BRITISH ASSOCIATION OF STROKE PHYSICIANS

ADVANCING STROKE MEDICINE

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STROKE SERVICE STANDARDS

CLINICAL STANDARDS COMMITTEE

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STROKE SERVICE STANDARDS

Through high quality research, stroke care has dramatically improved with the provision of stroke units, thrombolysis, specialist care in the community through early supported discharge and with major advances in primary and secondary prevention. The challenge of translating evidence into routine clinical practice however still remains a challenge to all health care systems in the UK.

A vital part for all stroke services is that they are subjected to rigorous quality improvement measures in order to attain clinical excellence and improve patient outcome and experience. This process requires development of applicable and meaningful standards so one can objectively assess how well a service is performing. The first British Association of Stroke Physicians Stroke Service Standards were developed in 2010 by the Clinical Standards Committee and described in detail what processes need to be in place for a high quality comprehensive stroke service.

This current document developed by the BASP Clinical Standards Committee has further updated the standards against which to measure performance. A number of sources defining the standards have been used to cover the management of stroke from the acute event through to longer term care. These include the fourth edition of the National Clinical Guidelines for Stroke (1), the NICE Rehabilitation Guidelines for Stroke (2), the Sentinel Stroke National Audit Programme (3) and the Scottish Intercollegiate Guidelines Network and Scottish Stroke Care Standards (4,5).

These standards will provide an important framework and guidance predominately for stroke clinicians to ensure that stroke services are configured in a way to deliver the best quality of care for all patients.

1. Pre-admission and Emergency Care Standards

	Standard	Description
1.1	**The Ambulance Paramedic service links with the receiving stroke service when they have a suspected stroke patient**	There must be an agreed pre-admission protocol between appropriately trained Emergency Medical Services and the Hyperacute Stroke Service with algorithms on dispatch time, assessment, transport strategies and pre-notification which includes (onset time, stroke recognition using a validated tool such as FAST and pre-alert systems). Transport to hospital with acute specialist stroke services should be achieved as quickly as possible and always within a maximum of 1 hour. Immediate assessment by the acute stroke service on arrival should occur, allowing timely expert triage of acute stroke patients and the potential for thrombolysis.
1.2	**Emergency Department has a process in place for the triage and initial assessment of patients with a provisional diagnosis of stroke.**	It is important that Emergency Department professionals are aware of the presentation of acute stroke and use validated stroke recognition tools (e.g. ROSIER) with direct transfer to a Hyperacute stroke service. There needs to be agreed protocols in place to facilitate emergency transfer of patients with a provisional diagnosis of stroke to Hyperacute stroke services if not present on site (inter-hospital transfer) to access thrombolysis and other acute interventions.

1.3	**The Hyperacute Stroke Service provides rapid assessment of patients in the Emergency Department**	There should be an established Hyperacute stroke pathway for all patients regardless of whether they are eligible for thrombolysis with direct transfer to a Hyperacute stroke unit.
1.4	**The Hyperacute Stroke Service has an established thrombolysis pathway. Time from hospital arrival to treatment is within 30 minutes of arrival in 50% of cases and up to 100% of cases within 60 minutes in license.**	Pathway to be in operation 24/7, 7 days per week on site or in collaboration with neighbouring hospitals. Evidence of protocols to underpin and support pathway. Alteplase should only be delivered by specialist staff embedded within a Hyperacute stroke service that are trained (BASP thrombolysis training) and experienced in the provision of stroke thrombolysis and recognition of complications. The earlier the thrombolytic treatment is delivered the better the outcome, particularly if delivered within 90 minutes of symptom onset. The license supports the use of Alteplase up to 4.5 hours
1.5	**Hyperacute stroke service has agreed protocols for the use of Telemedicine to support appropriateness of thrombolysis and other acute interventions if senior assessment is not available on site to conduct face to face evaluation.**	A Telemedicine service should consist of a video link whereby patient's clinical examination can be observed by a stroke specialist remotely with access to review brain imaging (PACS) and telephone consultation. Telemedicine may be used within specialist stroke services where there are geographical issues in delivering face to face assessments. Stroke specialist nursing staff should be involved in the assessment process in the admitting hospital. There is currently no evidence as yet to suggest that telemedicine assessment is superior to face to face assessments in delivering treatment decisions. Agreed protocols underpinning the use of such technology and staff training in acute assessments should be established to ensure high quality care. Regular audit of the process and thrombolysis decisions as part of a governance framework should be undertaken routinely.

1.6	**The Hyperacute Stroke Service has agreed protocols for neurosurgical referral for:** **a) Intracerebral Haemorrhage** **b) Malignant middle cerebral artery infarction**	The need for neurosurgical intervention in such hyperacute stroke emergencies needs to be clarified in advance through agreement with local/regional providers of neurosurgical services, not least to avoid ambiguity and inconsistencies in the management of individual emergency cases. Regular review of individual cases should occur to ensure these pathways are functioning appropriately. a) Selective patients should be considered for surgical intervention following primary intracerebral haemorrhage if hydrocephalus is present or rapid deterioration occurs b) Patients with extensive middle artery territory stroke should be considered for decompressive hemicraniectomy within 48 hours of onset if they satisfy the NICE Stroke Guidelines criteria. There is some evidence that selected older patients (>60 years) may benefit from this procedure but this requires further confirmation (6)
1.7	**If Endovascular therapy for acute ischaemic stroke is to be sought, this procedure should only be used in the context of research as part of a randomised controlled trial.**	As such the current evidence base for endovascular therapy is not robust at present and therefore such therapy should be delivered as part of a randomised controlled trial. For patients for whom thrombolysis is unsuitable or has failed, there must be very clear governance arrangements for proceeding with endovascular therapy. All patients undergoing such treatment must be entered into a national and international registry (SITS TBY) documenting key outcomes and safety processes.

2. Neuroradiology Service Standards

	Standard	Description
2.1	**All patients with suspected stroke should have immediate access to CT imaging if required to plan urgent treatment. All other patients with suspected stroke to be scanned within 12 hours of presentation (RCP 2012)**	Stroke patients who fulfil the NICE criteria for immediate scanning (including thrombolysis candidates) should have immediate CT scans (preferably in the next slot or within the hour in some cases). Immediate CT scanning is the most cost effective course (7), allowing rapid initiation of appropriate treatment such as thrombolysis in acute ischaemic stroke or reversal of anticoagulation in warfarin-induced intracerebral haemorrhage.

2.2	**The Stroke Service has access to MRI/ MR angiography and CT angiography for further investigation of stroke patients. MR and CT Angiography to be done as soon as possible within 24 hours of request.**	MRI and/or MR angiography will be useful where the radiological diagnosis is unclear or uncertain and in those patients with delayed presentation (>1 week). Both CT angiography and MR angiography may be used to confirm the presence of symptomatic tight ICA disease prior to surgery. MRI brain sequences for stroke/TIA should include diffusion weighted sequences to identify recent ischaemia and gradient echo sequences to identify haemorrhage. Increasingly it will be necessary to perform brain imaging in TIA patients to identify the arterial territory involved or where the diagnosis is uncertain. Here, MRI is the ideal option but CT should be used if MRI is contraindicated.
2.3	**All patients with acute stroke have access to urgent Carotid Imaging (usually duplex ultrasound but MRA or CTA according to local protocol)**	Carotid imaging should be carried out within 24 hours in patients with TIA or non-disabling anterior circulation stroke. Information from carotid imaging allows the clinician to review the aetiology of an ischaemic stroke and plan further investigations if appropriate. Symptomatic severe internal carotid artery (ICA) stenosis (which should be reported with NASCET criteria) carries a high risk of early recurrence and early surgery (within 1 week) yields the greatest benefit.

2.4	**The Stroke Service holds regular meetings between stroke physicians and expert radiologists / neuroradiologists**	Allows the stroke physician to review brain imaging with other physicians and expert radiologists, perform clinico-radiological correlation, and to discuss the most appropriate secondary or follow up imaging. Also provides an educational forum for all staff. Access to specialist neuroradiology opinion should be available if needed.

3. Hyperacute/Acute Stroke Standards

	Standard	Description
3.1	**All patients with suspected acute stroke are admitted directly to an Hyperacute Stroke Unit under the care of a stroke specialist multidisciplinary team (MDT)**	All patients should be managed on a stroke unit unless other conditions requiring immediate specialist care dominate (e.g. the need for ITU, cardiothoracic surgery, dialysis). The target is > 90% of patients with stroke to be admitted directly to the Stroke Unit from the ED or home, and to spend at least 90% of their length of stay in a specialist stroke bed. Patients to be admitted to the Stroke Unit as quickly as possible and no longer than 4 hours of hospital arrival. The Stroke Unit MDT holds at least weekly structured meetings to discuss progress and plan goals for acute stroke patients as well as timely and appropriate transfers of care.
3.2	**The Hyperacute Stroke Unit provides facilities for continuous physiological monitoring during acute illness**	Regular (at least 4 hourly) general monitoring and management of physiological parameters and neurological status with a protocol for managing abnormal findings. Continuous monitoring available for unstable patients. Length of time to be determined by clinical status of patient.
3.3	**The Acute Stroke Unit has a daily senior medical ward round by the Senior Clinical Decision Maker (Stroke Specialist) for diagnosis, assessment and management of patients with suspected acute stroke**	Acute stroke patients require daily assessment and review by the stroke medical team. Senior Medical Ward rounds should be conducted every day including weekends led by the Stroke Specialist.
3.4	**The Acute Stroke Unit provides sufficient trained**	In the first 72 hours of an acute stroke patient's admission, they

	nursing staff to provide high quality nursing care	will require more intensive monitoring and nursing input, requiring a minimum Level 2 nursing staff numbers to manage the acute stroke patient (2.9 WTE nurses per bed; 80:20% trained to untrained staffing ratio) is recommended. Thereafter a level of 1.2 WTE nurses per bed is appropriate.
3.5	**All patients admitted with suspected acute stroke have a swallow screening assessment performed on admission by appropriately trained and competent staff**	Screening to be performed within 4 hours of admission and before any food, fluids or medication is administered orally. Further full assessment at 24 hours where dysphagia is confirmed or in uncertain cases. An algorithm to be followed for patients with swallowing problems is recommended (4).
3.6	**All stroke patients should have a nutritional screening assessment performed within 24 hours of admission**	Swallowing problems are common after stroke. Stroke patients who are nil by mouth, on a modified-texture diet, or are identified as being at nutritional risk, are referred to and seen by a dietician for an individualised nutritional assessment and management plan and reviewed weekly.
3.7	**All conscious patients admitted with suspected acute stroke are mobilised out of bed on the day of admission**	Acute stroke units should have policies and staffing levels for very early mobilisation out of bed on admission unless contraindicated (reduced consciousness, unstable blood pressure or other unstable clinical state) (8).
3.8	**The Acute Stroke Unit has a protocol for the promotion of bladder and bowel continence including a policy to avoid urinary catheters**	Review bowel and bladder status to be assessed within 4 hours of admission. Urinary catheters should be avoided except under specific circumstances (e.g. urinary retention). The use of a urinary catheter requires clear justification and documented management plans. Stroke unit staff should be trained in continence promotion and bladder scanning.

3.9	**All patients should have their risk of venous thromboembolism assessed and appropriate treatment should be offered.**	Patients who are immobile (cannot mobilise to the toilet should without help from another person) should receive continuous intermittent pneumatic compression (IPC) as per CLOTS III trial unless contraindicated (9).
3.10	**All stroke patients with any new neurological impairment within 24 hours of admission should receive a multidisciplinary assessment from at least one member of the specialist team within the next working day**	Patients will be assessed by all relevant members of the MDT within 72 hours and goals should be agreed by 5 days of admission.
3.11	**All appropriate patients receive a minimum of 45 minutes of physiotherapy per day**	Provision of 1 WTE physiotherapist per 5 beds. Able to deliver a service 7 days a week.
3.12	**All appropriate patients receive a minimum of 45 minutes of occupational therapy per day**	Provision of 1 WTE occupational therapist per 5 beds. Able to deliver a service 7 days a week.
3.13	**All appropriate patients receive a minimum of 45 minutes of Speech and Language Therapy per day**	Provision of 1 WTE Speech and Language Therapist (SALT) / 10 beds. Able to deliver a service 7 days a week.
3.14	**The Acute Stroke Unit has regular support from a pharmacist**	Regular input for Acute Stroke Unit; reviewing drug interactions and helping improve patient concordance on discharge.
3.15	**All patients with acute stroke have access to specialist Clinical Psychology input and emotional support**	Provide for expert assessment of stroke patient's mood, cognition and adjustment issues as well as offering support for their families and guidance to the MDT.
3.16	**The Acute Stroke Unit has support available from a Nutrition Team/dietician for the management of patients with dysphagia and/or malnutrition**	Nutritional assessments on admission (using a validated tool e.g. MUST tool) and weekly during patient's stay. Nutritional advice and tube-feeding interventions are readily available. Decisions about insertion of PEG tube should only be made following appropriate MDT discussion.
3.17	**Acute stroke management is based upon protocols for the prevention and treatment of common complications**	Stroke units to have protocols / guidelines for prevention and treatment of common complications after stroke and secondary stroke prevention. These should be evidence based where

		possible, with regular audit to assess implementation and updated regularly
3.18	**Palliative Care/End of Life Pathway must implemented for appropriate patients**	The MDT should identify patients who are dying and initiate an appropriate local palliative care pathway.

4. Stroke Rehabilitation Standards

	Standard	Description
4.1	**All patients with stroke have access to a designated Stroke Rehabilitation Inpatient Unit and subsequently a specialist stroke team within the community if required.**	The Stroke Rehabilitation Unit occupies a defined geographical area with suitable facilities, with clinical practice showing evidence of multidisciplinary team working (structured team meetings at least weekly, regular programmes of stroke education tailored to the needs of staff and patients, multidisciplinary notes, involvement of family and carers in treatment programmes and regular goal planning meetings)(10)
4.2	**All medically stable patients with stroke are transferred from the Acute Stroke Unit without delay**	Protocols are in place to ensure the smooth transfer of patients from the acute unit to stroke rehabilitation unit. Where this involves units at differing sites, repatriation should occur directly between the acute and rehabilitation units without delay as soon as medically stable. There should be no exclusion policy restricting entry to the stroke rehabilitation unit.
4.3	**The Rehabilitation Unit has regular Stroke Physician input into the review and medical management of patients**	At least twice weekly Senior Medical Ward Rounds by Stroke Specialists are conducted in the Stroke Rehabilitation Unit.
4.4	**All appropriate patients receive a minimum of 45 minutes of physiotherapy per day**	Provision of 1 WTE physiotherapist per 5 beds. Able to deliver a service 7 days a week.

4.5	**All appropriate patients receive a minimum of 45 minutes of occupational therapy per day**	Provision of 1 WTE occupational therapist per 5 beds. Able to deliver a service 7 days a week.
4.6	**All appropriate patients receive a minimum of 45 minutes of Speech and Language Therapy per day**	Provision of 1 WTE SALT / 10 beds. Able to deliver a service 7 days a week.
4.7	**All patients undergoing stroke rehabilitation should be screened for cognitive deficits, visual neglect, attention deficits and emotional problems and have access to specialist Clinical Psychology input**	Cognitive, visual, attention and emotional problems are common in stroke patients, and screening for these problems should occur at entry to rehabilitation or the soonest appropriate point thereafter. Carers of stroke patients suffer from emotional problems both during the rehabilitation process and following discharge. The ability to support both patient and their family becomes increasingly important during their stroke journey. Psychological support can be a mixture of self help groups and formal psychologist assessment and treatment.
4.8	**Staff on the Stroke Rehabilitation Unit are trained in the promotion of urinary and bowel continence**	The promotion of continence is a key aspect of rehabilitation. Stroke units should have a range of resources and policies to promote continence and staff should be skilled in their use.
4.9	**All patients have access to specialised neurorehabilitation services**	Arrangements in place for access to specialised neurorehabilitation services e.g. spasticity, orthotics, driving assessment, specialist seating, vocational rehabilitation, assisted devices, orthoptists and patient information, advice and support. These services can be either provided locally or through the regional neuro-rehabilitation service.
4.10	**The Stroke Rehabilitation Unit actively involves families and carers in day to day care and rehabilitation**	Evidence of the active involvement of patients and families in goal planning. This will help communication, goal setting and prepare patients and family for discharge home. Self care and self management skills should be encouraged with the patient in goal setting.

4.11	**No patient with stroke is discharged to permanent institutional care without a comprehensive assessment of their potential for rehabilitation**	All patients with stroke should be assessed by a specialist multidisciplinary team to maximise their opportunity to respond to rehabilitation and avoid institutionalisation. Discharge to institutional placement should be reserved for those patients objectively assessed as failing to respond to a tailored programme of stroke rehabilitation (through for example, a failure to identify or achieve any rehabilitation goals) over an appropriate period of time. Early selection of patients for institutionalisation without a trial of rehabilitation should be reserved for exceptional circumstances e.g. where the prognosis from other co-morbidities does not allow time for a trial of rehabilitation.
4.12	**All eligible patients have access to an Early Supported Discharge scheme**	Offer Early Supported Discharge (ESD) to people with stroke who are able to transfer independently or with assistance of one person if a safe and secure environment can be provided. Early Supported Discharge schemes vary in their capability to take patients at differing levels of disability from mild-moderate to severe, with varying impact on length of stay. Regardless of the level of support available, an ESD should be available to all eligible patients and provide the same skill mix and intensity of care delivered with a hospital setting and delivered without delay. Generic and non specialist supportive schemes are not as effective.
4.13	**All patients discharged from hospital with a feeding tube receive regular follow up**	Specialist follow up (specialist nurse / nutrition team) will assess swallowing and nutritional status, and review the need for long-term feeding tubes.
4.14	**The Stroke Rehabilitation Service has established links with the voluntary sector**	Formal links with patient and carer organisations e.g. local users forum, Stroke Association Group, community stroke clubs.

4.15	**The Stroke Rehabilitation Service has processes in place for the training and education of carers**	Enable better patient care in the community and reduce carer stress. Carers should have a named contact for information provision.
4.16	**The Stroke Rehabilitation Service provides comprehensive secondary prevention advice and treatment**	Medical secondary prevention to be commenced prior to discharge from hospital. Comprehensive secondary prevention guidelines to be available to primary care clinicians. Lifestyle modifications to be discussed with the patient, supported by written material.
4.17	**The Stroke Rehabilitation Service provides comprehensive information to community services and primary care**	In agreement with the community health care team, including transfer of care documentation, follow up information, and information regarding secondary prevention. There should be evidence of joint care planning between Health and Social Services with agreed referral pathways from hospital to community settings.
4.18	**All patients have follow up by a community rehabilitation team post discharge**	All patients should have access to specialist community rehabilitation after discharge either from an in-patient stay or from an ESD scheme. This access should be available lifelong, with the ability to access community rehabilitation at any time following stroke.
4.19	**All patients receive follow-up six months after hospital (or ESD scheme) discharge and annually thereafter**	Clear protocols for follow up assessment at end of initial rehabilitation should be in place and 6 month assessments by stroke MDT for those with persisting disability. Review process in place to identify late problems in stroke patients and those who may benefit from late rehabilitation input with sign-posting of appropriate referral e.g. directory of services.

4.20	**All appropriate patients receive advice regarding a return to driving**	Written and verbal information should be available advising on DVLA regulations. Systems in place to enable eligible patients to be offered assessment / rehabilitation to enable them to return to driving.
4.21	**All eligible patients receive appropriate support and treatment to enable a return to work**	Services in place to enable vocational training and retraining. Links with social / voluntary organisations specialising in enabling return to work and enhancing leisure activities and involvement.

5. Neurovascular Service Standards

	Standard	Description
5.1	**All patients with a suspected minor stroke or TIA have urgent access to a comprehensive Neurovascular Service**	The Neurovascular Service should meet the standards set out by National Clinical Guidelines for Stroke (1). All patients identified as having a potential TIA should be assessed and investigated by at a specialist clinic either within 24 hours or for low risk patients within a maximum of 1 week. A validated scoring system such as $ABCD^2$ score can be used to stratify treatment and risk of recurrence. However it should be noted that this scoring system is not a substitute for taking a comprehensive history and is not a diagnostic tool.
5.2	**The Neurovascular Service has access to the full range of diagnostic facilities**	Access to all necessary investigations within the time interval determined by the level of risk i.e. all relevant diagnostic tests to be accessible within 24 hours for high-risk TIA and non-disabling stroke, within one week for low-risk TIA.
5.3	**The Neurovascular Service has access to carotid imaging with appropriate urgency**	A same day carotid doppler imaging service should be available. The NASCET should be the preferred method of reporting the degree of carotid stenosis. This is essential to identify those patients with symptomatic severe ICA disease and who have a high risk of stroke and benefit most from early surgical intervention.
5.4	**The Neurovascular Service has access to MRI scanning including MR angiography with appropriate urgency**	A same day service to identify arterial territory when not clear from clinical assessment, where the diagnosis is unclear or to exclude structural intracranial lesion). MR angiography may be required to provide evidence of carotid disease (if carotid Doppler unavailable) or carotid dissection.

5.5	**The Neurovascular Service has access to CT scanning including CT angiography with appropriate urgency**	Non-contrast CT and CT angiography to be used when MR imaging is contraindicated, or not tolerated.
5.6	**The Neurovascular Service provides comprehensive and prompt secondary prevention advice and treatment**	Personalised medical secondary prevention to be commenced without delay. Comprehensive secondary prevention guidelines to be available to Primary Care Clinicians. Lifestyle modifications to be discussed with the patient, supported by accessible written material.
5.7	**The vascular surgeons are integrated within the Neurovascular Service**	There must be a clear documented pathway of care and agreed protocols to minimise delay for carotid surgery. Surgical candidates for carotid endarterectomy should be assessed by the next working day of referral with surgery on a scheduled surgical list within 7 days of the symptom onset
5.8	**The Neurovascular Service holds regular multidisciplinary neurovascular meetings**	Regular meetings held between stroke physicians, vascular surgeons, vascular technologists and radiologists to monitor service performance, discuss clinical cases and provide feedback and education.
5.9	**The Neurovascular Service participates in regular audit**	Participation in local and National Audits of clinical practice e.g. RCP CEA audit for quality improvement.

6. Managerial and Audit Standards

	Standard	Description
6.1	**The Stroke Service has a Clinical Lead for Stroke**	A specific clinical lead for stroke will demonstrate that a Hospital/Trust recognises the importance of stroke in its portfolio. The Clinical Lead will represent the Hospital/Trust within the local strategic/managed clinical network
6.2	**The Stroke Service has an implementation plan for the relevant National Stroke Strategy**	Evidence of working with commissioning organisations to inform development of the whole stroke pathway. Representatives from Primary care, ambulance and voluntary services to be included in these meetings.
6.3	**The Stroke Service participates in National Stroke Audit**	Evidence of participation in national comparative audit (e.g. RCP SSNAP, Scottish Stroke Care Audit, SITS-MOST) and action planning following publication of results.
6.4	**The Stroke Service holds regular clinical governance meetings**	Evidence of the review of pathways, critical incidents and patient and carer feedback. Regular review of thrombolysis decisions and outcomes (including those not treated). Morbidity and mortality reviews to be part of clinical governance meetings.
6.5	**The Stroke Service participates in local audits**	Completed quarterly by medical, nursing or therapy staff examining an aspect of clinical practice on the ward. At least one audit annually from each of the above three groups, presented at a multidisciplinary clinical governance meeting.
6.6	**The Stroke Service maintains an in-patient stroke register**	All hospital admissions with stroke are captured, to ensure the accuracy of hospital episode statistics.

6.7	**The Stroke Service participates in Clinical Research**	Active involvement in clinical research networks and Good Clinical Practice (GCP) training to allow all patients the opportunity to participate in stroke research studies.
6.8	**The Stroke Service provides ongoing education and training of all staff.**	Evidence that all staff (qualified and unqualified) have a portfolio of evidence of their educational activities and how it applies to their clinical practice.
6.9	**The stroke service undertakes regular patient feedback survey**	Information from the patient feedback survey should be utilised to action service improvement

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