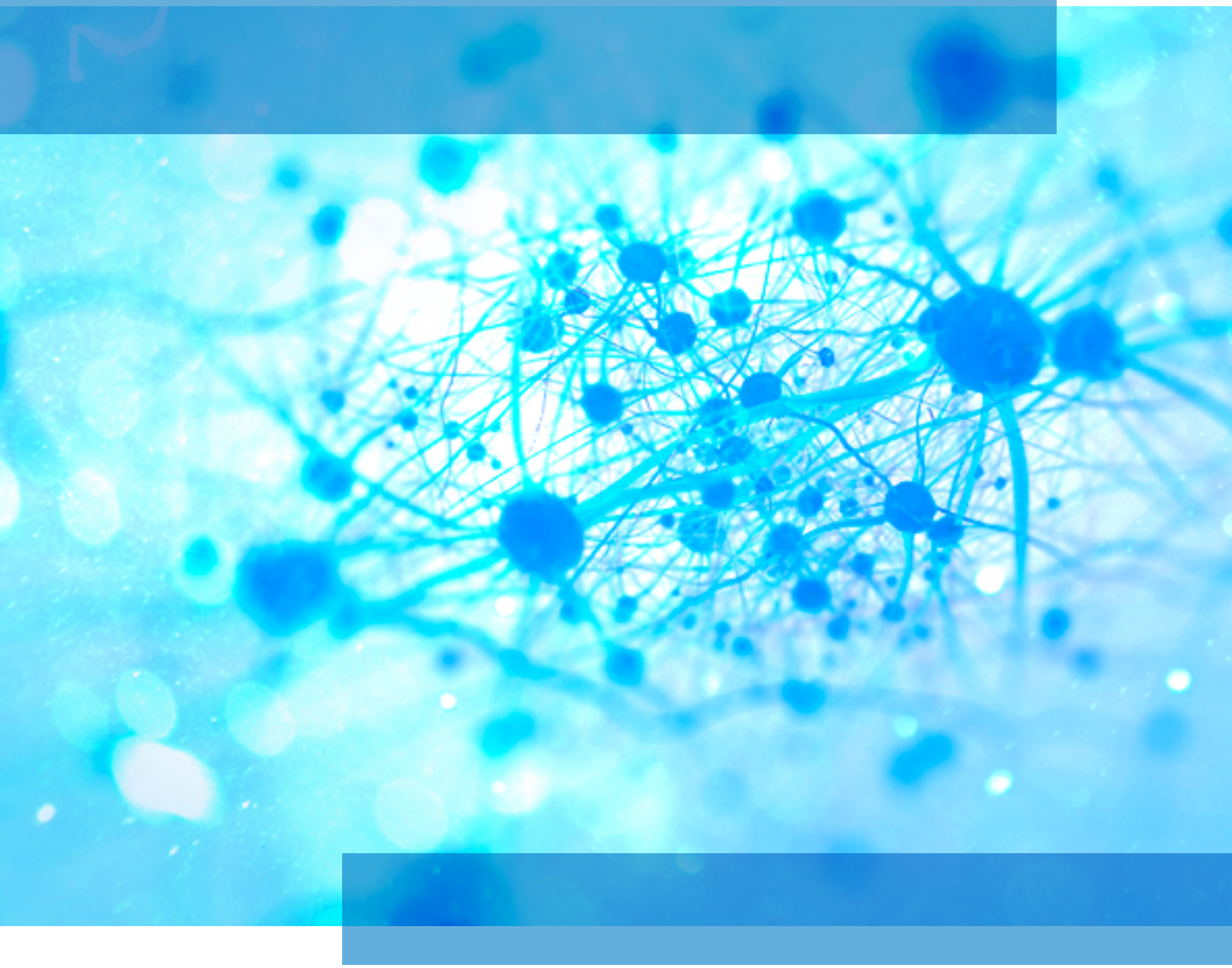
National Stroke Strategy 2022-2027



ROYAL COLLEGE OF PHYSICIANS OF IRELAND

National Clinical Programme for Stroke

Clinical Design & Innovation

Person-centred, co-ordinated care

Stroke is the second leading cause of death in middle to higher income countries and the leading cause of acquired adult neurological disability in Ireland.

Endorsement Letter from Dr Colm Henry

The National Clinical Programme (NCP) for Stroke was established in collaboration with the Royal College of Physicians of Ireland in 2010 to reorganise and develop our acute stroke services to meet the principles set out in the "Changing Cardiovascular Health: National Cardiovascular Health Policy 2010-2019". The initial goal was to prevent one death or disability from stroke each day by ensuring improved access to specialist opinion with acute stroke treatment and specialist-led stroke unit care.

As this programme has progressed, mortality from stroke has fallen from 19% to 11% in 2020. We have seen both the outcomes and recovery from stroke greatly improved by organised pathways of acute stroke care which includes pre-hospital, hospital and inter-hospital pathways to ensure that acute treatments such as thrombolysis, endovascular thrombectomy (EVT) and potentially new treatments for intracerebral haemorrhage are delivered appropriately and effectively.

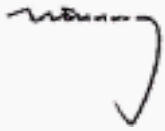
However stroke still remains the second leading cause of death in middle to higher income countries and the leading cause of acquired adult neurological disability in Ireland. Approximately 5,800 adults were admitted to our hospitals with a stroke in 2020, accounting for up to 4% of total health expenditure annually.

The National Stroke Strategy was developed by the multi-disciplinary Clinical Advisory Group (CAG) under the clinical governance and leadership of the NCP for Stroke and underwent extensive consultation with internal and external stakeholders.

The National Stroke Strategy's aim is particularly focused on achieving integration across primary, acute and social care services in line with Sláintecare. The strategy is described across four pillars, 'Prevention', 'Acute Care & Cure', 'Rehabilitation and Restoration to Living' and 'Education and Research', for our population.

I would like to extend my sincere thanks to Professor Rónán Collins, the clinical lead for the NCP for Stroke, the CAG and colleagues who have brought this strategy to fruition.

I fully support and endorse this strategy and I look forward to seeing significant progress and further improvement in patient outcomes over the next 5 years. Ba mhaith liom buíochas a ghabháil le achan dhuine ar oibrigh ar mhaithe leis an stratéis seo agus tá súil agam go mbeidh muid ag obair as lámh a chéile chun na moltaí uilig a chur i bhfeidhm sna blianta atá romhainn.



Dr Colm Henry
Chief Clinical Officer, HSE.

Foreword

The National Stroke Strategy 2022-2027 represents the single greatest investment in stroke services since the launch of the National Clinical Programme for Stroke in 2010.

In 2018, the clinical advisory group proposed the need for such a strategy to the minister for health and decided on a four pillar approach to the challenges of 'prevention', 'acute care and cure', 'rehabilitation and restoration to living' and 'education and research' in stroke. The programme had decided unlike previous healthcare strategies to be somewhat more granular and specific to address our current significant deficits in stroke care. The strategy was to focus on four or five high impact measures across the four pillars that were deliverable in the relatively short time frame of five years, the usual life span of a government administration.

Stroke will be a major challenge over the next decades with an ageing demography and will become the second leading cause of death and dementia in the developed world. The Kings College London report on the 'Burden of Stroke in Europe' predicts a 59% increase in stroke numbers in Ireland and more will need to be done, and urgently, to reduce the burden of stroke in Ireland. Many of the risk factors for stroke and most notably high blood pressure, are also major risk factors for diseases that most threaten our health in later life, such as heart failure, atrial fibrillation, dementia, visual loss and kidney disease. Healthy ageing needs action at a young age and the National Stroke Strategy has sought a real and resourced partnership with other stakeholders to tackle blood pressure and atrial fibrillation as key primary preventative measures.

The National Stroke Strategy seeks the designation of over 100 acute stroke unit beds across our health care system, calculated to account for the likely local demographic changes and to ensure that 90% of acute stroke patients get into an acute stroke unit bed and spend 90% of their acute hospital stay in that bed, our national KPI for acute stroke care. The strategy seeks to ensure our stroke units are properly staffed and not just 'signs over doors' and can deliver on the reduced mortality and improved outcomes that stroke unit care delivers. It also importantly ensures that our endovascular thrombectomy centres are able to provide this life-changing treatment to all our population on a 24/7 basis

When fully implemented the National Stroke Strategy will be providing an evidence based care pathway to 92% of the stroke patient population that allows patients to leave hospital earlier and continue their recovery at home with better outcomes for patients and more efficient bed use for the health service. Early supported discharge (ESD) teams have already delivered during the pandemic and more can be achieved. We in the programme feel a quarter of patents could be treated through ESD returning almost 5,500 beds days to the health service. We have also begun to address the lack of psychological support for patients, post-stroke, and the need for more practical and 'signposting' support for patients post-stroke through provision of clinical psychology and stroke key worker posts.

Education is a key concern of the National Clinical Programme for Stroke. The Irish National Audit for Stroke (INAS) has shown that less than half of all patients present to hospital within 3 hours, greatly limiting treatment options and the efficacy of those treatments. This needs to improve and we have set aside a budget to work with the Irish Heart Foundation and other professional societies and advocacy groups to improve public knowledge on stroke and risk factors for stroke. We also need to do more to support the education and career opportunities for healthcare staff of all disciplines in stroke care and the strategy seeks to create a dedicated continuing professional development fund and stroke fellowships in partnership with the Royal College of Physicians of Ireland (RCPI) , which will be open to all disciplines. Research in stoke delivers new treatments and innovative ways of doing things that benefit our patients and this must be supported in our universities. Our strategy commits to the creation of professorships in neurovascular and stroke medicine in all our medical schools.

The National Stroke Strategy 2022-2027 does not achieve all that we want and must achieve in order to realise the Stroke Action Plan for Europe (SAP-E), but its full implementation will mark an important and necessary first step towards that goal. We are confident we can deliver the contents of this strategy with the support of the HSE and RCPI which will allow for ‘a next steps for stroke’ to commence its’ planning in 2026 with the ambitious target of full implementation of the SAP-E by 2031.

I want to thank all my colleagues on the clinical advisory group under the chair of Professor Riona Mulcahy and the associated working groups under the guidance of Dr Paul Cotter, Dr Rory McGovern, Professor Frances Horgan and Professor Dominick McCabe, who have made this strategy possible. We all wish to publicly acknowledge the great body of work undertaken by our programme managers over the years, Joan McCormack, Edina O’ Driscoll, Lara Bourton-Cassidy and Sinéad Coleman. Finally, I would like to acknowledge the great support of Dr Colm Henry and the office of the Chief Clinical Officer of the HSE and my colleagues Dr. Siobhán Ní Bhriain, in the office of Integrated Care, and Dr Mike O’ Connor, Dr Vida Hamilton, Dr Siobhán Kennelly and Dr Emer Ahern, National Clinical Leads for acute hospitals and older persons and my colleagues in the Clinical Design and Innovation division, without whom this would not have come to fruition. I want to thank Professor Mary Horgan (President), and Professor Anto O’ Regan (Dean of the Institute of Medicine) at the RCPI who have enthusiastically supported the work of the stroke programme and our vision for a closer collaboration between commissioner and educator in delivering better stroke care.

With sincere thanks to our patients who make us want to try harder, strive for better.

Professor Rónán Collins
Clinical Lead
National Clinical Programme for Stroke

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Tables and Figures

Glossary

Acronym	Full Term
AF	atrial fibrillation
ANP	Advanced Nurse Practitioner
BPS	British Psychological Society
CAG	clinical advisory group
CHO	community health organisation
CNS	Clinical Nurse Specialist
CPD	continuing professional development
CSO	Central Statistics Office
CT	Computed tomography
DOAC	direct oral anticoagulants
ESD	early supported discharge
ESO	European Stroke Organisation
ESOTA	European Stroke Organisation Trials Alliance
EVT	endovascular thrombectomy
FAST campaign	Public awareness campaign highlighting stroke symptoms – Facial drooping, Arm weakness, Speech difficulties and Time to call emergency services
HASU	Hyper-acute stroke unit
HIQA	Health Information and Quality Authority
HSCP	Health and Social Care Professional
HSE	Health Service Executive
ICAT	Irish Clinical Academic Training
ICGP	Irish College of General Practitioners
ICPOP	Integrated Care Programme for Older Persons
IHF	Irish Heart Foundation
INAS	Irish National Audit of Stroke
LVO	large vessel occlusion
MDT	multidisciplinary team
MRI	Magnetic Resonance Imaging
MSW	medical social worker
NCAGL	national clinical advisors and group lead
NCHD	Non-Consultant Hospital Doctor
NCP for Stroke	National Clinical Programme for Stroke

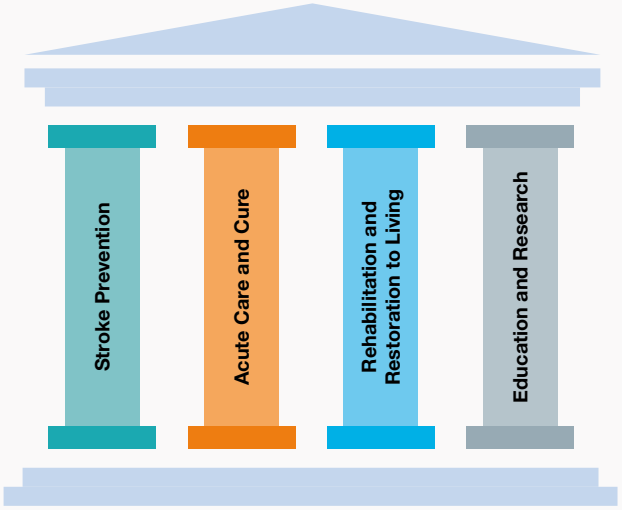
Acronym	Full Term
NIMIS	National Integrated Medical Imaging System
NMBI	Nursing and Midwifery Board of Ireland
NOAC	Non Vitamin-K antagonist oral anticoagulants
NOCA	National Office of Clinical Audit
NSS	National Stroke Strategy
NTS	National Thrombectomy Service
OT	occupational therapist
PT	physiotherapist
RCP	Royal College of Physicians
RCPI	Royal College of Physicians of Ireland
SAFE	Stroke Alliance for Europe
SAP-E	Stroke Action Plan for Europe
SCTNI	Stroke Clinical Trials Network Ireland
SLT	speech and language therapist
SPAFI	Stroke Prevention and Atrial Fibrillation in Ireland
SSNAP	Sentinel Stroke National Audit Programme
TCSI	Royal College of Surgeons in Ireland
TIA	Transient Ischaemic Attack
TOE	Trans-oesophageal echocardiogram
TTE	Transthoracic echocardiogram
WTE	whole time equivalent

Executive Summary

Stroke is the second leading cause of death in middle to higher income countries and the leading cause of acquired adult neurological disability in Ireland[1]. The National Clinical Programme (NCP) for Stroke was set up within the Royal College of Physicians of Ireland (RCPI) in 2010 by the Clinical Care and Strategy Division (now known as Clinical Design and Innovation) of the Health Service Executive (HSE) to reorganise and develop our acute stroke services to meet the principles set out in the 'Changing Cardiovascular Health: National Cardiovascular Health Policy 2010-2019'[2]. The initial goal was to prevent one death or disability from stroke each day and prevent one stroke each day by ensuring improved access to specialist opinion with acute stroke treatment and specialist-led stroke unit care. Mortality from stroke fell from 19% to 14% and the estimated total number of strokes had fallen to approximately 7,500 from an estimated 10,000 in 2008[3].

With an ageing demography and the rapidly changing milieu of acute stroke treatment the NCP for Stroke embarked on developing a new national strategy for stroke in 2018. To meet the challenge of a predicted 59% increase in the total number of strokes[3,4], four pillars of a new National Stroke Strategy (NSS) were identified which focus on:

1. Stroke Prevention
2. Acute Care and Cure
3. Rehabilitation and Restoration to Living
4. Education and Research



Each pillar had a separate working group of appropriate expertise in the field chosen by a chair nominated from within the clinical advisory group (CAG) of the NCP for Stroke. The remit of the working group was to produce a number of key objectives for the NCP for Stroke over the next five years that were;

- Realistic to achieve
- Needed to bring all stroke units up to an acceptable baseline to provide safe, effective stroke care
- High impact for patient care
- Consistent with other allied national strategies and the stroke action plan for Europe 2018-2030 (SAP-E) of the European Stroke Organisation (ESO)[5]

1 GBD 2016 Stroke Collaborators (2019) Global, regional, and national burden of stroke, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet Neurology, May;18(5):439-458. doi: 10.1016/S1474-4422(19)30034-1. Epub 2019 Mar 11. PMID: 30871944; PMCID: PMC6494974.

2 Department of health and children (2010) Changing Cardiovascular Health-national cardiovascular policy 2010-2019. https://www.gov.ie/en/publication/481948-changing-cardiovascular-health-national-cardiovascular-health-policy/

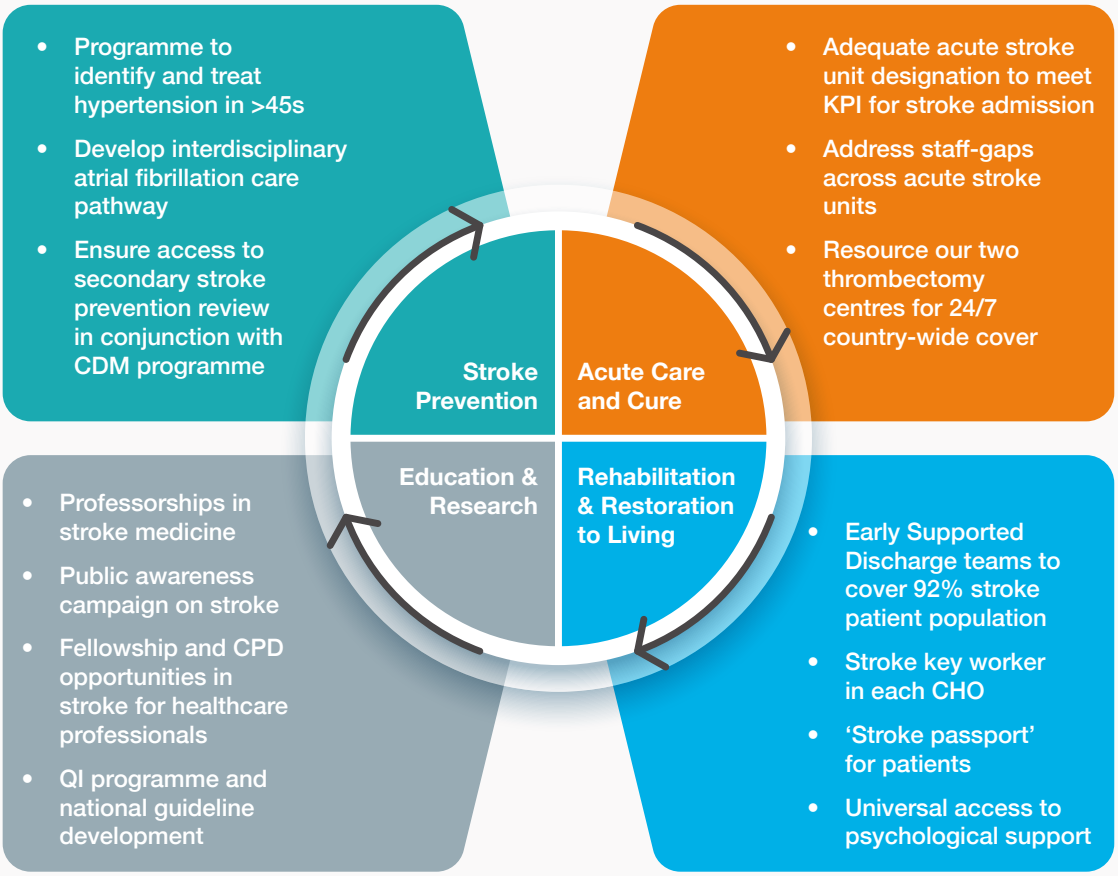
3 Irish Heart Foundation/Health Service Executive (2015) National Stroke Audit https://www.hse.ie/eng/services/publications/clinical-strategy-and-programmes/national-stroke-audit-2015.pdf

4 King's College London for the Stroke Alliance for Europe (SAFE) The Burden of Stroke in Europe – Report. https://www.safestroke.eu/wp-content/uploads/2020/06/The-Burden-Of-Stroke-In-Europe-Report-Main-Document_ENG_All-references.pdf

5 Norrving Bo et al, on behalf of the Action Plan for Stroke in Europe Working Group (2018), Action Plan for Stroke in Europe 2018-2030. European Stroke, Vol 3(4) 309-336 © European Stoke Organisation Action Plan for Stroke in Europe 2018–2030 (eso-stroke.org)

These were then to be costed where possible to give indicative scale to health policy makers and commissioners of health care. The NCP for Stroke is cognisant that the 2022-2027 strategy will not fulfil all of our ambitions or needs for stroke care nor will it address all the measures contained in the far-reaching SAP-E. It is also aware that the nature of stroke treatment and our demography is changing rapidly. The programme has prioritised a deliverable strategy to address our very poor level of resourcing of stroke services and seeks commitment from government, the department of health and the HSE for a structured implementation review and a 'next steps for stroke' strategy to commence in 2026 to progress the SAP-E in full. Figure 1 provides a summary of the recommendations that map out our NSS for 2022-2027.

Figure 1: **Summary of NSS 2022-2027 recommendations**



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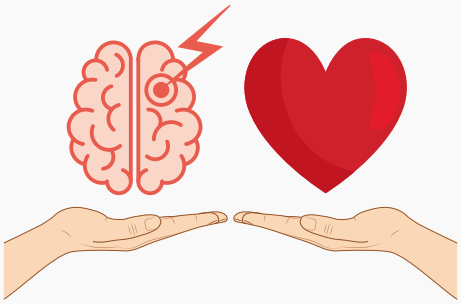
1. Stroke Prevention



Primary prevention of stroke is a key ambition of the NSS. Many strokes are preventable and principal risk factors for stroke, high blood pressure and atrial fibrillation (AF) are increasing in prevalence. Both conditions are under-detected and under-treated but both are amenable to prevention and treatment through cost effective non-pharmacological and pharmacological measures. An interdisciplinary initiative with experts from many fields of medicine, pharmacy, nursing and cardiac tech has also recently been formed to address the important issue of stroke prevention and atrial fibrillation in Ireland (SPAFI).

Up to one in five strokes are preceded by a warning syndrome known as a transient ischaemic attack (TIA) and urgent specialist evaluation and diagnostic-guided treatment of TIA significantly reduces the subsequent risk of stroke[6,7]. Risk of stroke is highest in those that have already had a stroke and Irish research has shown poor treatment-to-target in many fields of secondary prevention[8]. It is the recommended strategy of the NCP for Stroke to reduce the incidence of stroke by the following recommendations:

- **Working with the national HSE chronic disease programme and Irish College of General Practitioners (ICGP) and other key stakeholders such as the SPAFI inter-disciplinary initiative, community pharmacists, etc, to develop a clinical care pathway for the case-finding, diagnosis and treatment of high blood pressure in over 45-year-olds, to be delivered at primary care level.**
- **Under the umbrella of the interdisciplinary SPAFI initiative, to develop a clinical care pathway for the prevention and case detection of AF including comprehensive treatment algorithms for all patients with AF, to be delivered jointly between primary and secondary care.**
- **To ensure 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 clinical staffing and diagnostic resources to see TIA-patients within 24 hours of suspected TIA. Diagnostics must include at a minimum same day Computed Tomography (CT) scan and carotid imaging by CT angiography or Doppler ultrasound with urgent access to Magnetic Resonance Imaging (MRI), 24-hour blood pressure monitoring and extended ambulatory cardiac monitoring as indicated.**
- **All patients with symptomatic carotid stenosis > 50% should have access to the opinion of a vascular surgeon within 7 days of symptoms and have carotid endarterectomy performed within 14 days if appropriate.**

6 Rothwell PM, Warlow CP (2005) Timing of TIAs preceding stroke: time window for prevention is very short. Neurology, 64(5):817–820.

7 Rothwell PM, Giles MF, Chandratheva A, et al (2007) Effect of urgent treatment of transient ischaemic attack and minor stroke on early recurrent stroke (EXPRESS study): a prospective population-based sequential comparison. Lancet, 370(9596):1432-1442.

8 Brewer L et al (2015) Secondary prevention after ischaemic stroke: the ASPIRE-S study. BMC Neurology, 15: 216.

- **To ensure that all patients recovering from a stroke have access to a specialist secondary prevention stroke service and diagnostics including 24 hour ambulatory blood pressure monitoring, extended ambulatory cardiac monitoring or where required implantable-device monitoring and echocardiography, including trans-oesophageal echocardiogram (TOE). Specialist stroke prevention clinics should include lifestyle and risk factor reduction advice including advice on healthy eating and weight loss, exercise, smoking cessation and alcohol reduction, compliance with medication and reducing stress. The clinic should be multidisciplinary and, in addition to specialist stroke physicians, patients should have access to clinical nurse specialists (CNS) in stroke, physiotherapy (PT), occupational therapy (OT), clinical pharmacist, dietetics, speech and language therapy (SLT), medical social work (MSW) and clinical psychology.**

2. Acute Care and Cure

Outcomes and recovery from stroke are greatly improved by organised pathways of acute stroke care which includes pre-hospital, hospital and inter-hospital pathways to ensure that acute treatments such as thrombolysis (clot dissolving treatment), endovascular thrombectomy (EVT – mechanical retrieval of the clot) and potentially new treatments for intracerebral haemorrhage are delivered appropriately and effectively. EVT has been a relatively recent advance in stroke care and dramatically improves outcomes where large vessel occlusion (LVO) occurs in the brain[9]. It is a highly specialised technique which necessitates centralisation of expertise but up to 15% of strokes may be amenable to such treatment.

The outcome for all stroke patients is improved by stroke unit care[10]. It is the foundation of stroke unit care on which all patient multidisciplinary assessment, treatment, monitoring and education is delivered safely and with appropriate clinical governance so that patients have optimal chance to survive and recover maximally and successfully return to home and an independent life.

The following are the recommendations of the NSS for the acute care of stroke:

- **Acute stroke services must have adequate staffing and diagnostic resources to provide 24/7 acute stroke care and treatment.**
- **All hospitals receiving acute stroke patients must have an acute stroke unit. This must be of sufficient capacity so that 90% of all acute stroke admissions can be admitted to such a unit and spend 90% of their acute phase of hospital admission in specialised stroke care. The NSS is recommending an increased designation of acute stroke unit beds across 20 of our acute hospital sites. The roll out of this enhanced designation will be further informed by the recently published 2021 Irish National Audit of Stroke (INAS) organisational audit[11] of accessibility and availability of stroke unit beds.**

9 Goyal et al (2016) Endovascular thrombectomy after large vessel ischaemic stroke- a meta-analysis of individual patient data from five randomized trials. Lancet, 387:1723-1731.

10 Stroke Unit Trialists Collaboration (2013) Organised in- patient (stroke unit) care for stroke. Cochrane database of systematic reviews. https://doi.org/10.1002/14651858.CD000197.pub3

11 Irish National Audit of Stroke - Organisational Audit Report 2021. INAS Organisational Audit Report 2021 | NOCA

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- Specialist stroke services receiving acute patients should not be 'single-handed'. Each acute stroke unit should have a daily ward round by the senior clinical decision maker (Stroke Specialist) for diagnosis, assessment and management of patients with suspected acute stroke as well as providing a 24/7 acute stroke rota. Each acute stroke site should have a minimum of 6 trained physicians (on site or as part of telemedicine network) to deliver a 24/7 acute stroke treatment rota and a minimum equivalent of 2 whole time equivalent (WTE) i.e. 78 hours, of consultant sessions on site dedicated to specialist stroke services across the spectrum of care*. The NCP for Stroke will undertake a comprehensive workforce planning exercise which will determine specific gaps, however it is anticipated that with a review of existing work plans and reconfiguration this will most likely require, at a minimum, an additional consultant appointment of 1 WTE per acute stroke site. New consultant posts to fulfil this commitment to specialist stroke care will be developed in consultation with local stakeholders and other national programmes.

  * *(Meeting the future consultant workforce challenges : Stroke medicine 2019-2022 – British and Irish Association of Stroke physicians/GRIFT.)*

- All acute stroke units will have nurse staffing and skill mix determined by patient need, consistent with the Framework for Safe Nurse Staffing and Skill Mix in General and Specialist Medical and Surgical Care Settings in Acute Hospitals (2018). The NCP for Stroke especially recognises the need for evidence based approaches to nurse staffing and skill mix on acute stroke units given the complexity and urgent nature of stroke care.
- All acute stroke services are to have appropriate health and social care professional (HSCP) staff as outlined in the Royal College of Physicians (RCP) 2016 guidelines for stroke unit care[12]. These HSCPs should be appropriately trained in stroke. The NCP for Stroke recognises the deficit in HSCPs for stroke across our health system and recommends a phased costed schedule to add the additional required HSCP posts, identified by our gap analysis, to bring our acute stroke units up to the recommended HSCP staffing levels.

12 Intercollegiate Stroke Working Party for RCP (2016) National Clinical Guideline for Stroke. 2016-National-Clinical-Guideline-for-Stroke-5t-(1).aspx (strokeaudit.org)

- All patients must have 24/7 access to emergency acute stroke assessment and treatment by a stroke specialist (normally but not exclusively a consultant geriatrician or neurologist). This can occur in person or by telemedicine to facilitate network rotas. As this work is of an onerous, out-of-hours and critical decision-making nature, the TRASNA telemedicine programme and use of decision supporting software is to be supported and extended as needed to ensure specialist 24/7 stroke cover. Given the urgent and critical nature of modern stroke on-call, it is recommended on-call rosters are remunerated as per the existing agreed national arrangement for consultant 'onerous working' (i.e. 1:3-4) rotas.
- All patients with acute stroke must have access to CT and multi-phase CT angiography on a 24/7 basis to facilitate treatment decision making regarding thrombolysis and EVT. The CT equipment needs to be of appropriate specification to allow for perfusion capability and decision supporting software appropriate to the current radiological interpretation of stroke imaging.
- All patients with LVO stroke must have access to specialist opinion regarding EVT. Provision of EVT will be based at one of two comprehensive stroke centres at Cork University and Beaumont hospitals. Both hospitals will need extra Hyper-Acute Stroke Unit Beds (HASU) to allow for inward transfer of patients and short stay accommodation where required before repatriation to the referring stroke unit. This is recognised in the outlined plan for increased acute stroke unit bed designation. The comprehensive stroke centres will require adequate staffing at consultant, registrar, HSCP and CNS level. Specifically a recommendation is made for a total of 5.5 WTE consultants specialised in stroke medicine at both sites to provide 24/7 specialist access and clinical governance for EVT in addition to the comprehensive stroke care needs within centre's existing large catchment areas and for the additional inward and outward movement of acute LVO stroke cases from across the country.
- EVT to be provided at one of two biplane angiography suites at Beaumont Hospital and a biplane angiography suite at Cork University Hospital on a 24/7 basis and supported by the necessary consultant neuro-intervention radiologist and radiologist registrar manpower as part of the comprehensive centre staffing. Sufficient funding to be secured and capacity available to treat up to 15% of all ischaemic stroke – up to 750 cases a year.

3. Rehabilitation and Restoration to Living

Stroke is the most common acquired adult physical neurological disability and the previously estimated 30,000 adults living with disability post-stroke in Ireland in 2008, probably grossly under-represents the current scale of the issue. Rehabilitation services for stroke have been developed in a fragmented and often age-specific pattern which has led to exclusion of many stroke patients from accessing appropriate care. Central to planning services for those living with stroke, is accurate data on the number of people in Ireland with stroke and an analysis of the needs of people living with stroke. Any service developments should be informed by a proper population-needs analysis. We do not have such data currently in Ireland and this needs to be addressed as a priority step in future planning for the needs of stroke patients on a long term basis.

The models of care proposed in the *National Strategy & Policy for the Provision of Neuro-Rehabilitation Services in Ireland*[13] and *Specialist Geriatric Services* along with the *Integrated Care Programme for Older Persons*[14] *(ICPOP)* recognises these issues and the need for an all-age and complexity-tiered approach to neuro-rehabilitation, principles that the NCP for Stroke also aligns to. As described in the Implementation Framework for the Neuro-Rehabilitation Strategy, there is a requirement for neuro-rehabilitation services to be developed across the continuum of care, from acute rehab, to post-acute (60 beds per million, in addition to existing local level services), multidisciplinary community (neuro-) rehabilitation teams in each community health organisation (CHO) as well as a wide breadth of community-based services which are essential to keeping people with neurological conditions, including stroke, living and managing well in the community.

Considering that there is a national strategy and implementation framework for neuro-rehabilitation and ICPOP, the focus in the NSS, in terms of rehabilitation, is on services required in addition to those outlined in the neuro-rehabilitation and ICPOP strategies i.e. Early Supported Discharge (ESD)[15], key worker, stroke passport and hospital-based psychology services.

13 National Strategy & Policy for the Provision of Neuro Rehabilitation Services in Ireland – Implementation Framework 2019-2021 https://www.hse.ie/eng/services/list/4/disability/neurorehabilitation/national-strategy-policy-for-the-provision-of-neuro-rehabilitation-services-in-ireland.pdf

14 Specialist Geriatric Services Model of Care (2012) National Clinical Programme for Older People – https://www.hse.ie/eng/about/who/cspd/ncps/older-people/moc/specialist%20geriatric%20services%20model%20of%20care.pdf

15 Langhorne et al (2005) Early supported discharge services for stroke patients: a meta-analysis of individual patients' data. Lancet, 365: 501–06.

A stroke is a life-changing event for many patients and their physical, cognitive, communicative, perceptual, psycho-social and psychological abilities may not recover to their pre-stroke state. This can be very frightening for discharged patients who are suddenly alone and without the support of the hospital multi-disciplinary stroke team who have supported and encouraged them since their acute stroke. Considering this, it has been recommended by stroke survivor groups that both a '*stroke key worker*' and a dedicated personal resource such as a '*stroke passport*' would be beneficial in helping patients access support and information more effectively and retain control of their care. There is a dearth of formal psychological assessment and treatment available to stroke patients across the country which needs to be addressed.

In addition the NCP for Stroke recognises the importance of support given by the voluntary sector in provision of practical and emotional support to stroke patients on discharge and the need to support such initiatives.

The NSS 2022-2027 recognises the right of stroke patients to the appropriate therapy and support '*when needed and where wanted*' a core principle of the national health policy, '*Sláintecare*'. In addition to the implementation of the neuro-rehabilitation strategy and ICPOP, the NCP for Stroke recommends significant investment to fund stroke rehabilitation services which include:

- **ESD teams to be fully commissioned across 21 high activity sites over a three year period to cover 92% of the stroke inpatient population, a fifth of whom could be eligible for ESD. Effective ESD services have the potential to release ≈5,500 bed days into the acute hospital system per annum and, as such, the service effectively pays for itself e.g. phase one implementation of ESD across 10 sites will treat up to 700 patients saving over 4,200 bed days (€3.6 m based on FER of €856) and at a staffing cost of approximately €2.2m per annum. This equates to net saving of €1.4m per annum.**
- **A 'Stroke Key Worker'* resource is to be appointed in each CHO so that discharged stroke patients and their families have access to the specific support and advice needed for a successful transition from their hospital based care to returning to live in the community.**

  ** National Strategy & Policy for the Provision of Neuro Rehabilitation Services in Ireland also recommends a 'case worker' as part of its community neuro-rehabilitation teams)*
- **Stroke psychology services to be aligned to international staffing recommendations and additional posts to be created nationally across stroke services using a phased approach.**
- **All stroke patients to have a 'stroke passport' developed in conjunction with the HSE national documentation office detailing information relating to their stroke, strengths and needs, risk factor management, medicines, key contact numbers, entitlements and resources available to them.**

4. Education and Research

Education and research and production of clinical guidelines are core components of any national clinical strategy. Several advances in prevention and treatment of TIA and stroke have been achieved in recent years through collaborative international research in which Irish clinical researchers have had a leading role, resulting in direct translation into clinical practice and guidelines that have greatly improved patient outcomes.

Education and research in stroke and neurovascular medicine in Ireland has been poorly funded until recently. The advent of the Health Research Board – Irish Heart Foundation co-funded **Stroke Clinical Trials Network Ireland (SCTNI)** initiative has led to our first 'home-grown' multicentre international trial on stroke prevention[16] and the SCTNI has also taken a leading role in the establishment of the European Stroke Organisation Trials Alliance (ESOTA) which has given Ireland a strong international profile and access to new trial opportunities. Stroke medicine requires such research capability to be sustained and strengthened to enable best treatment for our patients and to attract and retain international leaders in clinical and academic neurovascular and stroke medicine.

Similarly the NCP for Stroke recognises the importance of training, education and continuing professional development opportunities as being very important for the career development and retention of all healthcare disciplines involved in stroke care.

16 Kelly P et al (2021) Colchicine for prevention of vascular inflammation in Non-CardioEmbolic stroke (CONVINCE) - study protocol for a randomised controlled trial. European Stroke Journal, 6(2):222-228. doi: 10.1177/2396987320972566.

The INAS National Report 2020[17] highlighted that less than 50% of stroke patients present to hospital within 3 hours. Public awareness and education regarding the risk factors for TIA and stroke, symptoms and signs of same and the course of action to be taken if a TIA or stroke is suspected are important to ensure that we maximise the potential for primary prevention, the effects of acute treatment and secondary prevention through our public health messaging.

The NSS 2022-2027 therefore recommends a significant investment annually in Education and Research in Neurovascular and Stroke Medicine via the following key strategic provisions:

- **Creation of Professorships in Neurovascular and Stroke Medicine in our six medical schools to lead and drive inter-disciplinary research and education in neurovascular and stroke medicine nationally at university level and to enhance our international reputation.**
- **Creation of six Registrar posts in stroke medicine to support the clinical service provision, audit and research programmes essential to the function of the Senior Academic Chairs in each clinical department/university.**
- **Creation of three Stroke Research Fellowships per annum to provide opportunities for staff retention and development by pursuing degrees at MSc, MD, or PhD level. Research fellowships through the RCPI will be open to applicants from Medical, Nursing, HSCP and Pharmacy disciplines, awarded by competitive interview, with funding reviewed annually.**
- **Support for continuing professional development (CPD) in neurovascular and stroke medicine amongst doctors in training, HSCPs and Advanced Nurse Practitioners (ANP)/ CNS in stroke, including the creation of bursaries for attendance at RCPI and NCP for Stroke-approved national stroke study days.**
- **Support for enhancement of public awareness campaigns and education on aspects of TIA and stroke prevention and treatment via a ring-fenced annual budget within the HSE Communications Division. This budget would to be utilised by the HSE following recommendations by the NCP for Stroke CAG after consultation with other collaborators, including e.g. The Irish Heart Foundation (IHF) Council on Stroke, SPAFI, stroke patients advocacy group, etc.**
- **Provision for the creation and updating of evidence-based clinical guidelines which promote best international standards of care for TIA and stroke patients in Ireland. This can be achieved by harnessing the expertise of Irish physicians involved in neurovascular and stroke medicine at the RCPI working in collaboration with other postgraduate colleges and national and international specialty bodies as well as through consultation with multidisciplinary teams, patients and care-giver organisations. This process is to be enhanced by a systematic quality improvement approach to deficits in stroke care identified in the annual INAS report.**

Concluding Remarks

Stroke is a major cause of mortality and morbidity in our population and a major cost to our health service when outcomes are poor. Much improvement in services and outcomes has occurred in the last decade since the inception of the NCP for Stroke, but the nature of our demography, development of new stroke treatments and technologies, and the need for healthcare staff and public engagement on the issue of stroke are a significant challenge over the next decade.

17 Irish National Audit of Stroke - National Report 2020 https://www.noca.ie/documents/irish-national-audit-of-stroke-national-report-2020

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The ESO prepared a Stroke Action Plan for Europe (SAP-E) for the years 2018 to 2030, in cooperation with the Stroke Alliance for Europe (SAFE). The SAP-E included seven domains: primary prevention, organisation of stroke services, management of acute stroke, secondary prevention, rehabilitation, evaluation of stroke outcome and quality assessment and life after stroke. Research priorities for translational stroke research were also identified. For each domain of the 2018 to 2030 SAP-E, specific targets are being set. Beyond these targets, four overarching targets have been set for 2030:

- **Reduce the absolute number of strokes in Europe by 10%.**
- **Treat 90% or more of all patients with stroke in Europe in a dedicated stroke unit.**
- **National plans for stroke to encompass entire chain of care from primary prevention to life after stroke.**
- **Implement national strategies for multisector public health interventions to promote and facilitate a healthy lifestyle, and reduce environmental (including air pollution), socioeconomic and educational factors that increase the risk of stroke.**

The NSS 2022-2027 presented for Ireland is fully in line with the SAP-E and represents a realistic deliverable approach to our stroke services across the realms of prevention, acute care and cure, rehabilitation and restoration to life after stroke and education and research in stroke for the next five years. It is re-iterated the 2022-2027 strategy will not fulfil all measures contained in the comprehensive SAP-E and the NCP for Stroke seeks commitment from government, the department of health and the HSE for a structured implementation review and 'a next steps for stroke' strategy to commence considerations in the second half of 2026 to progress the SAP-E in full.

The NSS 2022-2027 is an ambitious but realistic strategy that seeks to build on and compliment health policy in Ireland and other allied national strategies. We have endeavoured to avoid the potential for duplication of service provision. Our strategy should be read along with complimentary national policies as both aspects of organisation and staffing as well as the longer term need of patients living with stroke is dependent on realising their implementation*.

The NSS 2022-2027 looks for an investment of €37m (See Appendix 1 for a more detailed breakdown of costs) in our stroke services at a time of great challenges for our economy and healthcare system but we are confident it will pay significant dividend for patients, healthcare and society as a whole.

* *i) Sláintecare report and implementation plan; Healthy Ireland Framework; ii) Acute Medicine programme model of care-Framework for Safe Nurse Staffing and Staffing and Skill Mix in General and Specialist Medical and Surgical Care Settings in Adult Hospitals in Ireland 2018; iii) Changing Cardiovascular Health – National Cardiovascular Strategy 2010-2019; iv) National Framework for the integrated prevention and management of chronic disease; v) Integrated care programme for the older person (ICPOP); vi) Neurorehabilitation Strategy & Implementation Framework; vii) National Clinical Programme for care of older people – Specialist geriatric Services model of care; viii) Model of Care, National Clinical Programme for Rehabilitation Medicine.*

Introduction

The NCP for Stroke was set up in 2010. It is one of the clinical programmes within the Clinical Strategy and Programmes Division (now known as Clinical Design and Innovation) within the HSE. The objective of all clinical programmes is to improve quality, access and value of care. The mission of the programme is to shape the delivery of better care through better use of resources. The NCP for Stroke reports to the Office of the Chief Clinical Officer in the HSE through the National Clinical Advisor and Group Lead (NCAGL) for Older Persons and in close consultation with the NCAGL for Acute Operations as appropriate. Clinically the focus of the NCP for Stroke is on designing standardised models for the delivery of integrated clinical care to all stroke patients and to embed clinical operational management into those pathways.

Since 2010, there have been significant changes in how stroke services are delivered. Mortality from ischaemic stroke has fallen to single digit figures for the first time in the history of the country and is the result of better stroke prevention strategies, better stroke unit care, wider availability of thrombolysis (drug mediated clot dissolving treatment) and the commencement of a thrombectomy (mechanical retrieval of clot) service. Mortality from haemorrhagic stroke has fallen too over the last 10 years though it remains an area for improvement.

The Kings College London report "The Burden of Stroke in Europe"[18] forecasts that the burden of stroke in Ireland could appreciably increase in absolute terms by 59% over the next 5-10 years with our demographic shift. It is vital that our acute services are robustly resourced to meet this challenge while we also and increasingly focus on emerging preventative strategies over time.

The ambition of the NCP for Stroke in this 5-year strategy is to;

- mitigate against the predicted increased burden of stroke through reduced incidence of stroke by effective prevention strategies
- amelioration of the effects of stroke when it occurs by organised systems of modern acute stroke care
- development of rehabilitation services for those with disability post-stroke
- support a strong educational and research programme for stroke in Ireland.

It is anticipated that the strategy will provide a guide to optimal prevention and treatment of stroke to improve the quality of care for all people affected by stroke as well as identifying areas for improvement and investment for the health service.

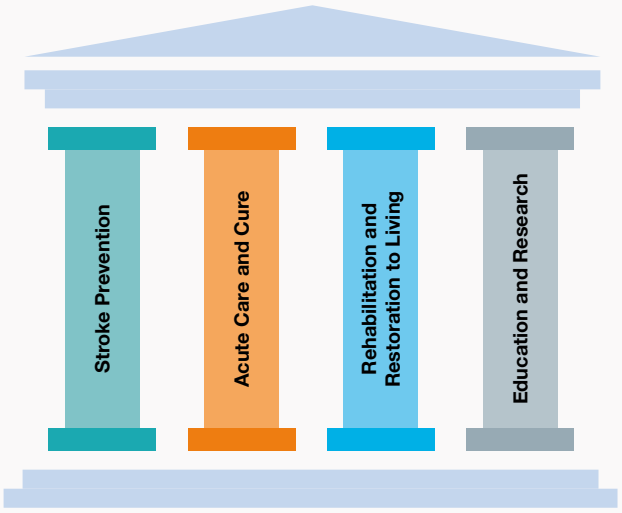
18 Wafa HA et al (2020) Burden of Stroke in Europe: Thirty-Year Projections of Incidence, Prevalence, Deaths, and Disability-Adjusted Life Years. Stroke, 51(8):2418-2427.

This strategy has been written with several audiences in mind:

- *the HSE with respect to planning and prioritising development of services for people with stroke and TIA*
- *clinical staff involved in the daily care of people with stroke and TIA*
- *hospital and healthcare managers involved in providing services for people with stroke and TIA*
- *voluntary and patient advocacy groups invested in stroke care*

In formulating a strategy four key pillars of stroke services in Ireland were identified:

1. Stroke Prevention
2. Acute Care and Cure
3. Rehabilitation and Restoration to Living
4. Education and Research



Interdisciplinary working groups for each pillar were established by the chairperson(s), with relevant expertise in respective areas, appointed from the clinical advisory group of the NCP for Stroke (**Appendix 2**). The working groups explored current needs and gaps with respect to international standards of care and best practice and formulated realistic 5-year goals within each pillar. This document will outline the recommendations of the NCP for Stroke for each pillar of our strategy over the next five years to facilitate improved clinical outcomes in stroke through organised service development that maximises clinical impact and value for money while ensuring that all investment in stroke services is aligned with government health policy and principles of *Sláintecare*. It is anticipated that this is a realistic and implementable 5-year strategy that will address many of our fundamental deficits in stroke care but will need an implementation review and 'a next-steps for stroke' strategy to commence in the second half of 2026 to address the entire continuum of care in line with the key objectives of the SAP-E 2018-2030. It is acknowledged that the 'entire chain of care from primary prevention to life after stroke' will not be achieved within the 5-year span of this strategy but it will result in a more standardised, equitable and safe service for acute stroke care across the country and address much of the requisite key deficits in modern stroke care needed for full implementation of the SAP-E going forward.

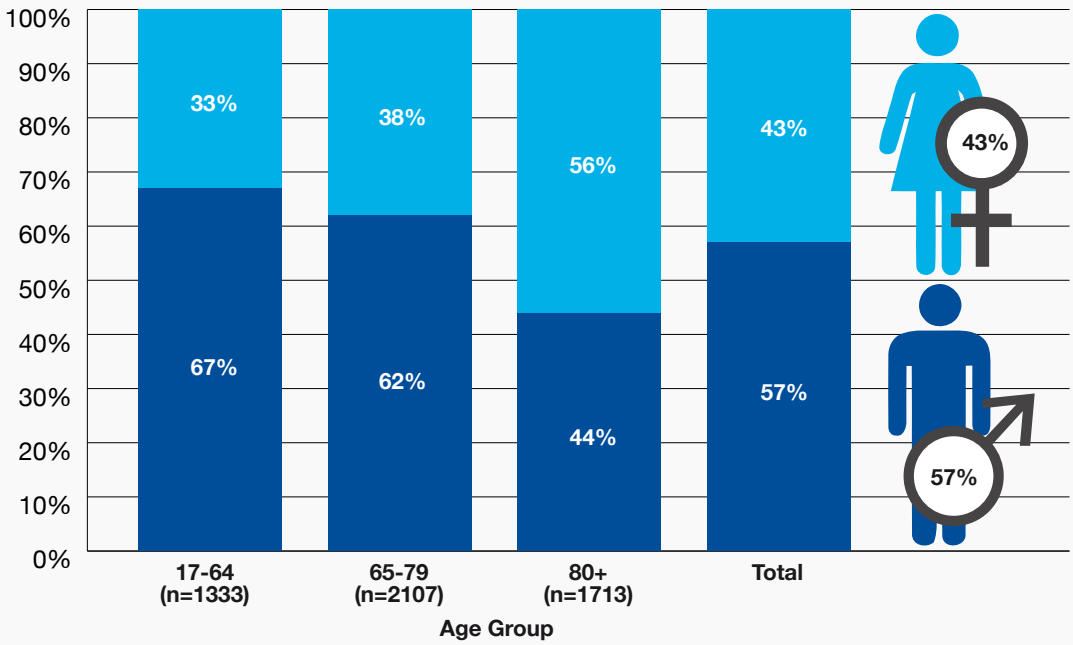
Overview of Stroke in Ireland

Stroke is the second leading cause of death in the developed world, the leading cause of acquired adult physical neurological disability in Ireland and a major cause of dementia, depression, falls, loss of independent living and institutionalisation in later life. Approximately 7,500 people in Ireland suffer from a stroke each year and it is estimated that over 30,000 are living with some form of disability post stroke in Ireland. (This is almost certainly a gross underestimate considering The National Institute of Clinical Excellence estimates the UK figure as being over 1.2 million[19]. An identical rate here would mean we could have over 90,000 people living with stroke or stroke survivors).

Our most up to date information on the delivery of stroke services is from the INAS National Report 2020. This report shows us areas where there have been significant improvements in terms of management of stroke, but also areas that require further attention. The learning from these annual register reports has helped inform the direction of this strategy and the incorporation of the register into the National Office of Clinical Audit (NOCA) as INAS will strengthen the connection between data, need and direction of this strategy in the years ahead.

With respect to demographic data, the data reported in the 2020 INAS report are largely consistent with those found in the 2019[20] report with approximately 74% of strokes occurring in patients over 65. The proportion of strokes occurring in men and women under 65 years of age was 30% and 20% respectively. See figure 2 for further details on age and sex stroke profiles.

Figure 2: **Age and sex profile of stroke In Ireland – INAS National Report 2020**



19 National Institute for Health and Care Excellence (2019) NICE Impact Stroke NICE impact stroke

20 Irish National Audit of Stroke - National Report 2019 https://www.noca.ie/documents/irish-national-audit-of-stroke-2019

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The INAS report highlights that patient presentation times to hospital after stroke symptom onset remain poor with only 50% of patients presenting within 3 hours of symptom onset and there is an obvious need, as recommended by the report, for a sustained public health information campaign on stroke – hence the inclusion of a recommendation in relation to a renewed 'FAST' awareness campaign within this strategy.

In terms of delivery of acute treatment, the time and date of hospital arrival and time and date of review by a medical team was available for 83% (n=4,127) of cases. 71% of patients with stroke were seen by the medical team within one hour of hospital arrival, an improvement from 66% in 2019. The median time to contact with the medical team, after hospital arrival was 11 minutes, improved from 17 minutes in 2019.

Median door to imaging times had reduced to 1 hour and 3 minutes in 2020 from 1 hour and 20 minutes in 2019. The RCPI/National Thrombectomy Service (NTS) Quality Improvement programme has further improved both processes of care and door to decision times nationally[21]. This is an area for continuous quality improvement in our processes of stroke assessment, time to treatment decision and transit time to point of specialist stroke care, particularly regarding time sensitive treatments for stroke e.g. thrombolysis and thrombectomy for ischaemic stroke.

Data on thrombolysis (intravenous clot dissolving) treatment were available in 99.8% of ischaemic, or presumed ischaemic, stroke (ICD-10 codes i63, i64 – 'stroke due to infarction' or 'stroke not otherwise specified as infarction or haemorrhage') cases treated. Thrombolysis was administered in 10.6%, which was the same figure as 2019, of cases of cerebral infarction in this stroke population, comparable to the 12% thrombolysis rate in the UK Sentinel Stroke National Audit Programme (SSNAP)[22]. Median 'door to needle' times are now 55 minutes (reduced from 56 minutes in 2019 and 71 minutes in 2017) and comparable to the 52 minutes reported by SSNAP in the same time period. This improvement can be largely attributed to the NTS quality improvement project which was completed in 2019.

71% of stroke patients were admitted to an acute stroke unit in 2020 – the same figure as 2019. While this is a significant improvement since the inception of the NCP for Stroke when there was only 1 acute stroke unit in the country, there still remains 29% of patients who did not receive their acute care in an acute stroke unit. In addition, many stroke patients do not get to such stroke unit care within ideal time frames. The UK reported that 58% of acute stroke patients were admitted to an acute stroke unit within 4 hours but 85% of UK stroke patients spend 90% of their acute hospital admission on such a unit.

The NCP for Stroke has national target KPIs that 90% of patients should be admitted to an acute stroke unit and spend 90% of their acute phase of admission in a stroke unit. Neither of these targets are being achieved and it is clear there is a shortage of acute stroke unit beds nationally from the reasons given as to why patients are not being admitted to an acute stroke unit in the INAS report. A key recommendation in this strategy is to increase capacity of acute stroke units through the designation of a significant number of additional appropriately-staffed acute stroke unit beds.

21 National Thrombectomy Service – Annual Report 2020 National Thrombectomy Service 2020 Annual Report (hse.ie)

22 Sentinel Stroke National Audit Programme – Acute Organisational Audit 2021 2021-AOANationalReport.aspx (strokeaudit.org)

Data in relation to the timeliness of imaging have always been important in order to ensure fast door to treatment decision times, however given the advent and impact of EVT on outcomes in acute large vessel occlusion stroke, rapid access to imaging, interpretation and treatment decisions have an even greater imperative within acute hospitals.

In 2020, 370 cases were recorded as having had a thrombectomy in the NTS annual report. Out of the 4284 recorded ischaemic strokes, this indicates a thrombectomy rate of 8.6% (8.3% in 2019). This is increased from a rate of 6.6% in 2018 and 5.6% in 2017 and compares very favourable to the 1.4% reported in the UK 2019 SSNAP report.

Swallow screening is considered a good indicator of organized stroke care. Swallow screening should be performed on all patients with stroke within four hours of admission and before any oral intake (IHF, 2010[23]; RCP, 2016[11]; NSP, 2017[24]). In 2020, 68% (3,507) of cases had a swallow screen completed, similar to 2019 (67%). Of those, 43% had the swallow screen completed within four hours, similar to screening rates in 2019. While trends overall are improving, further improvements are needed which will be dependent on additional resourcing of stroke units.

The reporting of screening for mood disturbance was added into the dataset in 2017. The completion of a mood screen remains low at 29% (1,488), an increase from 22% in 2019. However for 35% of acute stroke cases, it was reported that mood screen was not indicated, which could suggest that the mood was considered even though formal screen was not completed. Work is on-going within the NCP for Stroke to complete a guideline on assessment of mood and cognition after stroke. There is also supporting evidence for the need for additional psychology resources within stroke services to address this need.

2018 was the first year where data on access to therapy supports in the acute stroke units were captured, initially for PT, OT and SLT. These are the disciplines currently reporting into stroke register but this does not suggest they are the only disciplines providing specific interventions to stroke patients. Patients should undergo as much therapy appropriate to their needs as they are willing and able to tolerate. From the beginning, patients should receive a minimum of 45 minutes daily of each therapy which is required (IHF 2010, RCP 2016). This gives us useful information on the breadth of interventions required to meet the frequently complex needs of stroke patients including physical, cognitive, communicative, visual, nutritional, perceptual, psycho-social and vocational needs. These initial data showed that the majority of patients have ongoing therapy needs after the acute phase of stroke for example, 52% of those seen by PT, 54% of those seen by SLT and 49% of those seen by OT required onward referral post-acute treatment including to ESD where available.

23 Irish Heart Foundation: Council for Stroke - National Clinical Guidelines and Recommendations for the Care of People with Stroke and Transient Ischaemic Attack 2010 https://irishheart.ie/wp-content/uploads/2017/04/guidelines.pdf

24 National Clinical Programme for Stroke - National Guideline for Swallow Screening in Stroke 2017 national-guideline-for-swallow-screening-in-stroke-hse.pdf

Chapter 1: Stroke Prevention

A central aim of the NCP for Stroke is the prevention of first and recurrent strokes. The inaugural aims of the NCP for Stroke included reducing by one the number of strokes per day through organization of stroke services including rapid access stroke prevention/TIA clinics. This was effective, as shown in the falling numbers of stroke between the 2008 and 2015 National Stoke Audits conducted by the IHF in conjunction with the HSE. However, the challenge of an increasing burden of stroke with our demography is very real as shown in the Kings College London 'Burden of Stroke in Europe' report which forecast a scenario by which we could see a 59% increase in the absolute numbers of stroke in Ireland.[25]

For effective primary stroke prevention, high prevalence risk factors for stroke must be identified on an organised national scale with the appropriate pathways in place to address and mange such risks proactively and continuously. There is a real opportunity to reduce the numbers of strokes on a population level, due to the high prevalence of unidentified and/or untreated risk factors[26]. Achievement of these goals involves working with other clinical programmes and stakeholders involved with vascular disease, with public health medicine and with primary care. These links have been formed in the preparation of this strategy and will be developed further as we move towards implementation.

Prevention of a second stroke (secondary prevention) requires a more focused approach in those who have had a prior TIA or stroke. The aim is to identify specific high-risk pathology for recurrent stroke, and to reduce overall cardiovascular risk.

While the aim of the NCP for Stroke in primary and secondary stroke prevention is primarily to prevent stroke, the NCP for Stroke recognises that *addressing many of the risk factors for stroke will produce benefits in reduction in other cardiovascular events such as myocardial infarction, peripheral vascular disease and heart failure as well as related outcomes such as chronic kidney disease, visual loss and dementia.*

These ambitious aims can be achieved through engagement with other clinical programmes and key stakeholders from many disciplines, including the many voluntary advocacy bodies, to promote awareness of organised systems of care for the detection and treatment of high prevalence risk factors such as obesity or hypertension that are common risk factors in the development of many disease states including stroke, and by developing new care pathways that address such baseline risk factors common to many specific conditions.

Working groups with representation from **all** key stakeholders should be formed when designing care pathways and prevention clinics for stroke and allied conditions throughout our health system and be seen importantly as an '**ageing well**' initiative.

25 King's College London for the Stroke Alliance for Europe (SAFE) The Burden of Stroke in Europe – the challenge for Policy Makers. https://www.stroke.org.uk/sites/default/files/the_burden_of_stroke_in_europe_-_challenges_for_policy_makers.pdf

26 Report from the Prevention of Chronic Disease Programme, Health Service Executive (2014) Preventing Chronic Disease: Defining the Problem. http://hdl.handle.net/10147/338212

Primary Prevention

1. Hypertension

Hypertension is the most prevalent risk factor for stroke and is also a major cause of atrial fibrillation (significant risk for stroke). The prevalence of hypertension in Ireland is expected to rise to more than 1.2 million by 2020[27].

The majority of people with hypertension are undiagnosed, and in those with known hypertension, most are not treated to target. This large public health challenge requires a focus on public awareness and prevention through lifestyle and education in the first instance. Given the prevalence, asymptomatic nature and association of hypertension with all forms of stroke and wider end-organ damage, a programme for case finding across the at-risk population can be justified. It will likely have a high yield because high blood pressure is amenable to relatively inexpensive pharmacological and non-pharmacological treatment with major impacts on clinical events.

This represents a real opportunity to reduce numbers of strokes and associated chronic vascular diseases as well as the burden of heart failure, chronic kidney disease, visual loss and dementia. It is an important goal of both stroke and chronic disease programmes to identify and treat hypertension at a primary care level.

Recommendation:

- **To work with health and wellbeing and communications units of the HSE, and a coalition of invested voluntary agencies (IHF, Thrombosis Ireland, Irish Kidney Association , Alzheimer's Society etc.), and other key stakeholders to promote a national programme of awareness on lifestyle and high blood pressure and its relationship to 'ageing well' and chronic disease. This will incorporate the principles of 'health and wellbeing' and 'primary care for primary prevention' involving health promotion and programmes that are already in place e.g Making Every Contact Count, Health Food Made Easy, etc.**
- **Work to continue with the NCAGL for Chronic Disease, National Heart Programme and the ICGP clinical advisors and other key stakeholders (such as the interdisciplinary group SPAFI), in the design of a primary care-delivered case finding and treatment strategy in over 45-year-olds. This is to include an agreed diagnosis and treatment algorithms.**

2. Atrial Fibrillation

The burden of stroke due to AF is well recognised by all working in stroke services. AF is an age–related condition and the risk of AF rises steadily with age. Up to 10% of people over 80 may have AF. Over 30% of all new strokes in Ireland are associated with AF[28], and AF-associated strokes are larger and associated with poorer outcomes. AF is also associated with reduced quality of life and heart failure. Similar to all vascular risk factors the development of AF should be prevented where possible through education and lifestyle advice at a younger age and detection of early hypertension.

27 Molcho M et al. (2009) SLAN 2007: Survey of Lifestyle, Attitudes and Nutrition in Ireland. Injuries in Ireland: findings from national population surveys. Department of Health and Children. Royal College of Surgeons in Ireland. Report. https://doi.org/10.25419/rcsi.10770014.v2

28 Hannon N et al (2010) Stroke associated with atrial fibrillation--incidence and early outcomes in the north Dublin population stroke study. Cerebrovascular Disease, 29(1):43-9

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AF should be identified where possible in high-risk populations and the risk of stroke addressed. Following an Irish pilot project of case finding for AF by pulse checking at GP visits, the Health and Information Quality Authority (HIQA) completed a health and technology assessment recommending opportunistic case finding for AF in older Irish adults[29].

Anticoagulation rates have traditionally been low in Ireland (as elsewhere) with many strokes occurring due to under-utilisation of anticoagulation due to many factors. Anticoagulation rates have improved over the past decade, especially with the greater understanding of the risk of stroke in association with AF and the availability of easier to use anticoagulants (non-Vitamin-K antagonist anticoagulants or 'NOACs' also known as direct oral anticoagulants or 'DOACs'). Many more strokes can be prevented by promoting high rates of case detection, treatment, patient education and good drug adherence with anticoagulation in those with a high risk of AF or those known to have AF. This may be best achieved through the model of interdisciplinary AF clinics, as these patients are frequently older, have multiple co-morbidities, polypharmacy, frailty and at high risk of stroke, bleeding and functional decline. Such clinics may be expected to have input from cardiology, a specialist in stroke and gerontology, pharmacy, nursing and clinical nutrition.

Recommendations:

- **Work with NCAGL of Chronic Disease Programme and National Heart Programme and the interdisciplinary SPAFI group in continuing to develop a national AF case finding strategy in primary care in people over 65 years old.**
- **Work with the interdisciplinary SPAFI groups across disciplines and with key stakeholders to develop and promote integrated AF management pathways, to include prevention and cure of AF and rapid access multidisciplinary AF clinics.**
- **To promote improvement in the use and management of anticoagulation for those with AF at risk of stroke through promotion of the model of interdisciplinary AF clinics.**

3. Transient Ischaemic Attack (TIA)

TIA is traditionally defined as a sudden onset of focal neurological symptoms of stroke which last less than 24 hours or sudden monocular blindness. While TIAs generally do not cause permanent neurological impairment they are often associated with visible infarction on MRI and may precede a more serious stroke in up to 20% of cases therefore TIA provide a vitally important opportunity for stroke prevention. TIA is often labelled as a "mini-stroke," or a "warning stroke."

Several studies suggest that stroke risk is substantially reduced in patients with TIA who are immediately assessed and treated by a specialist stroke service in outpatient, day care, and stroke unit settings[30,31].

29 Health Information and Quality Authority (2015) Health Technology Assessment (HTA) of a national screening programme for atrial fibrillation in primary care. HTA-of-Screening-for-Atrial-Fibrillation.pdf (hiqa.ie)

30 Luengo-Fernandez R et al (2009) Effect of urgent treatment for transient ischaemic attack and minor stroke on disability and hospital costs (EXPRESS study): a prospective population-based sequential comparison. Lancet Neurology, 8(3):235-43. doi: 10.1016/S1474-4422(09)70019-5.

31 PC Lavellée et al (2007) A transient ischaemic attack clinic with round-the-clock access (SOS-TIA): feasibility and effects. Lancet Neurology, 6:953-960.

The diagnosis of TIA can be difficult, especially for non-specialist clinicians because the symptoms have, by definition, resolved, and there is no perfect diagnostic test. Making a diagnosis of a TIA is important because;

a) people with suspected TIA can have a range of other conditions or so called 'mimics' (e.g. hypoglycaemic episodes or focal seizures) and may not be even ischaemic (e.g. micro bleeds) and

b) people with confirmed TIA are at high risk of future ischaemic stroke.

The goal of assessment of a patient with a suspected TIA is to establish the diagnosis and reduce the potential for future strokes by starting preventive treatments[32].

Diagnostics must include at a minimum same day CT and carotid imaging by CT angiography or Doppler ultrasound with urgent access to MRI, 24-hour blood pressure monitoring, extended ambulatory cardiac monitoring and echocardiography (Transthoracic Echocardiography [TTE] at a minimum and TOE where appropriate) as indicated. The NCP for Stroke acknowledges that achievement of this target will require additional consultant manpower in neurovascular and stroke medicine. It will also necessitate specialist radiographer and cardiac technician (or vascular physiologist) support and adequate resourcing at consultant radiologist and cardiologist levels. The programme plans to work with the NCPs for Radiology and Cardiology in outlining specific WTE requirements and building a cohesive business plan to ensure rapid essential secondary prevention diagnostics are available to stroke services.

It has been clearly established in the clinical trials – North American Symptomatic Carotid Endarterectomy Trial (NASCET) and European Carotid Surgery Trial (ECST) which are now almost 30 years old that there is a significant reduction in risk of subsequent disabling stroke in patients, who have a TIA, Stroke or Amaurosis Fugax as a result of Carotid stenosis ≥ 70%, and who are treated with carotid endarterectomy and best medical therapy (BMT) when compared to BMT alone. There is more recent evidence that this risk reduction may also apply to patients with lesser degrees of carotid stenosis of the order of 50-69%. Patients having carotid endarterectomy can expect to have their subsequent stroke risk reduced from > 20% with BMT to < 4% with BMT and surgery. Carotid endarterectomy is performed by vascular surgeons in 10 hospitals in Ireland. The number of patients requiring surgery is in excess of 400 annually and this does not include 'rescue endarterectomy', where patients still have critically narrowed carotid arteries after endovascular thrombectomy, an increasing patient population that prior to the advent of thrombectomy might not have been surgical candidates , given the severity of the persisting neurological deficit.

The highest risk of stroke is within the four weeks post TIA and it is well established that the maximum gain in stroke prevention is by early intervention. European and UK guidelines suggest surgery should be within 14 days of symptom onset. It is therefore mandatory that all patients with a diagnosis of transient ischaemic attack have quick access to imaging to establish the presence or otherwise of significant carotid artery disease, and rapid referral to a vascular unit where carotid endarterectomy can be performed as soon as possible.

32 Stroke and transient ischaemic attack in over 16s: diagnosis and initial management 2019 Overview | Stroke and transient ischaemic attack in over 16s: diagnosis and initial management | Guidance | NICE

Meeting this guideline is one of the major challenges facing the entire pathway from the community to the surgeon. While most hospitals with vascular surgery on site have established rapid access TIA clinics and regular neurovascular multidisciplinary meetings, the same access to surgery is not available to the majority of the level 3 hospitals with 24/7 Emergency Departments. There is evidence from one vascular unit that less than 50% of patients reach these targets, mainly due to referral delays.

Clear pathways need to be established so that these patients can be treated in line with the above guidelines. These patients should never be subjected to cancellation or delay due to bed capacity issues. In addition, most vascular units would confirm a lack of sufficient theatre time, high dependency unit access etc. to meet the above guidelines.

Recommendations:

- **All acute hospitals receiving acute stroke have a specialist-led rapid access stroke prevention service or access to such a service within their hospital network.**
- **This service must have adequate multidisciplinary staffing and diagnostic resources to see patients within 24 hours of a suspected TIA.**
- **Diagnostics must include at a minimum same day CT and carotid imaging by CT angiography or Doppler ultrasound with urgent access to MRI, 24-hour blood pressure monitoring, extended ambulatory cardiac monitoring and echocardiography (TOE or at least TTE) as indicated.**
- **All patients with symptomatic carotid stenosis > 50% should have access to the opinion of a vascular surgeon within seven days of symptoms and have carotid endarterectomy performed within 14 days if appropriate.**

Secondary Prevention after Stroke

Those who have suffered a stroke are at a clear increased risk of second and subsequent strokes (and other cardiovascular endpoints). This group of patients have most likely already presented to a specialised stroke service and should have individualised strategies to identify and manage cardiovascular risk factors.

Investigating the causative factors for stroke and associated vascular risks is a core component of stroke care. Irish research however has shown that identification of, and treatment-to-target of risk factors post stroke is poor[33]. This should be the focus of specialised and interdisciplinary secondary prevention clinics to ensure all risk factors are identified and rigorously treated to an appropriate target with supportive patient education and measures to promote healthy living, wellbeing and adherence to treatments. A single centre study in an Irish university teaching hospital showed that adherence to secondary preventive treatment can be enhanced by providing goal-directed secondary prevention plans to patients and referring GPs[34]. In addition, those with no identified cause of stroke (so called 'Cryptogenic' stroke or embolic stroke of uncertain source (ESUS)) should have access to more detailed investigations such as prolonged external or implantable cardiac rhythm monitoring.

33 Brewer L et al (2015) Secondary prevention after ischaemic stroke: the ASPIRE-S study. BMC Neurology, 15: 216.

34 Murphy et al (2016) Continuation and adherence rates on initially-prescribed intensive secondary prevention therapy after Rapid Access Stroke Prevention (RASP) service assessment. Journal of Neurological Sciences, 361: 13-18.

Traditionally stroke investigations occurred soon after stroke and interventions commenced at an early stage. Treatments started are often lifelong, but further structured follow-up has been limited. Those who have had a stroke at any point are now considered to have a chronic disease, which presents an additional opportunity for longer-term follow-up and potential for pathway development for integrated prevention between primary and secondary care.

Recommendations:

- **National guidance on stroke secondary prevention treatment targets to be standardised, agreed and promoted by guideline development through the institute of medicine of the RCPI in conjunction with representatives from the NCP for stroke, chronic disease, the National Heart Programme and ICGP as represented on the interdisciplinary group SPAFI.**
- **To ensure that all patients recovering from a stroke have access to a specialist secondary prevention stroke clinic and diagnostics, including fasting risks, 24 hour ambulatory blood pressure monitoring, extended ambulatory or implantable cardiac monitoring (up to at least 30 days where AF remains a possibility e.g. with Embolic Stroke of Unknown Source -ESUS) and TOE or TTE .**
- **Specialist stroke prevention clinics to be designed and developed which should include advice on risk factor reduction and healthy lifestyle, including healthy eating, attaining ideal body weight, exercise, smoking cessation and alcohol reduction, adherence to medication and reducing stress. The clinic should be multidisciplinary and, in addition to specialist stroke physicians, patients should have access to CNS in stroke, PT, OT, SLT, clinical pharmacy, dietetics and clinical psychology where needed. Secondary prevention should also be a key component of any post-acute rehabilitation service supporting stroke survivors.**

Chapter 2: Acute Care and Cure

The acute care and cure section of the NSS is underpinned by the principles of urgent access to a trained senior decision maker for acute stroke treatment (e.g. thrombolysis and/or thrombectomy) and admission to an appropriately staffed acute stroke unit bed for the majority of patient's in-patient stay.

Access to acute stroke treatment has been improved through:

- Increased provision of **stroke units**
- Wider availability of **stroke thrombolysis and thrombectomy**
- Increase in **specialist quality care**
- Development of **early supported discharge services**

Acute Treatment

1. Thrombolysis

Thrombolysis is the delivery of a clot lysing agent which aims to dissolve the obstructive clot in the cerebral artery and is a standard treatment in acute ischaemic stroke (stroke caused by interruption of blood flow to the brain by clot) within 4.5 hours of symptom onset. It can increase chances of independent outcome by 11%, needs senior supported decision making and is most effective if delivered within two hours of onset of symptoms[35]. Our national KPI for thrombolysis is to treat 12% of ischaemic stroke. It is used on its own and, when appropriate, can be delivered as a complimentary therapy, in absence of contraindication, to EVT where the latter is also deemed appropriate treatment.

Thrombolysis is very time dependent and all acute hospitals treating stroke should have undergone quality improvement training in 'door to decision time' which should include repeated data collection, audit cycles and revised quality improvement activities which should be carried out in continuous cycle. Each service should have a thrombolysis protocol in place based on national guidelines and a 'what to do' in the event of complications. This is now the case in all of our acute hospitals receiving stroke patients. Senior decision making for thrombolysis is at an appropriately trained consultant level and cases are reviewed by in-person attendance or by telemedicine. This can have implications for onerous rota working and does need to be recognised particularly where telemedicine networks are covering several hospital sites at night.

35 Hacke W et al (2004) Association of outcome with early stroke treatment: pooled analysis of Atlantis, ECASS, and NINDS rt-PA stroke trials. Lancet, 363:768-774

2. Endovascular Thrombectomy (EVT)

EVT is the mechanical removal of an obstructing clot and is applicable to ischaemic strokes where large vessels are occluded e.g. M1 or M2 division of the middle cerebral artery or basilar artery occlusive clot. Following multiple international randomised controlled trials demonstrating very significant benefit in comparison with best medical treatment, EVT is now standard of care for all patients with LVO stroke potentially up to 24 hours following the onset of symptoms, or since last known normal, provided neuro imaging is favourable and suggests ischaemic brain tissue at risk can be rescued by the procedure.

Although it is possible to treat up to 24 hours, the procedure should be performed as soon as possible following the presentation of the patient to the emergency services. “Time is brain” and every minute counts. Two million brain cells die each minute after vessel occlusion and every minute saved between the time of onset and the reopening of the blood vessel results in the gaining of one week of healthy living for the patient (”*save a minute save a week*”) . This treatment even has a much greater efficacy than emergency percutaneous coronary intervention for acute coronary syndromes. The procedure is highly specialised and needs both volume and experience to ensure good outcomes.

For the foreseeable future, the NCP for Stroke in agreement with the NTS, are focused on the development of a 24/7 two centre approach to the country’s EVT needs with thrombectomy services based at Cork University Hospital and Beaumont Hospital, Dublin. Further satellite thrombectomy services on the south side of Dublin or in the west of Ireland may be needed in the future depending on trends in demography and incidence. However, modelling of any future developments in this regard must be cognisant of the expertise and procedural volume required for safe effective services and as such will be future-guided by national data from INAS and the NTS.

Approximately 15-20% of acute ischaemic strokes may be due to LVO and amenable to thrombectomy. Thrombectomy may increase the chances of independent outcome by as much as 33% in properly selected stroke cases and as such, only three people need to be treated to achieve an independent outcome over standard best medical treatment alone[36].

This has several clinical implications. Patient selection involves 24/7 senior decision making both at the receiving site and the catchment thrombectomy service and may require cross-site specialist hospital rotas, telemedicine and/or neuroimaging decision-supporting software to ensure best use of resources for best patient outcomes. Patient treatment at the EVT centre as is the case now, requires onward ambulance transport from the receiving hospitals to the EVT centre in the ‘drip-ship and return’ model of care.

The future and optimal model for EVT treatment in Ireland is continuously developing and will be influenced by geographical considerations, manpower and ambulance resources and will be better informed by both ongoing national and international research. In addition, we are proposing to examine the feasibility and efficacy of pre-hospital identification of LVO stroke and direct bypass to the EVT centre as a pilot pathway in a limited region of Dublin and a wider area of Munster to understand the impacts and benefits of such a bypass for hospitals, patients and stroke services.

36 Goyal et al (2016) Endovascular thrombectomy after large vessel ischaemic stroke- a meta-analysis of individual patient data from five randomized trials. Lancet, 387:1723-1731

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Bypassing stroke patients to EVT centres could have significant effects on ambulance services, receiving emergency departments at the EVT centres and rotas at EVT centres. While the referring catchment hospitals will need resourcing and maintenance of stroke services to deal with the majority of stroke presentations which are non-LVO as well as for receiving repatriated EVT-treated patients, the majority of whom will need further stroke treatment and acute stroke rehabilitation.

The combined staffing levels^ required at the EVT centres to provide acute stroke services locally and a 24/7 supra-regional thrombectomy treatment service are estimated and outlined below in Table 1:

Table 1: Staffing for Endovascular Thrombectomy centres

Grade	Combined WTE
Radiographer	1
Registrar, Medicine	4
Staff Nurse - General	1
Clinical Nurse Specialist (General)	2
Consultant Physician in Stroke Medicine*	5.5
Specialist Registrar, Radiology	2
Advanced Nurse Practitioner (General)	1

^ *This excludes interventional neuroradiology staff who are already in post and some of the acute stroke staff who are also in post - up to date gap analysis needed.*

* *Normally a geriatrician or neurologist with acute stroke experience. Consultant WTEs are total recommended and some are already in post at EVT sites.*

For this strategy we are assuming the existing '*drip-ship and return*' pathway to and from the EVT centre is the realistic scenario for our acute stroke services in the short to medium term and implementation of any future bypass system will be informed by pilot data, but the above level of resource will be needed for current service and to facilitate any future pilot of a bypass reconfiguration.

With a current number of approximately 6,400 ischaemic strokes per annum, it is envisaged we may perform up to 750 thrombectomy procedures annually under a 'maximum' treatment scenario. This has not been budgeted for before as this is a new treatment. In addition, the necessary decision-making radiology software to optimise patient selection and support radiologists in making accurate assessments needs to be rolled out nationally (pilot projects of potentially suitable applications are already underway with the support of the national radiology programme, National Integrated Medical Imaging System (NIMIS) and HSE information technology). The bi-plane angiography suites necessary for EVT procedures also have a life span of approximately seven years and will need a planned rolling maintenance and replacement schedule to avoid breaks in vital services.

Recommendations:

- **All acute hospitals receiving stroke have a thrombolysis decision protocol based on formulated and updated national guidelines including management of arising complications.**
- **All acute hospitals receiving stroke patients undergo a quality improvement process and audit for 'door to decision time' and aim to achieve a median time of less than 30 minutes.**

- All patients must have 24/7 access to emergency acute stroke assessment and treatment by a stroke specialist (normally but not exclusively a consultant geriatrician or neurologist). This can occur in-person or by telemedicine to facilitate network rotas. As this work is of an onerous, out-of-hours and critical decision-making nature, the TRASNA telemedicine programme is to be supported and enhanced as needed to ensure specialist 24/7 stroke cover. Due to the urgent and critical nature of acute stroke on-call, out-of-hours work to be remunerated as per the existing agreed national arrangement for consultant 'onerous working' (i.e. 1:3-4) rotas.
- All centres receiving patients with acute stroke must have access to CT and multi-phase CT angiography on a 24/7 basis to facilitate treatment decision making regarding thrombolysis and thrombectomy. The NCP for Stroke acknowledges the impact that this will have on radiology services and will work with the Radiology Programme to identify WTE requirements. The CT equipment needs to be of appropriate specification to allow for perfusion imaging capability. Decision support software in the interpretation of the non-contrast CT, multiphase CT angiogram and perfusion imaging should be available to assist in the rapid diagnosis of an acute ischaemic stroke. This software also facilities rapid communications of the results to the relevant clinical and radiological teams.
- All patients with LVO stroke must have access to specialist clinical and interventional neuro-radiological opinion regarding EVT from the EVT site. EVT will be based at one or two comprehensive stroke centres at Cork University and Beaumont Hospitals. Both hospitals will need extra HASU beds with multidisciplinary team (MDT) staffing to allow for transfer of stroke patients and short stay accommodation where required before repatriation to the referring stroke unit. This is recognised in the outlined plan for increased acute stroke unit bed designation.
- The EVT stroke centres will require adequate staffing at a consultant, registrar and CNS level. Specifically a recommendation is made is for 5.5 WTE consultants specialising in Stroke Medicine at the EVT site to provide 24/7 specialist clinical governance to existing case volume and catchment areas, as well as governance to the additional inward and outward movement of acute LVO stroke cases from across the country to access EVT.

- EVT is to be provided at one or two biplane angiographic suites at Beaumont Hospital and a biplane angiography suite at Cork University Hospital on a 24/7 basis, supported by the necessary consultant interventional neuroradiologist and radiologist registrar manpower as part of the comprehensive centre staffing. Consultant interventional neuroradiologist numbers will need to be increased if the number of thrombectomy procedures carried out is to increase from 370 to 750. The onerous nature of the on-call service provided by these consultants requiring immediate responses to frequent calls and often requiring many hours in hospital should be remunerated by the existing arrangements for 'onerous working' (e.g. 1:3-4) on call rotas. Additionally, a radiology registrar, nurse and radiographers are required to provide a 24/7 in house on call service. Sufficient funding will need to be secured and capacity available to treat up to 15% of all ischaemic stroke – up to 750 cases per year.

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Stroke Unit Care

Stroke is the third leading cause of death and is the leading cause of acquired adult neurological disability in Ireland[1]. Stroke unit care is the cornerstone and foundation of all stroke care and no acute hospital should be receiving acute stroke patients without providing such care. Stroke unit care serves all stroke patients, regardless of stroke type or time of onset. Acute stroke units have been shown to reduce stroke mortality and dependency and are an ESO recommendation with clear set guidelines on what constitutes an acute stroke unit[37].

What is a Stroke Unit?

A Stroke Unit is an organised, geographically identifiable unit in a hospital devoted to stroke care.

Staff have expert knowledge in stroke and rehabilitation

- It is staffed by a multidisciplinary team that meets at least once a week. The consists of doctor(s), nurse (s), healthcare assistant(s), physiotherapist(s), occupational therapist(s), social worker(s), speech and language therapist(s), dietetics and psychology (preferably with a neuropsychological profile)
- It has established a programme for interventions to meet common stroke patients' problems and for recording of the quality of care
- It is concerned with immediate mobilisation and early rehabilitation after stroke
- It provides communicatively-accessible detailed information and educates patients and family/friends during the hospital stay

The NCP for Stroke seeks to ensure that all of our acute hospitals have either an acute stroke unit or a bypass arrangement for acute stroke presentations to an adjacent hospital where such stroke unit care is available. All hospitals will aim to meet core quality ESO standards within their acute stroke units and we aim to achieve this for all sites by the end of 2026. Our national KPI is for 90% of all acute stroke cases to be admitted to an acute stroke unit bed and that patients spend 90% of their acute care in such a unit.

In Ireland, most acute hospitals operate a hybrid model of stroke unit care with a proportion of 'hyper-acute beds' (with acute treatment protocols, neuro-cardiac monitoring and intensive nursing support) for the initial period of care and early phase mobilisation, and acute stroke beds with reduced intensity monitoring and nurse staffing with ongoing full specialist multidisciplinary stroke team assessment and treatment continuing during the rehabilitation process.

In Ireland, none of the acute stroke units have been properly resourced in terms of actual bed numbers and staffing levels to date. The NCP for Stroke has undertaken a census in each of our acute hospitals receiving acute stroke patients and the designated acute stroke unit bed numbers and staff allocations for all the disciplines necessary for acute stroke unit care and rehabilitation in such a setting. In assessing acute stroke beds needed, the NCP for Stroke looked at the existing number of beds and what was needed now to ensure 90% of cases were admitted to a stroke unit bed and what will be needed over the next five years at each site using a calculation based on the proportional growth in the over 65-year-old population in the catchment of each hospital (taken from Central Statistics Office (CSO) data) and the fact that 75% of strokes occur in that age group. The results of that census and gap in current stroke bed need and projected need over 5 years is summarised below in Table 2.

37 Ringelstein et al for the ESO Stroke Unit Certification Committee (2013) European Stroke Organisation Recommendations to Establish a Stroke Unit and Stroke Centre. Stroke, 44:828-840. DOI: 10.1161/STROKEAHA.112.670430

Table 2: Current acute stroke unit beds and projected needs at each acute hospital site over the next 5 years

Hospital Group	Hospital Name	Current Stroke Unit Beds	Annual Stroke Admissions 2018	Average Length of stay 2018 by hospital	% increase >65yr olds by 2026	Potential increase in no of strokes	Total no's plus potential increase in stroke x hospital AvLoS ÷ 365
Dublin Midlands	St James's Hospital	26*	262	29	33.2	65	25
	Tallaght University Hospital	8	265	22	52.9	105	25
	Naas General Hospital	10	203	21	49.9	99	20
	Midland Regional Hospital Tullamore	0	86		Bypass for FAST+ve in operation		
	Midland Regional Hospital Portlaoise	0	62		Bypass for FAST+ve in operation		
Ireland East	Mater Misericordiae University Hospital	12	379	15	28.6	81	20
	St Vincent' University Hospital	10	428	22	25.9	83	30
	Midland Regional Hospital Mullingar	4	126	11	39.8	63	10
	Wexford General Hospital	4	158	18	36.8	43	10
	St Luke's Hospital Kilkenny	5	125	15	38.2	36	8**
	Our Lady's Hospital Navan	0	81	20	Bypass for FAST+ve in operation		
RCSI Hospitals	Beaumont Hospital	24	483	19	25.4	92	35
	Our Lady of Lourdes Hospital Drogheda	10	219	15	40.9	67	12
	Cavan General Hospital	6	150	17	34.6	39	10
	Connolly Hospital	8	168	22	69.4	129	25

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Hospital Group	Hospital Name	Current Stroke Unit Beds	Annual Stroke Admissions 2018	Average Length of stay 2018 by hospital	% increase >65yr olds by 2026	Potential increase in no of strokes	Total no's plus potential increase in stroke x hospital AvLoS ÷ 365
Saolta	Galway University Hospital	10	304	22	40.6	92	25
	Portiuncula Hospital	4	75	12	Bypass for FAST+ve in operation	17	5
	Mayo University Hospital	12	149	15	31.1	35	8**
	Sligo University Hospital	10	143	13	31.7	34	8**
	Letterkenny University Hospital	0	164	23	29.4	36	15
South/Southwest	Cork University Hospital	12	520	13	35.9	187	30
	Mercy University Hospital	5	95	8	35.9	26	5
	Tipperary University Hospital	6	112	18	33.6	28	8**
	University Hospital Waterford	7	139	15	33.8	35	8**
	University Hospital Kerry	4	199	12	33.2	50	8**
	Bantry General Hospital	4	85	18	35est	22	5
University of Limerick	University Hospital Limerick	15 (+9 neuro)	366	17	35.4	97	20
	Totals	210	5,546				327

* *inclusive of beds in MISA unit*

** *Staffing calculated @ multiples of 2.5 => 8 beds calculated at 7.5 beds*

Adequate multidisciplinary staffing of stroke units is essential to ensure proper care of this emergency brain injury, enhance acute treatment delivery, prevent and manage complications, start patient recovery and discharge planning early and to ensure proper patient and carer education and support.

The NCP for Stroke undertook a census of staffing WTEs dedicated to stroke care in each of our acute hospitals receiving acute stroke patients and benchmarked this against the recommendations of the Royal College of Physicians (UK) 2016 National Stroke Guidelines[11], previous IHF Council on Stroke guidance on the staffing of stroke units as well as the Framework for Safe Nurse Staffing and Skill Mix in General and Specialist Medical and Surgical Care Settings in Adult Hospitals in Ireland, 2018. Where recommended ratios for stroke unit care did not exist i.e. MSW and Dietetics, reference was made to Specialised Neuro-rehabilitation Services Standards and ratios applied to 'hyper-acute' rehabilitation were applied. The HSCP ratios given are based on a 5/7 working week. They will need to be increased as and when provision of HSCP services changes to a 7/7 staffing model. Table 3 shows the recommended staffing levels for a five-bedded acute stroke unit, consisting of one hyper-acute bed and four acute beds.

Table 3: **Recommended staffing levels for acute stroke units (5 beds)**

	PT	OT	SLT	Psychologist	Dietician*	MSW*	Nurse	Consultant Stroke Physician
	Whole-Time equivalent (WTE) per 5 beds						WTE per bed	
1 Hyperacute Stroke Unit bed	0.2	0.1	0.1	0.05	0.07		** Registered 2.32 Unregistered 0.58	
4 Acute Stroke Unit beds	0.7	0.7	0.3	0.2	0.3		** Registered 3.51 Unregistered 2.9	
Total WTE	0.9	0.8	0.4	0.25	0.37	0.5	** Registered 5.8 Unregistered 2.9	24/7 availability; minimum 6 thrombolysis trained physicians on rota. Consultant led ward round five days per week.

* *Recommended Ratios Taken From British Society Of Rehabilitation Medicine Ratios For Acute Rehabilitation*

** *These are indicative figures and full Nursing & HCA staffing for each unit will be developed in collaboration with National Lead for Safe Nurse Staffing and Skill Mix*

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We know from our staff mapping exercise that there are insufficient levels of nursing care hours available to meet the needs of patients on some stroke units. The Framework for Safe Nurse Staffing and Skill Mix in General and Specialist Medical and Surgical Care Settings in Acute Hospitals (2018) will be implemented in each unit in collaboration with the National Lead for Safe Nurse Staffing and Skill Mix. These numbers will be based on the recommendations contained within the Framework for Safe Nurse Staffing and Skill Mix in General and Specialist Medical and Surgical Care Settings in Adult Hospitals in Ireland. This framework has been developed with 4 key assumptions:

1. Assumption One:
   Patient care needs differ.
2. Assumption Two:
   Nurse staffing number, profile and mix are key to ensuring safe, high-quality care for patients.
3. Assumption Three:
   The organisational environment where patients receive care and staff deliver care has an impact on the ability to deliver safe effective care.
4. Assumption Four:
   Positive patient and staff outcomes are important indicators of the safety and quality of nursing care.

This framework is being rolled out nationally and will provide an evidence-based approach to nurse staffing and skill mix in stroke units and the NCP for Stroke has an already advanced collaborative plan to implement the Framework for Safe Nurse Staffing and Skill Mix in General and Specialist Medical and Surgical Settings in all acute Stroke Units. The NCP for Stroke will continue to ensure established and future national policy, such as the Framework for safe Nurse staffing and Skill Mix (including community and post-acute care settings) will be used to enable the provision of safe staffing and skill mix in the delivery of stroke care in all care settings to which the policies are developed.

For HSCPs we have mapped the existing gap in staff numbers for all disciplines that exists currently and what would be needed with the projected growth in stroke numbers at individual sites given the proportional growth in the over 65 population in the catchment area of that site (taken from CSO figures) and the fact that 75% of all strokes occur in that age group. **A mix of therapy grades is required to deliver optimum care to the person who has had a stroke, and this includes basic, senior and clinical specialist posts**. Increasing staff WTEs to the required level has significant costs and takes time to recruit suitable qualified personnel. Cognisant of these factors, we have adopted a stratified, staged approach to reaching optimal staffing levels so sites can see the required human resource and indicative budgetary implications inherent in staffing their stroke services appropriately. This is summarised in Table 4. We look to bring all services up to recommended capacity over three years of the strategy by a graduated process. A suggested potential scheme by which to achieve this is outlined in **Appendix 3**. This obviously will lead to some posts being divided into percentages of WTE. This presents an obvious challenge in terms of recruitment, requiring flexibility and innovation in our approach to staff gaps on our stroke units. Some work has already started on this and some small progress made as evidenced in the recent INAS Organisational Audit 2021.

Posts are costed at mid-point senior grade. The purpose of this is not to be overly prescriptive in how posts are filled, but to give an accurate estimate of likely costs to the system. This could be open to local interpretation i.e. 1 basic grade and 1 clinical specialist post instead of 2 WTE senior posts could be considered if appropriate.

Table 4: **HSCP staffing projections for our acute stroke unit needs**

Discipline	Gap to be filled over 5 years
Physiotherapy	42.15
Occupational Therapy	39.45
Speech and Language Therapy	15.60
Dietetics	22.50
Medical Social Work	19.65
Psychology	16.90
Total Posts/HSCP	156.25

The NCP for Stroke values the contribution of all MDT members. The following section, dedicated to psychology services is included as psychological supports for stroke survivors remain massively under developed. While it is wholly acknowledged that cognitive assessments and interventions are carried out by other members of the MDT, in particular, by the OT, the role of the psychologist compliments these assessments.

Clinical Psychologists have a role in both the acute and longer term adjustment and recovery after stroke, in the acute stages delivering evidence based recovery-focused and patient and carer tailored therapy. Provision of psychology services across the continuum or stroke care is important in facilitating a comprehensive assessment that identifies acute and ongoing disorders of cognition and mood, problems with adjustment, relationships and coping and implementing therapeutic interventions to improve psychosocial functioning after stroke and dealing with pain, fear and fatigue. Psychology input also supports the family unit after stroke helping reduce stress and fear and promoting successful coping and recovery after a significant life event.

The first Irish National Audit of Stroke Care[38] documented the status of services in 2006-2007, finding an almost complete absence of psychological services for patients with cognitive impairment and mood difficulties after stroke. It was noted in this audit that while 76% of patients see a clinical nurse specialist after stroke and 81% see a physiotherapist, just 3% see a psychologist. This figure has continued to remain extremely low with only 5% of patients having access to psychological services in 2020.

There is strong testimonial and experiential evidence to support a substantial unmet need in relation to longer term psychological services and speech and language services for people living with stroke in the community that needs to be addressed. This is particularly true for people with post-stroke communication impairments and needs to be addressed by a needs analysis of our current population and the implementation of the relevant proposed community structures in both the integrated care programme for older people and neuro-rehabilitation strategy.

38 Horgan F et al (2008) Irish Heart Foundation National Audit of Stroke Care: Royal College of Surgeons in Ireland. Irish Heart Foundation National Audit of Stroke Care.pdf

Recommendations:

- Acute Stroke services must have adequate staffing and diagnostic resources to provide 24/7 acute stroke care and treatment
- All hospitals receiving acute stroke patients must have an acute stroke unit. This must be of sufficient capacity so that 90% of all acute stroke admissions can be admitted to such a unit and spend 90% of their acute phase of hospital admission in specialised stroke care. The national stroke strategy is recommending an increased designation of stroke unit beds across 20 of our acute hospital sites
- Specialist Stroke services receiving acute patients should not be 'single-handed'. Each acute stroke unit should have a daily ward round by the senior clinical decision maker' (Stroke Specialist) for diagnosis, assessment and management of patients with suspected acute stroke as well as providing a 24/7 acute stroke rota. Each acute stroke site should have a minimum of 6 trained physicians to deliver a 24/7 acute stroke treatment rota and referencing consultant manpower guidelines for stroke in the UK, a minimum equivalent of 2 WTE of consultant sessions dedicated to specialist stroke services across the spectrum of care. The NCP for Stroke will undertake a comprehensive workforce planning exercise which will determine specific gaps, it is anticipated that even with review of existing work plans and reconfiguration this is likely to require additional consultant appointments of 1WTE equivalent per acute stroke site.
- All acute stroke units are to have appropriate nurse: patient and HCA: patient ratios as outlined in staffing guidelines for stroke unit care. The national stroke programme recognises both the need for proper nurse and HCA staffing ratios on acute stroke units as per the Framework for Safe Nurse Staffing and Skill Mix in General and Specialist Medical and Surgical Care Settings in Adult Hospitals in Ireland.
- All acute stroke services are to have appropriate dedicated health and social care professional (HSCP) staff as outlined in staffing guidelines for stroke unit care. The NCP for Stroke recognises the deficit in therapists for stroke across our health system a recommends a phased costed schedule to add the required additional HSCP posts to bring our acute stroke units up to the recommended levels of therapy staffing. Staffing levels proposed are taken from the RCP Stroke Guidelines, 2016. Where specific guidance did not exist or were felt to be insufficient, the NCP for Stroke referenced specialized neuro-rehabilitation services standards recommended ratios for acute rehabilitation[39]. The ambition of the NCP for Stroke is that these staff would be dedicated to stroke units. The NCP for Stroke acknowledges that these recommendations do not specifically reference colleagues such as pharmacy and radiology who play an essential role in supporting the delivery of safe and effective care to stroke patients. This is does suggest that the NCP for Stroke feels these professions are any less important, but is reflective of the fact that these professions are unlikely to be dedicated to stroke specific services so estimating a need specific to stroke represents a challenge.

39 Specialist neuro-rehabilitation services: providing for patients with complex rehabilitation needs https://www.bsrm.org.uk/downloads/specialised-neurorehabilitation-service-standards--7-30-4-2015-pcatv2-forweb-11-5-16-annexe2updatedmay2019.pdf

Chapter 3: Rehabilitation and Restoration to Living

The NCP for Stroke aims to ensure that all patients have adequate access to appropriately skilled multidisciplinary rehabilitation, in addition to ongoing practical, social and emotional support after stroke to ensure maximal physical, cognitive and psychological recovery and as full a return to a quality of life as possible. In line with SAP-E 2018-2030, the NCP for Stroke recognises the dynamic process of rehabilitation over time after stroke and that stroke is a chronic disease that requires periodic review and assessment. There has been significant under-investment in community-based services for stroke over the years. Investment in the continuing care and support of those living with stroke is essential.

This strategy recognises that planning for the scale of support needed in the community by stroke survivors is limited by a hiatus in current knowledge and that the often quoted 2008 figure of 30,000 stroke survivors living in the community in Ireland is likely to be an underestimate of the true position. To fully address and plan for longer term stroke survivor needs requires accurate data both in terms of numbers and associated level of need. *The NCP for Stroke recommends that an audit in relation to this is undertaken as a matter of priority.*

The NSS advocates for the following as key principles with respect to rehabilitation and restoration to living after stroke:

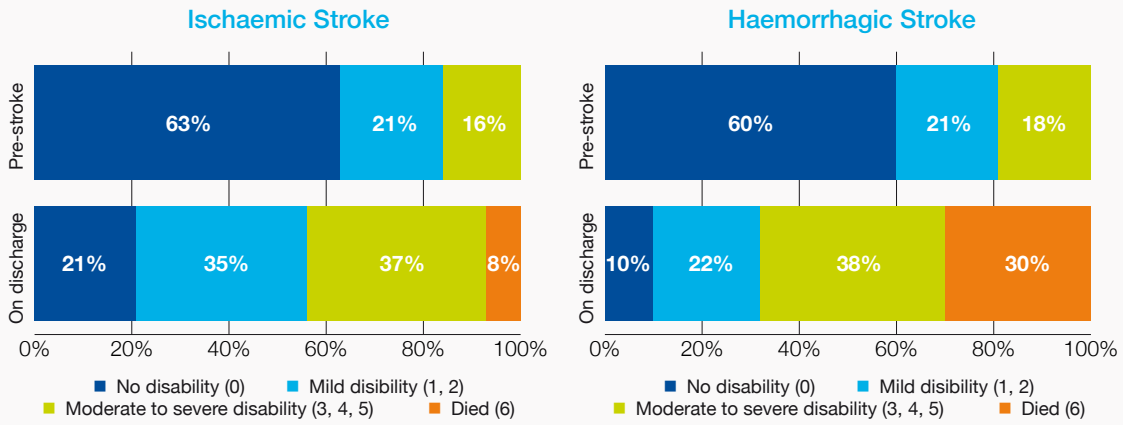
Every stroke patient should have:

- Timely access to the rehabilitation service which best meet their needs. The breadth of services required includes, but is not limited to;
    - Complex specialist inpatient rehabilitation
    - Post-acute inpatient rehabilitation
    - Early supported discharge
    - Community (neuro-) rehabilitation
    - Ongoing review and assessment of function as required
    - Ongoing supports in the community including:
        - Peer support
        - Self-management support
        - Day support
        - Homecare supports
        - Respite services
        - Access to information and education at the time it is required

- A standardised comprehensive discharge/transition plan formulated with stroke patients outlining their needs for continuing rehabilitation and signposting supports in the community.
- Services and supports should be 'aphasia friendly' and accessible to those with communication impairment post stroke.
- People should be supported by a case manager/key worker to manage their rehabilitation plan as set out at time of discharge.
- Patients should have access to a specialist stroke clinic based on a post-stroke check list after discharge at an appropriate interval (but within three months) determined by the discharge team to address secondary prevention; activities of daily living; mobility; spasticity; pain; continence; mood and cognition; communication and swallow; fatigue; life after stroke issues and personal relationships. An annual review is a standard of care in many stroke guidelines including the ESOs *"Basics of Stroke Care"* and should be offered to stroke patients.
- Stroke patients transitioning to long term care should have a discharge summary and care plan that can be presented on admission.
- Where there are ongoing rehabilitation goals, there should be access to relevant rehabilitation services including ESD and the community rehabilitation structures envisaged by the NCP for Older People (NCPOP) and the NCP for Rehabilitation Medicine.
- There should be a clear pathway of re-referral to specialist stroke services when required to re-evaluate need and treatment.
- Families of stroke survivors should have access to appropriate supports including counselling, education and training and practical advice/information.

The majority of patients who survive stroke will have some level of physical, cognitive, communicative, psycho-social or emotional disability. The 2020 INAS report captured the largest set of data to date on modified Rankin scores (mRS), a recognised measure of disability post-stroke. 72% of those surviving ischaemic stroke will have some form of disability, 37% of which is moderate/severe (mRS scores 3-5) and only 10% of those with haemorrhagic stroke were discharged with no disability.

Figure 3: mRS post Ischaemic and Haemorrhagic Strokes



Patients surviving stroke are increasingly discharged home after the acute event (59% in 2020) with a further 13% being discharged to non-acute rehabilitation units and 6% to nursing home care compared to 8% in 2019.

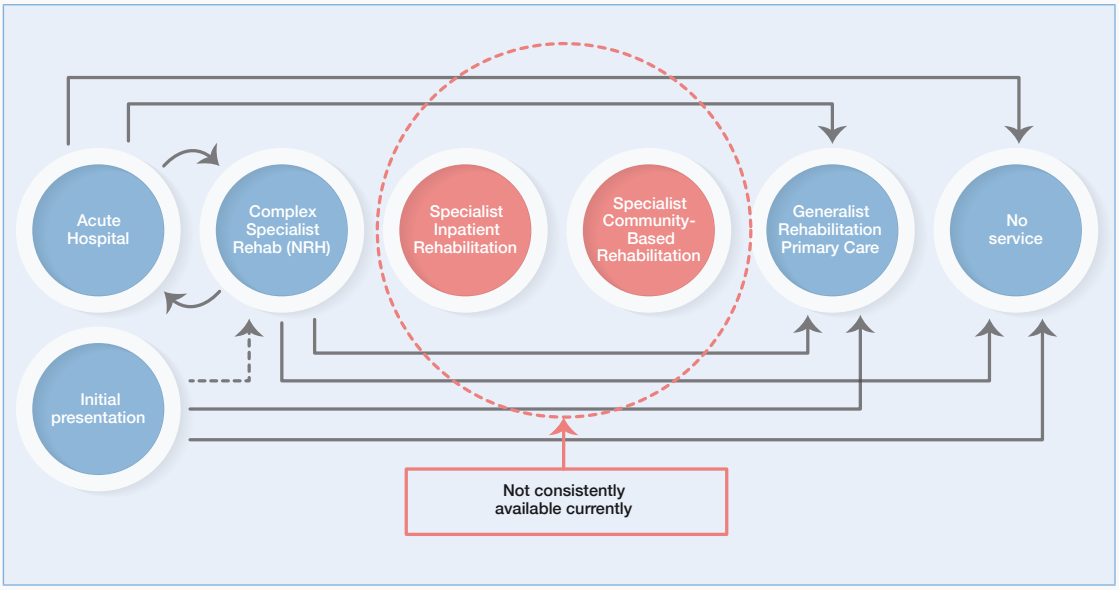
Stroke patients should have early access to the services that most meet their needs. This should be determined by a clinical multidisciplinary rehabilitation-needs assessment which includes medical (a significant number of patients with stroke have ongoing medical co-morbidities such as diabetes, heart failure and COPD which impact on rehabilitation), physical, communicative, cognitive, perceptual, psycho-social and psychological domains

It is wholly acknowledged that **rehabilitation services are under-developed in Ireland**. The 2016 Audit of Stroke Rehabilitation highlighted again the need for investment and enhancement of stroke rehabilitation services. The survey results of this audit showed that:

- **Bed access to rehabilitation units was age-restricted for patients in almost half of sites surveyed.**
- **Sites did not consistently have access to accurate admission and discharge data to monitor patient flow.**
- **A quarter of sites had a dedicated unit or ward for stroke patients. This compared with three-quarters of units in the UK.**
- **Only 40% of sites, had a stroke specialist responsible for the management of stroke patients' rehabilitation.**
- **Although patients had access to physiotherapy, occupational therapy and speech and language therapy on all sites, three-quarters of sites felt their patients were not to receiving the recommended levels of daily therapy.**
- **Psychology services were accessible in less than a third of sites, with access not available within a working week on any site.**
- **Only half of sites felt that training was available to patients and families and/or caregivers to manage the consequences of stroke.**
- **Less than a fifth of sites had access to an ESD team.**
- **Rehabilitation units were heavily dependent on voluntary organisations to provide support services for stroke patients.**
- **Sites highlighted the lack of psychology services, community rehabilitation teams and community based health and social care professionals as particular challenges to care provision.**

Prior to this audit of stroke rehabilitation units, the need for development of rehabilitation services was described as far back as in the Years Ahead (1988)[40] report and also in depth in the National Strategy and Policy for Neuro-Rehabilitation Services which was launched in 2011[41], and the Specialist Geriatric Medicine Model of Care in 2012[42]. The implementation framework supporting the Neuro-rehabilitation Strategy was published in 2019 and describes the need to develop acute, post-acute inpatient and community based services for those with neurological conditions including stroke. It also highlighted the lack of investment to date in neuro-rehabilitation services, particularly at local and community based levels. This was informed by a comprehensive mapping exercise undertaken in 2017 which looked at clinical services accessible to those with neurological conditions including stroke.

Figure 4: Gaps in service provision for those with neuro-rehabilitative needs (Neuro-rehabilitation Implementation Framework)



Similarly, recognising successful ageing in our demography and that the majority of strokes occur in older people, the NCPOP and ICPOP have published recommendations for community based rehabilitation teams to meet the needs of older people (inclusive of stroke) in the community in the specialist geriatric services model of care. All strategies are focused on achieving best outcomes for people, by providing safe, high quality, person-centred care at the lowest appropriate level of complexity, integrated across the care pathway, and provided as close to home as possible or in specialist centres where necessary. The Model of Care of the NCP for Stroke (2012)[43] identifies the need for specialist inpatient rehabilitation as well as ESD and community (neuro) rehabilitation teams.

40 Report of the Working Party on Services for the Elderly (1998) The Years Ahead - a policy for the elderly. https://www.nuigalway.ie/media/housinglawrightsandpolicy/nationalpolicy/olderpeople/A-Policy-for-the-Elderly.pdf

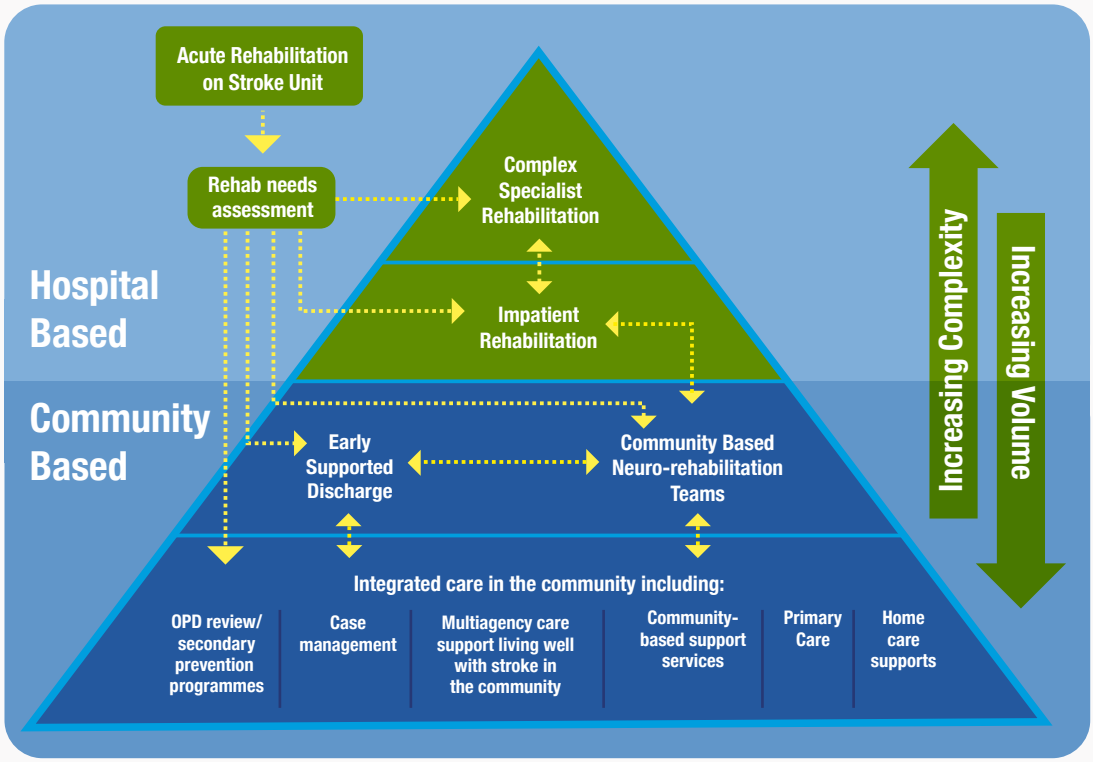
41 Department of Health and Health Service Executive (2011) National policy and strategy for the provision of neuro-rehabilitation services in Ireland 2011-2015. NeuroRehab_Services1.pdf (nai.ie)

42 National Clinical Programme for Older People (2012) Specialist Geriatric Services Model of Care Solution description (hse.ie)

43 Stroke Clinical Care Programme (2012) Model of Care https://www.hse.ie/eng/services/publications/clinical-strategy-and-programmes/stroke-model-of-care.pdf

The figure below outlines how frameworks described in the national rehabilitation strategy, the rehabilitation medicine programme, the specialist geriatric services model of care and the NCP for Stroke overlap.

Figure 5: **Continuum of rehabilitative supports and ongoing care in the community**



In relation to inpatient rehabilitation in Level 2 or community hospital sites, the NCP for Stroke, in line with the Neuro-rehabilitation strategy and the "*Years Ahead*" report (1988) and models of care for specialist geriatric medicine and rehabilitation medicine recommend the following:

- All stroke survivors should have timely and equitable access to rehabilitation services which meet their rehabilitative needs (in relation to intensity of therapy and goals for recovery) irrespective of their age or location.
- Services should be person centred with interventions planned around the individuals' identified needs and preferences.
- Services providing rehabilitation to stroke survivors should be under the clinical governance of a consultant experienced in the neuromedical sequalae of stroke, rehabilitation and discharge planning (normally a geriatrician, neurologist or consultant in rehabilitation medicine) and provide access to medical support and acute hospital services as required.

- Services providing specialist rehabilitation to stroke survivors should be appropriately resourced with full multidisciplinary teams in line with best practice staffing ratios. Staff should be appropriately trained in terms of supporting those with physical, cognitive, communicative and psychosocial needs post stroke. Ideal staffing ratios for rehabilitation, both inpatient and community based services, are outlined in the implementation framework of the neuro-rehabilitation strategy and the specialist geriatric services model of care.
- Active rehabilitation is a key therapeutic component of the patient care pathway. It should not be considered a residential support service. It should be accessible to those who need it in an equitable fashion and not restricted by ability to pay nor any 'residential' charges levied for such inpatient stays.
- Participation in an inpatient rehabilitation programme should not impact on access to other services/supports that are identified as required for the individual e.g. access to nursing home support scheme ('fair deal') funding where required.
- Rehabilitation services should reflect national and international best practice evidence with respect to therapies and interventions provided. Recommended staffing ratios for rehabilitation units are included in the Implementation Framework for the Neuro-rehabilitation Strategy. These are informed by the previously referenced British Society of Rehabilitation Medicine service standards for specialist rehabilitation.

Tertiary level services are also required for those with highly complex needs post stroke. These services are provided at the National Rehabilitation Hospital and access to same is through referral to a consultant in rehabilitation medicine.

The purpose of these recommendations is to try and highlight the need for equitable access to appropriately resourced rehabilitation services and facilities irrespective of geographical location, age or ability to pay.

The majority of strokes occur in older people and with respect to rehabilitation bed numbers the British Geriatric Society recommends 10/1000 over 65 years and 22/1000 over 75 years for the rehabilitation needs of older people inclusive of stroke. Staffing of such units is outlined in the Irish national model of care for specialist geriatric services. However a quarter of strokes occur in younger people and many older people are working so age cut-offs and age-assumed rehabilitation needs may be unhelpful in ensuring patients access appropriate neuro-rehabilitation. No stroke patient irrespective of age should be waiting for rehabilitation and ensuring adequate staffing on rehabilitation units is important.

It is estimated that in addition to local level services, there is a requirement of 60 beds per million of population for those who require specialist inpatient neuro-rehabilitation[44]. Based on our current population, that is an additional 294 inpatient neuro-rehabilitation beds required. These beds will be introduced throughout the country. While we don't have confirmation as to the exact location of all of the planned units, figure 6 gives an indication on potential geographical spread based on population.

44 National Clinical Programme for Rehabilitation Medicine (2018) Model of Care for the Provision of Specialist Rehabilitation Services in Ireland model-of-care-for-specialist-rehab-medicine.pdf (hse.ie)

Figure 6: **Requirement for beds as per neuro-rehabilitation strategy and current population**

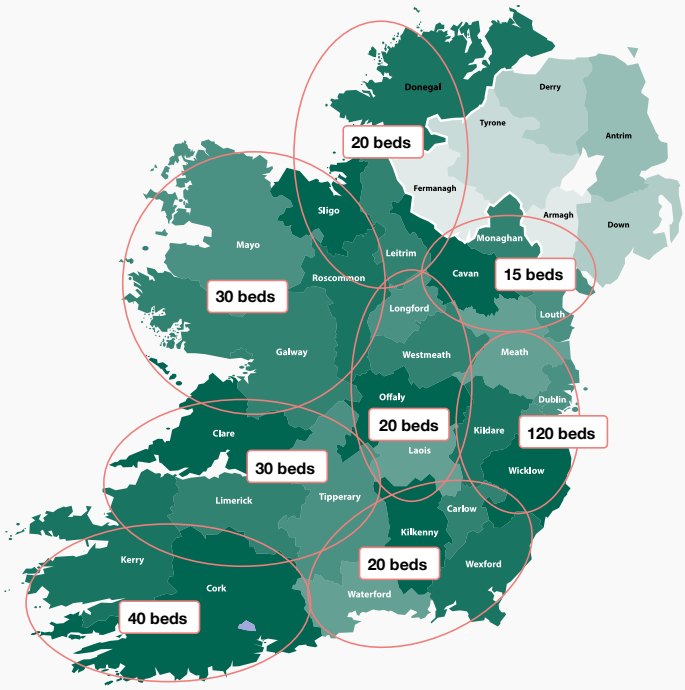


Table 5 outlines the recommendations for rehabilitation unit staffing based on the 'Specialist Geriatric Services Model of Care' and the Implementation Framework for the Neuro-rehabilitation Strategy.

Table 5: **Recommendations for rehabilitation unit staffing (based on the 'specialist geriatric services model of care' of national care programme of older people (column 1) and neuro-rehabilitation strategy – (column 2)**

Profession	Whole time equivalents Specialist Geriatric Services (20 bed unit)*	Whole Time Equivalents level 2 specialist neuro-rehabilitation inpatient unit – 20 beds
Physiotherapy	4 (2 senior)	5.5 (1 senior)
Occupational therapy	4 (2 senior)	5.5 (1 senior)
Speech and language therapy	2 (1 senior)	2.5 (1 senior)
Clinical nutrition/dietetics	1 senior	1
Medical social work	2	2
Podiatry	1	0
Clinical Psychology	0	2 (1 senior)

* *All patients should have access to specialist stroke rehabilitation medicine and nursing. Clear pathways to access psychiatry, psychology, ophthalmology and dentistry should be in place. The unit should have adequate clerical and ICT support.*

With respect to community based rehabilitation, the NCP for Stroke endorses the recommendations of both the 'Specialist Geriatric Services Model of Care' and the Implementation Framework for the Neuro-rehabilitation Strategy which calls for the introduction of community (neuro-) rehabilitation teams in each CHO as well as the development of community based supports, largely provided by the voluntary sector, which enable people with neurological conditions in the community to live well.

Community (neuro-) rehabilitation teams, when resourced fully over the next 2-3 years will include CNS, PT, OT, SLT, MSW, Clinical Psychology, Dietetics, case managers and rehabilitation assistants. Table 6 outlines staffing requirement for a team serving a population of 500,000 based on the recommendations of the British Society for Rehabilitation Medicine.

Table 6: Staffing of community neuro-rehabilitation team

Profession	WTE per 500,000
Team Leader	1.2
Consultant	1.4
ANP	1
CNS	3.7
Physiotherapy	3.5
Occupational Therapy	6
Speech and Language Therapy	2.4
Clinical Psychology	2.4
Social Work	4.7
Dietitian	1.2
Case Manager	5
Rehabilitation Assistants	4.7

Community specialist rehabilitation services after stroke form a critical link in the care pathway by supporting successful discharge of more complex stroke patients and providing a continuity of therapy after acute and post-acute rehabilitation including early supported discharge.

Such teams are likely to be multifunctional in many cases in an Irish setting and be an integration of the NCPOP and the national rehabilitation model of care as needs dictate locally. They have a key role in assessing and making recommendations on vocational options such as returning to work, educational, recreational and occupational activities including parenting, liaison with rehabilitative training services, advice on assisted and adaptive living in the homeplace and residential care and undertaking regular review of rehabilitation needs and goal-based reviews where indicated by the referring primary care provider or following specialist review.

They also have a role to play in providing support to families and caregivers of stroke survivors who we know can be greatly impacted by the effect of stroke on their loved one. A stroke can have an impact on personal relationships, with much of the literature reporting that there are higher levels of marital breakdown in couples affected by stroke and acquired brain injury (Moreno-Lopez et al. 2011[45];

45 Moreno-Lopez A et al (2011) A grounded theory investigation of life experience and the role of social support for adolescent offspring after parental brain injury. Brain Injury, 25(12), 1221-1233.

Butera-Prinzi et al. 2016[46]). Carnes and Quinn (2005)[47] discuss how spouses may have a reduction in financial support, leading to stress. They may also have less time to spend with friends or pursuing leisure activities due to this financial strain and caregiving responsibilities, which can lead to social isolation. They may also feel isolated if there is a loss of intimacy and empathy in their relationship. The research illustrates that the relationship between the brain-injured person and their significant other is changed in innumerable ways, many of which are challenging.

Having a stroke as a parent can have a significant impact on children. A parent with a stroke may not be able to perform parenting tasks as they did previously, which can influence a child's psychological and social well-being (Pessar et al. 1993[48]). It can be difficult for families to know how to help their children, which can lead to further stress within the family (Daisley et al. 2009). It is therefore recommended that children's needs be taken into consideration when working with stroke survivors and their families.

Another area where specific attention is needed is in 'return-to-work' programmes in light of Royal College of Surgeons in Ireland (RCSI) research[49] showing only 32% of stroke survivors who had been in employment were working full-time one year after their stroke. In particular a clear pathway is required, along with education for professionals, access to assessment and retraining and access to support to manage fatigue and post stroke cognitive interventions.

There is strong testimonial and experiential evidence to support a substantial unmet need in relation to longer term psychological services and speech and language services for people living with stroke in the community that needs to be addressed. This is particularly true for people with post-stroke communication impairments and needs to be addressed by a needs analysis of our current population and the implementation of the relevant proposed community structures in both the integrated care programme for older people and neuro-rehabilitation strategy

The implementation of the Neuro-rehabilitation Strategy is being led by the Disability Services Strategy and Planning and Clinical Design and Innovation in the HSE. It is governed by a National Steering Group, with representation from key stakeholders (included NCP for Stroke representation). Funding was secured in 2020 for the proposed managed clinical rehabilitation network demonstrator project which spans CHO 6 and CHO 7. This has recently seen the introduction of inpatient neuro-rehabilitation beds at Peamount Hospital and community neuro-rehabilitation teams in the demonstrator area. Phased national roll-out is planned over the coming three years. In addition the community rehabilitation services envisaged in the specialist geriatric services model of care have been adopted nationally and are currently actively being rolled out across CHOs by ICPOP.

Effective implementation of both strategies will greatly improve the rehabilitation services available to stroke patients post-hospital discharge and on an ongoing basis. It is important that these models of care are complimentary and flexible and underpinned by appropriate medial governance to meet the ongoing needs of stroke patients in the community.

46 Butera-Prinzi F et al (2016) Holding Resilience in Trust: Working Systemically with Families Following an Acquired Brain Injury. Journal of Social Work in Disability and Rehabilitation, 15(3-4):285-304. doi: 10.1080/1536710X.2016.1220882.

47 Carnes SL and Quinn WH (2005) Family Adaptation to Brain Injury: Coping and Psychological Distress. Families, Systems, & Health, 23(2), 186-203.

48 Pessar et al. (1993) The effects of parental traumatic brain injury on the behaviour of parents and children. Brain Injury, 7(3): 231-240.

49 Horgan F et al (2016) Factors associated with Return to Work after Stroke: A qualitative meta-analysis http://irishheart.ie/wp-content/uploads/2016/12/Exploring-the-Factors-Related-to-Return-to-Work-after-Stroke.pdf

It was noted in the 2011 Neuro-rehabilitation Strategy that agencies in the non-statutory sector play a vital role in providing a range of services allied to neuro-rehabilitation. This situation has not changed significantly over the past 10 years. The NCP for Stroke recognises the significant role the voluntary sector plays in increasing awareness about stroke through public awareness campaigns. They also play a key role in aiding the recovery and providing support to stroke survivors through organised educational events, stroke survivor awards, stoke support groups and more recently formally trained peer-to-peer telephone helpline for stroke patients leaving hospital such as that offered by the IHF.

These services provide important practical, social and emotional support to stroke survivors living in the community. They also help provide people with the tools for effective coping, reducing distress, building self-confidence and an outlet that helps overcome isolation. The NCP for Stroke considers the voluntary providers as essential partners in the delivery of stroke services across the continuum of care. Voluntary services play an important role in complementing specialist rehabilitation services in ensuring patients have the best possible outcome and reach their maximum potential in terms of health and wellbeing, functional abilities and engaging in a meaningful way with their communities.

The following supports are detailed, not because the NCP for Stroke feels they are the only rehabilitation needs of the post-stroke patient, but are felt by the NCP for Stroke to be important *in addition* to services sought in the neuro-rehabilitation strategy and by the NCPOP in its' "specialist geriatric services model of care". Staffing levels recommended for ESD teams are made based on the assumption that the recommendations for specialist geriatric and neuro-rehabilitation will be fully implemented and each CHO will have a full interdisciplinary community (neuro-) rehabilitation team able to meet the needs of all stroke patients in a model of chronic disease management.

Early Supported Discharge

Early Supported Discharge (ESD) for stroke is an international model of best care for stroke patients, with milder levels of disability that improves patient outcomes while facilitating a faster discharge home through the provision of stroke specific rehabilitation in the home setting. It has largely developed from within a geriatric medicine model of care but is an all-age service. A consensus has emerged from international research that stroke survivors with mild to moderate disability are appropriate for an ESD approach, while the needs of survivors with more severe disability are better met by specialised inpatient rehabilitation. ESD can be expected to improve disability outcomes, quality of life, reduce the likelihood of long-term care and reduce the inpatient length of stay. Key results of the Cochrane review (Langhorne 2017)[50] showed a reduction of 5-6 days for hospital stay in the ESD group, and six months after stroke ESD patients were more likely to be living at home and to be independent in daily activities.

The National Cardiovascular Health Policy Changing Cardiovascular Health 2010-2019 recommended that ESD services be developed for stroke patients and development of ESD services is a key area within the National Stroke Programme Model of Care 2012.

Sláintecare emphasises the importance of patient centred care and its delivery 'as close to home as possible' and ESD is fully aligned to these principles. The estimated ≈5,500 beds days released back into the acute hospital system through the ESD expansion (Table 11) demonstrates the possibility for more efficient use of hospital beds, with positive impacts on patient flow and unscheduled care management in particular. The resulting increase in access to stroke unit beds will also improve outcomes.

50 Langhorne P, Baylan S; Early Supported Discharge Trialists. Early supported discharge services for people with acute stroke. Cochrane Database Syst Rev. 2017 Jul 13;7(7):CD000443. doi: 10.1002/14651858

In addition provision of specialist stroke services from within the ESD teams to stroke patients in nursing homes may significantly improve quality of life, support both patient and staff in the transition to a fuller life in residential care and prevent unnecessary readmission to acute hospital. The composition of an ESD team as outlined below (Table 7) is based on international best practice, however it is acknowledged that other professions such as pharmacy, dietetics and psychology, play a significant role in supporting earlier discharges of patients. It is important that the clinical governance of the ESD team has dedicated consultant stroke input as recently discharged stroke patients often have multiple complex neuro-medical issues.

Table 7: Composition of an ESD team

WTE	Discipline
1	Occupational Therapist, Senior
1	Physiotherapist, Senior
1	Speech and Language Therapist, Senior
0.5	Medical Social Worker, Senior
0.5	Clinical Nurse Specialist (General)
1	Therapy Assistant

Baseline of current services

The implementation of ESD programmes in Ireland has been realised as a model of care and continues to grow in activity year on year despite inadequate human and financial resourcing. There are currently nine teams providing ESD services for stroke patients in Ireland:

- Mater Misericordiae University Hospital (MMUH) commenced in 2011
- Tallaght University Hospital (TUH) commenced in 2012
- University Hospital Galway (UHG) commenced in 2013
- University Hospital Limerick (UHL) commenced in 2018
- Cork University Hospital/Mercy University Hospital (CUH/MUH) commenced in 2018
- Beaumont Hospital (BH) commenced in 2018
- St James's Hospital (SJH)* commenced in 2020
- St Vincent's University Hospital (SVUH)* commenced in 2020
- Sligo University Hospital (SUH)* commenced in 2020

* *Operating with temporary funding*

These services were established through re-configuration of existing HSCP and nursing staffing and funding provided through the NCP for Stroke and Integrated Care Programme for Patient Flow. In 2018 Beaumont Hospital established an ESD team, availing of Winter Initiative Funding.

ESD figures are reported monthly to the NCP for Stroke from all ESD teams. In 2021, 764 patients accessed ESD services, representing 24.4% of stroke patients discharged alive, across the nine sites (Table 8). ESD should now be viewed as the normal model of care for stroke and developed as a key component of a comprehensive package of care for the stroke patient with milder levels of disability.

Table 8: **ESD activity 2021**

Hospital	Total discharged to ESD	Total Strokes less RIP	Percentage who received ESD
BH	110	330	33.3
CUH	88	674	13.1
UHG	66	262	25.2
UHL	103	403	25.6
MMUH	80	314	25.5
SUH	57	225	25.3
SJH	75	249	30.1
SVUH	94	374	25.1
TUH	91	301	30.2
Total	**764**	**3,132**	**24.4**

ESD is available for up to 8 weeks should a patient require on-going intensive rehabilitation. However, on average people require 4.5 weeks of ESD intervention.

The published evidence supporting ESD relates most often to urban areas. During a previous audit of the three pilot programmes, UHG recorded the biggest bed-day savings, despite having the only current programme serving rural dwellers who make up one-third of its patient numbers. Recent research in Norway supports the Galway experience by showing that ESD gains can be achieved in outpatient settings as well as in the home environment (Hofstad, 2014[51]). This demonstrates that a sustainable case for a national ESD programme can be proposed and executed in Ireland for both urban and rural areas. Recent developments in tele-rehabilitation should also facilitate improved access to therapeutic interventions irrespective of location.

It is clear that expanding ESD services will facilitate more efficient use of hospital beds, with positive impacts on patient flow and unscheduled care management in particular. The resulting increase in access to stroke unit beds will also improve outcomes.

Proposed ESD Network in Ireland

The aim of the NCP for Stroke is to have 21 ESD teams in place by the end of 2025 with the intention of covering 92% of stroke services. The proposal recommends:

Phase 1 ESD Service Expansion

Commissioning of full ESD teams at existing sites and expansion to four new sites - St James's Hospital, Connolly Hospital, St Vincent's University Hospital and Our Lady of Lourdes Hospital. This involves the consolidation of six existing teams to ensure consistent delivery of services and sustainability of ESD services. No currently operational ESD team has a full complement of staff and this puts the future viability and efficiency of the ESD team at risk. Table 9 indicates the WTE requirements to complete Phase 1.

51 Hofstad et al (2014) Early supported discharge after stroke in Bergen (ESD Stroke Bergen): three and six month results of a randomised controlled trial compared with two early support discharge schemes with treatment as usual. BMC Neurology, 21;14:239

Table 9: **WTE requirements to complete Phase 1 ESD expansion ***

Discipline, grade	MMUH	UHG	TUH	CUH	UHL	Beaumont	SVUH	SJH	OLOL	Connolly	Total WTE
Occupational Therapist, Senior	0	0	0	0.5	0	0	0.5	0.5	0	0	1.5
Physiotherapist, Senior	0	0	0	0.5	0	0	0.5	0.5	0	0	1.5
Speech and Language Therapist, Senior	0	0.5	0	0.5	0	0	0.5	0.5	0	0	2
Medical Social Worker, Senior	0	0.3	0	0.75	0.5	0	0.25	0	0	0	1.8
Clinical Nurse Specialist (General)	0.5	0.5	0.5	0.75	0	0	0.25	0	0	0	2.5
Therapy Assistant (PT scale)	0	0	1	1.5	1	1	0.5	0.5	0	0	5.5
											14.8

* *including funding received in 2022 from Demographic pressures.*

Phases 2 and 3 ESD Service Expansion

The NCP for Stroke has an ambitious target of rolling out ESD throughout the HSE network of acute hospitals. This will ensure that stroke patients can benefit from this evidenced based intervention regardless of their geographical location. Table 10 indicates the planned phases 2 and 3 of ESD expansion.

Table 10: **Phases 2 and 3 ESD expansion**

Phase	Site
2	Sligo University Hospital
	Naas General Hospital
	University Hospital Waterford*
	Wexford General Hospital*
	University Hospital Kerry
	Letterkenny University Hospital
	Mayo University Hospital
3	St Luke's General Hospital, Kilkenny
	Cavan General Hospital*
	Regional Hospital Mullingar*
	Tipperary University Hospital*

* *Smaller population requiring 0.5 ESD team.*

Service User Benefit and Activity Uplift

The 2017 Cochrane Review of ESD services for people with acute stroke showed a reduction of 5-6 days for hospital stay in the ESD group, and six months after stroke ESD patients were more likely to be living at home, to be independent in daily activities. It is estimated that 21 teams seeing 20% of all stroke discharges would equate to approximately 996 patients with an associated bed day saving of >5480 annually (Table 11).

Table 11: Anticipated figures based on 2019 HIPE data and the assumption of 20% discharges with ESD

	Phase 1 plan – 10 sites	Phase 2 plan – 17 sites	Phase 3 plan – 21 sites
Total Stroke Discharges	3,166	4,422	4,983
20% ESD Cases	633	884	996
Bed Days Saved*	3483	4,864	5,480

* *Based on Av reduction in LOS in published evidence.*

In summary, with respect to stroke rehabilitation the NCP for Stroke believes that all stroke survivors across the continuum of care irrespective of care setting (including residential care) should have timely and equitable access to rehabilitation that is needs based. The NCP for Stroke supports the need for specialist inpatient rehabilitation as well as ESD and community neuro-rehabilitation teams.

The aim of the NCP for Stroke is to have 21 ESD teams in place by the end of 2025 with the intention of covering 92% of stroke services. Stroke patients should have early and ongoing access to MDT rehabilitation and services and ongoing supports that most meet their needs. This should be determined by a clinical MDT rehabilitation needs assessment which includes physical, communicative, cognitive, perceptual, psycho-social and psychological domains.

Stroke Key Worker

A stroke can be a life-changing event for many patients and their physical abilities may not recover to their pre-stroke state. The time immediately after discharge is often distressing and confusing for stroke survivors and their families and/or caregivers who are suddenly alone and without the support of the hospital multi-disciplinary stroke team[52]. The co-ordination of care for patients with complex needs and a long term illness is currently poor and health systems that employ models of chronic care management are associated with better outcomes and higher patient satisfaction[53].

Social and emotional support play a vital role in stroke recovery by providing tools for effective coping, reducing distress, building self-confidence and providing an outlet for both survivors and families and/or caregivers who may otherwise be isolated. This includes help both to make the transition from hospital back to the community and longer-term peer support that can improve quality of life and overall health. Positive relationships with health care professionals and access to appropriate community services have been shown to influence adjustment after stroke[54].

52 Wright D (2016) An exploratory study of the value and impact of the Stroke Association's Stroke recovery service to stroke survivors and carers. The value of our services | Stroke Association

53 Naylor C et al (2015) The kings fund - Transforming our health care system, ten priorities for commissioners. Transforming our health care system | The King's Fund (kingsfund.org.uk)

54 Sarre S et al (2014) A systematic review of qualitative studies on adjusting after Stroke : lessons from the study of resilience. Disability and Rehabilitation, 36(9):716-26. doi: 10.3109/09638288.2013.814724

We propose the introduction of a Stroke Key worker who will act as a valuable resource for stroke patients. They support the stroke patient and their families and/or caregivers for the first year as they transition from a hospital based acute stroke phase to returning to life in the community.

The Stroke Key Worker uniquely operates in both the hospital and community setting. They develop a relationship with the patient while they are in the acute hospital or rehabilitation setting. They attend the stroke multi-disciplinary meetings to gain a full understanding of the patient's physical and psychological status. They engage with the patient on their return to the community and review them at set-time intervals to assess their adjustment to life post stroke. They will set personally relevant goals and address the individual patient concerns.[55] They will signpost and facilitate a robust handover and seamless transfer of care to community services.

The responsibilities of the key worker should include:

1. To provide communicatively-accessible individual support in hospital, on return home and other settings as appropriate, offering a person centred support service.
2. Liaise with the MDT with regard to preparing for hospital discharge.
3. To support stroke survivors and their families and/or caregivers, including children by offering a range of solutions to meet their needs and desired outcomes, including: coordination and system navigation of health and social care; personalised information; representation and advocacy; emotional and practical advice and support; and help to self-manage.
4. Agree and commence regular goal-setting based on an individual recovery plan.
5. Carrying out regular calls/visits to support stroke survivors and families to achieve their own personal goals.
6. To develop and maintain effective working relationships with stroke teams across acute and community settings to ensure the smooth transition of stroke survivors through the system.
7. Assess understanding and adherence with medications.
8. Evaluate potential readmission risks.
9. To initiate and develop close and integrated working relationships with related agencies including, the private and voluntary sector, local housing providers and local councils (as appropriate).
10. To develop opportunities for peer support and personally meaningful community participation and contribution, maintaining excellent working relationships with other voluntary sector and local organisations.
11. To keep accurate and up to date confidential records in line with GDPR requirements.
12. To ensure the implementation of all relevant policies, procedures and quality standards.
13. To keep up to date with new developments and ideas in stroke knowledge and services, and be flexible and responsive in service delivery.

55 Forster A et al (2012) Information provision for stroke patients and their caregivers. Cochrane Database Systematic Review14;11(11):CD001919. doi: 10.1002/14651858.CD001919.pub3.

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The HSE and the IHF have joined together to fund a pilot which will employ a Stroke Key worker in CHO5 (Kilkenny/Carlow stroke service) for an initial 2 year period. The post will be recruited in 2023. Clinical oversight is provided by the hospital stroke service though the post is embedded within the HSE primary care structure. This ensures that the post is consistent with the aims of *Sláintecare* in increasing support for patients in their communities. The key worker role will be evaluated prospectively and it is anticipated that there will be a further roll out of stroke key worker resources. This may be provided remotely following our successful experience of stroke support initiatives online during the pandemic. The key worker will dovetail with other community supports which may be available such as the IHF's telephone support service (12 weeks) and local stroke support groups.

The ICPOP in their publication 'Case management approaches to support integrated care in older adults' suggest that the role has been undertaken by people from a variety of health and social care professions and in some cases by people without clinical expertise. Regardless of the background of the individual taking up this role, there are certain skills and competencies that they must possess or receive training in to be effective (Boaden et al, 2006[56]), these include:

- Excellent interpersonal skills
- Advocacy and negotiating skills
- System knowledge
- Needs assessment (ability to carry out holistic assessment)
- Problem solving skills

To this list, the NCP for Stroke would add:

- Excellent communication skills
- Specific knowledge relating to post-stroke communication impairment and supported communication skills
- Experience of disability, particularly in working with people directly affected by stroke and their families and caregivers
- Experience of working with social care and health professionals in a variety of settings

Potential benefits of the Key-Worker function in collaboration with an effective community based rehabilitation service;

- Increased patient satisfaction
- Reduction in carer burden
- Early identification of physical deterioration or decompensation
- Access to quality stroke care for people with post-stroke aphasia

56 Boaden R et al (2006) Evercare evaluation: final report. Evercare Evaluation Final Report – York Research Database

Psychological Services

The physical effects of stroke are evident and 'visible' and there have been improvements, albeit limited, to services to meet these needs. The less easily seen psychological and social consequences, 'invisible' deficits, are equally or even more important to people with stroke and their families and families and/or caregivers. In Ireland, these needs have been greatly overlooked not least because the significant benefits of meeting these less tangible needs are difficult to quantify.

The British Psychological Society (BPS) guidance for stroke services note "*In addition to the physical problems following stroke, at least 35 per cent of patients will have cognitive impairment, 30 per cent will suffer from depression at some point post-stroke, and a significant minority will develop challenging behaviours. Such difficulties impede rehabilitation and prolong the adjustment process that increases the costs of rehabilitation to already stretched services*"[57].

People with post-stroke communication impairments including aphasia face additional barriers in accessing appropriate psychological support. This is despite a high incidence of clinical depression in people with aphasia and evidence of effective treatment of depression in this context. Additionally, there is evidence of co-occurring cognitive impairment in the context of aphasia, with problematic differentiation due to the impact of aphasia on cognitive assessments.

Post-stroke cognitive impairment is common, as is progression of this cognitive impairment to dementia, especially in a context of further stroke. Thus, stroke is considered the most preventable cause of dementia. Interventions that improve cognitive impairment post-stroke, minimise or improve functional impairments and reduce further cognitive decline and admission rates to long term care are likely to reduce the overall costs to the individual, as well as the economic costs to society of post-stroke care, and health and social care costs more generally. If unmanaged, cognitive impairment and emotional distress is likely to interfere with patients' capacity to adhere to their medication, rehabilitation and broader treatment regimes.

Evidence Base

The Irish National Cardiovascular Health Policy has highlighted that the lack of inclusion of cognitive rehabilitation as part of standard stroke rehabilitation is of major concern. There is a dearth of research to quantify the type of deficits faced by stroke patients in the long-term aftermath of stroke and this is particularly the case for haemorrhagic strokes. The first Irish National Audit of Stroke Care[37] documented the status of services in 2006-2007, finding an almost complete absence of psychological services for patients with cognitive impairment and mood difficulties after stroke.

Recommendation for increased Psychology Services in Stroke

A well-funded and resourced clinical neuropsychology service can address the needs of patients at acute, post-acute and long-term stages of care, both in the clinic and at home. These services can manage a range of sequelae and support caregivers and family members in their management. They can liaise with community rehabilitation in the management of cognitive and behavioural difficulties. Every effort should be made to ensure those with communication issues post stroke are able to access supports such as psychology. How this can be achieved will need to be considered going forward in collaboration with SLT services.

As with other disciplines it is recommended that we enhance the service in a graduated way allowing the Hospital Groups structure to facilitate shared posts within the group.

57 Thomas SA and Lincoln NB (2010) 'Factors relating to depression after stroke', British Journal of Clinical Psychology, 45(1): 49–61. doi:10.1348/014466505x34183

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Stroke Passport

Stroke patients report that when they leave hospital they feel abandoned; with 'little to no support' for them and their families and/or caregivers, and that services aren't 'joined up'. A stroke passport can help to make the transition from acute care to community care as seamless as possible for patients and their caregivers. It can form a repository for their personalised information relating to their stroke journey, allowing the patient to keep clear and up-to-date records of treatment and support available throughout their rehabilitation and set goals to help them in "getting their life back". The health professionals can complete some sections before the patient goes home. The patient can keep updating it as they continue to make progress in their recovery by setting new goals to work towards. The stroke passport should contain information about their stroke, MDT contacts, their condition, stroke medication etc. This makes the passport a useful document for them to take to clinic appointments with them, when they meet new professionals. We propose an initial hard copy, with consideration of a future soft interactive document.

We will include HSCPs, stroke survivors and those who represent them in the design of the passport and a small working group will be established to develop and pilot the stroke passport. Particular thought will need to be given to how such as tool can be accessible to those with communication difficulties post stroke. People with post-stroke aphasia experience reduced access to stroke and health related information and reduced digital access. It is therefore particularly important that people with post-stroke aphasia are also meaningfully involved in the development and evaluation of a stroke passport intervention

The stroke passport does not replace a comprehensive, standardised discharge report, but should be considered in addition to same.

The recommendations of the NCP for Stroke in relation to Rehabilitation and Restoration to Living are as follows:

- **The implementation of the specialist geriatric services model of care and the neuro-rehabilitation strategy to ensure the full development of rehabilitation services across the continuum of care as described within the integrated care programme of the older person and the implementation framework for the neuro-rehabilitation strategy. Implementation of both strategies is included in the implementation plan of Sláintecare plan and is being delivered by ICPOP and Disability Strategy and Planning within the HSE.**
- **ESD teams to be fully commissioned across 21 high stroke activity sites over a three year period to cover 92% of the stroke inpatient population, a fifth of whom could be eligible for ESD. Effective ESD services have the potential to release ≈5,500 bed days into the acute hospital system per annum, as such the service effectively pays for itself.**
- **A 'Stroke Key Worker' resource is to be appointed so that discharged stroke patients and their families have access to the specific support and advice needed for a successful transition from their hospital based care to returning to live in the community.**
- **Stroke psychology services to be aligned to international staffing recommendations and 17 posts to be created nationally across stroke services in a phased approach as outlined in the Acute Care and Cure section.**
- **All people with stroke to have a communicatively-accessible 'Stroke Passport' developed detailing information relating to their stroke, strengths and needs, risk factor management, medicines, key contact numbers, entitlements and resources available to them. 'Soft copy' and aphasia friendly versions should also be explored.**

Chapter 4: Education and Research

The NCP for Stroke strongly recommends ring-fenced funding from the Department of Health to support research into and education and learning in neurovascular disease to reduce morbidity and mortality from TIA and stroke. Research in stroke and neurovascular disease in Ireland has been poorly funded until relatively recently prior to the formation of the Health Research Board/IHF SCTNI, and has been driven by committed clinical researchers, some of whom are international leaders in their field. The formation of the SCTNI has led to our first 'home-grown' multicentre international trial called 'CONVINCE' (COLchicine for preventioN of Vascular Inflammation in Non-CardioEmbolic stroke), examining the role of colchicine in the prevention of recurrent stroke after TIA or ischaemic stroke.

SCTNI
Health Research Board
Stroke Clinical Trials Network Ireland

The SCTNI has also taken a leading role in the establishment of the European Stroke Organisation Trials Alliance (ESOTA) which has given Ireland a strong profile in and increased capability to participate in important international clinical trials in TIA and stroke. Furthermore, the SCTNI has now agreed to support innovative clinical translational research, observational studies and other original research studies led by Irish researchers, which are essential to the development of and planning of future clinical trials. Participation in such research is often directly translational both in terms of the discovery of new treatments and in the development of critical clinical infrastructure and pathways to deliver care. Our NTS is a good example, whereby care pathways and co-operation between hospitals was fostered and formalised by our participation in an international trial of acute endovascular treatment in acute stroke called ESCAPE (Endovascular Treatment for Small Core and Anterior Circulation Proximal Occlusion With Emphasis on Minimizing CT to Recanalization Times Trial).

Because stroke is the second leading cause of death in middle to higher income countries and is the leading cause of acquired adult physical neurological disability in Ireland, the NCP for Stroke is keen to ensure that a multidisciplinary educational curriculum in neurovascular disease and stroke is available to enable training of our healthcare workers.

Education and Learning

The NCP for Stroke will focus on postgraduate education and learning, with undergraduate Medical, HSCP, Nursing and Pharmacy education and learning remaining the remit of the undergraduate medical schools and universities and their training programmes. However, senior and junior clinical academic development obviously affords the opportunity for staff to promote undergraduate education, learning and research also.

A. Diploma in Stroke and Neurovascular Medicine/Stroke Medicine Training:

The NCP for Stroke will encourage medical trainees and nursing staff to complete formal postgraduate education in stroke, such as, the previously provided RCPI's Diploma in Stroke and Neurovascular Medicine (which is currently being reconfigured to take in to account modern educational methods, including simulation). The aim of such education is to ensure trainees attain adequate training in the diagnosis, prevention, investigation, treatment, rehabilitation and interdisciplinary care of TIA and stroke patients, followed by an objective measurement of learning. Such postgraduate education will be of a nature to enable candidates to register for an MSc if they wish to pursue a postgraduate degree during their study period.

The Education and Research component of the National Stroke Strategy aims to:

- **Support clinically-important and innovative research at a senior and junior clinical and academic level to enhance our knowledge base and treatment options**
- **Be inclusive and trans-disciplinary to develop research by and post-graduate education of Medical Staff, Health and Social Care Professionals (HSCPs), Nursing and Pharmacy Staff involved in TIA and stroke care throughout the Republic of Ireland**
- **Promote training, employment, career development and retention of professionals involved in this critically-important area of medicine**
- **Support, consolidate but not duplicate the work of the HRB-funded Stroke Clinical Trials Network Ireland (SCTNI)**
- **Focus on post-graduate education and learning, with undergraduate education and learning remaining the remit of the medical schools, universities and training bodies**
- **Support rigorous Public and Patient Involvement and participatory research approaches in developing and evaluating stroke interventions, guidelines and policy documents**

The NCP for Stroke CAG will also work with colleagues affiliated with the RCPI with a view to establishing 'Acute Stroke Training Days' for medical and nursing staff involved in the assessment and treatment of acute stroke patients. This will aim to provide attendees with a basic, but essential, knowledge of urgent neurological history taking and examination skills, including National Institutes of Health Stroke Scale (NIHSS) scoring, and evidence-based selection and acute treatment of patients suitable for urgent thrombolysis, mechanical thrombectomy, neurosurgical transfer and urgent secondary prevention etc.

The NCP for Stroke CAG will also collaborate with colleagues in the RCPI and the appointed Chairs in Neurovascular and Stroke Medicine to promote the development of formal Stroke Medicine/Vascular Neurology SpR training programmes and Fellowships at accredited training sites.

B. Nurse Education Programme:

An experienced, dedicated nursing workforce, with expertise in caring for patients with TIA and stroke is required to ensure the highest quality of care for patients within the context of the interdisciplinary team. Senior nurses need to be equipped with management and leadership skills to support a culture of ongoing education, training, practice and professional development in stroke medicine. The NCP for Stroke strongly supports the development of essential CNS- and ANP-led TIA/stroke services.

Investment in the continued professional development and competency attainment for nursing staff working within stroke medicine/neurology settings should be a priority. Such an investment, together with an increased ratio of staff with appropriate experience working with patients, has been demonstrated to yield positive outcomes with respect to:

– Avoidance of adverse outcomes;

– Avoidance of unnecessary hospital inpatient days;

– The economic benefits of optimisation of patients' functional independence.

NCP for Stroke CAG members will encourage CNSs in Stroke to:

- Continue the Nursing and Midwifery Board of Ireland (NMBI)-accredited STARS on-line education and learning programme, which currently includes 19 modules with 9 advanced educational modules on prevention, acute treatment and rehabilitation of TIA and stroke patients. (Ongoing NMBI accreditation will be organised by Nursing representatives who collaborate closely with the NCP for Stroke CAG);
- Progress with their training and career development by registering for available university courses to achieve accreditation as ANPs in Stroke;
- Complete a postgraduate education course in stroke such as that previously provided by the RCPI, mentioned above in section A;
- Attend the acute stroke training days, proposed above;
- Continue to attend approved stroke study days such as, the IHF Council on Stroke Annual Scientific Meeting, the Munster Stroke Network meeting and the UK stroke forum.

C. HSCP 'Neurovascular Disease-Specific' Education:

The NCP for Stroke encourages HSCP participation in the following:

- Level 1: e.g. STARS programme;
- The NCP for Stroke and affiliated staff need to promote more formal HSCP qualifications to facilitate sub-specialisation in stroke care, including completion of postgraduate programmes such as a Diploma/Certificate/MSc/PhD focused on neurovascular disease.

Support for enhanced HSCP conference attendance at relevant scientific meetings is required to promote education and learning.

The NCP for Stroke also supports the introduction of more Clinical Specialist HSCP posts and the development of Advanced Practice HSCP grades. A HSE review of the Clinical Specialist Therapist Grade (2007:27) concluded that the appointment of HSCP Clinical Specialists has had a positive impact on the Irish Health Service. These benefits included the establishment of appropriate clinical protocols, development of evidence-based practice, an expert referral source, improved education and research within the professions.

In the UK, following the 'Agenda for Change' (1999), HSCP Advanced Practitioner and Consultant grades have become integral to the development of appropriate, sustainable and affordable services, with some tasks shifting between professions and non-medical leadership of care pathways.

D. Continuing Professional Development and Annual Scientific Stroke meetings:

Training, education and CPD opportunities are important for the development and retention of our healthcare staff in stroke medicine.

The NCP for Stroke CAG have promoted the attendance of medical trainees in all relevant specialties and HSCP staff at the annual IHF Council on Stroke study day, Munster Stroke Network meeting, SCTNI Study day and other RCPI-approved stroke scientific meetings. Registration fees required to fund not-for-profit scientific meetings has in part adversely impacted on attendance of all disciplines. The interdisciplinary nature of these meetings is a real strength and unique feature of stroke medicine meetings.

To *support and improve attendance of specialist registrars in training who are attending or presenting at the meetings*, the NCP for Stroke CAG *recommend*:

- An annual allocation budget to cover registration fees for attendance at a RCPI-approved stroke conference (in a relevant training specialty in Geriatric Medicine, Neurology, Clinical Pharmacology, Neuroradiology or Rehabilitation Medicine),
- Advertising all RCPI-approved Irish stroke meetings across the hospital and university networks.

To *improve ANP, CNS and HSCP attendance at approved stroke study days*, the NCP for Stroke CAG will:

- Request funding to cover the attendance of 150 delegates at approved stroke study days (to cover registration and bursaries for both HSCPs and ANPs/CNSs in Stroke - combined for practical budgetary purposes in this section of the strategy document).
- Identify nursing and HSCP leads for CPD in stroke medicine allied to the different hospital groups and universities to advertise the meetings internally within their networks.
- Encourage adequate dedicated nursing and HSCP workshops and parallel sessions relevant and appropriate to the interdisciplinary nature of stroke care at RCPI-approved Irish stroke meetings.
- Promote development of a 'lunchtime networking event' for nursing and HSCP staff to encourage staff to develop a focused research interest in cerebrovascular disease, to encourage collaboration and to provide mentoring to more junior members of staff.
- NCP for Stroke and CAG members will continue to promote trainee and staff attendance at other Stroke Medicine/Vascular Neurology meetings each year, including e.g. at the annual meetings of the European Stroke Organisation, British and Irish Association of Stroke Physicians, International Stroke Conference, American Academy of Neurology and other specialty-specific national meetings.

Public Education

Public awareness and education regarding the risk factors for TIA and stroke, symptoms and signs of same and the course of action to be taken if a TIA or stroke is suspected are important to optimise the potential for primary prevention of stroke, and the effects of acute and secondary preventive treatments for TIA and stroke through our public health messaging.

The impact of public awareness on patient outcomes should not be underestimated, particularly with respect to timeframes for thrombolysis. The INAS 2020 National Report and Sentinel Stroke National Audit Programme (SSNAP) reports both showed that only 10.6% and 12% of patients respectively with confirmed ischaemic stroke received thrombolysis, and delay in presentation remains a major barrier to effective acute stroke treatment. In 2020, only 50% of cases arrived at hospital within 3 hours of onset of stroke symptoms.

There is evidence that the gains made in public awareness regarding symptoms and signs of stroke, and what one should do in the case of a suspected stroke have regressed since the termination of the 'FAST' TV campaign, especially in more deprived socioeconomic areas. The duration of time from symptom onset to presentation is increasing in recent SSNAP reports, and only one half of Irish stroke patients present within a time frame which enables optimal acute stroke care. There is general agreement amongst members of the newly formed Irish National Audit for Stroke Governance Group and the NCP for Stroke CAG that this is due, in part, to poor public awareness of the key symptoms of stroke.

A ring-fenced budget is required to reignite this specific public education campaign regarding the symptoms and signs of acute stroke which should be coordinated by the HSE communications division, following agreement and advice from the NCP for Stroke CAG. Members of the NCP for Stroke CAG will provide this advice after joint consultation with other invested parties who are committed to stroke prevention and treatment e.g. the IHF Council on Stroke, SPAFI and the Irish Patients Association etc. The effectiveness of public awareness campaigns should be evaluated and adapted accordingly to enhance the future campaigns.

Clinical Guidelines

Stroke and neurovascular medicine is a rapidly evolving area of medicine and investigations, treatments and models of care are dynamically evolving in response to new research and evidence. Many countries have specific guidelines for stroke produced by expert committees e.g. RCP. This is a continuous process, requiring rigorous, standardised methodology and scheduled updates which are responsive to new developments and systematic reviews and meta-analyses of available evidence. The approach has the advantage of interpreting the evidence to promote best practice nationally, which also pragmatically addresses local and regional gaps in resources and knowledge. We have not had any updated national stroke guidelines since the IHF Council on Stroke published its inaugural guidelines for the organisation of stroke services and treatment of TIA and acute stroke in 2009. Several 'local' documents from the IHF Council on Stroke, NTS, etc. exist and currently serve as *de facto* national clinical guidance for acute stroke treatments, but these guidelines need to be updated and formalised. A significant gap in relation to clinical guidelines has been identified in relation to management of communication impairment and post-stroke aphasia. About 50% of hospital inpatients with stroke have reduced ability to communicate their healthcare needs[58]. Inpatients with communication impairment (including aphasia) have a six-fold increased risk of experiencing a preventable adverse event in acute settings.

The adoption and implementation of any new guidelines, and an effective clinical response to deficits in optimal stroke care identified by INAS requires support via a systematic approach to quality improvement methodology and training. For example, the introduction of a dedicated quality improvement lead associated with the NTS has led to significant improvements in patient care by promoting best practice based on evidence-based medicine and national and international guidelines.

To standardise our approach to stroke guidelines and respond to INAS findings, the NCP for Stroke proposes the establishment of a Stroke Guideline and Quality Improvement Resource group to be based at the RCPI. This group would have appropriate multidisciplinary expertise and **Public and Patient Involvement** to support the review, adoption and/or development of guidelines for the management and investigation of TIA and acute stroke, in conjunction with other postgraduate medical colleges in the UK and working groups of the ESO, as appropriate. This aims to facilitate a systematic quality improvement approach to deficits in TIA/stroke care identified by INAS. This process requires a budget for a senior administrator with appropriate expertise, with an allocation for meeting, stipend and production costs.

58 Hemsley B et al (2013) "That really shouldn't have happened": People with aphasia and their spouses narrate adverse events in hospital. Aphasiology, 27(6):706-722.

Research

A. Senior Clinical Academic Appointments:

The key aspect of this strategy is to fund one Senior Clinical Academic appointment per University and linked Hospital Group to establish '**Chairs in Neurovascular and Stroke Medicine**' at Trinity College Dublin/University College Dublin/Royal College of Surgeons in Ireland/National University of Ireland, Galway/University College Cork/University of Limerick and affiliated hospital groups (**6 posts in total**).

The posts will be open to suitable applicants from several key disciplines of medicine, including Vascular Neurology, Older-Adult/Geriatric Medicine, or Clinical Pharmacology with expertise in Stroke Medicine to lead and drive inter-disciplinary research and education in neurovascular and stroke medicine nationally and enhance our international reputation. These appointments will foster the development of early and advanced clinical translational, clinical observational and epidemiological research studies, and enhance the development and participation in innovative and existing national and international clinical trials in collaboration with colleagues in the SCTNI. Posts need to be costed at Medical Professorial Consultant level to provide mentorship and leadership particularly to postgraduates, but also to undergraduates in affiliated Universities. If insufficient applicants are available in the current climate, individual universities may opt to appoint some staff at Associate Professor/Senior Lecturer level initially with a view to subsequent promotion, pending successful appraisal procedures over time. Each job description should include a 60% academic and a 40% clinical commitment.

B. Clinical Non-Consultant Hospital Doctors (NCHD) Appointments:

There is a requirement to secure funding for the appointment of 1 Clinical NCHD at Registrar level (mid-point on the scale) per Senior Academic appointment to each of the relevant hospital groups to support clinical service provision, audit and research (6 posts in total). These clinical Registrar posts in Vascular Neurology, Older Adult/Geriatric Medicine, or Clinical Pharmacology are considered essential to assist the appointed Senior Academic Chairs in each Clinical Department/University in successfully carrying out her/his role. The NCHD appointees will be offered 'Honorary Lecturer posts' at the affiliated Universities/Medical Schools, which will also facilitate training and career progression.

C. Postgraduate 'Stroke Research Fellowships':

To support postgraduate research, the NCP for Stroke seeks protected funding for 3 Postgraduate 'Stroke Research Fellowships' each year. These should each be costed at 'medical PhD level' to ensure that there is adequate funding to support the best applicants each year. Applicants should apply for funding for 1 year in the first instance, with the option of reapplying for ongoing funding for up to 4 years to support staff working on clinically-relevant research studies with a view to a higher degree (PhD, MD or MSc). The application process would be competitive, peer-reviewed, and pending agreement following forthcoming discussions, we hope that these fellowships will be administered through the RCPI and open to postgraduate research applicants from Medical (Older Adult/Geriatric Medicine, Vascular Neurology or Clinical Pharmacology with expertise in Stroke Medicine), HSCP (PT, OT, SLT, Dietetics, Clinical Neuropsychology, MSW), Nursing and Pharmacy backgrounds. At present, there are only 11.43 WTE staff in dedicated Medical (N = 6), HSCP (N = 0) or Nursing (N = 5.43) research posts focused on research into the most common cause of acquired adult neurological disbaility in Ireland and the second leading cause of death in middle-high income countries. This aspect of the strategy will enable clinical academic career progression and enhance opportunities to develop future clinical academic posts between the hospital groups and universities.

D. Senior Medical, HSCP and Nursing Clinical and Academic Staff will encourage:

- Postgraduate Medical, HSCP and Nursing staff to apply for research funding from current HRB-funded and other charitable-funded programmes to foster training in grant writing, preparing ethics applications, data collection, analysis and interpretation and manuscript preparation;
- Medical trainees to apply for the Irish Clinical Academic Training (ICAT) programmes because there are no ICAT trainees focused on neurovascular disease-specific research at present. The NCP for Stroke will work with colleagues coordinating the ICAT programme to explore opportunities for developing a neurovascular disease-specific ICAT post also;
- Collaboration with SCTNI colleagues to promote post-graduate academic staff development, foster links between staff in hospital groups and universities to facilitate engagement in existing and planned clinical studies and trials via the HRB-funded SCTNI, thus avoiding duplication of effort;
- Collaboration with SCTNI colleagues to secure specific funding for Clinical Research Nurses who are essential for coordinating and promoting recruitment to national and international clinical studies and trials;
- Strategies to enhance the accessibility of potential clinical academic partners working in the area of neurovascular disease research in Ireland via web-based profiles of NCP for Stroke members on the RCPI website, of Executive Committee Members of the SCTNI on the SCTNI website, and of Clinical and Academic members of the IHF Council on Stroke on the IHF website.

The NSS 2022-2027 therefore recommends a significant annual investment in Education and Research in Neurovascular and Stroke Medicine via the following key strategic provisions:

- **Creation of Professorships in Neurovascular and Stroke Medicine in our six medical schools to lead and drive inter-disciplinary research and education in neurovascular and stroke medicine nationally at university level and to enhance our international reputation.**
- **Creation of 6 Clinical Registrar posts to support the clinical service provision, audit and research programmes essential to the function of the Senior Academic Chairs in each clinical department/university.**
- **Creation of 3 Stroke Research Fellowships per annum to provide opportunities for staff retention and development by pursuing degrees at MSc, MD, or PhD level. Research fellowships will be open to applicants from Medical, Nursing, HSCP and Pharmacy disciplines, awarded by competitive interview, with funding reviewed annually.**
- **Support for CPD in neurovascular and stroke medicine amongst medical NCHDs, HSCPs and ANPs/CNSs, including the creation of bursaries for attendance at RCPI-approved and NCP for Stroke -approved national stroke study days.**
- **Support for enhancement of public awareness campaigns and education on aspects of TIA and stroke prevention and treatment via a ring-fenced annual budget within the HSE Communications Division. This budget would to be utilised by the HSE following recommendations by the NCP for Stroke CAG after consultation with other stakeholders and collaborators, e.g. The IHF Council on Stroke, SPAFI, people living with stroke etc.**
- **Provision for the creation and updating of evidence-based clinical guidelines which promote best international standards of care for TIA and stroke patients in Ireland. This can be achieved by harnessing the expertise of Irish Stroke Medicine Physicians at the RCPI in collaboration with their relevant multidisciplinary colleagues and specialty bodies, and enhanced by a systematic quality improvement approach to deficits in stroke care identified in the annual INAS report.**

Appendix 1: National Stroke Strategy Costings

Unless specified otherwise, costings are recurrent annually.

WTE calculations have been informed by the most recent post calculator issued in July 2022 to calculate the costings for NSD in 2023. WTEs are costed at the mid-point of the grade specified, non-pay costs are calculated at 15%. Costings are subject to change.

Prevention	
Extension of GP contract	**Clinical care pathway for the case-finding, diagnosis and treatment of high blood pressure in over-45 year olds €5.5m**

Acute Care and Cure				
Consultant posts	**Additional consultant appointments of 1 WTE equivalent per acute stroke site at a cost of almost €6.3m**			
		Pay costs	**Non-pay costs**	**Total costs**
		€5,465,381	€819,808	€6,284,318

HSCP posts	Additional 156.25 HSCP posts to bring our acute stroke units up to the recommended therapy staffing, This represents an investment of almost €13m.			
Discipline	**Gap to be filled over 5 Years**	**Pay costs**	**Non-pay costs**	**Total costs**
Physiotherapy	42.15	€2,833,765	€425,065	€3,258,830
Occupational Therapy	39.45	€2,608,177	€391,227	€2,999,404
Speech and Language Therapy	15.6	€1,033,280	€154,992	€1,188,272
Dietetics	22.5	€1,486,654	€222,998	€1,709,652
Medical Social Work	19.65	€1,440,183	€216,027	€1,656,210
Psychology	16.9	€1,735,297	€260,295	€1,995,592
Total Posts/Costs HSCP	**156.25**	**€11,137,356**	**€1,670,603**	**€12,807,959**

Endovascular Thromectomy	EVT centres adequate staffing = Estimated recurring additional staffing costs of almost €2.7m			
Grade	**Combined WTE**	**Pay costs**	**Non-pay costs**	**Total costs**
Radiographer	1	€81,151	€12,173	€93,324
Registrar, Medicine	4	€403,080	€60,462	€463,542
Staff Nurse - General	1	€56,377	€8,457	€64,834
Clinical Nurse Specialist (General)	2	€134,830	€20,225	€155,055
Consultant Physician in Stroke Medicine	5.5	€1,358,671	€203,801	€1,562,471
Specialist Registrar, Radiology	2	€220,948	€33,142	€254,090
Advanced Nurse Practitioner (General)	1	€79,863	€11,979	€91,842
		€2,334,920	**€350,238**	**€2,685,158**
	Up to 750 EVT cases per year requiring a dedicated annual procedure budget of €0.75 m			

Rehabilitation and Restoration to Living				
Early Supported Discharge				
ESD Team Costing				
Grade	**WTE**	**Pay costs**	**Non-pay costs**	**Total costs**
Occupational Therapist Senior	1	€66,114	€8,914	€75,028
Physiotherapist Senior	1	€67,231	€8,914	€76,145
Speech and language Therapist Senior	1	€66,236	€8,914	€75,151
Social Worker-Medical Senior	0.5	€36,647	€4,944	€41,591
Clinical Nurse Specialiast General	0.5	€33,709	€4,160	€37,869
Physiotherapist Assistant	1	€37,968	€5,050	€43,019
		€307,905	**€40,896**	**€348,803**

Phase	**Site**	**Non-pay costs**
Phase 1	Completion of original six teams and expansion to SJH, SVUH, OLOL and Connolly	€968,000
Phase 2	Sligo University Hospital	€348,803
	Naas General Hospital	€348,803
	University Hospital Waterford*	€174,402
	Wexford General Hospital*	€174,402
	University Hospital Kerry	€348,803
	Letterkenny University Hospital	€348,803
	Mayo University Hospital	€348,803
Phase 3	St Luke's General Hospital*	€174,402
	Cavan General Hospital*	€174,402
	Regional Hospital Mullingar*	€174,402
	Tipperary University Hospital*	€174,402
		€3,758,424

* *Smaller population requiring 0.5 ESD team.*

Phase	**Site**	**Non-pay costs**
Keyworkers	One in each CHO (9)	€724,000
Psychology	16.9 WTEs (costed with acute HSCP WTEs)	
Passport	A recurring production cost of approximately €6,000 per annum. 'Soft copy' and aphasia friendly versions should also be explored. A recurring production cost of approximately €6,000 per annum.	€6,000

Education and Research				
CPD support – An annual bursary fund of €25,000		€25,000		
Public awareness campaigns		€1.8m over three years		
QI initiatives		€100,000		
		Pay costs	**Non-pay costs**	**Total costs**
Professors in Neurovascular & Stroke Medicine	6	€2,173,412	€326,012	€2,499,424
Registrars, Medical	6	€516,854	€58,178	€575,032
Senior Research fellows	3	€221,359	€33,204	€254,563
		€2,911,625	**€417,394**	**€3,329,018**

Appendix 2: Working Group Membership

Prevention Pillar	
Chair:	Dr Paul Cotter, Consultant Gerontologist, Kilkenny.
Clinical Lead:	Professor Rónán Collins
NCP for Stroke Programme Managers:	Joan McCormack, Edina O'Driscoll, Lara Bourton Cassidy, Sinéad Coleman
Nora Cunningham, Advanced Nurse Practitioner, University Hospital Limerick Kathy McSharry, Practice Nurse Lead, Donegal Jackie Boyle, Dietitian Professor Sean Murphy, Joint-Director, Acute Stroke Service, Mater Misericordiae University Hospital, Associate Professor of Medicine, RCSI Medical School, UCD Associate Clinical Professor, UCD School of Medicine, Dublin, Ireland Dr Michael Murnane, Consultant Neurologist, Mater Misericordiae University Hospital Dr Dan Ryan, Consultant Physician Geriatric and Stroke Medicine at Tallaght University Hospital Professor Joe Harbison, Consultant Gerontologist, Associate Professor in Medical Gerontology, St James's Hospital/TCD	

Acute Care and Cure Pillar	
Chair:	Professor Rónán Collins
Clinical lead:	Professor Rónán Collins
NCP for Stroke Programme Managers:	Joan McCormack, Edina O'Driscoll, Lara Bourton Cassidy, Sinéad Coleman
Professor John Thornton, Consultant Neuroradiologist, Beaumont Hospital Professor Karl Boyle, Consultant Gerontologist, Beaumont Hospital Dr Barry Moynihan, Consultant Gerontologist, Kerry University Hospital Dr Liam Healy, Consultant Stroke Physician, Cork University Hospital Dr Rachael Doyle, Consultant Gerontologist, St Vincent's University Hospital and St. Columcille's Hospital. Chair of Irish Heart Foundation Council of Stroke	

Rehabilitation and Restoration to Living Pillar	
Co-Chaired by:	Dr Rory McGovern, Consultant Geriatrician, St Luke's Hospital Carlow Kilkenny Professor Frances Horgan, Associate Professor in Physiotherapy, Royal College of Surgeons in Ireland
Clinical Lead:	Professor Rónán Collins
NCP for Stroke Programme Managers:	Joan McCormack, Edina O'Driscoll, Lara Bourton Cassidy, Sinéad Coleman
Dr Eugene Wallace, Consultant in Rehabilitation Medicine, National Rehabilitation Hospital Dr Barry Moynihan, Consultant Gerontologist, Kerry University Hospital Heather Coetzee, Speech and Language Therapy Manager, Mater Misericordiae University Hospital Helen Kavanagh, Clinical Specialist Physiotherapist, St James's Hospital Libby Cunningham, Senior Occupational Therapist, Mater Misericordiae University Hospital Ciara Breen, Occupational Therapy Manager, University College Hospital Galway Laura O'Donnell, Senior Occupational Therapist, ESD Service, Tallaght University Hospital Siobhan Healy, Senior Dietician, Tallaght University Hospital Mary Diskin, Clinical Nurse Specialist Stroke, Portiuncula hospital Suvi Dockree, Neuropsychologist, National Rehabilitation Hospital Chris Macey, Head of Advocacy, Irish Heart Foundation	

Education and Research Pillar	
Chair:	Professor Dominick McCabe, Consultant Neurologist, Clinical Professor in Neurology, Tallaght University Hospital/Trinity College Dublin
Clinical Lead:	Professor Rónán Collins
NCP for Stroke Programme Managers:	Joan McCormack, Edina O'Driscoll, Lara Bourton Cassidy, Sinéad Coleman
Professor Joe Harbison, Consultant Gerontologist, Associate Professor in Medical Gerontology, St James's Hospital/Trinity College Dublin Professor Frances Horgan, Associate Professor, Interim Head of School of Physiotherapy, Royal College of Surgeons in Ireland. Professor Peter Kelly, Consultant Neurologist, Clinical Professor in Neurology, Mater Misericordiae University Hospital/University College Dublin Professor Riona Mulcahy, Consultant Gerontologist, University Hospital Waterford Ms. Imelda Noone, Advanced Nurse Practitioner, St Vincent's University Hospital Professor David Williams, Consultant Stroke Physician, Professor in Geriatric and Stroke Medicine, Beaumont Hospital/Royal College of Surgeons in Ireland	

Appendix 3: HSCP Staffing

Based on a gap analysis carried out in 2020, figures are subject to change following future updated audits.

Hospital Name	Recommended Stroke Unit Beds (Rounded to multiples of 5)	Physiotherapy	Occupational Therapy	Speech and Language Therapy	Dietetics	Psychology	MSW	Total Posts
St James's Hospital *(recommended staffing)*	**25**	**4.5**	**4**	**2**	**1.9**	**1.2**	**2**	**15.6**
Current HSCP staffing for stroke service		2.5	2	1.3	0.9	0	1	7.7
Gap		2	2	0.7	1	1.2	1	7.9
WTE required to makeup to a 50% capacity		0	0	0	0	0.6	0	0.6
WTE required to makeup to a 75% capacity		0.9	1	0.2	0.5	0.3	0.5	3.4
WTE required for 100% capacity		1.1	1	0.5	0.4	0.3	0.5	3.8
Tallaght Hospital *(recommended staffing)*	**25**	**4.5**	**4**	**2**	**1.9**	**1.2**	**2**	**15.6**
Current HSCP staffing for stroke service		1.3	1.5	1.5	1	0.7	1.5	7.5
Gap		3.2	2.5	0.5	0.9	0.5	0.5	8.1
WTE required to makeup to a 50% capacity		1	0.5	0	0	0	0	1.5
WTE required to makeup to a 75% capacity		1.1	1	0	0.45	0.2	0	2.75
WTE required for 100% capacity		1.1	1	0.5	0.45	0.3	0.5	3.85
Naas General Hospital *(recommended staffing)*	**20**	**3.6**	**3.2**	**1.6**	**1.5**	**1**	**1.5**	**12.4**
Current HSCP staffing for stroke service		1.3	0.9	1	0	0.3	0.3	3.8
Gap		2.3	2.3	0.6	1.5	0.7	1.2	8.6
WTE required to makeup to a 50% capacity		0.5	0.7	0	0.7	0.2	0.5	2.6
WTE required to makeup to a 75% capacity		0.9	0.8	0.2	0.4	0.25	0.4	2.95
WTE required for 100% capacity		0.9	0.8	0.4	0.4	0.25	0.3	3.05

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Hospital Name	Recommended Stroke Unit Beds (Rounded to multiples of 5)	Physiotherapy	Occupational Therapy	Speech and Language Therapy	Dietetics	Psychology	MSW	Total Posts
Mater Misericordiae University Hospital *(recommended staffing)*	**20**	**3.6**	**3.2**	**1.6**	**1.5**	**1**	**1.5**	**12.4**
Current HSCP staffing for stroke service		2	2	0.7	0.5	0	0.5	5.7
Gap		1.6	1.2	0.9	1	1	1	6.7
WTE required to makeup to a 50% capacity		0	0	0.1	0.2	0.5	0.2	1
WTE required to makeup to a 75% capacity		0.7	0.4	0.4	0.4	0.25	0.4	2.55
WTE required for 100% capacity		0.9	0.8	0.4	0.4	0.25	0.4	3.15
St Vincent' University Hospital *(recommended staffing)*	**30**	**5.4**	**4.8**	**2.4**	**2.2**	**1.4**	**2.4**	**18.6**
Current HSCP staffing for stroke service		2	3	1	0.3	0	1	7.3
Gap		3.4	1.8	1.4	1.9	1.4	1.4	11.3
WTE required to makeup to a 50% capacity		0.7	0	0.2	0.8	0.7	0.2	2.6
WTE required to makeup to a 75% capacity		1.3	0.6	0.6	0.55	0.35	0.6	4
WTE required for 100% capacity		1.4	1.2	0.6	0.55	0.35	0.6	4.7
Midland Regional Hospital Mullingar *(recommended staffing)*	**8 (7.5)**	**1.8**	**1.6**	**0.8**	**0.7**	**0.5**	**0.6**	**6**
Current HSCP staffing for stroke service		0.5	0.5	0.5	0	0	0	1.5
Gap		1.3	1.1	0.3	0.7	0.5	0.6	4.5
WTE required to makeup to a 50% capacity		0.4	0.3	0	0.35	0.25	0.3	1.6
WTE required to makeup to a 75% capacity		0.45	0.4	0.1	0.15	0.125	0.15	1.375
WTE required for 100% capacity		0.45	0.4	0.2	0.2	0.125	0.15	1.525

Hospital Name	Recommended Stroke Unit Beds (Rounded to multiples of 5)	Physiotherapy	Occupational Therapy	Speech and Language Therapy	Dietetics	Psychology	MSW	Total Posts
Wexford General Hospital *(recommended staffing)*	**10**	**1.8**	**1.6**	**0.8**	**0.7**	**0.5**	**0.75**	**6.15**
Current HSCP staffing for stroke service		0.6	0	0	0	0	0	0.6
Gap		1.2	1.6	0.8	0.7	0.5	0.75	5.55
WTE required to makeup to 50% capacity		0.3	0.8	0.4	0.35	0.25	0.35	2.45
WTE required to makeup to 75% capacity		0.45	0.4	0.2	0.175	0.125	0.2	1.55
WTE required for 100% capacity		0.45	0.4	0.2	0.175	0.125	0.2	1.55
St Luke's Hospital Kilkenny *(recommended staffing)*	**8 (7.5)**	**1.4**	**1.2**	**0.6**	**0.6**	**0.4**	**0.75**	**4.95**
Current HSCP staffing for stroke service		0.8	1	0	0	0	0	1.8
Gap		0.6	0.2	0.6	0.6	0.4	0.75	3.15
WTE required to makeup to 50% capacity		0	0	0.3	0.3	0.2	0.4	1.2
WTE required to makeup to a 75% capacity		0.25	0	0.15	0.15	0.1	0.1	0.75
WTE required for 100% capacity		0.35	0.2	0.15	0.15	0.1	0.25	1.2
University Hospital Galway *(recommended staffing)*	**25**	**4.5**	**4**	**2**	**1.9**	**1.2**	**2**	**15.6**
Current HSCP staffing for stroke service		0.5	0.5	0.5	0	0.1	0.1	1.7
Gap		4	3.5	1.5	1.9	1.1	1.9	13.9
WTE required to makeup to a 50% capacity		1.8	1.5	0.5	0.9	0.5	1	6.2
WTE required to makeup to a 25% deficit		1.1	1	0.5	0.5	0.3	0	3.4
WTE required for 100% capacity		1.1	1	0.5	0.5	0.3	0.9	4.3

Hospital Name	Recommended Stroke Unit Beds (Rounded to multiples of 5)	Physiotherapy	Occupational Therapy	Speech and Language Therapy	Dietetics	Psychology	MSW	Total Posts
Portiuncula Hospital *(recommended staffing)*	**5**	**0.8**	**0.8**	**0.4**	**0.4**	**0.2**	**0.4**	**3**
Current HSCP staffing for stroke service		0	0	0	0.1	0	0.5	0.6
Gap		0.8	0.8	0.4	0.3	0.2	0	2.5
WTE required to makeup to 50% capacity		0.4	0.4	0.2	0.1	0.1		1.2
WTE required to makeup to a 75% capacity		0.2	0.2	0.1	0.1	0		0.6
WTE required for 100% capacity		0.2	0.2	0.1	0.1	0.1		0.7
Mayo University Hospital *(recommended staffing)*	**8 (7.5)**	**1.4**	**1.2**	**0.6**	**0.6**	**0.4**	**0.6**	**4.8**
Current HSCP staffing for stroke service		0.9	0.6	0.5	0	0	0	2
Gap		0.5	0.6	0.1	0.6	0.4	0.6	2.8
WTE required to makeup to a 50% capacity		0	0	0	0.3	0.2	0.3	0.8
WTE required to makeup to a 75% capacity		0.15	0.3	0	0.15	0.1	0.15	0.85
WTE required for 100% capacity		0.35	0.3	0.1	0.15	0.1	0.15	1.15
Sligo University Hospital *(recommended staffing)*	**8 (7.5)**	**1.4**	**1.2**	**0.6**	**0.6**	**0.4**	**0.6**	**4.8**
Current HSCP staffing for stroke service		0.5	0	0	0	0	0	0.5
Gap		0.9	1.2	0.6	0.6	0.4	0.6	4.3
WTE required to makeup to a 50% capacity		0.2	0.6	0.3	0.3	0.2	0.3	1.9
WTE required to makeup to a 75% capacity		0.35	0.3	0.15	0.15	0.1	0.15	1.2
WTE required for 100% capacity		0.35	0.3	0.15	0.15	0.1	0.15	1.2

Hospital Name	Recommended Stroke Unit Beds (Rounded to multiples of 5)	Physiotherapy	Occupational Therapy	Speech and Language Therapy	Dietetics	Psychology	MSW	Total Posts
Letterkenny University Hospital *(recommended staffing)*	**12**	**2.7**	**2.45**	**1.2**	**1.1**	**0.7**	**0.9**	**9.05**
Current HSCP staffing for stroke service		0.8	0.75	0.4	0.2	0	0	2.15
Gap		1.9	1.7	0.8	0.9	0.7	0.9	6.9
WTE required to makeup to a 50% capacity		0.55	0.5	0.2	0.3	0.3	0.5	2.35
WTE required to makeup to a 75% capacity		0.67	0.6	0.3	0.3	0.2	0.1	2.17
WTE required for 100% capacity		0.67	0.6	0.3	0.3	0.2	0.3	2.37
Cork University Hospital *(recommended staffing)*	**30 (25+3)**	**5.4**	**4.8**	**2.4**	**2.2**	**1.4**	**2.4**	**18.6**
Current HSCP staffing for stroke service		0.5	0	0.5	0	0	0.4	1.4
Gap		4.9	4.8	1.9	2.2	1.4	2	17.2
WTE required to makeup to a 50% capacity		2.2	2.4	0.7	1.1	0.7	0.8	7.9
WTE required to makeup to a 75% capacity		1.35	1.2	0.6	0.55	0.35	0.6	4.65
WTE required for 100% capacity		1.35	1.2	0.6	0.55	0.35	0.6	4.65
Mercy University Hospital *(recommended staffing)*	**5**	**0.9**	**0.8**	**0.4**	**0.2**	**0.4**	**0.5**	**3.2**
Current HSCP staffing for stroke service		0	0.5	0	0	0	0	0.5
Gap		0.9	0.3	0.4	0.2	0.4	0.5	2.7
WTE required to makeup to a 50% capacity		0.5	0	0.2	0.1	0.2	0.25	1.25
WTE required to makeup to a 75% capacity		0.2	0.15	0.1	0	0.1	0	0.55
WTE required for 100% capacity		0.2	0.15	0.1	0.1	0.1	0.25	0.9

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Hospital Name	Recommended Stroke Unit Beds (Rounded to multiples of 5)	Physiotherapy	Occupational Therapy	Speech and Language Therapy	Dietetics	Psychology	MSW	Total Posts
Tipperary University Hospital *(recommended staffing)*	**8 (7.5)**	**1.4**	**1.2**	**0.6**	**0.6**	**0.4**	**0.6**	**4.8**
Current HSCP staffing for stroke service		0	0	0.5	0	0	0	0.5
Gap		1.4	1.2	0.1	0.6	0.4	0.6	4.3
WTE required to makeup to a 50% capacity		0.7	0.6	0	0.3	0.2	0.3	2.1
WTE required to makeup to a 75% capacity		0.35	0.3	0	0.15	0.1	0.15	1.05
WTE required for 100% capacity		0.35	0.3	0.1	0.15	0.1	0.15	1.15
University Hospital Waterford *(recommended staffing)*	**8 (7.5)**	**1.4**	**1.2**	**0.6**	**0.6**	**0.4**	**0.6**	**4.8**
Current HSCP staffing for stroke service		0.5	0.5	0.3	0.3	0	0	1.6
Gap		0.9	0.7	0.3	0.3	0.4	0.6	3.2
WTE required to makeup to a 50% capacity		0.2	0.1	0.15	0.15	0.2	0.3	1.1
WTE required to makeup to a 75% capacity		0.3	0.3	0	0	0.1	0	0.7
WTE required for 100% capacity		0.4	0.3	0.15	0.15	0.1	0.3	1.4
University Hospital Kerry *(recommended staffing)*	**8**	**1.4**	**1.2**	**0.6**	**0.6**	**0.4**	**0.6**	**4.8**
Current HSCP staffing for stroke service		0.6	1.3	0.9	0.4	0	0	3.2
Gap		0.8	0	0	0.2	0.4	0.6	2
WTE required to makeup to a 50% capacity		0.1	0	0	0	0.2	0.3	0.6
WTE required to makeup to a 75% capacity		0.35	0	0	0.1	0.1	0	0.55
WTE required for 100% capacity		0.35	0	0	0.1	0.1	0.3	0.85

Hospital Name	Recommended Stroke Unit Beds (Rounded to multiples of 5)	Physiotherapy	Occupational Therapy	Speech and Language Therapy	Dietetics	Psychology	MSW	Total Posts
Bantry General Hospital *(recommended staffing)*	**5**	**0.9**	**0.8**	**0.4**	**0.2**	**0.4**	**0.5**	**3.2**
Current HSCP staffing for stroke service		0.25	0.25	0.1	0.5	0	0	1.1
Gap		0.65	0.55	0.3	0	0.4	0.5	2.4
WTE required to makeup to a 50% capacity		0.3	0.55	0.15	0	0.2	0.25	1.45
WTE required to makeup to a 75% capacity		0	0	0	0	0.1	0	0.1
WTE required for 100% capacity		0.35	0	0.15	0	0.1	0.25	0.85
University Hospital Limerick *(recommended staffing)*	**20**	**3.6**	**3.2**	**1.6**	**1.5**	**1**	**1.5**	**12.4**
Current HSCP staffing for stroke service		2.6	2	1.5	0	0.5	1	7.6
Gap		1	1.2	0.1	1.5	0.5	0.5	4.8
WTE required to makeup to a 50% capacity		0	0	0	0.5	0	0	0.5
WTE required to makeup to a 75% capacity		0.1	0.4	0	0.5	0.25	0	1.25
WTE required for 100% capacity		0.9	0.8	0.1	0.5	0.25	0.5	3.05
Beaumont Hospital *(recommended staffing)*	**35 (30+4)**	**6.3**	**5.6**	**2.8**	**2.6**	**1.7**	**2.4**	**21.4**
Current HSCP staffing for stroke service		3	2	1	0.5	0	1	7.5
Gap		3.3	3.6	1.8	2.1	1.7	1.4	13.9
WTE required to makeup to a 50% capacity		0.3	0.8	0.4	0.8	0.9	0.2	3.4
WTE required to makeup to a 75% capacity		1.5	1.4	0.7	0.65	0.4	0.6	5.25
WTE required for 100% capacity		1.5	1.4	0.7	0.65	0.4	0.6	5.25

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Hospital Name	Recommended Stroke Unit Beds (Rounded to multiples of 5)	Physiotherapy	Occupational Therapy	Speech and Language Therapy	Dietetics	Psychology	MSW	Total Posts
Our Lady of Lourdes Hospital Drogheda *(recommended staffing)*	**13**	**2.3**	**2**	**1**	**0.9**	**0.6**	**0.75**	**7.55**
Current HSCP staffing for stroke service		1	1	1	0	0	1	4
Gap		1.3	1	0	0.9	0.6	0	3.8
WTE required to makeup to a 50% capacity		0.1	0	0	0.5	0.3	0	0.9
WTE required to makeup to a 75% capacity		0.6	0.5	0	0.2	0.15	0	1.45
WTE required for 100% capacity		0.6	0.5	0	0.2	0.15	0	1.45
Cavan General Hospital *(recommended staffing)*	**10**	**1.8**	**1.6**	**0.8**	**0.7**	**0.5**	**0.75**	**6.15**
Current HSCP staffing for stroke service		1	0	0.5	0.5	0	0	2
Gap		0.8	1.6	0.3	0.2	0.5	0.75	4.15
WTE required to makeup to a 50% capacity		0	0.8	0	0	0.2	0.4	1.4
WTE required to makeup to a 75% capacity		0.4	0.4	0	0	0.1	0	0.9
WTE required for 100% capacity		0.4	0.4	0.3	0.2	0.2	0.35	1.85
Connolly Hospital *(recommended staffing)*	**25**	**4.5**	**4**	**2**	**1.9**	**1.2**	**2**	**15.6**
Current HSCP staffing for stroke service		2	0	0.8	0.2	0	1	4
Gap		2.5	4	1.2	1.7	1.2	1	11.6
WTE required to makeup to a 50% capacity		0.3	2	0.2	0.7	0.6	0.5	4.3
WTE required to makeup to a 75% capacity		1.1	1	0.5	0.5	0.3	0	3.4
WTE required for 100% capacity		1.1	1	0.5	0.5	0.3	0.5	3.9
		42.15	39.45	15.6	22.5	16.9	19.65	156.25

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