Appendix A

Enhanced Network Model of Acute Stroke Care and Rehabilitation in Lancashire & South Cumbria

Full Business Case

July 2021

Version 1.0

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0.2	Elaine Day	Activity data and modelling update	03.06.21
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0.4	Katherine Disley	Financial Case update	05.07.21
0.5	Sharon Walkden	Management Case update	05.07.21
1.0	Jack Smith	Full case update	07.07.21

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Executive Summary

Reducing mortality and dependency due to disability after stroke remains a key strategic priority for the Lancashire and South Cumbria (L&SC) health and care economy in 2021. The shared vision of all stakeholders in our system, inclusive of stroke survivors, is to deliver sustainable and equitable acute stroke care to benefit close to 6,000 people across Lancashire and South Cumbria who attend the hospital emergency department with suspected stroke symptoms each year.

Although marginal gains have been made in recent years through increasing collaboration and knowledge sharing between system providers, only two out of five acute stroke services in our system are achieving a 'B' rating on the Sentinel Stroke National Audit Programme (SSNAP) for their local population only. This demonstrates an unwarranted variation and inequitable access to best-practice stroke care for the population.

As a system we are currently providing life-saving treatments including thrombolysis (clot busting intervention) and mechanical thrombectomy (clot retrieval intervention) at rates less than the national average and well below the national ambition laid out in the NHS Long-Term Plan. This indicates people are missing out on important treatments and our health and care economy is spending more on avoidable NHS care and Personal Social Service costs as a result.

This business case seeks to address the unwarranted variation and increase thrombolysis and thrombectomy rates to the national ambition. As a system we must come together to increase the speed and capacity with which our acute stroke and ambulance services can respond to stroke to save lives and reduce disability. Improved patient outcomes in the region of 36 more lives saved and 360 stroke survivors with less disability each year is expected.

Commissioner investment over a three year period is now sought to implement an enhanced Network model of care designed to optimise workforce capacity, stroke beds and ensure nationally recommended travel times to hospital emergency departments across our expansive semi-rural geography are not compromised. Levelling up the workforce and capital assets of three Acute Stroke Centres (one of which is a Comprehensive Stroke Centre), two Stroke Recovery Units and the North West Ambulance Service will cost local NHS commissioners an extra £13.8 million a year in revenue and £5.7 million in capital expenditure.

The economic benefits are compelling. A reduction in societal costs to the NHS, Social Care and patients and their carers is anticipated through more efficient ways of working as a Network, a significant reduction in Personal Social Service costs and increased productivity/employment attributed to the increase in people living independently after stroke.

The purpose of this full business case is to:

1. provide a 3 year plan for enhancing the quality of, and reducing the variation in access to, acute stroke care and rehabilitation services provided across Lancashire and South Cumbria
2. secure the Lancashire and South Cumbria Strategic Commissioning Committee's approval of the capital and revenue funding to implement the enhanced network model of care proposed
3. confirm the governance arrangements for implementation
4. advise the Committee in public, the plan for further communication and engagement with stakeholders

1. Introduction

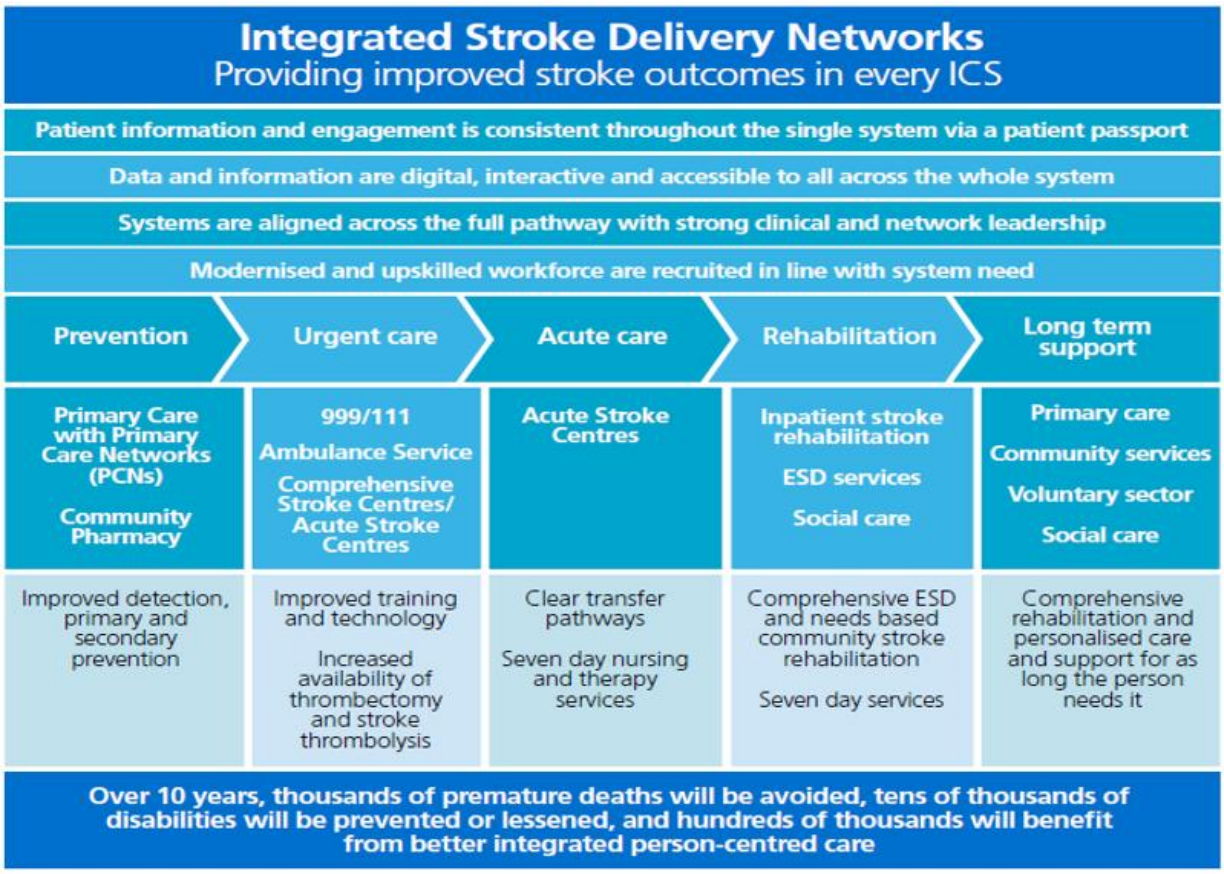
Stroke, a preventable disease, is the fourth single leading cause of death in the UK and the single largest cause of complex disability. Approximately 100,000 people in the United Kingdom have a stroke every year, and 50% of stroke survivors will be left with disability (physical, communication, cognitive, psychological, visual, fatigue). It is a devastating disease for patients and their families and is estimated to cost the NHS around £3billion per year, with additional cost to the economy of £4billion in lost productivity, disability and informal care. Rapid assessment and treatment are known to save lives and improve chances of recovery.

Across Lancashire & South Cumbria in 2020/21 there were 6,409 presentations to hospital emergency departments with stroke-like symptoms of which 2,575 resulted in an admission with a diagnosis of stroke. Due to the predicted rises in the number of older people in the local population and the expected improvements in acute stroke care provision outlined in this business case, the number of stroke cases and survivors are expected to increase.

The Lancashire and South Cumbria Integrated Care System (ICS) is committed to improving stroke outcomes and reducing health inequalities for its population as stated in its 2021 Clinical Strategy.

The NHS Long-Term Plan clearly states that ICSs, through the establishment of Integrated Stroke Delivery Networks, are expected to lead the co-design and implementation of end to end stroke pathway improvement for their population. Figure 1 below outlines the scope of what our ISDN will be expected to deliver over the next ten years.

Figure 1 – Integrated Stroke & Neurorehabilitation Delivery Network framework



This business case solely focuses on improving the urgent and acute care elements of the stroke pathway over the next 3 years. By investing in the enhanced Network model, there will be more equitable access to important life-saving care 7 days a week and there will be an increased availability of treatments reducing long-term disability and costs to health and social care.

It is important to acknowledge however that reducing the burden of disease from stroke requires systematic interventions at the population level across all parts of the care pathway including primary and secondary prevention, urgent and acute stroke care, rehabilitation and long-term support.

Further information on the current and planned improvement activities for preventing stroke in Lancashire and South Cumbria is contained in the information sheet attached in Appendix H.

Significant improvements have already been made in the rehabilitation element through local CCG investment of £2.4 million in out of hospital high intensity community stroke rehabilitation teams at place commencing 2020/21. **This Committee can now be assured that these community stroke rehabilitation teams will be in place in advance of the planned implementation of the Network model of acute stroke care in 2021/22.**

The **long term support element** will become a key focus of the ISNDN in 2022/23 to develop strategic workforce plans to meet the challenge of the unmet psychological and social care needs experienced by many stroke survivors and their carer/families across L&SC.

2. Background

In 2018/19 the Lancashire and South Cumbria acute stroke pathway underwent a standardised review, model re-design and approval process which consisted of:

- **Case for Change** – endorsed by the L&SC Provider Chief Executives and CCG Accountable Officers in July 2019, noted by the Lancashire Health Scrutiny Committee in September 2019 and endorsed by the Joint Committee of CCGs in December 2019.

- **Model of Care** – supported by the L&SC Care Professionals Board in September 2019 and the North West Clinical Senate in January 2020; approved by the ICS Executive Team in January 2020; endorsed with recommendations at the Collaborative Commissioning Board in February 2020.

The full list of fora the Case for Change was presented at is available in Appendix A.

The **key drivers for change** described in the Case for Change document relate to:

- Unwarranted variation
- An out of date 'silo hospital system' design requiring transformation towards the updated National stroke service model specification.
- Patient flow is inefficient
- Staffing levels fall significantly short of nationally recommended levels

A key aspect of providing effective acute stroke care is the availability of qualified and experienced doctors, nurses and therapists when the patient most needs them, in the initial hyper acute phases of care (the first 72 hours/3 days of care), together with timely access to the latest medical advancements such as thrombectomy or thrombolysis. The national shortage of suitably qualified and experienced stroke specialists means that it is not possible to fully staff all existing acute stroke units and maintain this going forward.

Developing and implementing new models of acute stroke care to improve patient outcomes through delivering more accessible hyper-acute stroke care has recently been successful in other parts of the country i.e. London, Greater Manchester and North Cumbria.

New models of centralised provision of hyper-acute stroke care in urban conurbations such as London and Greater Manchester for example have delivered a 5% relative reduction in mortality at 90 days and reductions in length of hospital stay. A further 10% impact on the number of stroke survivors with reduced disability at hospital discharge has also been found.

Lancashire and South Cumbria however has its geographical challenges with a mixed urban and rural population. As such the typical centralised model approach does not favourably relate due to travel time and access limitations which would negatively impact clinical outcomes for local residents living in rural areas.

The key transformation priorities proposed in response to the Case for Change to meet the unique needs of the Lancashire and South Cumbria population are to:

Enhanced Network Model of Acute Stroke Care

Strengthen the front door:

- Ensure the presence of stroke triage nurses in Emergency Departments 24/7 to meet the patient, assess for stroke including brain scanning and ensure timely stroke treatment takes place – time is brain.
- Establish ambulatory emergency care pathways in all stroke receiving hospital sites to triage suspected stroke presentations and ensure both stroke and none stroke patients move from the hospital Emergency Department to the right care ensuring appropriate patient flow

Enhance acute services:

- Increase thrombolysis and thrombectomy rates towards national ambition
- Establish a network model of **a single Comprehensive Stroke Centre (CSC) at Preston, two Acute Stroke Centres (ASC) at Blackburn and Blackpool and Stroke Recovery Units (SRU) at all local acute hospital sites compliant with the national stroke service specification.**
- All existing stroke units in the system will remain open.
- Separate clinical pathways will be created for Morecambe Bay residents. Residents ordinarily attending Furness General Hospital will continue to do so for triage and initial treatment before transferring to the Comprehensive Stroke Centre in Preston for 24 hour care for up to 3 days. Residents ordinarily attending Royal Lancaster Infirmary will be directly diverted to Preston for the whole triage and treatment process along with 24 hour care for up to 3 days.
- Repatriation policy will be created to ensure a safe return from Preston for Morecambe Bay residents to their local Stroke Recovery Unit for inpatient stroke rehabilitation or home with community rehabilitation.

Strengthen community services:

- Ensure system-wide coverage of community stroke rehabilitation teams in place to provide intensive therapy services to stroke survivors in their homes following hospital discharge.

3. Strategic Case

This strategic case describes in detail the case for change to a new model of acute stroke care. It describes the current model of care. It describes the additional features of the preferred model of care, the proposed benefits and risks of implementation.

3.1 Population Health

The Lancashire and South Cumbria system covers a population of around 1.8 million and the region is diverse, with areas of differing demography and local challenges. For most of the system, the quality of life for people with long term health conditions including stroke is worse than the average across England.

Across L&SC, approximately 20% of the population live in the 10% most deprived areas nationally, with Fylde Coast and Pennine Lancashire having significantly higher levels of deprivation compared with the rest of the local health and care partnerships.

All five local partnerships have areas that are amongst the 10% most deprived areas nationally and the latest information shows a decline since 2015. This means that Blackpool is now the most deprived borough in England, Burnley is ranked 11th and Blackburn with Darwen 14th. Barrow-in-Furness (44th) and Preston (46th) are in the top 20% most deprived authority areas in the country. Ribble Valley (282th) is the only district within the top 20% least deprived authority areas in the country.

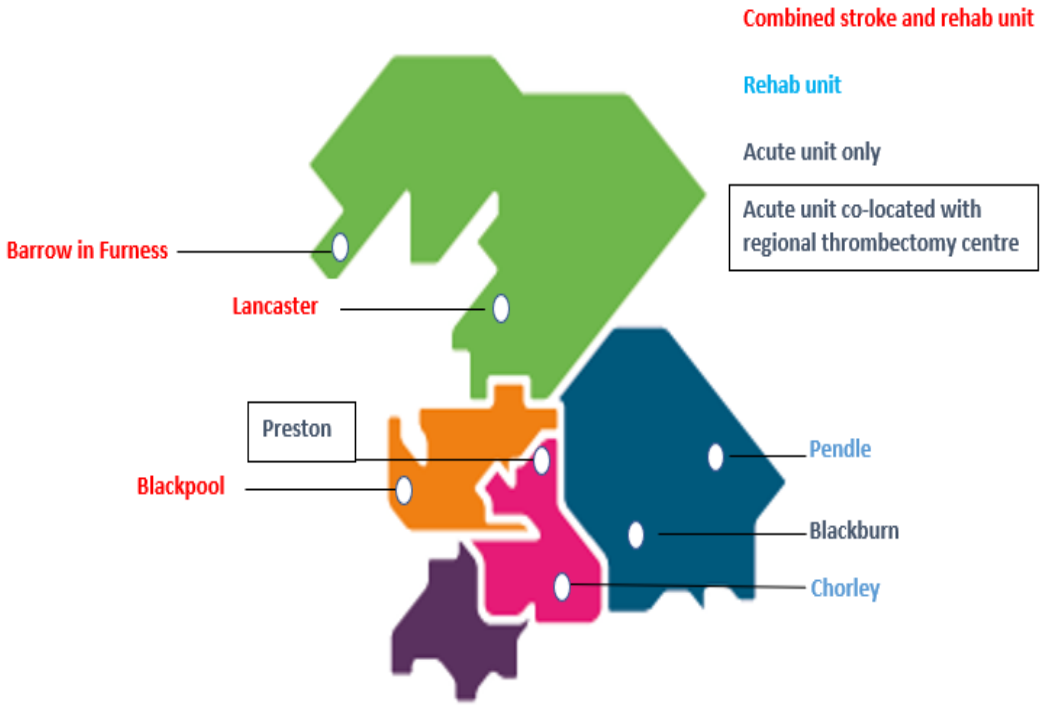
Inequalities exist between different population groups: men, older people, ethnic groups, and those of lower socioeconomic status have higher risk of stroke. Stroke risk is twice as high in the most deprived groups compared to the least deprived and the subsequent death is 26% more likely[1].

[1] Bray BD, Paley L, Hoffman A, et al. Socioeconomic disparities in first stroke incidence, quality of care, and survival: a nationwide registry-based cohort study of 44 million adults in England. Lancet Public Health. 2018;

3.2 Current model of care

Across Lancashire and South Cumbria there are five local stroke receiving hospitals (Blackburn, Blackpool, Furness, Lancaster and Preston) each providing varying levels of acute stroke unit care and inpatient rehabilitation to their local Trust catchment populations only – see Figure 1.

Figure 1 – L&SC hospitals providing acute stroke care and in-patient rehabilitation



The Regional Thrombectomy Centre is co-located with the Lancashire Teaching Hospital acute stroke service at Royal Preston. This service is currently open 9am-5pm, 5 days a week and is commissioned on block contract by NHS Specialised Commissioning. Implementation planning is underway to move this service towards providing a 24/7 service in a phased approach commencing with additional staff recruitment this November.

It is estimated that in 2020/21 there were 6,409 presentations to local hospital emergency departments with stroke-like symptoms of which 2,575 resulted in an admission with a diagnosis of stroke. The reason for the difference between number of presentations and stroke diagnoses is that patients may present with stroke-like symptoms caused by a disease other than stroke. These are referred to as stroke mimics, attributed most commonly to seizures, migraines and psychiatric disorders.

Although only confirmed strokes are inputted into the Sentinel Stroke National Audit Programme (SSNAP), a percentage of stroke mimics are also admitted into the stroke units for a brief stay until diagnostics confirm diagnosis, hence why the numbers expected into HASU beds is greater.

A breakdown by Provider is shown below:

Provider	A&E presentations	Confirmed Stroke admissions	Stroke Mimic
BTHT	1,521	507	1,014
RPH	1,420	710	710
RBH	2,256	752	1,504
RLI	762	381	381
FGH	450	225	225
Total	**6,409**	**2,575**	**3, 834**

Each of the acute stroke services' in-patient bed bases are commissioned separately and funded through payment by results stroke tariff. A breakdown by Provider is shown below.

Provider	Stroke Service Name	Acute Beds	Rehab Beds	Total
UHMB	Furness General	6	10	16
UHMB	Royal Lancaster Infirmary	6	14	20
LTH	Royal Preston	24	24	48
ELHT	Blackburn	23	24	47
BTH	Blackpool	20	19	39

All stroke receiving hospitals and the regional thrombectomy service are now being supported by **artificial intelligence software**. This innovation supports stroke clinicians in making more timely and accurate diagnoses of stroke. This also enables rapid image sharing with the Interventional Neuro-Radiologists at the receiving thrombectomy service in Preston, reducing time to treatment and improving patient outcomes. This innovative digital application is expected to contribute favourably to an increase in thrombolysis (8% towards the national ambition of 15%) and thrombectomy (2% towards the national ambition of 10%) rates over the next few years.

It is important for this Committee to note that a separate business case has been approved by the Lancashire Teaching Hospitals NHS Foundation Trust Board to expand the thrombectomy service to operate 24 hours a day/ 7 days a week to meet additional demand. This service currently runs 9am-5pm Monday to Friday. The separate thrombectomy service expansion business case is currently being reviewed by NHS Specialised Commissioning for funding decision.

The current model of care also possesses **Integrated Community Stroke Teams** in line with national stroke guidelines. In 2019/20 business cases to establish ICSTs were successfully approved by all CCGs to ensure essential capacity was available to receive the expected increase in stroke survivors with less complex disability as a result of the proposed enhanced Network model of acute stroke care. The positive impact of these community rehabilitation services can already be seen by the increased number of referrals to the team, a reduction in the number of patients moving to in-patient rehabilitation and a reduction in the length of stay on the stroke ward. Further and final recruitment of staff in the Central Lancashire and Blackburn with Darwen teams is due by the end of 21/22.

3.3 Case for change

The key drivers for transforming the model of acute stroke care in L&SC are:

- **unwarranted variation against best practice standards**
- **out of date system design**
- **inefficient patient flow**
- **workforce shortages**

3.3.1 Unwarranted variation in Provider performance against best practice stroke service standards (Sentinel Stroke National Audit Programme - SSNAP) affects patient outcomes, service costs and overall productivity.

The Sentinel Stroke National Audit Programme (SSNAP)[2] measures the quality and organisation of stroke care in the NHS and is the single source of stroke data in England. SSNAP performance is the basis upon which Providers and Commissioners can make informed decisions about where change is required in the configuration of acute stroke services to deliver the best quality of care for all patients.

All stroke units across the country are rated A-E, A being the highest performing. A higher performance rating indicates better outcomes for patients.

Figure 2 SSNAP performance data for Jan – Mar 21 by domain

Lancashire & South Cumbria												
Jan 21-Mar 21	Case ascertainment	Audit compliance	Scanning	Stroke Unit	Thrombolysis	Specialist Assessment	Occupational Therapy	Physiotherapy	Speech & Language Therapy	MDT Working	Standards by discharge	Discharge process
Blackpool Victoria Hospital	A	A	C	E	D	B	C	D	E	B	B	B
Royal Blackburn Hospital	A	A	A	D	C	B	B	B	B	B	A	A
Royal Preston Hospital	A	A	A	E	C	B	B	B	D	D	A	C
Furness General Hospital	A	B	B	E	D	B	D	D	C	C	B	B
Royal Lancaster Infirmary	A	B	B	E	E	E	D	D	E	D	B	B
Pendle Community Hospital - Marsden Stroke Unit	B	A	No Data	A	No Data	No Data	D	C	C	No Data	A	A
Chorley and South Ribble Hospital	A	A	No Data	A	No Data	No Data	C	B	C	No Data	A	C

The above table denotes issues with:

- Access to a stroke unit within 4 hrs of arrival. This is both a regional and national issue, often due to ED business, ineffective pathway, ineffective use of beds, non-ring fencing of beds.
- Thrombolysis rates are low, recognised locally and nationally, especially in Lancaster, reduced stroke consultant levels, lack of stroke nurses at the front door to pull patients through and late post stroke arrivals are rationale for this.
- Reduced levels of therapists but especially SLT & OT who are on the protected list of careers.

The aim of the L&SC ISNDN is for all of the above to turn green/become 'A' rated by April 2023 subject to investment required to implement the network model of care outlined in this business case.

[2] Sentinel Stroke National Audit Programme, School of Population Health, Kings College London, 2021

In 2020/21 L&SC provided 210 treatments of thrombolysis (only 8% of the estimated 15% ambition highlighted in the NHS Long-Term Plan). We would need to thrombolyse 140 extra patients per year to achieve 15% national target.

In 2020/21 the regional thrombectomy service provided 58 procedures (only 2% of the estimated 10% ambition highlighted in the NHS Long-Term Plan). We would need to undertake a further 198 extra thrombectomy procedures per year to achieve 10% national target.

3.3.2 Out of date system design requiring transformation towards the updated National stroke service model specification[3].

Each Trust has had a continuous stroke improvement plan in place since 2018 for improving their acute stroke care performance against the national clinical indicators of best practice stroke care (Sentinel Stroke National Audit Programme (SSNAP)). Prior to the impact of COVID only 2 out of the 5 acute stroke services in L&SC were maintaining an A level SSNAP status of best-practice acute stroke care. The population is not consistently receiving the high standard of care that they should rightfully expect. This results in different outcomes for different people.

Overarching SSNAP Trust Scores over time (all sites impacted by covid):

	Lancashire & South Cumbria																				
Site	Jul 15-Sep 15	Oct 15-Dec 15	Jan 16-Mar 16	Apr 16-Jul 16	Aug 16-Nov 16	Dec 16-Mar 17	Apr 17-Jul 17	Aug 17-Nov 17	Dec 17-Mar 18	Apr 18-Jun 18	Jul 18-Sep 18	Oct 18-Dec 18	Jan 19-Mar 19	Apr 19-Jun 19	Jul 19-Sep 19	Oct 19-Dec 19	Jan 20-Mar 20	Apr 20-Jun 20	Jul 20-Sep 20	Oct 20-Dec 20	Jan 21-Mar 21
National	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data
Blackpool Victoria Hospital	E	E	E	E	D	E	E	C	D	D	C	D	D	C	C	C	D	D	D	D	D
Royal Blackburn Hospital	E	E	D	D	D	C	C	B	A	A	A	A	A	A	A	A	A	A	A	B	B
Royal Preston Hospital	D	C	C	D	D	D	C	B	B	B	C	B	C	B	C	A	B	A	A	B	C
Furness General Hospital	D	D	D	D	D	C	C	C	C	D	D	C	B	C	C	C	C	C	D	D	D
Royal Lancaster Infirmary	D	D	D	D	D	D	D	D	D	C	C	C	C	C	C	D	D	D	D	E	D
Pendle Community Hospital - Marsden Stroke Unit	No Data	No Data	No Data	D	D	C	D	B	B	No Data	C	A	A	B	B	B	A	B	B	B	B
Chorley and South Ribble Hospital	D	C	B	C	C	D	D	B	B	No Data	B	A	B	A	A	A	B	A	A	A	B

It is clear from the SSNAP performance data that without a transformational change to a new model of care, involving collaboration between all hospital Trust Providers and supported by additional investment from Commissioners, further improvements to reduce clinical variation in health outcomes across L&SC after stroke is highly unlikely.

Effective stroke care will only occur if the organisational structure facilitates the delivery of the best treatments at the optimal time. NHS England and Improvement state that investigations and interventions, such as brain scanning, thrombolysis and mechanical thrombectomy, can best be delivered as part of a 24/7 networked service, including Comprehensive and Acute Stroke Centres (CSC, ASC) of a sufficient size to ensure expertise, efficiency and a sustainable workforce.

[3] National Stroke Service Model, Integrated Stroke Delivery Networks, NHS England & Improvement, 2021

A volume of at least 600 acute admissions a year correlates with an adequate level of institutional experience and competence in providing hyper-acute treatments [4] and a volume of between 600 and 1,500 patients admitted per year has been recommended[5][6] based on cost effectiveness.

3.3.3 Patient flow is inefficient

Ambulatory care is recommended as an intervention to reduce pressure on NHS hospital in-patient services. Relevant to stroke, implementation of ambulatory care pathways for stroke in the Emergency Department has been shown to significantly reduce unnecessary patient admissions to acute stroke unit beds thus improving patient flow. This is considered essential at all stroke receiving hospital sites in the new model of care to ensure appropriate and timely access to acute stroke beds for those who need them, preventing pathway blockages and reducing length of stay in hospital

There is a lack of appropriate and timely access to acute stroke beds due to **a lack of consistent ambulatory emergency care for stroke** embedded across the system. In some acute stroke services there is a 2:1 ratio of stroke mimic presentations that should not receive admission to an acute stroke bed. In 2020/21, it is estimated that around 3,800 patients presented in the emergency departments with a "stroke-like" clinical picture caused by a disease other than stroke and attributed most commonly to seizures, migraines and psychiatric disorders.

Currently there is variation on how ambulatory care is staffed, but it is anticipated that consultant stroke nurses will be responsible for running these clinics. Evidence from the pilot ambulatory care projects demonstrated a reduction of inappropriate admissions, minimal impact on therapy, improved patient pathway and experience.

During an ambulatory care pilot at Blackpool Hospital between October 2018 and February 2019 of the 50 patients with stroke like symptoms who presented 46 were discharged on the same day following appropriate assessment and treatment and 4 were admitted.

ELHT also carried out a three month pilot who saw 29 patients with stroke symptoms of which 24 were discharged on the same day following appropriate assessment and treatment and 4 were admitted.

[4] Bray BD, Campbell J, Cloud GC, Hoffman A, Tyrrell PJ, Wolfe CD, et al. Bigger, faster? Associations between hospital thrombolysis volume and speed of thrombolysis administration in acute ischemic stroke. Stroke. 2013;44:3129-3135

[5] Hart S, Lowe D, Hargroves D, Doubal F. Meeting the future consultant workforce challenges: Stroke medicine, stroke medicine consultant workforce requirements 2019-2022. 2019 https://basp.ac.uk/wp-content/uploads/2019/07/BASP-Stroke-Medicine-Workforce-Requirements-Report-FINAL.pdf

[6] Rudd A. Stroke services, guidance for STP's on recommended standards for acute stroke services. https://www.england.nhs.uk/mids-east/wp-content/uploads/sites/7/2018/03/stroke-servicesconfiguration- decision-support-guide.pdf

Appropriately resourced Comprehensive and Acute Stroke Centres need to be commissioned to meet demand and improve patient flow in the system. Furthermore, delayed repatriation from the regional Thrombectomy Service due to limited acute stroke centre beds in the system, reduces this tertiary service's capacity to receive emergency transfers for mechanical thrombectomy, introducing significant clinical risk.

3.3.4 Staffing levels fall significantly short of nationally recommended levels

The provision of a well-led, appropriately trained and skilled workforce providing holistic and compassionate care to patients and their family/carers is the cornerstone of the care of people with stroke. The fifth edition of the National Clinical Guideline for Stroke, published in October 2016, provides a comprehensive examination of stroke care, encompassing the whole of the stroke pathway from acute care through to longer-term rehabilitation, and informs healthcare professionals about what should be delivered to stroke patients and how this should be organised, including recommended staffing levels.

Consultant requirements have recently been reviewed as recommended by British Association of Stroke Physicians 2019, they are measured in numbers of direct care contacts.

An estimate of the current stroke workforce numbers and shortages to deliver the current model of care is shown below.

Gap analysis of recommended qualified staffing levels for acute stroke services in current model

Role	L&SC WTE*	RCP WTE	Capacity Gap WTE
Consultant Stroke Physician	12.5 (70 DCC's)	16.82 (104 DCC's)	-4.21 (34 DCC's)
Nurse - registered	161.37	166.73	-5.36
Nurse - unregistered	166.93	89.78	+77.15
Occupational Therapist	26.12	43.09	-16.88
Physiotherapist	26.30	44.69	-18.39
Speech & Language Therapist	11.0	21.28	-10.28
Dietician	0.7	9.59	-8.89
Clinical Psychologist	1.30	10.64	-9.34
Orthoptist	1.3	5.4	-4.1

***L&SC staffing levels audit on 07/01/2021**

These figures clearly outline that there is a significant need to prioritise recruitment, retention and investment in staff for Stroke services across L&SC and this proposal allows us the opportunity to review and address some of our challenges.

Since 2011, L&SC has utilitised the regional Tele-stroke service to partly mitigate these shortfalls given the geographical issues and the insufficient investment available to staff all five local acute stroke services to the minimum recommended levels for 24 hours a day/7 days a week.

This **out of hours Tele-stroke service** runs from 5pm-8am Monday to Friday and all-day Sat, Sun and Bank Holidays. There is an out of hours stroke consultant rota currently covered with 15 stroke consultants from eight sites, reaching beyond the L&SC footprint into the rest of Cumbria. ELHT are

the current lead providers and are responsible for updating of governance and operational polices and equipment refresh on behalf of all the other sites.

Nationally, there is a shortage of stroke consultants and registered nurses - in particular Band 5s. There is also a shortage of allied health professionals including clinical psychologists, occupational therapists and speech and language therapists and orthoptists. All of which are on the National Shortage Occupation List for 2020. It is also important to note that dieticians are part of the generic hospital service and are not commissioned separately for individual stroke units.

As a response to these challenges the ICS Finance Advisory Committee recommended in May 2021 that a phased workforce plan should accompany the phased investment plan to ensure delivery of the proposed network to start in 2024.

This workforce plan will form the basis of an ICS stroke workforce strategy and will articulate the actions and interventions that the system will take to target closing the highlighted gaps and delivering the required future workforce.

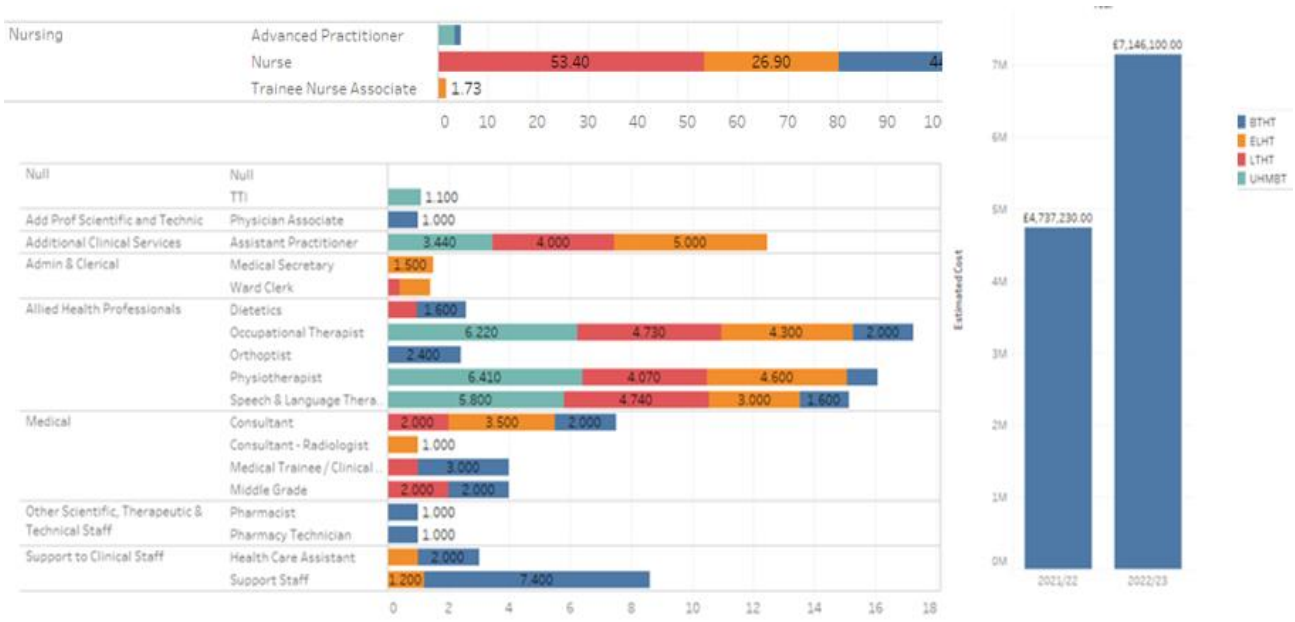
The L&SC ISNDN workforce work stream will be working closely with Health Education England and ICS workforce leads to solidify our understanding of the future supply stroke specialist staff. Using HEE STAR methodology, we will be exploring innovative ways to bolster workforce supply; navigating opportunities for upskilling; adopting and embedding new roles and new ways of working as well as improving the leadership capacity of the Stroke workforce.

The L&SC Stroke workforce strategy will be aligned to the themes below outlined in the *NHS People Plan: We are the NHS: action for us all*, published in July 2020:

- Looking after our people – with quality health and wellbeing support for everyone.
- Belonging in the NHS – with a particular focus on the discrimination that some staff face.
- New ways of working – capturing innovation, much of it led by our NHS people.
- Growing for the future – how we recruit, train and keep our people, and welcome back colleagues who want to return.

This approach will enable us to build robust transformation and optimisation options which will address both the needs of the workforce as well as delivering staffing structure required for improved Stroke provision across L&SC. We have an opportunity aligned to this business case to ensure we align workforce solutions to service delivery and the needs of our populations across the timescales of this service transformation and beyond.

The indicative workforce requirements for this transformation work, produced by Health Education England, are as follows:



Over the three years of expansion modelled there is a requirement for 232.2 additional staff to strengthen the front door to stroke services and get people on the stroke pathway quickly, sufficiently staff the Acute and Comprehensive Stroke Centres to provide the enhanced services 24/7 and strengthen the rehabilitation element. This equates to an estimated cost of £11,883,330. The numbers of staff vary by organisation, role and band with the highest number of staff needed within nursing roles, followed by AHP and then medical roles.

The indicative workforce requirements by Trust are as follows:

Medical workforce requirements (WTE):

Trust		
BTHT	2 Consultants, 2 Middle grades, 3 Junior grades	2 Nurse consultants
ELHT	3.5 Consultants	1 Nurse consultants
LTHT	2 Consultants, 1 Middle grade, 2 Junior grades	1.6 Nurse consultants

Nursing workforce requirements (WTE):

Trust	Qualified	Unqualified
BTHT	27.2	18.5
ELHT	25.9	1.73
LTHT	35.5	1
UHMBT	2.5	0

AHP workforce requirements (WTE):

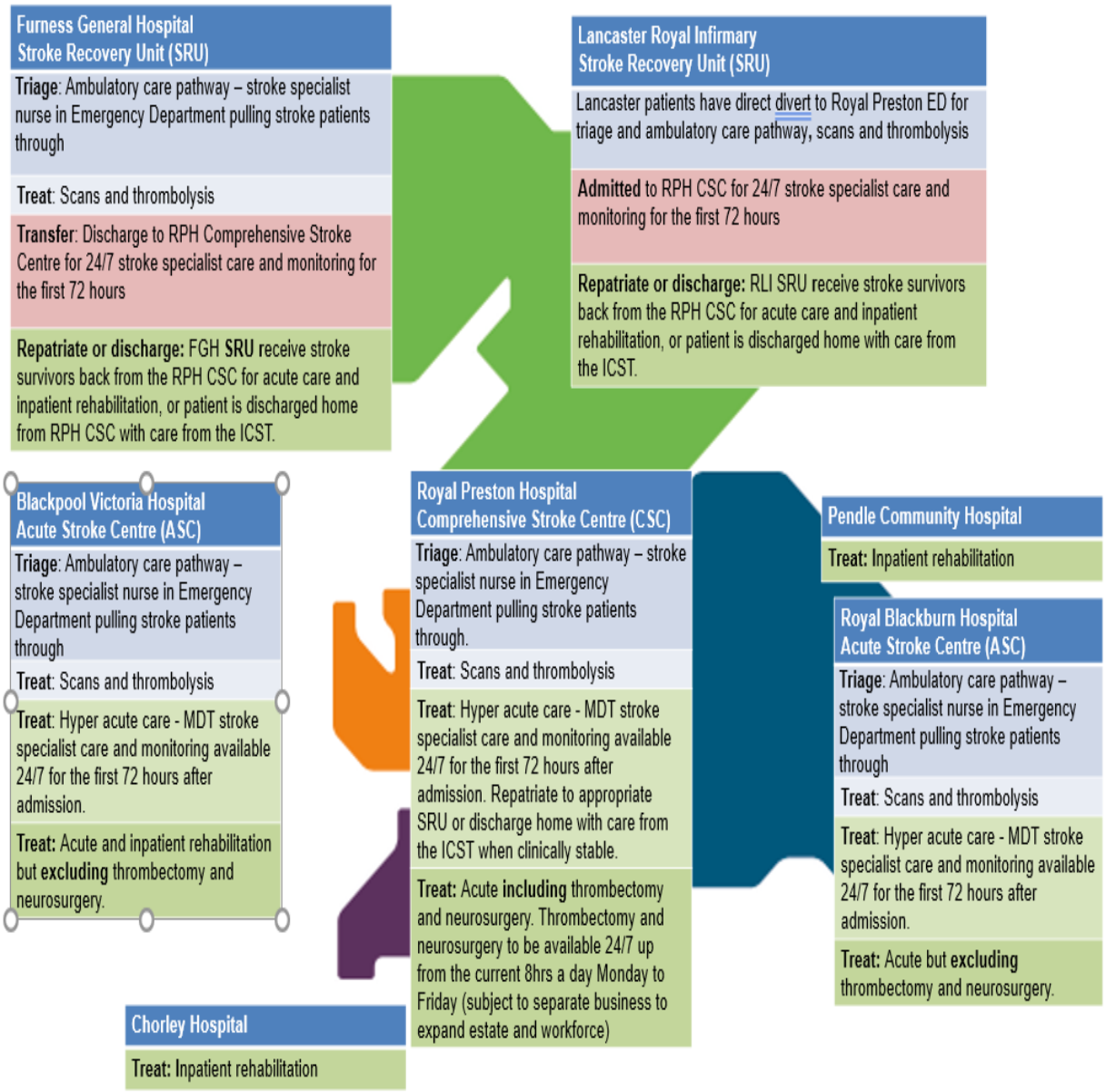
	Bed based	Community	Total
TOTAL	66.5	47.1	113.6

Well organised and adequately staffed acute stroke unit care is consistently associated with improved outcomes following stroke[7] . The key features of an acute stroke service that should be provided throughout the in-patient care of the stroke patient are that it should be a geographically defined unit just caring for stroke patients, have a multidisciplinary team of clinicians who have stroke specific expertise and operating to agreed protocols.

A moderate increase in revenue for additional medical, nursing and allied health staff across the Network is now required.

3.4 Future model of care

A pictorial overview of the future model is presented below with a high level description of what is to be offered at each local hospital in Lancashire and South Cumbria.



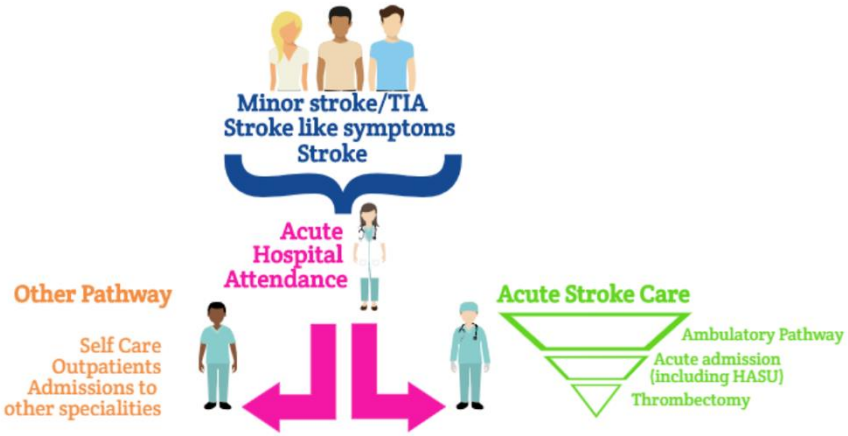
[7] Stroke Unit Trialists' Collaboration Organised inpatient (stroke unit) care for stroke. Cochrane Database Syst Rev. 2013 Sep 11;9:CD000197. doi: 10.1002/14651858.CD000197.pub3.

3.4.1 Ambulatory care pathways

To address the patient flow issue observed in the current model, the introduction of ambulatory care pathways in all local hospitals across Lancashire and South Cumbria is recommended by the L&SC ISNDN.

In ambulatory care shown in figure 3 below, patients are seen as outpatients if presenting with stroke-like symptoms, TIA or minor stroke. Within a "one-stop clinic" type approach, they are rapidly assessed, including therapy assessments, and receive all necessary diagnostics to determine whether they need to be admitted for specialist, hyper-acute stroke care, or can be discharged and followed up in clinic or discharged on to a more appropriate pathway, if needed.

Figure 3 – Ambulatory care pathway



Ambulatory emergency care pathways will be provided in all stroke receiving hospital sites to triage suspected stroke presentations from the hospital Emergency Department to the right care ensuring appropriate patient flow.

3.4.2 Optimal number of Acute Stroke Centres

A number of factors were taken into account when working out the optimum number and location of a Comprehensive Stroke Centre (CSC) and Acute Stroke Centres (ASCs):

- **Capacity of hospitals:** extensive bed modelling was undertaken to establish the right number of specialist hyper-acute and stroke rehab beds for the estimated incidence of suspected stroke presentations per annum (6,409 confirmed strokes and stroke mimics). The RCP and NHS E/I guidance recommend Comprehensive and Acute Stroke Centres should expect to admit between 900-1200 stroke patients per annum, therefore a three centre model (1 CSC and 2 ASCs) is considered as the ideal configuration for the network stroke services.

- **Access:** the location of stroke receiving hospitals needed to ensure all of the L&SC population received the right care within 60 minutes by blue light ambulance. The triage, treat and transfer model best serves residents where longer travel times involved namely Barrow in Furness.

- **Critical Mass:** Evidence shows that teams providing complex care to lots of people have the best outcomes for patients - therefore fewer, larger units are likely to provide better care for stroke patients.

- **GiRFT reviews**: The National Stroke team recommended that Royal Blackburn Hospital and Royal Preston Hospital became an Acute Stroke Centre and Comprehensive Stroke Centre respectively due to the number of stroke patients they manage and Preston's co-location with the regional thrombectomy centre.

To determine the preferred location of the second Acute Stroke Centre, a scoring evaluation exercise was undertaken in February 2021 by a panel consisting of a wide cross section of the stroke community who evaluated the Royal Lancaster Infirmary and Blackpool Victoria Hospital sites. Further information on the evaluation process is available in the Economic section of this business case.

From this exercise, the following site locations are proposed in this business case for enhancement by April 2023:

- Comprehensive Stroke Centre – Royal Preston Hospital
- Acute Stroke Centre – Royal Blackburn Hospital
- Acute Stroke Centre – Blackpool Victoria Hospital

The preferred three centre model has been shared at the following fora:

Date	Forum	Outcome
Dec 2019	Joint Committee of CCGs informal meeting	Endorsed
Dec 2019	Finance Investment Group	Indicative investment noted and guiding principles discussed
Jan 2020	North West Clinical Senate	Independently reviewed and endorsed clinical assumptions (Appendix B)
Jan 2020	ICS Executive Board	Approved
Mar 2021	ISNDN Network Board	Approved
April 2021	Provider Collaborative Board	Review of two centre model requested
April 2021	Finance Advisory Committee	Check and challenge on cost
May 2021	Finance Advisory Committee	Approval of a phased investment plan over three years
June 2021	NHS England & Improvement	Service change process need not be followed but an emphasis on engagement should be made
June 2021	Strategic Commissioning Committee informal meeting	Supportive of presenting business case at formal meeting in July
June 2021	Morecambe Bay CCG Executive Board	Broadly supportive with recommendations for further public engagement prior to implementation of patient transfer pathways
July 2021	Informal meeting with South Cumbria MPs	Broadly supportive with guidance to further consider impact on carers who may be disadvantaged by travelling out of area during the hyper-acute stroke care phase

It is important to note that the proposed 3 centre model was challenged by the L&SC Provider Collaborative Board in April 2021 and a review of a 2 site model was requested.

Royal Preston and Royal Blackburn hospital sites were modelled with Central Lancashire, Morecambe Bay and Fylde Coast patients transferring to Royal Preston Hospital and Pennine Lancashire patients attending Royal Blackburn.

Qualitative insights were sought from the Stroke Service Manager and the Medical and Surgical Directorate Managers at Lancashire Teaching Hospital (LTH), along with the National Clinical Director for Stroke, who reviewed the two site modelling outputs.

The comparative analysis revealed that a two centre model was neither clinically, operationally or financially appropriate. It would essentially become the largest acute stroke centre in England. Detrimental operational impacts to LTH and system financial risks were highlighted.

The recommendation in this business case remains therefore that the three centre model using a triage, treat and transfer pathway approach is preferred.

3.4.3 Triage Treat and Transfer pathway

The proposed Triage, Treat and Transfer pathway was collaboratively developed in 2019 and formally amended by the L&SC ISNDN Board in July 2021. The amendment was made to address the challenge from the National Clinical Director for Stroke that Lancaster residents should be attending their nearest Acute Stroke Centre, in this instance Preston Comprehensive Stroke Centre, directly rather than triage, treat and transfer.

The triage, treat and transfer pathway will serve Morecambe Bay residents due to the geography and travel times involved. Subject to appropriate capacity at the Preston Comprehensive Stroke Centre being available from April 2023:

Residents ordinarily attending Furness General Hospital with suspected stroke symptoms will continue to be taken directly to Furness General Hospital Emergency Department for initial triage and treatment e.g. CT scans and thrombolysis if appropriate. They will then be transferred to Royal Preston's Comprehensive Stroke Centre for up to the first 72 hours of multi-disciplinary stroke specialist inpatient care, then repatriated back to Furness General Hospital's Stroke Recovery Unit for ongoing care and inpatient rehabilitation or discharged home with care from the Integrated Community Stroke Team.

Residents ordinarily attending Royal Lancaster Infirmary with suspected stroke symptoms will be taken directly Royal Preston's Comprehensive Stroke Centre, receive the 72 hours of multi-disciplinary stroke specialist inpatient care, then repatriated back to Royal Lancaster Infirmary's Stroke Recovery Unit for ongoing care and inpatient rehabilitation or discharged home with care from the Integrated Community Stroke Team.

3.4.4 Future state activity impact

The modelled activity based on 2020/21 data is shown in the table below:

	Hospital	*Furness General Hospital*	*Royal Lancaster Infirmary*	*Blackpool Victoria Hospital*	*Royal Blackburn Hospital*	*Royal Preston Hospital*
ACTIVITY NUMBERS	**ED**	450.0	0.0	1521.0	2256.0	2182.0
	HASU	0.0	0.0	729.0	1081.0	1724.0
	Acute	164.0	279.0	447.0	663.0	553.0
	Rehab	72.0	137.0	233.0	260.0	176.0

The future state bed requirements are shown in the table below:

	Trust	Ave LoS	*Furness General Hospital*	*Royal Lancaster Infirmary*	*Blackpool Victoria Hospital*	*Royal Blackburn Hospital*	*Royal Preston Hospital*
BED REQUIREMENT	**ED**						
	HASU	**3**	0	0	7	11	17
	Acute	**7**	4	6	10	15	13
	Rehab	**23**	5	10	17	19	13
	TOTAL	**33**	**9**	**16**	**34**	**45**	**43**

3.5 Equality Impact Assessment

A stroke can happen to anyone but there are some things that can increase the risk of a stroke. The main risk factors for stroke, relating to the equality protected groups are:

- Age
- Ethnicity - strokes happen more often to people from African and Caribbean families, as well as people from South Asian countries.
- Gender - Men are at a higher risk of having a stroke at a younger age than women due to a combination of behavioural and medical factors.

The modifiable risk factors for stroke e.g. medical conditions (high blood pressure, diabetes, atrial fibrillation, high cholesterol) and lifestyle factors (smoking, drinking too much alcohol and eating unhealthy foods) may also be more prominent with some protected characteristic groups.
The impact on the stroke patient's carers also needs to be considered.

Not all patients with stroke like symptoms will transfer to the CSC. It is estimated that 30% of the Furness patients presenting with stroke like symptoms will be discharged from the emergency department through the triage and ambulatory care pathways, 12% of patients will present after 48 hours and will stay in the local stroke unit and 5% of patients eligible for transfer for treatment will refuse and therefore stay in the local stroke unit. For the Morecambe Bay patients that transfer to Royal Preston for treatment at the Comprehensive Stroke Centre, the best possible outcomes will be

achieved through having MDT stroke specialist care and monitoring available 24/7 for the first 72 hours after admission. These outcomes include:

- a reduction in mortality and levels of dependency following an acute stroke
- a reduction in the length of stay of stroke patients in bed-based services
- enhanced recovery following a stroke
- a reduction readmission rates for stroke patients
- improve patient and carer experience and quality of life through improved functional outcomes and extended activities of daily living; and every person post stroke has a rehabilitation care plan, which includes personal goals.
- All patients will have equitable access and treatment regardless of point of entry to the health service, gender, age, ethnicity, disability, sexual orientation, religion or beliefs, marital status, pregnancy or maternity status, or gender reassignment status.

The stroke patient's family members and carers who live in the Morecambe Bay area will be most impacted upon by the increased distance for the first 72 hours when the patient is receiving treatment at the Royal Preston CSC. This will impact most on those who have no access to their own transport and/or have a low income.

The NHS Transformation Unit carried out travel analysis by creating a model to simulate the travel times. The analysis looked at how people in different age groups and ethnicities would be impacted by increased travel times. The findings showed that:

- Those aged 65 and over are the most impacted age group
- The white population are most impacted ethnicity.

During engagement visits to the Stroke Association support groups in summer 2018, the programme team engaged with 132 attendees and 29 members of the Stroke Association team. There was general support for the proposed approach of developing acute stroke centres and the benefits that this type of model would bring. Attendees said that it would be a positive to have a specialist stroke centre as they felt it could provide consistent, good quality treatment, improve treatment times and patients' experiences and perhaps provide more personalised care. More recent engagement visits to Stroke Association support groups in July 2021 again provided support for the proposed model of care. The main concerns expressed were around the availability of car parking at Royal Preston.

Further work will be carried out to minimise the impact of increased travel. Older people may be more likely to have impairments which may affect engagement such as eyesight and hearing impairment, so this will need to be considered as part of the communications plan. CSC and ASCs will review their equality policy and how it supports different protected characteristics and their needs, especially transgender patients. Links will be made with key community groups for their input and update policy and practice where necessary.

The Comprehensive Stroke Centre will review how they support key visitors to the patients by offering advice with travel and ensuring those pathways for support are known to patients. Alternative and innovative methods used during the covid pandemic to assist with absence of visiting time and keeping loved ones in touch with a patient's progress can be explored. Resolving this issue may benefit

from collaboration with other Healthier Lancashire and South Cumbria programmes experiencing similar challenges.

These recommendations and any further equality needs and requirements of patients and carers will be monitored during implementation and built into the benefits framework for ongoing reporting. There will be meaningful representation from the protected characteristic groups most at risk of stroke and carers in engagement activities.

Overall the change to enhance services through the creation of the Comprehensive and Acute Stroke Centres network to serve the region should result in a positive effect due to the expected better outcomes for all patients.

3.6 Anticipated Benefits

As highlighted in the table below, saving lives and reducing disability are the key anticipated benefits of the proposed enhanced Network model of care. Economic benefits and improved patient experience along with a reduction in health inequalities are also anticipated. Further detail around anticipated benefits is in Appendix C.

Benefits of the Enhanced Network Model of Acute Stroke Care

Benefit type	Measurement
Reduce mortality	Save 32 more lives each year across LSC; 5% mortality reduction seen in London and Greater Manchester following reconfiguration of 24/7 hyper acute stroke units (Ref 1)
Improved clinical outcomes	Increase in LSC thrombolysis rate from 8% to 15%; n=140 extra patients per year Increase in LSC thrombectomy rate from 2% to 10%; n= 198 extra patients per year
Reduce disability after stroke	361 more stroke patients will be discharged with reduced disability/dependence, MRS score < 2. (Ref 1) ; 1 in 5 patients will achieve functional independence following thrombectomy (Ref 2)
Positive patient experience	Improved qualitative patient feedback at hospital discharge and 6 months review
Reduced societal cost - NHS	£4,100 saving for each extra patient thrombolysed (Ref 2) at least same again could be assumed for thrombectomy £2.33 million saved in reduced length of hospital stay of 3 days per patient
Reduced societal cost – Social Care	Social care savings of £6,900 and 0.26 QALYs gained in total for each extra patient thrombolysed (Ref 2); at least same again could be assumed for thrombectomy
Reduced health inequalities	All patients in ICS footprint will have access to high quality hyper acute stroke care that meets national best practice standards. It is expected that assessment, treatment and care will be standardised across the sub-region thus reducing unwarranted variation.

1. Evaluation of reconfigurations of acute stroke services in different regions of England: A mixed methods study (2019), NIHR
2. Stroke Pathway Evidence Based Commissioning (2020) Kings College London

The key elements to realising these benefits are:

- Adopt a regional approach to patient pathways where there is a strong case for change and underpinning evidence, in order to better meet the needs of patients, drive improvement and increase the sustainability of services.
- Strong commitment, effective collaboration and leadership at all levels.
- Obtaining feedback from patients, family, staff and stakeholders to measure the success of the implementation of a new service model and the feedback gained can play a critical role in further developing services.
- The ISNDN and its partners continuing to play a pivotal role in continued development and improvement of stroke services within L&SC.

3.7 Reduced societal costs

The economic burden of stroke falls on different sectors of society. Every new case of stroke represents a significant cost to the NHS, social care services, the patient and their family. There are also indirect costs due to loss of productivity when stroke survivors and their carers can no longer work.

Numerous studies have explored the cost associated with stroke. It was estimated in 2017 that the average societal cost of stroke per person was £45,409 in the first year after stroke. An additional £24,778 per patient has been estimated for subsequent years (cost of prevalent stroke).

Economic analysis of stroke care in England, Wales and Northern Ireland[1] have found that increasing the proportion of patients receiving high quality stroke care in a specialist stroke unit including thrombolysis and early supported discharge into community stroke rehabilitation can save the combined health and social care system up to £6,400 per patient after one year and £17,400 after five years.

The National Stroke Programme has set the ambition for the NHS to deliver clot-busting thrombolysis to twice as many patients, ensuring 15% of stroke patients receive it by 2025 – the best performance in Europe. The thrombolysis rates of local acute stroke services across Lancashire and South Cumbria taken from the SSNAP Toolkit 2020 public report ranges from 6.4-11.9% (average 8.9%).

If 15% of eligible patients were thrombolysed in a year (the new national target), cost savings for the Lancashire and South Cumbria system are estimated to be:

Trust	NHS Cost Savings	Social Care Savings	Would need to thrombolyse an additional
LTHT	£206,800	£190,000	40 patients
BTHFT	£110,900	£103,000	35 patients
ELHT	£89,900	£82, 600	28 patients
RLI	£48,200	£44,800	29 patients
FGH	£26,100	£24,300	8 patients
Total Savings	£481,900	£444,700	140 patients

For every 100 patients treated with thrombectomy, 38 have a less disabled outcome than with best medical management, and 20 more achieve functional independence. The National Stroke Programme has set the ambition for the NHS to deliver clot-removing thrombectomy to 10% of eligible patients by 2025.
The thrombectomy rate of local acute stroke services across Lancashire and South Cumbria are 2%. On average, one extra patient receiving thrombectomy would save the NHS £47,000 over 5 years. [8]

3.8 Risks

A risk log below will continue to be monitored by the ISNDN Board. The initial risks of implementing the enhanced Network mode of care are as follows:

Risk	Mitigation
Finance – affordability, given current system financial deficit.	FAC has supported the proposed phased investment and recognised disinvestment and additional efficiencies elsewhere will be required.
Clinical risk of transferring patients to the Comprehensive Stroke Centre (CSC)	The triage, treat and transfer model from Furness will ensure that patients receive time critical brain scan and recovery enhancing treatment before transfer for direct admission to the CSC.
Operational risk around patient pathways	All operational leads to agree the pathways for transferring and repatriating patients via the dedicated operational implementation group.
Workforce – cannot recruit or train staff in timescales	Working with and seeking advice from HEE, providers and national clinical director for stroke. Recruitment and training to take place over the next 2.5 years and the plan will be progressed by a dedicated workforce working group.
Families and carers' concerns around increased travel and transport for visiting in the first 72 hours .	Understand lessons learned from Carlisle experience. Patient and carer working group to explore potential solutions/ alternative methods Feedback obtained from SA groups. Wider public engagement planned.
Increase in ambulance activity both emergency and PTS with protracted journey times and the impact of system pressures.	Financial envelope available for vehicle, additional crew and estates cost. NWAS to define the demand and financial requirement. Potential use of UHMBT dashboard to obtain better quality data in relation to activity. Allow adequate time in project plan to procure additional vehicle and crew.
NWAS availability to respond to emergencies in timely manner – impact on programme and wider communities.	
Limited assurance on data quality to inform modelling for ambulance resource.	

[8] "Current, future and avoidable costs of stroke in the UK" Stroke Association

3.9 Dependencies and interdependencies

The following elements have been identified as programme dependencies:

- The community rehab teams being fully operational
- Triage nurse service in ED being fully operational
- Ambulatory care models being fully embedded
- Clear understanding of workforce arrangements and plans at each of the providers to enable and build a network approach to recruitment strategy
- Upskilling of stroke nursing workforce – a regional approach to education, training, research and development
- Agreement on bed bases for the proposed model
- Funding for set up costs – estates, equipment

The following elements have been identified as programme interdependencies:

- Expansion of thrombectomy services
- Access to diagnostics
- Access to vascular services
- Access to general medicine
- Healthcare Infrastructure Programme (HIP2)

3.10 Healthcare Infrastructure Programme (HIP2)

The Healthcare Infrastructure Programme (HIP), of which University Hospitals of Morecambe Bay and Lancashire Teaching Hospitals are part of the second phase (HIP 2), is concerned with the design and construction of a brand new hospital or hospitals for both Preston and Lancaster. The current environment in both hospitals is no longer fit for purpose and so they require infrastructure to be rebuilt rather than refurbished. However, no decisions have yet been taken in regards to the possible locations or service configuration/design.

Plans are to be submitted to the Department of Health over the next two years. Should these plans be successfully accepted, subsequent building work will be completed by 2030. All of the plans will be subject to public and patient involvement under established NHS and local authority governance arrangements. These include formal consultation with the public and stakeholders, and we expect those leading and involved in Stroke and neurological care to be active participants in this work.

There is no reason that existing programmes of work, such as enhancing the acute stroke care and rehabilitation model, should stop because of something that might happen in the next decade. Rather, programmes will need to be cognisant of building this potential positive change into their planning and, in doing so, reflecting the possible positive benefits for patients, carers and colleagues. This was recognised and acted upon by rejecting the capital option for a new build at Royal Preston Hospital site from an earlier version of the phased investment plan considered for this business case.

4. Economic Case

The purpose of the Economic Case is to set out the spending objectives and business needs in terms of the projects critical success factors (CSFs). The options under consideration are then assessed against the CSF's and an economic analysis undertaken to identify the preferred option.

4.1 Critical Success Factors

CSFs are the attributes essential for successful delivery of the project against which the initial assessment of the options for the delivery of the project is appraised. The CSFs in relation to the enhancement of acute stroke and rehabilitation services across LSC are as follows:

1. To deliver clinically sustainable, high quality SSNAP 'A-rated' Network of acute stroke services that are accessible to all LSC residents 24 hours a day, 7 days a week;
2. Robust stroke specialist triage and ambulatory care within RPH, RBH, BVH and FGH;
3. Appropriate ambulance cover for Morecambe Bay patient transfers and repatriation to and from the Preston Comprehensive Stroke Centre;
4. 7 day in-patient stroke rehabilitation service in all acute stroke services including RLI;
5. Integrated community stroke rehabilitation service available 6 days in all local areas, and;
6. Deliverable from an operational, workforce and financial perspective.

4.2 Potential Options

3 options were identified and assessed against the critical success factors:

- Option 1 – Do nothing / Business as usual
- Option 2 – 2 site model
- Option 3 – 3 site model

Option 1 was discounted on the basis that it does not deliver against CSFs 1 to 5.

Option 2 was discounted on the basis that the additional patient volume pressure on Preston Comprehensive Stroke Centre was deemed too high for this hospital's A&E and wider medical services. Significant estate expansion and additional investment in Diagnostic Imaging services would be required. Neither of which is possible in the current financial climate. This option poses an unmitigated risk to patient safety and therefore does not deliver against CSFs 1,2 and in particular CSF 6.

Option 3 was therefore chosen as the preferred option as it delivers against all of the CSFs.

4.3 Acute Stroke Centre site identification process

The National Stroke Clinical Team visit in 2017 confirmed that Royal Preston Hospital and Royal Blackburn hospital meet the criteria for a HASU and recommend that the ICS should consider this when designating Acute Stroke Centre sites.

The Lancashire and South Cumbria Integrated Care System's (ICS) Executive Team and the Collaborative Commissioning Board (CCB) in February 2020 agreed that a three site model must include Preston and Blackburn due to the existing stroke admission activity levels and Preston's co-location with the regional mechanical thrombectomy service. It was further agreed that an options appraisal must include a short-list of Lancaster, Blackpool or Furness hospital as the third Acute Stroke Centre location.

All sites were subject to hurdle criteria. "Hurdle criteria" are criteria that must be met in order for an option to be shortlisted for further consideration and were based on the national requirements for an Acute Stroke Centre. These are:

- The site must have the potential capacity to receive over 600 stroke patients a year
- 60 minutes or less travelling time from receiving unit to the Acute Stroke Centre site under the treat, triage and transfer model.
- The site must be an acute stroke unit.

Table 2 below show the travel time between sites.

	Site distance (miles) and normal (not lights and sirens) travel time (minutes)									
	RPH		RBH		BVH		RLI		FGH	
	Time	Miles	Time	Miles	Time	Miles	Time	Miles	Time	Miles
RPH			26	19.2	25	15.8	30	19.8	78	64.4
RBH	26	19.2			41	32.2	43	35.1	92	79.6
BVH	25	15.8	41	32.2			45	33	93	77.6
RLI	30	19.8	43	35.1	45	33			68	46.5
FGH	78	64.4	92	79.6	93	77.6	68	46.5		

Blackpool Vitoria Hospital and Royal Lancaster Infirmary met the requirements of the hurdle criteria and were both progressed to the scoring stage. Furness did not progress due to the travelling time to all the other sites and therefore was not part of further evaluation.

A scoring exercise was completed by a scoring panel of made up of stroke services' stakeholders to identify the location of the second Acute Stroke Centre in Lancashire and South Cumbria. The scoring exercise took place between 19 February and 1 March 2021. Detail of the scoring panel is in Appendix D. Each member of the scoring panel scored the two options and a "Do Nothing" option based on how well they met the evaluation criteria within the themes of:

- Quality and safety
- Access
- Patient and Carer experience
- Value for money
- Deliverability

The scores submitted for each option were collated, and the agreed weightings applied to result in a final score for each option.

The result from the scoring exercise found the location of the second Acute Stroke Centre should be Blackpool Victoria Hospital. A summary of the collated results is available in Appendix E.

4.4 Economic Appraisal

An economic appraisal was undertaken to ensure that the preferred option delivers the best public value in relation to the other options under consideration. Costs and benefits for each of the options were appraised over a 10 year period to calculate the Net Present Social Value (NPSV) of each option.

The capital costs of the preferred option are £5.7m and additional revenue costs are £13.8m recurrently. The costs and sources of funding will be described in more detail in the financial case.

Quantifiable benefits arising from the preferred option total £150m over the 10-year appraisal period and are comprised of £17.5m length of stay reductions and £132.5m of societal benefits linked to reduced social care costs arising from thrombolysis and thrombectomy.

The benefit cost ratio of the preferred option is 1.59 as shown in the table below. This means that the benefits outweigh the costs by a factor of 1.59 from a purely economic perspective.

	Option 2 - 3 site option
Incremental costs - total	-£94,259.05
Incremental benefits - total	£149,871.42
Risk-adjusted Net Present Social Value (NPSV)	£55,612.37
Benefit-cost ratio	1.59

On the basis that Option 3, the 3-site model, delivers the highest NPSV and delivers against the CSFs the economic case concludes that this option as the preferred option. The financial and deliverability implications of this option will be explored in more detail in the financial and management case sections of the business case.

5. Financial Case

The following section will summarise the cost of delivering the current stroke service across L&SC for both providers and commissioners and will outline the anticipated financial impact of implementing the enhanced Network model of acute stroke care. In terms of the cost to commissioners of implementing the new pathway, the focus will be on the financial impact of the preferred option only. The financial oversight of this work has been provided by the Lancashire & South Cumbria Finance Advisory Committee, ICS Executive Director of Finance, CCG Chief Finance Officers and provider Directors of Finance.

5.1 Current Service Cost

The table below summarises the current cost to commissioners across the four acute providers.

	BTH		ELHT		LTH		UHMB		TOTAL	
SLAM Cost	Activity	Price £000	Activity	Price £000	Activity	Price £000	Activity	Price £000	ACTIVITY	INCOME £000
2021/22 *		£4,173		£6,920		£5,355		£4,765		£21,214
2019/20	590	£4,060	713	£6,732	605	£5,209	652	£4,635	2,560	£20,636
2018/19	699	£3,707	716	£5,790	482	£3,161	596	£3,140	2,493	£15,798
2017/18	535	£3,808	705	£4,201	617	£4,146	612	£3,357	2,469	£15,512
2021/22 Rehab Cost		£126		£576		£3,800		£0		£4,502
2021/21 Total Cost		£4,299		£7,496		£9,155		£4,765		£25,716

** 2021/22 cost based on 2019/20 uplifted to reflect current cost under block payment structure*

In 2019-20, under the national payment by results tariff structure, the seven Lancashire & South Cumbria CCGs spent a total of £20.6m with the four main providers in respect of the coded activity for Stroke. The activity numbers charged via SLAM for primary diagnosis of Stroke have remained consistent over the three year period at approximately 2,500. However, the cost to commissioners over this timeframe has increased by £5m which is a reflection of improved data collection and capture of all co-morbidities and interventions generating the higher complexity tariff for patients.

In addition to the Stroke inpatient cost, commissioners have paid for the rehab element under local tariff arrangements. This brings the total inpatient pathway cost to £25.7m across the Lancashire & South Cumbria footprint.

In terms of how this commissioner cost compares to cost base of providers, the table below demonstrates that the in-patient and rehabilitation stroke service provides a good overall level of contribution to provider fixed costs.

	BTH £'000	ELHT £'000	LTH £'000	UHMB £'000	TOTAL £'000
Current provider service cost	£4,300	£4,879	£5,210	£2,655	£17,044
2021/22 In patient tariff income	£4,173	£6,920	£5,355	£4,765	£21,214
2021/22 Rehab income	£126	£576	£3,800	£0	£4,503
Total income	**£4,300**	**£7,497**	**£9,156**	**£4,765**	**£25,717**
Contribution	***£0***	***£2,618***	***£3,946***	***£2,109***	***£8,673***

5.2 Preferred Option

The predicted activity flows and financial impact for both capital and revenue have been based on the preferred option in relation to a 3 HASU model. Furness Hospital confirmed stroke patients will drip and ship to Royal Preston Hospital and Royal Lancaster suspected stroke patients will divert directly to Royal Preston Hospital as the Comprehensive Stroke Centre. East Lancashire Hospitals and Blackpool Teaching Hospitals will treat their own patients as Acute Stroke Units. Under this preferred option, the assumed activity flows are set out in the table below.

	A&E Activity						24%	0-3 days	4-10 days
Provider	Strokes	Mimics	TOTAL	RLI Direct to LTH	Confirmed Strokes	Discount MIMICS	Discharged from AMBC	Admit to HASU	Admits to ASU
BTH	507	1,014	1,521		465	264	243	642	480
ELHT	752	1,504	2,256		690	391	361	953	713
LTH	710	710	1,420	762	1,214	284	261	1,540	566
FGH	225	225	450		206	59	54	0	164
RLI	381	381	762	-762	0	0	0	0	279
	2,575	**3,834**	**6,409**		**2,575**	**997**	**919**	**3,135**	**2,202**

5.3 Financial impact of preferred option

A full baseline assessment has been undertaken of the current service cost for Stroke activity. The incremental cost of establishing the infrastructure and workforce requirements to deliver the future model has been estimated at £5.7m capital and £13.8m of recurrent revenue. Given the significant underlying deficit position of the Lancashire & South Cumbria ICS, this resource is not available for immediate investment. The collective finance community via the Finance Advisory Committee have agreed a phased approach to the investment to ensure the system has sufficient time to identify the resource over the three year period.

Prioritisation of investment has focussed on the elements of the new pathway that would deflect mimics/minor strokes via A&E Triage and Ambulatory diagnosis/treatment and also prompt discharge into community rehab and support teams. This will then have the benefit of 'right sizing' the inpatient capacity ready for investment in hyper and acute stroke pathways in subsequent years.

The phased investment plan for both capital and revenue it set out in the table below.

Year	Enhancement	Capital	Revenue	Total
2021/22	- Complete fully integrated community stroke rehabilitation recruitment – ***BwD CCG & Central Lancs CCGs only***		£943,100	
	- Blackpool hospital estate modification to enable provision of ambulatory care	£750,000		
	- Recruit stroke triage nurses – LTH, BTH and FGH		£242,900	
	- Enhance stroke specialist workforce to deliver 7 day ambulatory care – LTH, BTH, RBH and FGH		£606,700	
	- Increase hyper-acute stroke beds at Preston to facilitate 24/7 thrombectomy service (part SPEC COMM funded)		£484,900	
	Year total	**£750,000**	**£2,277,600**	**£3,027,600**
2022/23	- Enhance workforce to deliver 6 day in-patient rehabilitation – all sites including RLI		£2,395,600	
	- Additional Acute Stroke Centre equipment / ward reconfiguration	£2,330,400		
	Year total	**£2,330,400**	**£2,395,600**	**£4,726,000**
2023/24	- Expansion of Comprehensive and Acute Stroke Centre workforce to deliver 24/7 service – LTH, BTH and RBH		£6,528,600	
	- Additional Comprehensive and Acute Stroke Centre estates & equipment	£2,657,600		
	- Enhance workforce to deliver 7 day in-patient rehabilitation – all Trusts		£996,200	
	- Enhance NWAS resource to complete 4 patient transfers per day from UHMB to Preston and repatriation of HASU patients.		£1,650,000	
	Year total	**£2,657,600**	**£9,174,800**	**£11,832,400**
	TOTAL INVESTMENT	**£5,738,000**	**£13,848,000**	**£19,586,000**

A more detailed summary of investment by provider is attached at Appendix F.

5.4 Hosted Delivery Network

Aligned to the NHS Commissioning Reform objectives towards Strategic Commissioning of services at an ICS level by April 2022, this business case recommends the enhanced Network model of acute stroke care be **hosted by a single Trust and commissioned by the Lancashire and South Cumbria Strategic Commissioner from 2022/23**.

This will enable the potential sharing of resources across all Trusts to achieve better outcomes for patients and financial improvements, while retaining their original legal entity and minimising any stranded costs incurred.

5.5 Costs and ROI for the New Model of Care Components

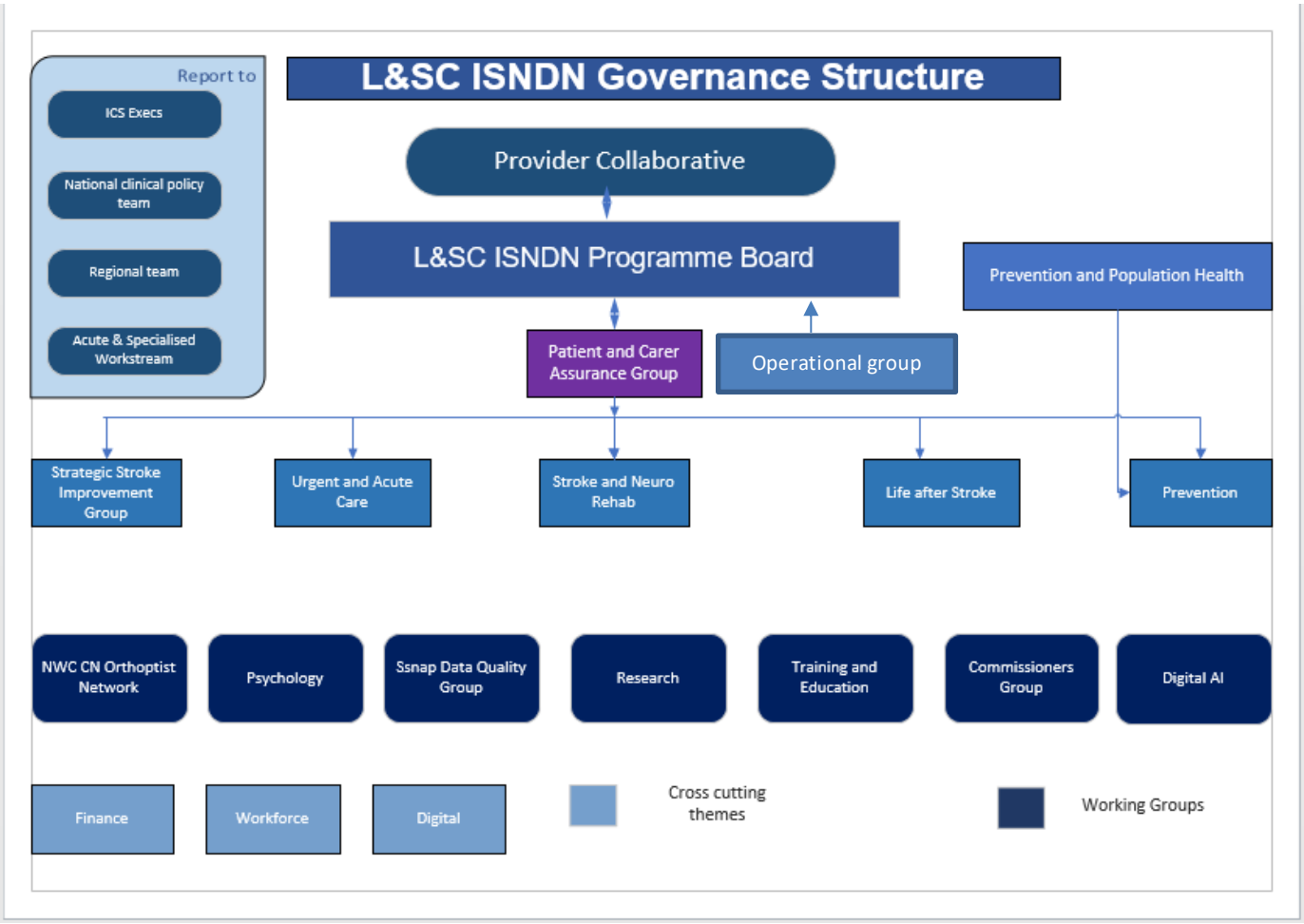
Component	Costs	ROI
ED Triage and Ambulatory emergency care pathway in all stroke receiving hospitals can filter up to 74% of stroke mimics away from an acute stroke bed to more appropriate pathways of care, reducing avoidable cost.	£606,700 staffing Ambulatory care £242,900 staffing ED triage £750,000 Estates	Savings – c.2837 patients in scope – equates to £2.27 million as a minimum
Enhancing the provision of hyper-acute stroke bed care (<72hrs) through investment in Acute Stroke Centre staffing will reduce mortality and disability and is cost effective. *References:* *National Audit Office, 2010* *Kings College, Draft evidence review, 2020*	Average increase per-patient cost of 32.3% in real terms (to £10,962 from £8,287 (2021/22),) this is the total cost of the inpatient spell **not** just the first 72 hours	Reductions in death (36 per year) and disability (for 361 patients per year). Estimated that the average number of *Consider: money being saved through lower rates of admissions to intensive care units, fewer admissions to long term nursing home care and reduced requirements for social support in the community.*
Increasing the number of patients who receive IVT will further reduce mortality and disability than the current model. *Ref: Royal College of Physicians Sentinel Stroke National Audit (SSNAP). Cost and Cost-effectiveness analysis. NHS England; 2016*	The cost of IVT treatment in England is estimated at £1,214 per patient (including cost of medication and staff time for administration)	For each extra patient receiving IVT, an NHS savings of around £4100 and health gains of 0.26 QALYs are expected during the first 5 years from stroke onset. For L&SC thrombolysing an additional 140 eligible patients would mean an NHS saving of £481,900 and social care saving of £444,700 and 36.4 QALYs.
Increasing the number of patients who receive IAT will reduce mortality and disability than the current model. *Ref: Ganesalingam J, Pizzo E, Morris S, Sunderland T, Ames D, Lobotesis K. Cost-Utility Analysis of Mechanical Thrombectomy Using Stent Retrievers in Acute Ischemic Stroke. Stroke.2015;46(9):2591-2598.*	The cost of IAT is £8,365 per patient (including the cost of the stent, the material and the procedure).	The incremental cost of £7,431 per patient was estimated to yield an additional 1.05 QALYs over 20-years period (about 3.8 QALYs for IVT alone versus 4.8 QALYs for adjunctive IAT).
Increasing the AHP staffing in Stroke Recovery Units (>72hrs) at all sites	£3.4 million	An additional 361 stroke survivors will experience reduced level of disability and increased return to independence. With the development of the ICSTs more patients will return home quicker from the CSC/ASC therefore in the longer term reducing the need for inpatient rehabilitation.

6. Management Case

This section describes the structures and processes for the programme management arrangements to ensure robust management throughout the life-cycle of the programme. This will then provide an established governance structure to support the service following implementation and during business as usual.

6.1 Programme Governance and Management

The implementation will be delivered by a dedicated Operational Implementation Group which will report directly to the ISNDN Board. The governance structure is illustrated below:



6.2 Programme Plan

The stroke programme management team has developed a high level implementation plan, subject to adjustment under the direction of the ISNDN Board, for the recommended preferred option to show how the transition would take place over three years, as advised by the Finance Advisory Committee.

The local ambition is to implement the new services as efficiently as possible whilst ensuring that quality and patient safety are not compromised. Planning principles will need to be agreed to support the development of a detailed implementation plan, including:

- reflecting the projected flows between hospitals and the impact on activity, beds, travel time and workforce over the transition period
- understanding the impact of a phased approach on the workforce, ambulance service and patients

- assessing the ability of site operational teams to accommodate the transition based on seasonal variation in demand and staffing shortfalls.

The key considerations to ensure successful implementation of the plans are securing the capital monies, the lead time for capital developments, the flows of activity between hospital sites (i.e. that capacity is ready in an ASC/CSC to successfully run the triage, treat and transfer model), the availability of the workforce to staff units, a robust and comprehensive communications and engagement plan and developing locally agreed mitigations to the areas identified in the Equality Impact Assessment and travel impact analysis.

The high-level outline plan is illustrated below.

		2021/22			2022/23				2023/24			
		Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Enablers											
1	Obtain agreement and endorsement of the model to be in implemented											
2	Develop Communications and Engagement plan											
3	Develop workforce strategy											
4	Secure the capital and revenue monies for 2020/21											
5	Secure the lead in time for 2020/21 capital development of estate modification to Blackpool hospital to enable provision of ambulatory care											
6	Establish acute stroke services workstream implementation group											
7	Establish working groups to lead on both the planning and development required to support changes to service provision.											
	Project priorities for 2021/22											
8	Complete full integrated community stroke rehabilitation recruitment across the											
9	Recruit stroke triage nurses to strengthen the region's ED front doors											
10	Recruitment to deliver 7 day ambulatory care across the region's ED front doors											
11	Increase hyper acute beds at Royal Preston to support expansion of thrombectomy											
12	Blackpool hospital estate modification for provision of ambulatory care											
13	Secure the capital and revenue monies for 2022/23											
	Project priorities for 2022/23											
14	Recruit workforce to deliver 6 day in-patient rehabilitation – all Trusts											
15	Procurement of the required Acute Stroke Centre equipment											
16	Ward reconfiguration at RPH											
17	Secure the capital and revenue monies for 2023/24											
18	Plan with NWAS to manage additional ambulance journeys											
	Project priorities for 2023/24											
19	Recruit workforce to deliver 24/7 services at ASCs and CSC											
20	Procurement of equipment to deliver 24/7 services at ASCs and CSC											
21	Ward reconfiguration at RBH											
22	Recruit workforce to deliver 7 day in-patient rehabilitation – all Trusts											
23	Plan for evaluation and realisation of benefits											

6.3 Benefits Framework and Management

The benefits framework outlines the methodology for collecting and reporting against different elements of the Programme. The framework describes four complementary methods of capturing progress against the process measures defined in the standards and measurement of improvements. These elements are as follows:

- **Readiness Assessment** - This self-assessment tool will be used to give assurance that key and mandatory elements are in place to support 'go-live'. The assessment will be split into sections to cover pre-live, implementation and post 'go-live' elements and will include the process standards developed during the design phase.

- **Clinical Dashboard (SSNAP)** – The existing SSNAP clinical dashboard will be used to measure performance of the new service model against standards.

- **Peer Review process** - An annual peer review process will be introduced utilising clinical champions. This will include site one-day visits where paper-based evidence for standards is required that are not already captured via the dashboard and readiness assessment.

- **Annual Report** - Outputs from the key elements of the framework, the readiness assessments, clinical dashboards and peer review will be collated into the ISNDN annual report detailing performance across L&SC. This report will identify performance against the keys aims of the programme.

6.4 Post implementation evaluation

An evaluation will be undertaken following full implementation of the new model of care to assess the effectiveness of the project in realising the proposed benefits as outlined in the model of care and Business Case. The following clinical elements will be used to evaluate the impact of the programme:

- Increase in specialist assessments
- Reduction in inappropriate admissions
- Increase in number of patients discharged through ambulatory care
- Reduction in door to needle time
- Increase in number of thrombolysis and thrombectomy procedures
- Decrease in length of stay
- Decrease in transfers to rehabilitation unit
- Increase in referral to ICSTs
- Reduction in level of disability
- Reduction in number of deaths
- Reduction in health inequalities

The national PROMS and PREMS are in the process of being developed. Once approved these will be used for measurement of patient experience. The Communications and Engagement plan will also include approaches to obtain, review and act upon patient, carer and staff experience.

6.5 Change management and communications

The ISNDN implementation steering group will manage the organisational and cultural changes arising from the implementation of the programme. These change management processes are interwoven into the governance of the programme, the programme plan and the readiness assessment within the benefits framework.

Communication during implementation will be managed by the L&SC communications team.
It is envisaged there will be regular communication through team brief and in the Trust staff bulletin. Regular meetings will be scheduled with staff working within Acute Stroke services and the regional Thrombectomy service to ensure they are appraised of progress.

Formal up-dates will be provided to relevant Trust Boards/Committees as per the Trust Governance structure.

External communication and engagement will be coordinated with the ISNDN utilising existing structures. The ISNDN will also work with the Stroke Association to ensure consistency of message and engage with established patient networks.

The engagement plan will include a multi – factorial approach to ensure the wider L&SC public and services are aware of the transformation. The first draft of the communications plan is shown in Appendix G.

6.6 Interdependencies

The programme interdependencies will be regularly considered through the ISNDN Board in order to make best use of existing and evolving resources as the programme continues to be implemented.
Where there is a risk related to interdependency, this is captured and managed in the risk log at Programme level and escalated as required.

6.7 Risk Management

The programme approach to risk management is embedded in the formal governance structure for the ISNDN 2021/22 Work Programme.

The risks and issues management framework provides a structured approach to allow enhanced strategic and business planning, and best practice approach to risk management to ensure:

- The value and benefits of risk and issue management are understood by all partners
- Roles and responsibilities are clear
- Risk management is applied in the day-to-day processes.

Strategies will be in place for the proactive and effective management of risk as outlined below.

The programme has mechanisms in place to ensure all stakeholders are able to identify and flag potential risks, with review process to ensure controls to minimise the likelihood of them materialising with adverse effects.

Risks can be raised at all levels then reviewed through the ISNDN Implementation Steering Group on a monthly basis. Key programme risks are managed by the programme team with designated owners and escalated and reviewed through to the ISNDN Board on a monthly basis.

The main programme risks are captured on a risk and issues log and are scored using a likelihood/ impact matrix.

Identified risks are categorised by work stream and assigned to the most appropriate person for ongoing management.

The ISNDN Manager will be responsible for ensuring that the register, including mitigating actions is updated monthly, and presented to the ISNDN Board.

All single provider risks will be reviewed and managed within existing internal governance frameworks and escalated within the programme if required. The ISNDN Implementation Steering Group will be able to generate actions and working groups to help resolve risks as well as ensuring shared learning across L&SC. In addition, meeting minutes detail any newly identified risks. Escalation of risks due to score, impact etc. is through ISNDN Implementation Steering Group to ISNDN Board.

Key risks to the implementation have been outlined in section 3.8.

Appendix A – Case for change engagement and decision making

The Case for Change was presented at the following fora:

Date	Forum	Outcome
Sept 2019	Lancashire Health Scrutiny Steering Group Committee	Group concluded that formal public consultation was not required and engagement activities proportionate to the number of patients affected by the proposed change had been undertaken during the design process.
Dec 2019	Joint Committee of CCGs	Request for the Full Business Case and supplementary information to focus and give assurance on: • The full financial impact of implementing the new model of acute stroke care • Equality Impact Assessment • Travel Impact Assessment • Community Stroke Rehabilitation Services – whilst this full business case relates to acute stroke care in hospital, assurance is required that high intensity community stroke rehabilitation services are in place.
Jan 2020	NHS England	Confirmation that the NHSE 5 Stage process was correct to follow in relation to the proposed service enhancements.
March 2020	ICS Executive Team	Stand down the stroke transformation programme and the development of the full business case in response to the action required to manage the COVID-19 pandemic.
Nov 2020	Provider Collaborative Board	Permission to resume action on the acute stroke transformation priorities, including the resumption of the development of this business case with implementation oversight to be provided by the newly formed L&SC Integrated Stroke and Neurorehabilitation Delivery Network (ISNDN).

Appendix B – Assumptions used for New Model of Care

Lancs and Cumbria Stroke Services Modelling - Assumptions Log

#	Assumption	Source	NWCSCN agreed	Comments
	NWAS			
1	Ambulance modelling has been completed by NWAS and does not need to be considered in this model			
	AED			
2	Total number of confirmed stroke presentations in 2020/21 is 2575	SSNAP		FGH 225, RLI 381, Blackpool 507, Blackburn 752, Preston 710
4	The stroke to mimic ratio is 2:1 at BVH and RBH and 1:1 at all others	Group		
5	Under a drip and ship model, non HASU centres will assess stroke presentations in AED before transfer to HASU centre	Group		Non-HASU will exclude 50% of mimics. Some of these will still require admission but not to a
6	24% of patients will be discharged from AED under the TIARA model	Local pilots		
7	12% of patients will present after 48 hours and will stay in the local stroke unit	3 of the 5 pt level data		
8	5% of patients eligible for transfer for treatment will refuse and therefore stay in the local stroke unit	M'OD		
	Tertiary Centre			
10	10% of stroke presentations will be eligible for IAT	National targets		
11	IAT will be undertaken at Preston	Group		
	HASU			
12	Under a direct transfer model, 100% of patients will be taken directly to the nearest HASU	Group		
13	There will be a 72 hour stay at the HASU	Group		
14	Mortality rate at 72 hours is 3.3%	SuS		Confirmed with local data
15	Bed Occupancy is 85%	NICE guidance		
	ESD			
16	40% of patients discharged from the HASU will require ESD	National targets		
	ASU			
17	There will be a median length of stay of 7 days on ASU	Group		
18	24% will be discharged from ASU and not need rehab (either home or mortality)	SuS		Confirmed with local data
25	Patients will be repatriated from the HASU to their local ASU	Group		
26	Bed Occupancy is 85%	NICE guidance		
	Rehab			
27	There will be a median length of stay of 23 days on the rehab ward			FGH 72, RLI 137, Blackpool 233, Blackburn 260, Preston 176
28	Bed Occupancy is 85%	NICE guidance		

Appendix C - Benefits of proposed enhanced stroke network model of care

Reduction of health inequalities of healthcare	All patients in ICS footprint will have access to high quality hyper acute stroke care that meets national best practice standards. As the transformation programme will be operationally delivered by the ISNDN, unwarranted variation will be reduced through improved performance by all acute stroke care providers on SSNAP i.e. aspiration for all Providers to achieve and maintain A ratings.
	Reduction in inequalities in access, patient experience, quality of care and outcomes.
	Should acute stroke services be commissioned by a single commissioning organisation in the future, it is expected this will support further elimination of unwarranted variation.
Improved sustainability and resilience of acute stroke service	The stroke programme transformation will strengthen acute stroke care provision with the adoption of a regional approach for the stroke pathway across L&SC.
	Improved staffing levels - greater job satisfaction for stroke specialist staff.
	Work on standardisation of high quality practices will continue bringing about improved patient flow and standards of care.
	Attract and retain high quality specialist stroke work force with decreased reliance on locums.
	Improved patient flow between hyper acute, acute and rehabilitation phases.
Improved Clinical Quality – Clinical Effectiveness, Patient Safety and Patient Experience	The ASCs and CSC will have patient numbers of sufficient size (>600 stroke admissions per year) to provide sufficient patient volumes to make an acute stroke service clinically sustainable, to maintain expertise and to ensure good clinical outcomes.
	Enhanced patient safety through care delivered by skilled, adequate staffing levels and stable workforce.
	More integrated and coordinated care with enhanced communication between providers.
	Enhanced patient and carer experience, via the delivery of high quality stroke care in a timely manner from skilled experience team
Improvement in health outcomes	Reduction in in-hospital and overall mortality from stroke.
	Reduction in disability from stroke and improved quality of life for people who have had a stroke.
	Increase in thrombolysis rates from 8% towards 15%
	Increase in mechanical thrombectomy rates from 3% towards 10%
	A higher proportion of people who have had a stroke are able to return home to live independently and return to work.
	Reduction in number of patients newly discharged to care homes / requiring continuing health care.
Minimising Costs of acute stroke care	Reduction in length of hospital stay.
	Return on investment expected

Appendix D – Scoring panel membership

Title	Name	Organisation	Representation
Local Commissioning	Helen Rushton	Central Lancashire ICP	Commissioning
Local Commissioning	Jeannie Hayhurst	Fylde Coast ICP	Commissioning
Local Commissioning	Helen McConville	Morecambe Bay ICP	Commissioning
Specialised Commissioning	David Schofield	North of England Specialist Commissioning Team	Commissioning
Local Commissioning	Collette Walsh	Pennine ICP	Commissioning
Healthcare Public Health Consultant	Aidan Kirkpatrick	Public Health England - Lancashire	Commissioning
Healthcare Public Health Consultant	Dr Matt Saunders	Public Health England - Cumbria	Commissioning
Operational Manager	Susan Roberts	Blackpool Teaching Hospitals Trust	Management
Operational Manager	Michelle Montague	East Lancashire Hospitals Trust	Management
Operational Manager	Brian Boardman Connell	Lancashire Teaching Hospitals Trust	Management
Operational Manager	Neil Smith	University Hospitals of Morecambe Bay Trust	Management
Director of Clinical Effectiveness and Deputy Medical Director	Grahame Goode	Blackpool Teaching Hospitals Trust	Medical
Clinical Lead	Anis Ahmed	Blackpool Teaching Hospitals Trust	Medical
Medical Director	Jawed Husain	East Lancashire Hospitals Trust	Medical
Clinical Lead	Dr Nicholas Roberts	East Lancashire Hospitals Trust	Medical
Medical Director	Gerry Skailes	Lancashire Teaching Hospitals Trust	Medical
Interventional Neuro radiologist	Sid Wuppalapati	Lancashire Teaching Hospitals Trust	Medical
Clinical Lead	Dr Hari Bhasker	Lancashire Teaching Hospitals Trust	Medical
Medical Director	Dr Shahedal Bari	University Hospitals of Morecambe Bay Trust	Medical
Clinical Lead	James Barker	University Hospitals of Morecambe Bay Trust	Medical
Stroke Consultant	Gill Cook	University Hospitals of Morecambe Bay Trust	Medical
Clinical Nurse Specialist	Mark Delajaban	Blackpool Teaching Hospitals Trust	Nursing
Clinical Nurse Specialist	Catherine Curley	East Lancashire Hospitals Trust	Nursing
Clinical Nurse Specialist	Anu Thomas	Lancashire Teaching Hospitals Trust	Nursing
NWAS	Matt Dunn	NWAS	NWAS
Patient Transport	Nathan Hearn	Patient Transport Services	NWAS
Carer	Susan Schofield	Patient and Carers	Patient and Carers
Carer	Les Readfearn	Patient and Carers	Patient and Carers
Carer	Cheryl Nichols	Patient and Carers	Patient and Carers
Patient	Paul McCormack	Patient and Carers	Patient and Carers

Patient and carer	Jean Sherrington	Patient and Carers	Patient and Carers
Patient	Kay Rawcliffe	Patient and Carers	Patient and Carers
Patient	Phil Woodford	Patient and Carers	Patient and Carers
Patient	Derek Passmore	Patient and Carers	Patient and Carers
GP	Dr Gary Wallis	L&SC Primary Care representative	Primary Care
Allied Health Professions Lead	Nick Lane	Blackpool Teaching Hospitals Trust	Rehabilitation
Allied Health Professions Lead	Alison Turner	East Lancashire Hospitals Trust	Rehabilitation
ICS Rehab Clinical Lead	Sian Davies	ICS	Rehabilitation
ICS Rehab Clinical Lead	Helen Vernon	ICS	Rehabilitation
Allied Health Professions Lead	Claire Granato	Lancashire Teaching Hospitals Trust	Rehabilitation
Clinical Service Manager, Integrated Community Stroke Team	Yvonne Hastings	University Hospitals of Morecambe Bay Trust	Rehabilitation
Stroke Association Lead- North	Nikki Chadwick	Stroke Association	Stroke Association Lead- North

Panel members abstained from scoring.

Appendix E - Scoring exercise results

Option		1	2	3
Option description		Do nothing	Blackpool Victoria Hospital is the third Acute Stroke Centre	Royal Lancaster Infirmary is the third Acute Stroke Centre
Final Score		35.95%	69.31%	54.31%
Parameter		Option meets only some criteria	Option moderately meets the criteria	Option moderately meets the criteria
Recommendation		Not recommended but further investigation or evidence may be required	Option is recommended but review, mitigation or modification may be required to particularly low scoring criteria	Option is recommended but review, mitigation or modification may be required to particularly low scoring criteria
		% scored within Theme		
A	**Quality and safety**	27.35%	63.25%	41.03%
B	**Access**	42.09%	67.95%	62.39%
C	**Patient and carer experience**	52.35%	79.49%	76.50%
D	**Value for money**	18.80%	65.81%	35.04%
E	**Deliverability**	39.46%	70.09%	56.98%

Appendix F – Detailed costings by provider

	PRIORITIES	BTH requirements	BTH Estimated cost £000's	ELHT requirements	ELHT Estimated cost £000's	LTH requirements	LTH Estimated cost £000's	UHMB requirements	UHMB Estimated cost £000's	TOTAL £000's
YEAR 1 2021/22	Complete fully integrated community stroke rehabilitation recruitment – BwD CCG & Central Lancs CCGs only	Funding agreed with CCG and service in place	0.0	To invest in and strengthen BwD service offer	243.1	Central Lancashire CST - phase 2 to be implemented	700.0	Funding agreed with CCG and service in place	0.0	**943.1**
	Recruit stroke triage nurses – LTH, BTH and FGH	Additional Nursing assistants	59.5			24/7 Specialist nurses rota	91.4	Recruitment of ANP's	92.0	**242.9**
	Blackpool hospital estate modification to enable provision of ambulatory care	Capital requirement	750.0							**750.0**
	Enhance stroke specialist workforce to deliver 7 day ambulatory care – LTH, BTH, RBH and FGH	Nurse Consultant & HCA support	214.7	Nurse Consultant & HCA support	133.6	Nurse Consultant & HCA support	166.4	Nurse Consultant & HCA support	92.0	**606.7**
	Increase hyper-acute stroke beds at Preston for additional thrombectomy activity **(SPEC COMM COST)**					Middle grade & ward nursing support	484.9			**484.9**
	OVERALL TOTAL	**BTH**	**1,024.2**	**ELHT**	**376.7**	**LTH**	**1,442.7**	**UHMB**	**184.0**	**3,027.6**
YEAR 2 2022/23	Preparation for transition to become ASC and CSCs - estates and equipment	ECG, Scanners, Monitors	149.9	ECG, Monitors, hoist	180.5	Reconfiguration required for thrombectomy service and CSC	2,000.0			**2,330.4**
	Ensure all sites providing a 6 day rehab service	Physio & OT additional staff for 6 day service	146.3	Physio & OT additional staff for 6 day service	443.8	Physio & OT additional staff for 6 day service	766.6	Physio & OT additional staff for 6 day service	1,038.9	**2,395.6**
	OVERALL TOTAL	**BTH**	**296.2**	**ELHT**	**624.3**	**LTH**	**2,766.6**	**UHMB**	**1,038.9**	**4,726.0**
YEAR 3 2023/24	Expansion of Comprehensive and Acute Stroke Centre workforce to deliver 24/7 service – LTH, BTH and RBH (includes non pay requirements across all sites)	Clinical leads, ward nursing and support staff and pharmacy tech	2,730.1	Clinical leads, Radiologist, ward nursing & Support staff	2,342.1	Clinical leads, ward nursing & Support staff, Psychology support	1,456.4			**6,528.6**
	Expansion of Acute Stroke Centres - Blackpool and Blackburn sites. Preston - equipment only	IT & Specialist equipment	83.1	Capital Investment and IT equipment	2,204.5	Monitors and Orthoptic equipment	370.0			**2,657.6**
	7 day rehab service across all acute sites – workforce requirement pending.	Increased staffing to deliver 7 day service	223.2	Increased staffing to deliver 7 day service	154.8	Increased staffing to deliver 7 day service	144.0	Increased staffing to deliver 7 day service	474.2	**996.2**
	Enhance NWAS resource to complete 4 patient transfers per day from UHMB to Preston and repatriation of HASU patients.									**1,100.0**
	OVERALL TOTAL	**BTH**	**3,036.4**	**ELHT**	**4,701.4**	**LTH**	**1,970.4**	**UHMB**	**474.2**	**11,282.4**
	TOTAL INVESTMENT (YEARS 1 TO 3)	**BTH**	**4,356.8**	**ELHT**	**5,702.4**	**LTH**	**6,179.7**	**UHMB**		**19,036.0**

NOTE The estimated costs for workforce are based on mid point costs
Thrombectomy costs included above which will be funded by Specialised Commissioning as the responsible commissioner

Appendix G – Communications and engagement plan

Task Name	Due Date	Status	Comments
Comms and engagement resources			
Core narrative document	02/07/21	In Progress	02/07: JSchol has provided first draft of narrative and shared with team for comment. To be agreed by Jack Smith and Elaine Day along with Phil Woodford and John Barbour. To be shared with Directors of Comms across LSC Trusts and Heads of Comms in LSC CCGs.
Q&A document	02/07/21	In Progress	02/07: JSchol and PW provided first draft of FAQs. JSchol updating today and redistributing to the group.
Key messages	02/07/21		
Press Handling	02/07/21	In Progress	02/07: SR drafted lines and now with PW for review - Morecambr Bay related ICS Comms team to own press handling to cover whole region
Website and online information	Commence on 15/07/2021	In progress	
Graphic representation of proposal - turning the narrative into a more visual way of representing the narrative and ideally some of the Key messages	Commence on 15/07/2021	Not commenced	
Easy read materials to describe model	Commence on 15/07/2021	Not commenced	
Audience and stakeholders	05/07/2021	In Progress	Michelle to produce Morecambe Bay audience and stakeholder mapping - JS to consider wider Lancashire and South Cumbria.
Delivery & action plan for both pre 15 July and after	02/07/2021	In Progress	
Folder on Kahootz as repository for all resources and evidence	02/07/21	Complete	
Share any supporting materials	Ongoing	In progress	Save useful programme materials e.g. statements, briefings etc.in Kahootz folder for use as supporting documentation throught comms and engagement.
Plan for immediate engagement (pre 15 July)			
Agree core narrative document	05/07/2021	In Progress	Jeremy Scholey and Neil Greaves to co-ordinate agreement from JS and ED with involvement of group.
Contact Morecambe Bay MPs and offer discussions/update ahead of 15 July	02/07/21	In Progress	Meeting arranged at 4pm Fri 2 July. Jack Smith, Elaine Day, Phil Woodford, Aaron Cummins to attend
Contact Lancashire and South Cumbria MPs (excluding MB) with brief update ahead of SCC	06/07/21	In Progress	Recommended update letter ahead of 15 July SCC.
Lancs and Cumbria HOSCs	TBC	In Progress	Phil contacting both county HOSCs to arrange updates.
Inform HOSC Chairs in Blackpool and Blackburn with Darwen	07/07/2021	Not commenced	
UHMBT stroke pathway staff	05/07/21	In Progress	02/07: PW and LJ meeting with Shahedal 5pm today to ensure there a plan for engaging and communication with all UHMBT staff in the stroke pathway w/c 5 July and clinical lead Gill Cooke is involved.
Inform stroke pathway staff in Fylde Coast, Pennine Lancashire, West Lancashire, Central Lancashire	05/07/21	In Progress	NG to develop lines to be shared with Stroke staff across the system
Plan for wider engagement			
Attend and present an update at BwD and Blackpool HOSCs	TBC	Not commenced	
Develop single website for information about stroke pathway	15.07.2021	In Progress	Include messages for trust and CCG staff to link to website for consistent information
L&SC MPs			Letter to build on narrative, proposals taken to SCC on 15/07 re new model of services, key messages. Meetings with MPs on request with Jack Smith to attend with relevant trust CEO and CCG AO where appropriate.
Morecambe Bay GPs	15/07/21	In Progress	F2F briefings via Teams. Two or three sessions pre the 15th re proposal. Jack and Cath to provide availability. MJ arranging sessions.
GPs across the rest of Lancashire and South Cumbria	Post 15/07/2021		
Planning from outcomes of HOSC discussions	15/07/21	Not commenced	Planning for if any of the improvements are considered to a 'substantial variation' -conversations with HOSC and CCG
Primary care Patient User Groups	Post 15/07/2021	In Progress	MJ ascertaining best approach for involving these groups. JS to consider messages for groups across LSC.
BAE employees in Barrow	Post 15/07/2021	In Progress	MJ finding how to link with BAE occupational health colleagues
BTHT, ELHT, LTHT stroke pathway staff	Post 15/07/2021	Not commenced	NG to ontact LTH/BTH and ELHT about potential F2F briefings ahead of 15 July. Working with Shelley Wright and Naomi Duggan
Wider public - update stroke survivor groups across LSC	Post 15/07/2021	Not commenced	Engagement sessions using key messages and additional materials
Wider public - develop plan for reaching wider public	Post 15/07/2021	Not commenced	Engagement sessions using key messages and additional materials

Appendix H – Stroke prevention activities

Preventing strokes in L&SC – Information sheet

Improvement activities for **preventing strokes** are currently led by Public Health England and more locally in Lancashire and South Cumbria by the Stroke Prevention Alliance. Clinicians have identified the following factors as crucial to improving stroke prevention:

- Reduction in smoking rates
- Improvements in diabetes detection and care
- Better identification and management of high blood pressure and atrial fibrillation
- More wide use of statins

The Stroke Prevention Alliance has produced a five year strategy, it is now its second year, the targets within the strategy (see below) have been embedded in 80% of GP contracts, further work needs to be done on this:

1. Diagnosed 90% of all people estimated to have atrial fibrillation
2. Treated (with anticoagulation) 90% of those with atrial fibrillation who are at high risk of stroke
3. Diagnosed 80% of all people estimated to have high blood pressure
4. Treated (to NICE recommended blood pressure thresholds) 80% of those diagnosed with high blood pressure
5. Ensured that 75% of people aged 40-74 have had their cardiovascular disease risk assessed
6. Treated 60% of those at high risk (>20%) of developing cardiovascular disease over the next 10 years

This presents a societal challenge in the future which will require additional funding and policy support.

Public Health England has historically highlighted the considerable diagnosis and treatment gap that currently exists for these key risk factors along with an associated economic analysis:

The diagnosis and treatment gap across Lancashire and South Cumbria[i]

1. The diagnosis and treatment gap, 2015/16		
Hypertension	Estimated adult population with hypertension	433,900
	Estimated adult population with undiagnosed hypertension	175,900
	GP registered hypertensives not treated to 150/90 mmHg target	50,800
Atrial Fibrillation (AF)	GP registered population with Atrial Fibrillation (AF)	33,200
	Estimated GP registered population with undiagnosed AF	13,500
	GP registered high risk AF patients (CHA2DS2VASc >=2) not anticoagulated	7,200
CVD risk	Estimated adult population 30 to 85 years with 10 year CVD risk >20%	123,000
	Estimated percentage of people with CVD risk ≥20% treated with statins	49%

Although the associated economic modelling was undertaken just over three years ago, it nevertheless powerfully made the point that achieving optimal treatment of hypertension and high risk atrial fibrillation alone in Lancashire and South Cumbria could result in the prevention of more than 1000 strokes and 300 heart attacks as well as £18.2 million saved in treatment costs over a three year period. Although the economic modelling did not extend as far as the impact of improved cholesterol management it is hoped that this will be provided as the wider CVD Prevent Audit programme is rolled out though it is acknowledged that even this national audit has been significantly impacted by COVID19 in the same way that our local Stroke Prevention Programme has.

[i] Size of the Prize Data, Public Health England, 2017