, and to identify and support the teams in the implementation of new improvements**

In 2018, a QI project for the care of patients with acute ischaemic stroke commenced. The aim was to reduce the time between arrival and a decision being made regarding the suitability for EVT to 30min.

The changes implemented across the 22 hospitals involved in the project, resulted in great improvements to the patients journey.

In 2020, the sustainability of the improvements previously made, was severely challenged by Covid 19. However allowing for inter-hospital variability, the processes held up and the time metrics were sustained.

There are some steps to take in order to sustain improvements, to ensure the system and performance does not revert to old patterns.



**Celebrate the success to date**



**Remove the old systems**



**Continue to measure - DATA**



**Embed the approach/ anchor the change**



**Build contingencies for outliers**



**Plan to continually improve**

## LVO Bypass Proposal

**Patients identified by EMS as potentially having an LVO, in the Dublin and Cork region, to transfer directly to Beaumont or CUH EVT centers**

The Large Vessel Occlusion (LVO) Bypass proposal was recommended to the National Stroke programme by NOCA through INAS based on the 2019 Annual Report. For patients not identified as LVO positive, they would be transferred to their PSC as before, and would be treated with PitStop protocol.



EMS crew identify severe arm and leg weakness using ACTFAST Scale



If patient is positive (i.e. likely candidate for thrombectomy) Ambulance crew call EVT centre to confirm suitability for bypass



If patient is suitable, they are brought directly to EVT centre, bypassing PSC.



Following the procedure, patients are repatriated to the PSC as soon as clinically possible following a period of observation (<24hrs)

## Thrombectomy Database

**The project has established an easy to use database which may be integrated with National Reporting Systems.**



Together with Beaumont IT, the NTS is developing a standalone database with associated data entry system, interactive dashboard, automated reporting and accessible dataset. This database went live in 2020 and this years report was successfully extracted from this database.

The NTS Database Development Project have been shortlisted for the Intergrated Digital Excellence Category of the HSE Excellence Awards.



**For more information** please contact The National Thrombectomy Service

## NATIONAL THROMBECTOMY SERVICE PROJECTS

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### PITSTOP PROTOCOL: PROTOCOL FOR IMPROVING TIMES FOR STROKE PATIENTS REQUIRING ONWARD TRANSFER FROM PRIMARY STROKE CENTRE TO THROMBECTOMY CENTRE

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In 2018/2019, a new protocol was introduced in Naas General Hospital in conjunction with the NAS and Beaumont Hospital/National Thrombectomy Service Quality Improvement. This resulted in a reduction of the DIDO times for patients from 96mins to 45mins. This protocol, now known as PITSTOP, was extended in Oct 2020 to include MRHM and TUH.

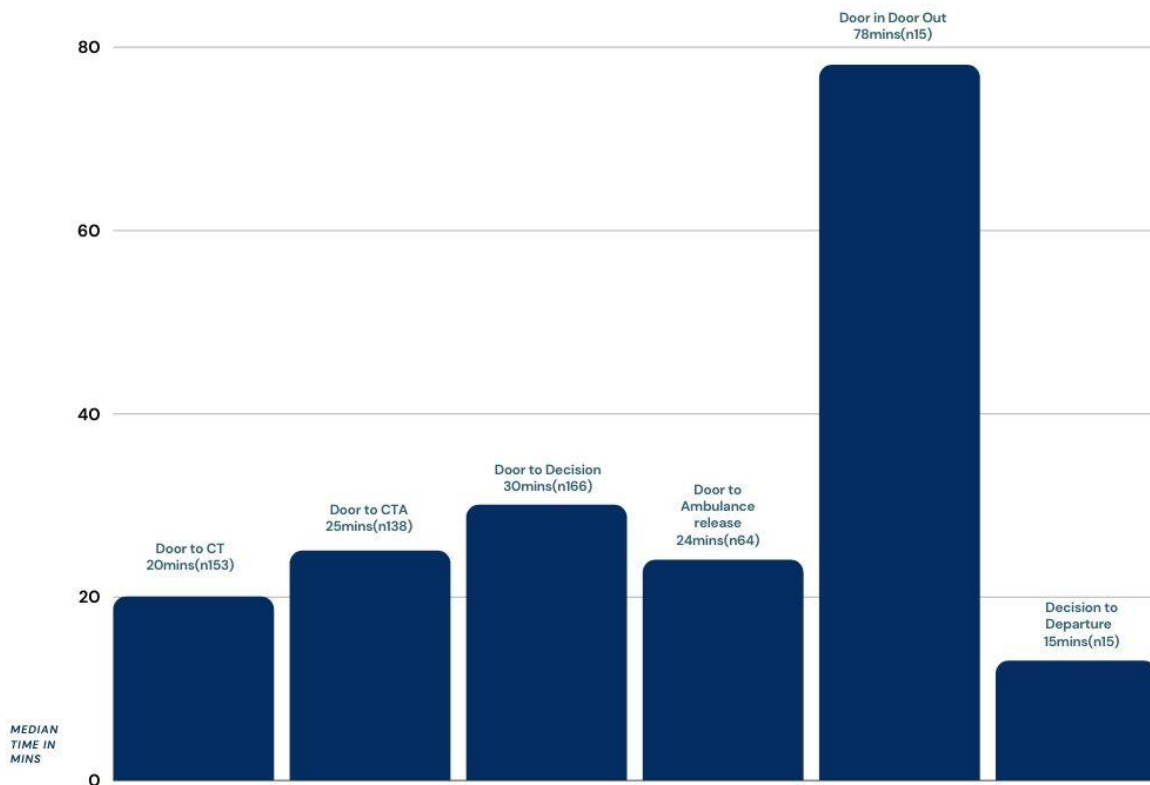
In this protocol, the ambulance crew waits with the patient on arrival to the PSC until a decision is made whether or not to transfer the patient to the endovascular stroke centre. In order for this to operate, the door to decision time must be reduced to under 30 minutes.

To measure the success of the PITSTOP protocol, data is required. As the hospitals involved are already in the QI project 'Door to Decision in 30!' data has been collected and analysed continuously. For the PITSTOP protocol, additional data has been included to measure the efficacy of this initiative. Notably 'Time of ambulance crew release', and 'Time of Decision to Departure' capture the impact of the implemented changes on the patient outcomes.

The PITSTOP protocol data for this report is the data collected in MRHM and TUH from Oct 2020 – April 2021 inclusive. The project is ongoing.

In MRHM and TUH DIDO median times =78mins (n15)

Figure 4: Median time in mins of all PITSTOP data times stamps from Oct 2020 – April 2021 (n169).



Challenges still remain and the PITSTOP hospitals have yet to achieve the Naas times of DIDO. Nonetheless, the impact on the Door to Ambulance Release time is significant for both MRHM and TUH (MRHM =25mins and TUH = 18mins). This means that for non EVT patients the decision is made, and the ambulance teams are released in under 25 mins for both hospitals.

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*MRHM door to ambulance release time = 25 mins (n40)*

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*TUH door to ambulance release time = 18mins (n24)*

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Overall, delays exist with regards to the transport of patients to the endovascular centre once a decision has been made. Reducing the time spent in the PSC (ie reducing the DIDO) is necessary to provide rapid treatment. By having the ambulance waiting with the patient, to complete the transfer to the EVT centre significantly reduces this delay.

The initial PITSTOP data (Oct 2020 -April 2021) captures fifteen patients who had an LVO amenable for mechanical thrombectomy from MRHM and TUH. This equates to 9% (n15) of all the PITSTOP patients referred for EVT to Beaumont Hospital.

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*9% (n15) of all PITSTOP protocol patients were referred to Beaumont from MRHM and TUH for EVT from Oct 2020- April 2021*

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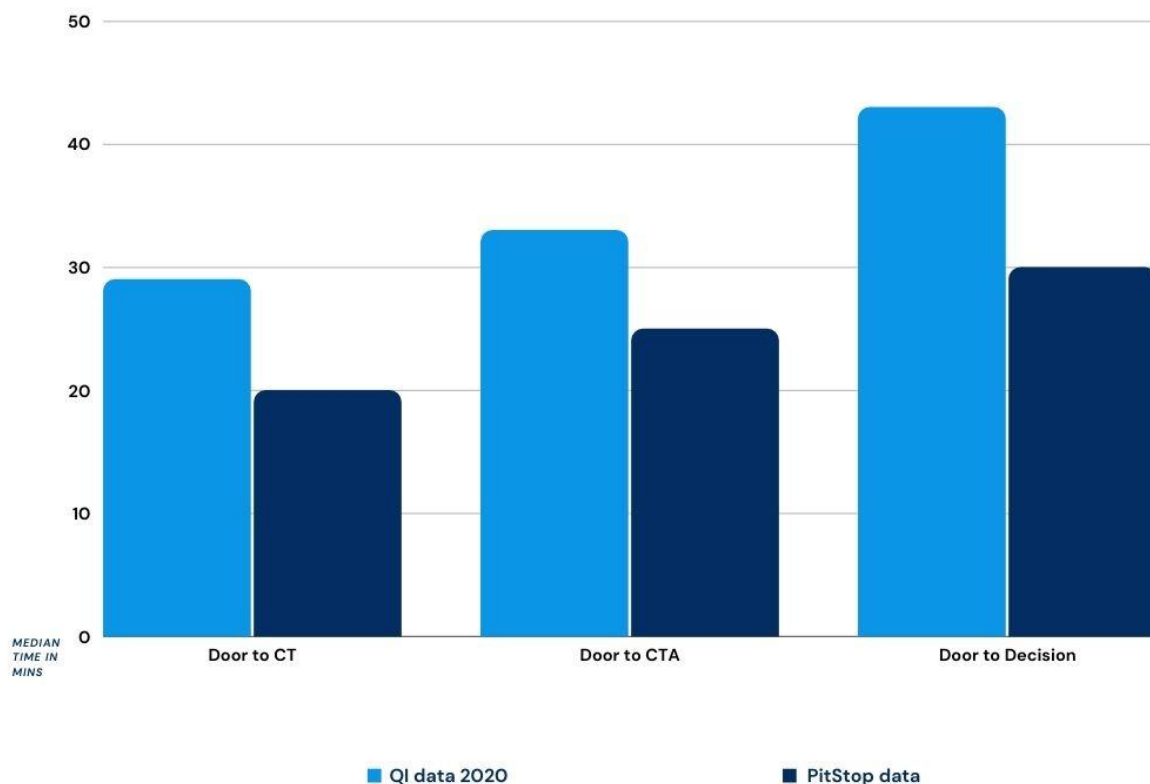
There was a significant reduction in the DIDO times for patients from MRHM and TUH using the PITSTOP protocol compared to the 2020 national median DIDO times (median 78mins V 104 mins).

Our preliminary data not only shows a significant reduction in the DIDO for patients transferred for thrombectomy, but also the additional various non-thrombectomy benefits for those patients identified as not suitable for referral for EVT.

The PITSTOP data showed a reduced Door To CT, Door to CTA and Door to Decision times for the patients who are non-suitable for EVT, when compared against the 2020 national median times (QI data 2020).

The PITSTOP protocol developed is widely applicable and can easily be adopted by other hospital sites where a rapid door-to-decision can be achieved.

*Figure 5: FAST positive patients (n3796) versus PITSTOP patients (n169)*



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### NATIONAL THROMBECTOMY DATABASE

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A large volume of data is collated on patients presenting as FAST positive with possible acute stroke and in particular on those who are referred for thrombectomy. Over the last few years we have been working with Beaumont Hospital IT Department to develop a standalone database (as opposed to an excel spreadsheet!) for data entry and collection. This new electronic database went live in early 2020 and the data for this year's report has been extracted from it.

There are huge benefits to this: we can provide the feedback form with all of the patient's time metrics and the thrombectomy procedure details, immediately after the procedure is completed, ready for sending back with the patient being repatriated post thrombectomy.

Ongoing work is being performed to improve the reporting capabilities and hopefully to enable mobile access to the database. The NTS Database Development Project was entered under the Integrated Digital Excellence Category of the HSE Excellence Award competition and we are delighted to announce that we have been shortlisted and forwarded to the Selection Panel for this Category. Our project was one of 671 projects received, so to get shortlisted is an achievement itself.

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## NATIONAL THROMBECTOMY SERVICE MEETINGS

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The first NTS meeting took place in October 2017.

In January 2020, the second NTS meeting was held at the RCSI. This was well attended and we heard about the QI journeys from Connolly, Limerick and Tallaght hospitals.

Due to the impact of Covid 19, we have been unable to host another 'in person' meeting

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## LVO – LARGE VESSEL OCCLUSION PATHWAY

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In 2019 INAS/NOCA reported the median time of onset to arrival at EVT centre of 1hr 33mins for patients who arrived directly to the EVT stroke centre compared to 4hrs for those who were transferred from another hospital. They also reported the onset to reperfusion times were 3hrs 32mins for those presenting directly to EVT centers and 4hrs 39 mins for those using the drip and ship model. One of the key recommendations from the report was to develop a pilot LVO pathway.

In this proposed pathway patients in the Dublin region who are identified as potentially having an LVO stroke, would be transferred directly to Beaumont Hospital EVT centre for treatment. The initial assessment by the ambulance crew would identify severe arm and leg weakness by using the ACTFAST scale. If positive, the ambulance crew would contact the EVT centre directly to confirm suitability for bypass. The patient is then brought directly to the EVT centre, bypassing the PSC. Following the procedure, the patient would be repatriated to their PSC as soon as is clinically possible following an observation period.

The recommendation to the NSP is for the NTS to work with the NSP, CAG and acute hospital division of HSE to develop this for Beaumont Hospital and CUH.

At the time of writing we are waiting for a steering group to be implemented in these hospitals.

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## NATIONAL STROKE QUALITY IMPROVEMENT PROJECT

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In 2018, the National Thrombectomy Service and Beaumont Hospital Stroke team, in conjunction with the Royal College of Surgeons (RCSI) of Ireland, commenced the national Quality Improvement (QI) Collaborative Project “Door to Decision in under 30!”. The aim of this collaborative was to improve and sustain the interval between the time of the arrival of the patient in hospital, the clinical and radiological diagnosis and decision making process.

The primary outcome metric was the “door to decision” time i.e. the time interval between arrival at hospital and a decision being made regarding the suitability of the patient for emergency thrombectomy.

The official collaborative process comprising formal learning sessions and action periods ended in June 2019. However, all participating hospitals have committed to continue engaging with the project and to continue collecting data and testing service improvements into 2020 and 2021.

Despite the challenges of Covid 19 on the HSE, in 2020 the hospitals involved in the ‘Door to Decision in 30!’ project managed to collect more FAST+ patient datasets than in 2019. Congratulations to all on continued improvements and sustainability.

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*Despite the challenges of Covid 19 on the HSE, in 2020 the hospitals involved in the ‘Door to Decision in 30!’ project managed to collect more FAST+ patient datasets than in 2019. Congratulations to all on continued improvements and sustainability.*

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The data collected by each team aims to reflect not only the patients journey from arrival to the hospital to decision for EVT, but also the activities of the teams responding to all the FAST calls, even if the patients do not require thrombectomy or are not having a stroke. We do acknowledge that not all FAST+ calls have been captured or have completed data sets as each team vary in their ability to continue to collect the data.

*Table 18: Comparison of FAST positive data 2018 versus 2019 versus 2020.*

Date Range	Fast+ Patients Total	Total “Time Of Decision” Recorded (%)	Median Door To CT <sup>1</sup> {IQR}	Median Door To CTA <sup>1</sup> {IQR}	Median Door To Decision <sup>1</sup> {IQR}
Jan – Dec 2018 <sup>1</sup>	383	59 (15.4%)	30mins {17-78mins} n358	35mins {24-66mins} n272	71mins {42-131mins} n54
Jan – Dec 2019 <sup>2</sup>	3740	1562 (43.4%)	32mins {18-61mins} n3050	34mins {22-59mins} n2131	37mins {23-62mins} n1462



Jan – Dec 2020 <sup>3</sup>	3796	1891 (50%)	29mins {18-53mins} n3345	33mins {23-53mins} n2452	43mins {27-68mins} n1830
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- <sup>1</sup>17 hospitals
- <sup>2</sup>23 hospitals (St. James not included)
- <sup>3</sup>2 hospitals (St. James & Portiuncula not included)

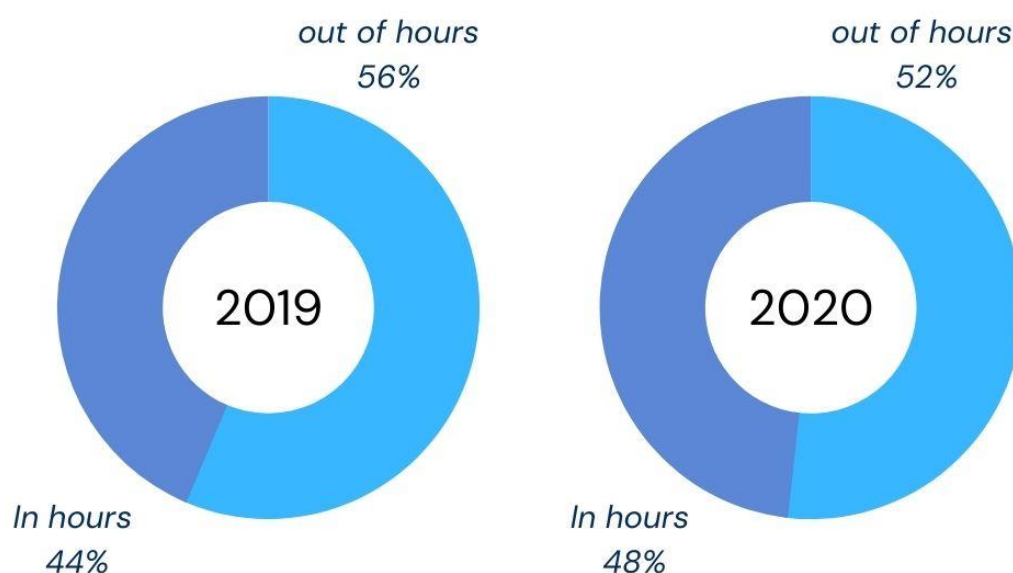
### IN HOURS VERSUS OUT OF HOURS

For this report the 'in hours' is defined as Monday to Friday 9am to 5pm and the 'out of hours' is defined as all other times (including public holidays and weekends).

The initial focus of the QI project was to concentrate on the 'in hours' systems and processes, with the aim of making changes to improve these processes. The 'out of hours' processes have also improved as a result but delays still exist.

The proportion of patients presenting 'in hours' and 'out of hours' remained consistent throughout 2020, compared with 2019 (Fig 6).

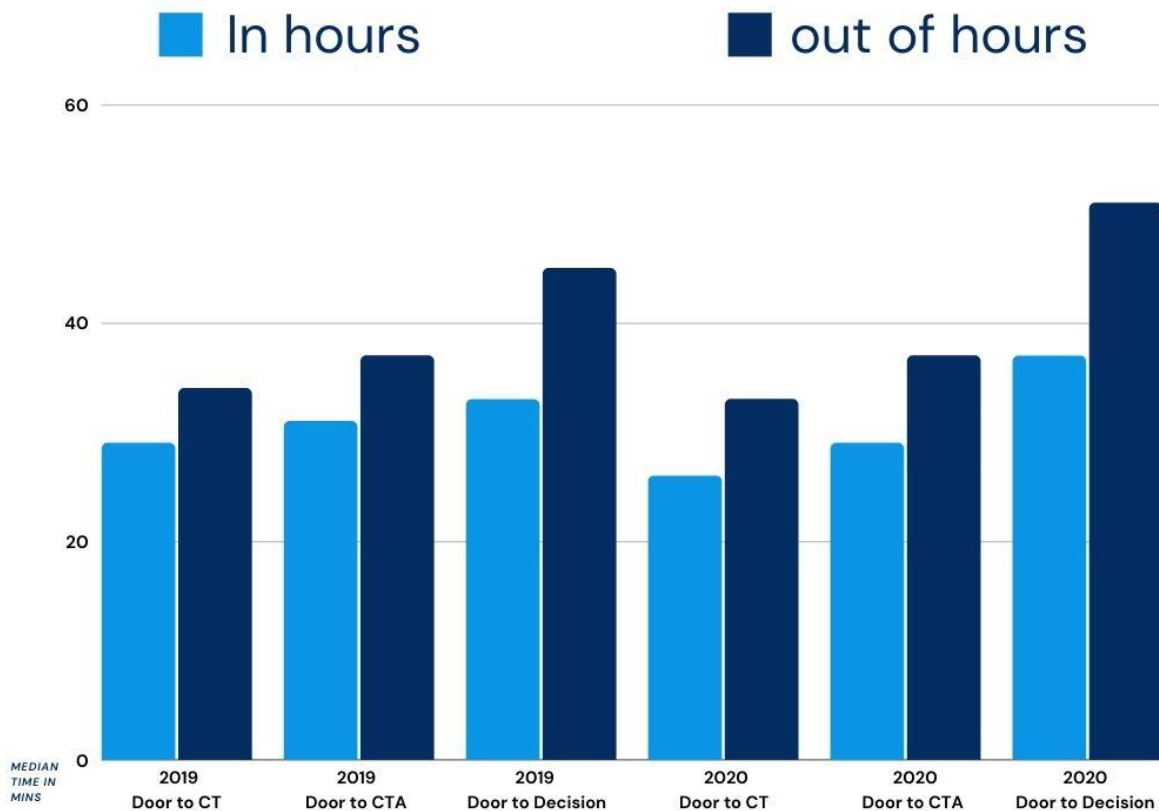
Figure 6: Comparison of number of patients presenting as FAST positive in hours versus out of hours per year.



As per (Fig 7) below, the 'in hours' times for Door to CT, Door to CTA, Door to Decision & Door to TPA in 2020 have improved compared to 2019 times, but the 'out of hours' times remain much slower. Whilst trying to provide a 24/7 stroke service, challenges including lack of access to imaging, not having staff onsite 24/7 and access to key decision makers may attribute to the out of hours delays.

Considering the number of patients presenting ‘in hours’ is 48% compared with ‘out of hours’ of 52%, this shows the importance of establishing standardized processes which can be adapted for ‘out of hours’ use.

Fig 7: Comparison of FAST positive Data in hours versus out of hours



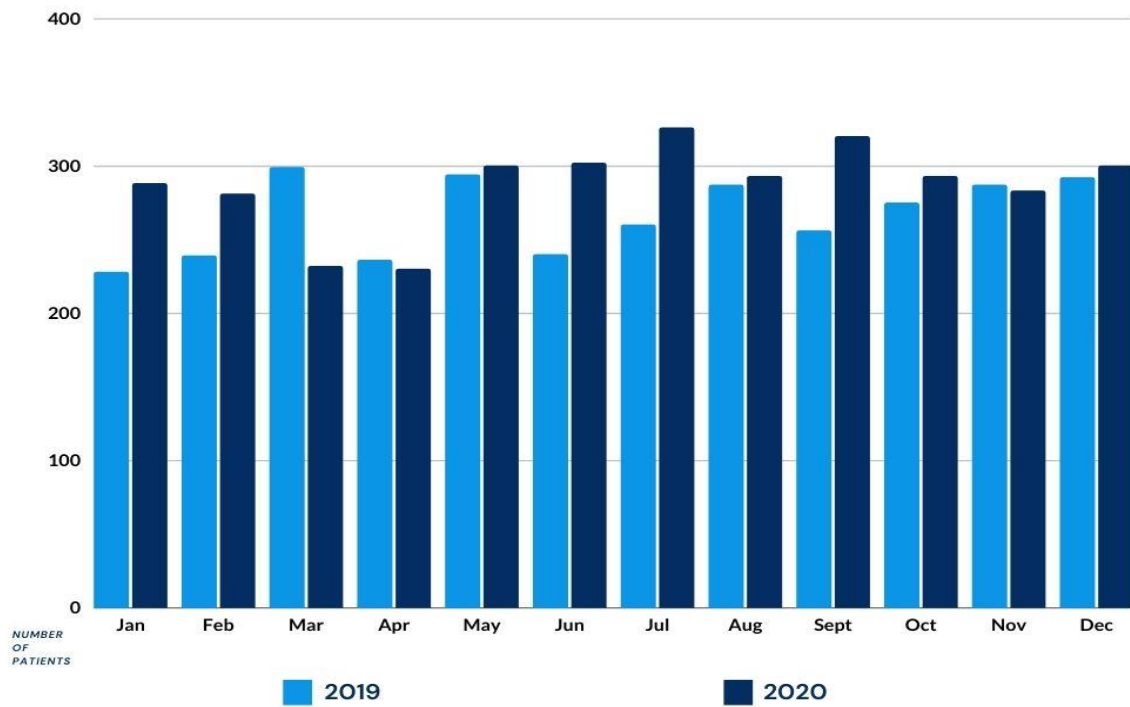
#### IMPACT OF COVID 19 ON PATIENTS PRESENTING TO HOSPITAL

The impact of Covid 19 across the HSE in 2020 affected the QI data collection and the patient’s journey. Challenges of Covid 19 on the hospital teams may include: staff redeployment, increased staff sick leave, less patients presenting, delays in presenting to their local hospitals during lockdown periods, extra infection control procedures introduced in each hospital. Despite the challenges of Covid 19, the amount of data collected increased in 2020 compared to 2019.

The comparison of FAST data for 2019 and 2020 (Fig 8) shows the fluctuation in the number of patient presentations per month. It shows a decrease during the initial lockdown period in March 2020 and an increase in the summer months.

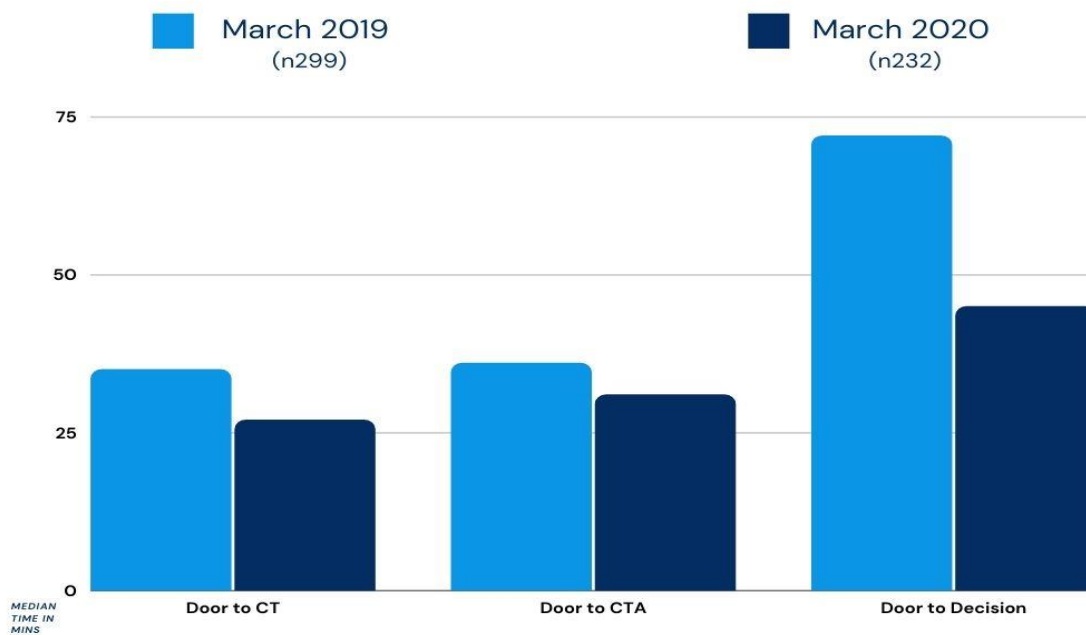


Fig 8: Comparison of number of FAST positive patient data sets captured per month per year



A snapshot of the March 2019 data versus the March 2020 data shows that despite fewer data sets captured during March 2020, the door to CT, door to CTA and door to thrombolysis times were faster than in the same period in 2019 (Fig 9).

Fig 9: Comparison of time metrics of FAST positive data March 2019 versus March 2020



## DOOR TO THROMBOLYSIS

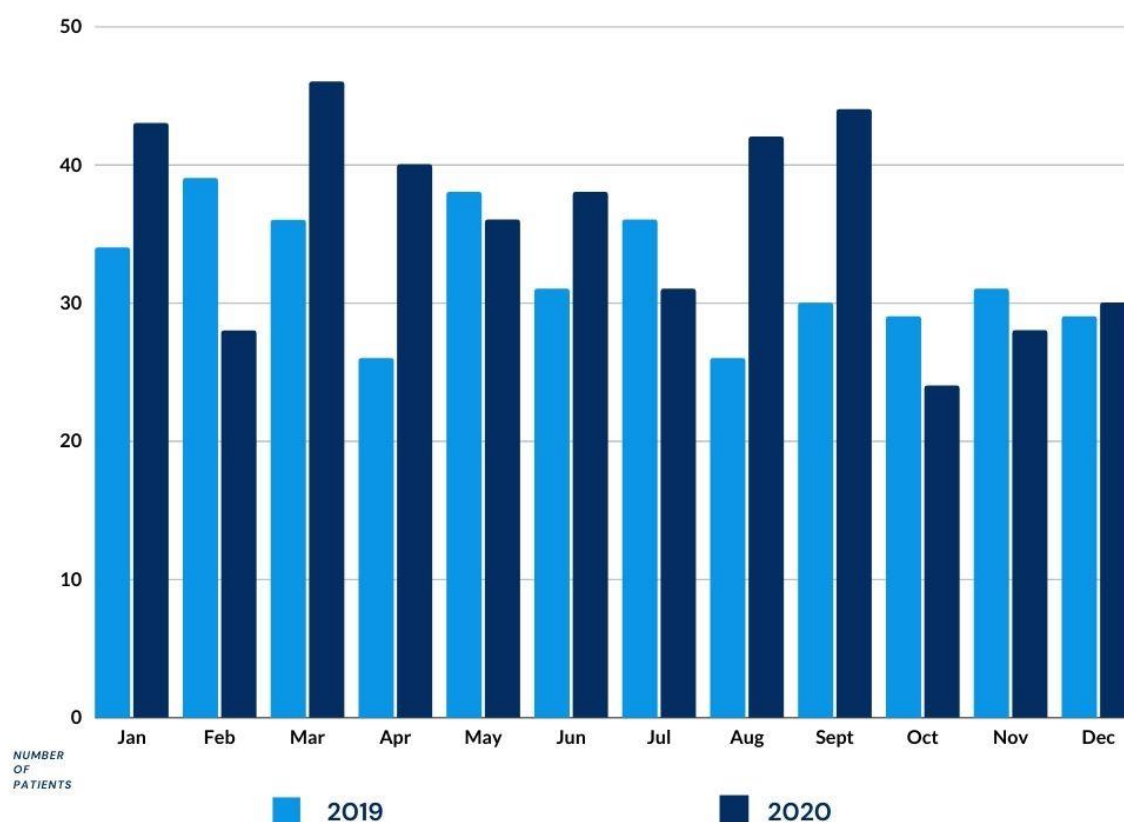
The NOCA Irish National Audit of Stroke for 2019 (NOCA, 2019) recorded that 10.6% (n389) of people with ischaemic strokes received thrombolysis therapy. The median door to needle time was measured at 56mins for (n353) no door time available or perhaps they were in patients.

The FAST+ data collected through the QI project recorded similar figures in 2019. Based on the data we received from stroke teams, we recorded 422 cases of patients receiving thrombolysis with recorded median times of door to thrombolysis = 51mins (n371). A possible reason for the increased number of cases relative to the NOCA figure is that some patients may turn out not to have a stroke diagnosis on discharge, even though they have received thrombolysis on admission.

In 2020 the QI Fast+ data identified 451 patients who received thrombolysis. This is a 7% increase on the number of patients receiving thrombolysis since 2019.

DTN times were captured for 426 patients. The median door to needle time was 53 mins. We await the formal national figures for 2020 from NOCA.

Figure 10: Comparison of the number of patients who received thrombolysis per month in 2020 compared to 2019.



## ROOM FOR IMPROVEMENT

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Whilst the data for 2020, showed some faster times, there is always room for improvements. Part of the QI process is to ensure that the improvements made are sustainable. For the result of the collaborative to be sustained and improved it is important that the work is owned and integrated into mainstream services and infrastructure.

The National Stroke Strategy for 2021-2026, (National Stroke Programme, 2020) recognise that the acute treatment for patients with ischaemic stroke, especially in the time sensitive treatments of thrombolysis and thrombectomy, is an area requiring continuous quality improvement.

A recommendation from the strategy is that all hospitals receiving acute stroke patients have a specialist-led rapid access stroke service or access to such a service within their hospital network. This service must have adequate staffing and diagnostic resources to provide 24/7 acute stroke care and treatment. It is also recommended that all patients recovering from a stroke have access to a similar specialist secondary prevention stroke service and diagnostics (NSP, 2020).

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*Continuous quality improvement is required to ensure old patterns of working do not remerge*

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The need for continuous quality improvements highlights the importance for teams to lock in the progress that has been made and to continually build upon it.

There are some steps to take, in order to sustain improvements, to ensure the system and therefore performance, does not revert to old patterns (Aurum Institute, 2020).

1. Celebrate: it is important to reinforce successful behaviour with recognition
2. Remove the old systems: do not be tempted to resort back to the old ways!
3. Continue to measure: this will provide an objective means of identifying if you are managing to sustain your improvements.
4. Embed the approach: Making measurement systems permanent, developing SOP's etc.
5. Make it hard not to follow the new process
6. Connect with hearts as well as minds : engage with individuals' values and beliefs
7. Build contingencies for known exceptions : have a plan for when this does occur
8. Plan to continually improve: New processes can quickly become old processes – lock in the progress and continually build upon it.

The QI process has shown us how to set goals, identify change ideas and measure to see if changes are an improvement. Going forward we can continue to apply these techniques in response to patients' needs, best practices and policy changes.

Table 19: 2020 Fast Positive Patient Data by Individual Hospital

Hospital	Date Range	2020Fast+ Patients Total N (2019 N) {2020 Total Ischaemic Strokes}	Total "Time Of Decision" Recorded (%)	Median Door To CT <sup>1</sup> Mins {IQR}	Median Door To CTA <sup>1</sup> Mins {IQR}	Median Door To Decision Regarding Thrombectomy <sup>1</sup> Mins {IQR}
<sup>2</sup> Bantry	Jan – Nov 2020	24(↓33) {64}	12 (48%)	14 (↑6mins) {3-29mins} n18	63(↑40mins) {29-116mins} N5	22(↑7mins) {17-51mins} n11
Beaumont	Jan – Dec 2020	506 (↓119) {668}	445 (88%)	28(↓2mins) {19-41mins} N438	32(↓1min) {23-47mins} N420	37(↓1min) {26-55mins} N385
<sup>3</sup> Cavan General Hospital	Jan – Dec 2020	26(↓35) {125}	0%	21(↓41mins) {15-54mins} N24	22(↓22mins) {15-54mins} N20	
Connolly Hospital	Jan – Dec 2020	108(↓8) {196}	99 (92%)	31(↑7mins) {20-67mins} n106	30(↑3mins) {23-61mins} n56	34(↑9mins) {25-70mins} n99
Cork University Hospital	Jan – Dec 2020	511(↓8) {434}	64 (12.5%)	35(↓15mins) {21-102mins} N490	31(↓1mins) {22-56mins} N227	39(↓9mins) {31-54mins} N62
<sup>3</sup> LOL Hospital Drogheda	Jan – Dec 2020	40(↓4) {222}	0%	19(↓3mins) {15-33mins} N35		
University Hospital Galway	Jan – Dec 2020	405(↑224) {210}	127 (31%)	39(↑16mins) {20-160mins} N347	31(↑5mins) {20-60mins} N204	60(↓13mins) {42-90mins} N116
University Hospital Kerry	Jan – Dec 2020	232(↑65) {126}	187 (80%)	21(↑3mins) {14-49 mins} N220	27(↔) {19-52 mins} N196	59(↑23mins) {42-86mins} N165
St Lukes Hospital Kilkenny	Jan – Dec 2020	72(↑50) {123}	15 (21%)	35(↔) {23-47mins} N71	36(↓1min) {25-50mins} N42	60(↓4mins) {42-84mins} N15
Letterkenny University Hospital	Jan – Dec 2020	67(↓26) {166}	5 (7%)	45(↓10mins) {26-66mins} n67	46(↓15mins) {30-67mins} N48	88(↑15mins) {71-105mins} n5
University Hospital Limerick	Jan – Dec 2020	167(↑20) {367}	165 (99%)	38(↓3mins) {22-57mins} N150	53(↑14mins) {34-78mins} N136	65(↑11mins) {44-88mins} N150
Mater Misericordiae	Jan – Dec 2020	513(↑22) {258}	55 (11%)	22(↓3mins) {15-33mins} N463	28(↓2mins) {21-38mins} N411	56(↑16mins) {37-72mins} N54
Mayo University Hospital	Jan – Dec 2020	120(↓26) {191}	84 (70%)	45(↓14mins) {34-76mins} N112	48(↓21mins) {35-71mins} N77	62(↓2mins) {36-89mins} N79
Mercy University Hospital	Jan – Dec 2020	20(↓29) {84}	20 (100%)	31(↓35mins) {23-44mins} N17	41(↓2mins) {35-54mins} N11	41(↓8mins) {25-52mins} N17
MRH	Jan – Dec	169(↑68)	141	20(↔)	29(↑2mins)	30(↓1min)

Mullingar	2020	{135}	(83%)	{14-31mins} N139	{20-38mins} N133	{18-41mins} N138
<sup>2</sup> Naas General Hospital	Jan – Oct 2020	215(↑73) {170}	40 (19%)	28(↑11mins) {17-43 mins} N198	33(↑11mins) {22-47 mins} N150	41(↑6mins) {27-61mins} N40
<sup>2</sup> Sligo General Hospital	Jan – July 2020	30(↓62) {167}	28 (93%)	42(↓8mins) {22-61mins} N30	44(↓2mins) {26-62mins} N19	45(↑7mins) {32-60mins} N27
South Tipperary General Hospital	Jan – Dec 2020	63(↓23) {77}	63 (100%)	27(↓8mins) {20-38mins} n63	38(↓17mins) {28-55mins} n35	39(↓7mins) {26-57mins} N62
<sup>3</sup> St. Vincent's University Hospital	Jan – Dec 2020	46(↓119) {351}	17 (37%)	26(↓1min) {14-38mins} N47	22(↓13mins) {14-45mins} N10	54(↑1min) {25-69mins} N17
Tallaght University Hospital	Jan – Dec 2020	258(↑49) {244}	257 (100%)	35(↑6mins) {19-58mins} N209	39(↑6mins) {25-63mins} N181	41(↑6mins) {27-66mins} N257
University Hospital Waterford	Jan – Dec 2020	91(↓1) {139}	29 (32%)	32(↓1min) {24-52mins} N62	45(↔) {32-71mins} N50	46(↓19mins) {28-67mins} N28
Wexford General Hospital	Jan – Dec 2020	112(↑9) {99}	94 (84%)	41(↓5mins) {37-50mins} N40	53(↓6mins) {46-60mins} N22	23(↓9mins) {13-39mins} N92

- <sup>1</sup>Excluding inpatients
- <sup>2</sup>Not a full year of data provided
- <sup>3</sup>Data provided was Thrombectomy/Thrombolysis only pts

Although the overall data demonstrates improvement in each metric, there remains variability between hospitals

In 2020, 7 hospitals attained median Door to Decision times of less than 40mins. This is lower than 2019 data of 10 hospitals. Of these 7 hospitals, 4 have achieved a median Door to Decision time of 35mins or less, with 3 hospitals attaining median Door to Decision times of less than 30mins.

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*7 hospitals attained median door to decision times of less than 40mins.  
Of these, 4 achieved a time of 35mins or less, with 3 hospitals attaining  
median door to decision times of less than 30mins*

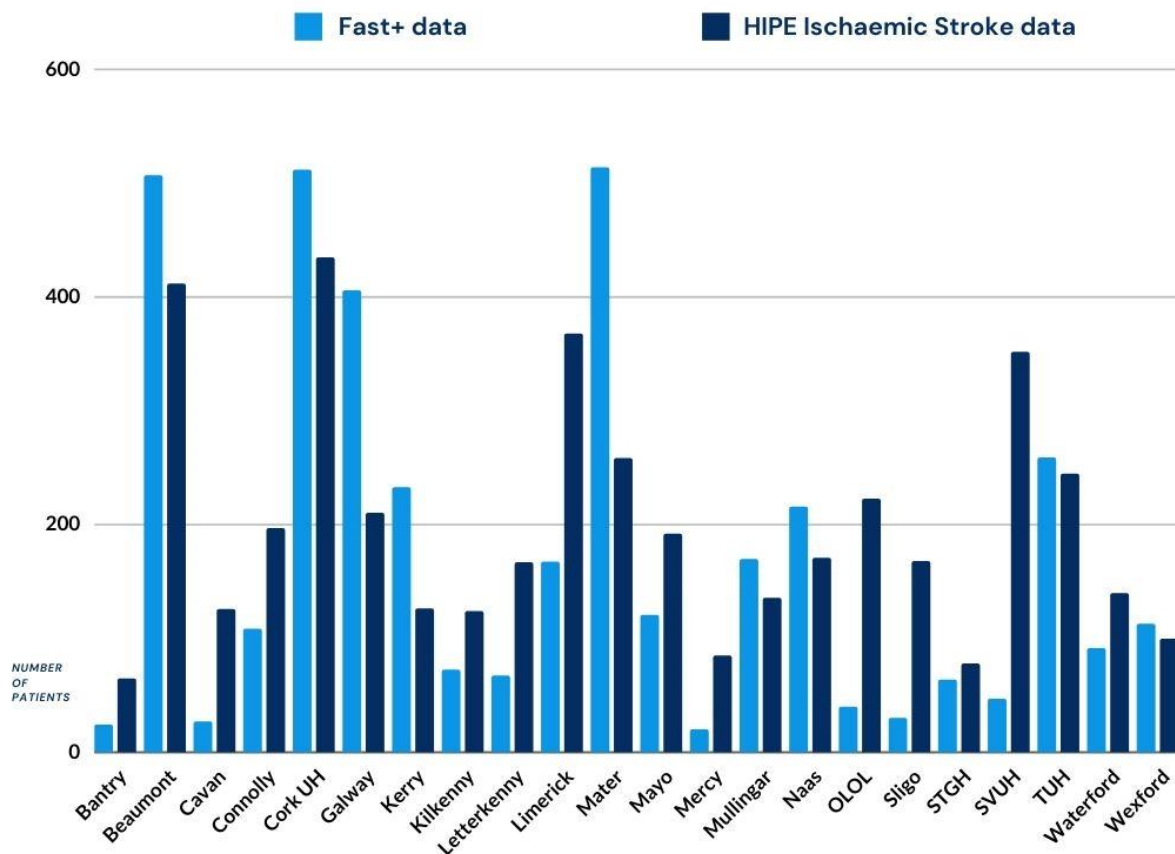
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The QI process involves the collaboration and cooperation of the wider MDT, however special thanks must go to the Clinical Nurse Specialists and Advanced Nurse Practitioners for their ongoing commitment to the collection of this data and leadership of local improvement efforts.

Abstracts summarising the QI Project to date have been accepted for presentation at both the European Stroke Organisation Conference 2020 and the International Society for Quality in Healthcare Conference 2021 (postponed from 2020).

Limitations in data collection: It is worth noting that data collection practices and definitions can vary between hospitals; therefore, the comparison of individual hospitals should be undertaken with caution. We do acknowledge that not all FAST+ calls have been captured or have completed data sets, as each team vary in their ability to collect the data.

Figure 11: Amount of FAST positive data sets per hospital in 2020 versus the amount of total ischaemic strokes recorded on HIPE in 2020.





# Door to Decision in 30! 2020 QI Review

A Quality Improvement Project for the care of patients with acute ischaemic stroke commenced in 2018. The aim of this collaborative is to reduce the door to decision time. Despite the impact of COVID 19 on the stroke service all the teams continued to work together to improve the FAST journey for our patients.

## The impact of Covid 19

In 2020 despite the impact of the Covid 19 pandemic, the teams involved in the QI project, continued to sustain the changes implemented throughout the project, to help improve patient outcomes. The teams continued to make best efforts to collect the data and as a result the number of patient data sets collected increased to 3796 for 2020. The Door to CT and Door to CTA times improved, but there was a small increase in the decision times recorded in 2020.

22



### Hospitals

In 2020, the QI Collaborative incorporated 22 hospitals around the country.

3796



### FAST + Patients

3796 FAST patient journeys were documented as part of the QI project in 2020.

392



### Thrombectomies

In 2020, 392 patients underwent emergency thrombectomy.

## Door to Decision 43 mins



Median time from door to decision for treatment for all FAST+ patients was 43 mins (n1818).

## Decisions Recorded 1947



1947 patients had the time of decision regarding their suitability for thrombectomy recorded in 2020,

## Door to CT 29 mins



The median time from arrival at hospital to CT Brain was 29 mins (n 3343). A decrease of three minutes from 2019 (n3050)



## Door to CTA 33 mins



The median time from arrival at hospital to CT Angiography was 33 mins (n 2453). A decrease of one minute from 2019 (n2131)

*For more information* please contact The National Thrombectomy Service

## ANNUAL REPORT COMPILED BY:

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Assoc. Prof. John Thornton	Consultant Neuroradiologist & Director of National Thrombectomy Service, Neuroradiology Department, Beaumont Hospital <a href="mailto:johnthornton@beaumont.ie">johnthornton@beaumont.ie</a>
Ms. Sinead McElroy	Business Lead, National Thrombectomy Service, Neuroradiology Department, Beaumont Hospital <a href="mailto:sineadmcelroy@beaumont.ie">sineadmcelroy@beaumont.ie</a>
Ms. Roisin Walsh	Quality Improvement Lead, National Thrombectomy Service, Neuroradiology Department, Beaumont Hospital <a href="mailto:roisinwalsh@beaumont.ie">roisinwalsh@beaumont.ie</a>
Dr. Naomi Nowlan	Quality Improvement Lead, National Thrombectomy Service, Neuroradiology Department, Beaumont Hospital <a href="mailto:naominowlan@beaumont.ie">naominowlan@beaumont.ie</a>
Dr. Matt Crockett	Consultant Neuroradiologist Neuroradiologist Department, Beaumont Hospital <a href="mailto:matthewcrockett2@beaumont.ie">matthewcrockett2@beaumont.ie</a>
Dr. Karl Boyle	Stroke Consultant & Joint Clinical Stroke Lead Beaumont Hospital <a href="mailto:karlboyle@beaumont.ie">karlboyle@beaumont.ie</a>
Dr. Aidan Hegarty	Radiology Registrar Neuroradiology Department, Beaumont Hospital
Dr. Darragh Herlihy	Radiology Registrar Neuroradiology Department, Beaumont Hospital <a href="mailto:darraghherlihy@beaumont.ie">darraghherlihy@beaumont.ie</a>
Ms. Emma Martin	Stroke & Thrombectomy CNS Stroke Service Beaumont Hospital <a href="mailto:strokecns@beaumont.ie">strokecns@beaumont.ie</a>
Dr. Jack Alderson	Research Registrar, Neuroradiology Department, Beaumont Hospital



Ms. Jackie Fitzpatrick

Business Lead, National Thrombectomy Service, Neuroradiology  
Department, Beaumont Hospital

Special mention must be made of the stroke CNS and ANPs around the country who have lead roles in rolling out the QI process in their hospitals and gathering the large volume of data which gives us a clear vision of the acute stroke pathway in their hospitals.

We acknowledge the hard work and dedication involved in data collection at time of referral, or acute admission by the radiology/stroke teams here in Beaumont - Neuroradiologists; Dr. Paul Brennan, Dr. Dr. Alan O'Hare, Dr. Seamus Looby and Dr. Sarah Power, Stroke Physicians; Prof. David Williams, Dr. Barry Moynihan, Dr. Kevin Cregg, CNS; Julie Lynch and Sarah Smith along with the radiology registrars, nurses and radiographers. The team in CUH - Neuroradiologists; Dr. Gerry Wyse and Dr. Noel Fanning, Stroke Physician; Dr. Liam Healy, Stroke CNS; Karena Hayes and Glen Arrigan.

Great efforts were made to ensure accuracy and analysis of the data to the best of our ability. If any further information is required, please do not hesitate to contact any of the NTS team.

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