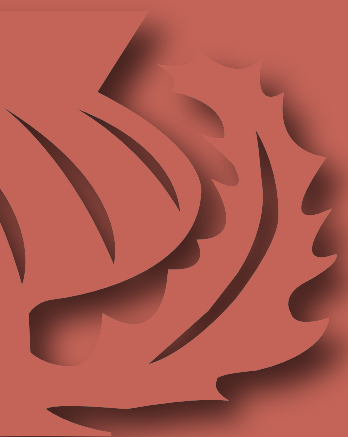


**Management of patients with stroke:**

Rehabilitation, prevention and management of complications, and discharge planning

A national clinical guideline



June 2010

KEY TO EVIDENCE STATEMENTS AND GRADES OF RECOMMENDATIONS

LEVELS OF EVIDENCE

1 ⁺⁺	High quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias
1 ⁺	Well conducted meta-analyses, systematic reviews, or RCTs with a low risk of bias
1 ⁻	Meta-analyses, systematic reviews, or RCTs with a high risk of bias
2 ⁺⁺	High quality systematic reviews of case control or cohort studies High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal
2 ⁺	Well conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal
2 ⁻	Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal
3	Non-analytic studies, eg case reports, case series
4	Expert opinion

GRADES OF RECOMMENDATION

Note: The grade of recommendation relates to the strength of the evidence on which the recommendation is based. It does not reflect the clinical importance of the recommendation.

A	At least one meta-analysis, systematic review, or RCT rated as 1 ⁺⁺ , and directly applicable to the target population; or A body of evidence consisting principally of studies rated as 1 ⁺ , directly applicable to the target population, and demonstrating overall consistency of results
B	A body of evidence including studies rated as 2 ⁺⁺ , directly applicable to the target population, and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 1 ⁺⁺ or 1 ⁺
C	A body of evidence including studies rated as 2 ⁺ , directly applicable to the target population and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 2 ⁺⁺
D	Evidence level 3 or 4; or Extrapolated evidence from studies rated as 2 ⁺

GOOD PRACTICE POINTS

- ☒ Recommended best practice based on the clinical experience of the guideline development group



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Scottish Intercollegiate Guidelines Network

**Management of patients with stroke:
Rehabilitation, prevention and management
of complications, and discharge planning**

A national clinical guideline



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SIGN consents to the photocopying of this guideline for the
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1 Introduction

1.1 THE NEED FOR A GUIDELINE

1.1.1 UPDATING THE EVIDENCE

This guideline is an update of SIGN 64 Management of patients with stroke: rehabilitation, prevention and management of complications, and discharge planning and supersedes it.

Since the publication of SIGN 64 in 2002, new evidence has been published in many areas covered by the recommendations in that guideline resulting in the need for this selective update. Where this evidence was thought likely to significantly change the content of these recommendations, it has been identified and reviewed.

The guideline development group based its recommendations on the evidence available to answer a series of key questions, listed in Annex 1. Details of the systematic literature review can be found in section 9.1.

Where new evidence does not update existing recommendations, no new evidence was identified to support an update or no key question was posed to update a section, the guideline text and recommendations are reproduced from SIGN 64. The original supporting evidence was not re-appraised by the current guideline development group.

1.1.2 SUMMARY OF UPDATES TO THE GUIDELINE, BY SECTION

2	Key recommendations	New
3	Organisation of services	Partial update
4	Management and prevention strategies	Extensive update
5	Transfer from hospital to home	Partial update
6	Roles of the multidisciplinary team	Partial update
7	Provision of information	New

1.1.3 BACKGROUND

Stroke is the third commonest cause of death and the most frequent cause of severe adult disability in Scotland. Seventy thousand individuals are living with stroke and its consequences and each year, there will be approximately 12,500 new stroke events.¹ Immediate mortality is high and approximately 20% of stroke patients die within 30 days.

For those who survive, the recovery of neurological impairment takes place over a variable time span. About 30% of survivors will be fully independent within three weeks, rising to nearly 50% by six months.²

Disabling conditions such as stroke are best considered within an agreed framework of definitions. The World Health Organization (WHO) International Classification of Impairments, Disabilities and Handicaps (ICIDH) provides the following framework for considering the impact of stroke on the individual:^{3,4}

- pathology (disease or diagnosis): operating at the level of the organ or organ system
- impairment (symptoms and signs): operating at the level of the whole body
- activity limitations (disability): observed behavior or function
- participation restriction (handicap): social position and roles of the individual.

A number of contextual factors may influence this framework as recognised in the International Classification of Functioning, Disability and Health (ICF).⁵ ICF has two parts, each with two components:

- Part 1 Functioning and disability
 - a) Body functions and structures
 - b) Activities and participation
- Part 2 Contextual factors
 - c) Environmental factors
 - d) Personal factors.

The ICF also outlines nine domains of activity and participation which can provide the focus for rehabilitation efforts:

- Learning and applying knowledge
- General tasks and demands
- Communication
- Mobility
- Self care
- Domestic life
- Interpersonal interactions and relationships
- Major life areas
- Community, social and civic life.

Within this framework, rehabilitation aims to maximise the individual's activity, participation (social position and roles) and quality of life, and minimise the distress to carers.

1.1.4 REHABILITATION

The conventional approach to rehabilitation is a cyclical process:

- assessment: patients' needs are identified and quantified
- goal setting: goals are defined for improvement (long/medium/short term)
- intervention: to assist in the achievement of the goals
- re-assessment: progress is assessed against the agreed goals.

Rehabilitation goals can be considered at several levels:

- aims: often long term and referring to the situation after discharge
- objectives: usually multiprofessional at the level of disability
- targets: short term time-limited goals.

The process of rehabilitation can be interrupted at any stage by previous disability, co-morbidities and complications of the stroke itself.

1.1.5 TERMINOLOGY

'Disability' and 'handicap' have been replaced with the new terms 'activity limitations' and 'participation restrictions', respectively. The above terms are used interchangeably in this document.

1.2 REMIT OF THE GUIDELINE

1.2.1 OVERALL OBJECTIVES

The aim of this national guideline is to assist individual clinicians, primary care teams and hospital departments to optimise their management of stroke patients. The focus is on general management, rehabilitation, the prevention and management of complications and discharge planning, with an emphasis on the first 12 months after stroke.

The guideline complements SIGN 119 Management of patients with stroke: identification and management of dysphagia⁶ and SIGN 108 Management of patients with stroke or TIA: assessment, investigation, immediate management and secondary prevention.⁷

Although stroke can cause continuing problems in subsequent years and decades, a review of the continued management of people with stroke is beyond the scope of this guideline. However, the guideline includes some guidance that may also be relevant beyond the first year of stroke.

Approximately 20% of people who experience a stroke will die within 30 days of its occurrence. While care of the dying and of their family is an important and sometimes unrecognised aspect of stroke care, it is beyond the scope of this guideline. Guidance on palliative and end of life care is available from the NHS National End of Life Care Programme.⁸

A number of important topics not included in SIGN 64 nor in this selective update were identified during peer review of this guideline. These topics will be considered in the update of this guideline and include:

- contracture
- apraxia
- participation restrictions
- palliative and end of life care
- social work interventions
- people living in a care home before and/or after having a stroke.

This guideline has five main sections:

- **Organisation of services:** this section addresses the issue of how services should be configured to provide optimal care for people who have had a stroke. This section will be of most relevance to those responsible for planning and providing rehabilitation services.
- **Management and prevention strategies:** this section addresses general rehabilitation principles, which are relevant to the majority of stroke patients. It also aims to inform the assessment and management of common impairments or complications resulting from a stroke. It is based on studies which have identified common and important impairments, disabilities and complications following stroke. It aims to be useful to multidisciplinary teams and individual clinicians when planning treatment of individual patients.
- **Transfer from hospital to home:** this section addresses the planned transfer of care of patients from the hospital to the home setting.
- **Roles of the multidisciplinary team:** this section is derived from clinical studies and supporting information and aims to provide guidance on the levels of care and expertise to be provided within stroke services.
- **Provision of information:** This section reflects the issues likely to be of most concern to patients and their carers. It will be of most relevance to health professionals discussing rehabilitation after stroke with patients and carers and in guiding the production of locally produced information materials.

Creating regional/local consensus on the use of a standardised set of assessments when patient-related information is transferred from one centre to another (or the community) may be an important aspect for improving the quality of care of stroke patients.

1.2.2 TARGET USERS OF THE GUIDELINE

This guideline will be of particular interest to anyone with an interest in stroke, including but not exclusively, stroke physicians, nurses especially those caring for people with stroke, specialists in geriatric medicine and care of the elderly, rehabilitation specialists, general physicians, speech and language therapists, dietitians, physiotherapists, occupational therapists, orthoptists, orthotists, pharmacists, psychologists, neurologists, general practitioners, specialists in public health, healthcare service planners, people who have had a stroke, their carers and families.

1.2.3 PATIENT VERSION

A patient version of this guideline is available at www.sign.ac.uk.

1.3 STATEMENT OF INTENT

This guideline is not intended to be construed or to serve as a standard of medical care. Standards of care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge and technology advance and patterns of care evolve. These parameters of practice should be considered guidelines only. Adherence to them will not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at the same results. The ultimate judgement regarding a particular clinical procedure or treatment plan must be made in light of the clinical data presented by the patient and the diagnostic and treatment options available. However, it is advised that significant departures from the national guideline or any local guidelines derived from it should be fully documented in the patient's case notes at the time the relevant decision is taken.

1.3.1 PRESCRIBING OF LICENSED MEDICINES OUTWITH THEIR MARKETING AUTHORISATION

Recommendations within this guideline are based on the best clinical evidence. Some recommendations may be for medicines prescribed outwith the marketing authorisation (product licence). This is known as "off label" use. It is not unusual for medicines to be prescribed outwith their product licence and this can be necessary for a variety of reasons.

Generally the unlicensed use of medicines becomes necessary if the clinical need cannot be met by licensed medicines; such use should be supported by appropriate evidence and experience.⁹

Medicines may be prescribed outwith their product licence in the following circumstances:

- for an indication not specified within the marketing authorisation
- for administration via a different route
- for administration of a different dose.

'Prescribing medicines outside the recommendations of their marketing authorisation alters (and probably increases) the prescribers' professional responsibility and potential liability. The prescriber should be able to justify and feel competent in using such medicines.'⁹

Any practitioner following a SIGN recommendation and prescribing a licensed medicine outwith the product licence needs to be aware that they are responsible for this decision, and in the event of adverse outcomes, may be required to justify the actions that they have taken.

Prior to prescribing, the licensing status of a medication should be checked in the current version of the British National Formulary (BNF).

1.3.2 ADDITIONAL ADVICE TO NHSSCOTLAND FROM NHS QUALITY IMPROVEMENT SCOTLAND AND THE SCOTTISH MEDICINES CONSORTIUM

NHS QIS processes multiple technology appraisals (MTAs) for NHSScotland that have been produced by the National Institute for Health and Clinical Excellence (NICE) in England and Wales.

The Scottish Medicines Consortium (SMC) provides advice to NHS Boards and their Area Drug and Therapeutics Committees about the status of all newly licensed medicines and any major new indications for established products.

SMC advice relevant to this guideline is summarised in the section on implementation. No relevant NICE MTAs were identified.

2 Key recommendations

The following recommendations were highlighted by the guideline development group as the key clinical recommendations that should be prioritised for implementation. The grade of recommendation relates to the strength of the supporting evidence on which the evidence is based. It does not reflect the clinical importance of the recommendation.

2.1 ORGANISATION OF SERVICES

- A** Stroke patients requiring admission to hospital should be admitted to a stroke unit staffed by a coordinated multidisciplinary team with a special interest in stroke care.
- B** In exceptional circumstances, when admission to a stroke unit is not possible, rehabilitation should be provided in a generic rehabilitation ward on an individual basis.
- B** The core multidisciplinary team should include appropriate levels of nursing, medical, physiotherapy, occupational therapy, speech and language therapy, and social work staff.
- B** Patients and carers should have an early active involvement in the rehabilitation process.

2.2 MANAGEMENT AND PREVENTION STRATEGIES

- B** Stroke patients should be mobilised as early as possible after stroke.
- B** Personal ADL training by occupational therapists is recommended as part of an in-patient stroke rehabilitation programme.
- B** Treadmill training may be considered to improve gait speed in people who are independent in walking at the start of treatment.
- C** Where the aim of treatment is to have an immediate improvement on walking speed, efficiency or gait pattern or weight bearing during stance, patients should be assessed for suitability for an AFO by an appropriately qualified health professional.
- B** Physiotherapists should not limit their practice to one 'approach' but should select interventions according to the individual needs of the patient.
- A** Gait-oriented physical fitness training should be offered to all patients assessed as medically stable and functionally safe to participate, when the goal of treatment is to improve functional ambulation.
- B** Rehabilitation should include repetitive task training, where it is assessed to be safe and acceptable to the patient, when the aim of treatment is to improve gait speed, walking distance, functional ambulation or sit-to-stand-to-sit.
- B** Where considered safe, every opportunity to increase the intensity of therapy for improving gait should be pursued.
- B** Splinting is not recommended for improving upper limb function.

- ☒
 - Stroke patients should have a full assessment of their cognitive strengths and weaknesses when undergoing rehabilitation or when returning to cognitively demanding activities such as driving or work.
 - Cognitive assessment may be carried out by occupational therapists with expertise in neurological care, although some patients with more complex needs will require access to specialist neuropsychological expertise.
- C** All stroke patients should be screened for visual problems, and referred appropriately.
- D** Ongoing monitoring of nutritional status after a stroke should include a combination of the following parameters:
 - biochemical measures (ie low pre-albumin, impaired glucose metabolism)
 - swallowing status
 - unintentional weight loss
 - eating assessment and dependence
 - nutritional intake.
- ☒
 Every service caring for patients with stroke should develop and adhere to local urinary and faecal continence guidelines including advice on appropriate referral.
- A** Electrical stimulation to the supraspinatus and deltoid muscles should be considered as soon as possible after stroke in patients at risk of developing shoulder subluxation.
- ☒
 Patients should be asked about pain and the presence of pain should be assessed (for example, with a validated pain assessment tool) and treated appropriately, as soon as possible.
- ☒
 Given the complexity of post-stroke shoulder pain consideration should be given to use of algorithms (such as the simple example shown in Annex 3) or an integrated care pathway for its diagnosis and management.¹⁰
- ☒
 Appropriate referral to health and clinical psychology services should be considered for patients and carers to promote good recovery/adaptation and prevent and treat abnormal adaptation to the consequences of stroke.

2.3 TRANSFER FROM HOSPITAL TO HOME

- A** Patients with mild/moderate stroke should be able to access stroke specialist early supported discharge services in addition to conventional organised stroke inpatient services.
- ☒
 NHS Boards should consider providing a specific local expert therapist to provide advice to rehabilitation teams including signposting to relevant statutory services such as Disability Employment Advisors at Job Centres, organisations specifically providing opportunities for people with disabilities, eg Momentum, or voluntary services who can provide help and support, eg CHSS, Stroke Association, Disability Alliance (see section 7.3).

2.4 ROLES OF THE MULTIDISCIPLINARY TEAM

- B** Stroke inpatients should be treated 24 hours a day by nurses specialising in stroke and based in a stroke unit.

2.5 PROVISION OF INFORMATION

- A** Information should be available to patients and carers routinely and offered using active information strategies, which include a mixture of education and counselling techniques.

3 Organisation of services

When an individual experiences a stroke a series of clinical decisions are made (either implicit or explicit) about the most appropriate setting for their care. These decisions can be considered in the form of four main issues, recognising that each individual stroke patient presents a unique set of problems and potential solutions. Efficient and effective management of patients depends on a well organised expert service that can respond to the particular needs of each individual patient. To achieve this, the organisation of stroke services must be considered at the level of the NHS Board, acute hospitals, primary care and in the patient's own home or care home.

The main issues in planning services for stroke patients are:

- organisation of hospital care (eg urban or remote and rural)
- hospital or home based care
- discharge and post-discharge services
- ongoing rehabilitation and follow up (including specific needs of younger people).

An important part of the assessment process should include identifying whether there were any pre-stroke problems or comorbidities.

3.1 REFERRAL TO STROKE SERVICES

The early assessment, diagnosis and in-hospital treatment of patients with suspected stroke reduces mortality and morbidity.⁷

Urgent assessment and diagnosis facilitates acute stroke treatment with thrombolytic therapy with intravenous rt-PA (alteplase 0.9 mg/kg up to a maximum of 90 mg) given within four and a half hours of symptom onset. The odds of a favourable outcome are strongly related to the time of treatment and are significantly greater the earlier the treatment is delivered.⁷

4

Scotland has a geographically scattered population with patients with suspected stroke often presenting to rural and remote hospitals without a resident stroke physician. Telemedicine allows a distant stroke physician to interact with stroke patients, carers and a local doctor remotely.⁷

- ☒ All patients with suspected stroke (*irrespective of severity*) should be referred urgently to stroke services with a view to either:
 - admitting the patient to hospital
 - requesting urgent assessment.
- ☒ Patients should receive information about the risk of recurrent stroke, the signs and symptoms of onset and the action they should take if stroke is suspected, for example FAST (Face, Arm, Speech, Time (to call 999)).
- ☒ In areas without a local stroke specialist, telemedicine consultation should be considered.

3.2 ORGANISATION OF HOSPITAL CARE

3.2.1 SUMMARY OF RECOMMENDATIONS

Recommended
<ul style="list-style-type: none"> ▪ admission to a stroke unit ▪ admission to a general rehabilitation ward
Not recommended
<ul style="list-style-type: none"> ▪ routine implementation of integrated care pathways

Evidence from a large systematic review of a wide range of trials of organised stroke unit care indicates that stroke patients have better clinical outcomes in terms of survival, returning home and independence if they are managed in a stroke unit rather than admitted to a general ward or remaining at home.¹¹ The trials included patients with a diagnosis of ischaemic stroke or primary intracerebral haemorrhage (PICH), although a minority of trials excluded patients with transient symptoms. The study described an effective stroke unit as a multidisciplinary team, coordinated through regular multidisciplinary meetings, providing multiple interventions (see section 3.3).

1+

A Cochrane review of the benefits of stroke rehabilitation in an organised hospital stroke unit found, in comparison with a general medical hospital ward:¹²

- an 18% relative reduction in death (95% confidence interval (CI) 6 to 29%)
- a 20% relative reduction in death or institutional care (95% CI 10 to 29%)
- a 22% relative reduction in death or dependency (95% CI 11 to 32%).

These benefits were seen for those under and over 75 years of age, male or female and those with mild, moderate or severe stroke.

Length of hospital stay appears to be reduced by between two to ten days but this result is inconsistent between trials.

1++

The benefits of a stroke unit were seen in units that admitted patients directly from the community or took over their care within two weeks of admission to hospital. The evidence of benefit is most clear for units which can provide several weeks of rehabilitation if required.

The numbers needed to treat (NNT) for stroke unit care are:

- for every 33 patients treated in the stroke unit there is one extra survivor (95% CI 20 to 100)
- for every 20 patients treated in the stroke unit one extra patient is discharged back to their own home (95% CI 12 to 50)
- for every 20 patients treated in the stroke unit there is one extra independent survivor (95% CI 12 to 50).

The confidence intervals are wide reflecting modest to substantial benefits.

There was insufficient evidence to assess whether acute stroke units with a short period of admission, roving stroke teams or general neurology units resulted in improved clinical outcomes for patients with suspected stroke.

A Stroke patients requiring admission to hospital should be admitted to a stroke unit staffed by a coordinated multidisciplinary team with a special interest in stroke care.

The stroke unit trials did not directly address the management of younger stroke patients, but subgroup analysis indicates that stroke unit care is of equal benefit to those aged below and above 75 years. Younger stroke patients with specific needs (eg vocational rehabilitation, caring for young family) may benefit from referral to rehabilitation services for younger adults.¹²

1+

Although admission to an organised stroke unit is the treatment of choice, it may not always be feasible. Small hospitals in rural areas with small numbers of stroke patients may have generic rehabilitation services. The systematic review of stroke units included trials of mixed rehabilitation wards (ie where multidisciplinary care is provided to a range of disabled patients including those with stroke).¹² Six trials compared a mixed rehabilitation ward with care in the general medical ward and found that patients in the mixed rehabilitation ward were less likely to die or require long term institutional care or remain dependent. Direct comparisons of mixed rehabilitation wards with stroke rehabilitation wards favour the stroke specific ward,¹² with fewer patients dying or requiring institutional care or remaining dependent.

1+

B In exceptional circumstances, when admission to a stroke unit is not possible, rehabilitation should be provided in a generic rehabilitation ward on an individual basis.

Early supported discharge and rehabilitation in the community are covered in sections 5.3-5.5.

3.2.2 INTEGRATED CARE PATHWAY

An integrated care pathway can be defined as a plan of care that aims to promote organised and efficient multidisciplinary patient care based on the best available evidence. Care pathways are complex interventions made up of a number of components, are often implemented with some form of education and usually form all or part of the patient record.¹³

One systematic review of three randomised controlled trials (RCTs) and 12 observational studies found that the routine application of an integrated care pathway did not substantially improve patients' outcomes in terms of survival or independence compared to standard multidisciplinary care. Potential benefits in preventing urinary tract infections were only seen in studies that were prone to bias.¹³

2+

The components of a multidisciplinary stroke care team and the roles of the team members are described in sections 3.3 and 6.

B The routine implementation of integrated care pathways for acute stroke management or stroke rehabilitation is not recommended where a well organised multidisciplinary model of care exists.

3.3 MULTIDISCIPLINARY TEAM MEMBERSHIP

3.3.1 SUMMARY OF RECOMMENDATIONS

Recommended

- multidisciplinary team working
- early active involvement of patients and carer
- specialist training and education

Stroke rehabilitation in hospital or within the community is a patient-centred process with a variety of professional staff contributing to the overall management of an individual patient. An important principle of rehabilitation is goal setting. Stroke unit care usually incorporates a process in which individual recovery goals are identified and monitored.¹⁴

The core multidisciplinary team should consist of appropriate levels of nursing, medical, physiotherapy, occupational therapy, speech and language therapy, and social work staff (see section 6).

The typical staffing structure within stroke unit trials was as follows (approximated to a 10-bed stroke unit).¹¹

- Nursing: 10 whole time equivalents (WTE) per 24 hour shift
- Medical: 0.6-1.5 WTE of medical input (divided between consultant and junior staff). Staffing levels tended to be higher in units with acute admission than in second line rehabilitation units
- Physiotherapy: one to two WTE divided between qualified and assistant staff
- Occupational therapy: one to two WTE divided between qualified and assistant staff
- Speech and language therapy: 0.2-0.6 WTE
- Social work: part-time social work input.

1+

B The core multidisciplinary team should include appropriate levels of nursing, medical, physiotherapy, occupational therapy, speech and language therapy, and social work staff.

Other disciplines are also regularly involved in the management of stroke patients including:

- clinical psychologists
- dietitians
- ophthalmologists
- orthoptists
- orthotists
- psychiatrists.

- ☒ Members of the core team should identify problems and ensure that the appropriate allied healthcare professionals contribute to the treatment and rehabilitation of their patients as appropriate.

3.3.2 PATIENT AND CARER INVOLVEMENT

A characteristic feature of stroke unit care is the early active involvement of patients, carers and family in the rehabilitation process. The best way to involve all relevant individuals in this process is less clear.¹¹

1+

- B** Patients and carers should have an early active involvement in the rehabilitation process.

- ☒ Carers should be invited to attend therapy sessions at an early stage.

3.3.3 MULTIDISCIPLINARY TEAM COMMUNICATION

Regular weekly meetings for members of the stroke unit multidisciplinary team have been shown to improve patient outcome.¹¹ These meetings serve as a focus for collective decision making.

1+

- B** Stroke unit teams should conduct at least one formal multidisciplinary meeting per week at which patient problems are identified, rehabilitation goals set, progress monitored and discharge is planned.

A number of units also incorporate one or two informal operational meetings per week attended by nursing and therapy staff, and often patients and family. These meetings are an additional opportunity for noting progress, highlighting problems and providing patients and carers with information. Providing information and support for patients and carers is covered in section 7.

- ☒ Family conferences between the multidisciplinary team and the patient, carers and family should be arranged to discuss goal setting.

3.3.4 STROKE LIAISON WORKERS

The Better Heart Disease and Stroke Action Plan recommends that the focus of services should be to enable people who have had a stroke to return to independent living.¹⁵ Services should reflect this by providing support and empowerment through the process of recovery.

A systematic review and meta-analysis of stroke liaison workers identified 14 published and two unpublished trials.¹⁶ Some trials excluded patients with communication or cognitive difficulties. A stroke liaison worker was defined as someone whose aim is to increase participation and improve wellbeing for patients and carers. The review found little evidence to support this role for all groups of patients and carers.¹⁶

1++

Typically the stroke liaison workers provided emotional and social support and information to stroke patients and their families and liaised with services with the aim of improving aspects of participation and quality of life for patients with stroke and/or their carers. The backgrounds of the stroke liaison workers varied extensively, and their level of knowledge and skills was different which may have influenced the intervention. Because of the broadness of the role, inappropriate outcome measures may have been used to evaluate the effectiveness of stroke liaison workers in the trials. The stroke liaison workers were grouped into four distinct subgroups:¹⁶

1++

- nurse
- psychologist
- social worker
- generic health worker (included AHPs and volunteers).

Patients with mild to moderate activity limitations (Barthel activities of daily living index 15-19) had a significant reduction in dependence (OR 0.62, 95% CI 0.44 to 0.87, $p=0.006$). This equates to 10 fewer dependent patients (95% CI 17 fewer to 4 fewer) for every 100 patients seen by the stroke liaison worker.¹⁶ A subgroup analysis showed the subgroup providing education and information provision as the dominant emphasis of the service showed a positive subgroup result (SMD = -0.24, 95% CI -0.44 to -0.04, $p=0.02$). Similarly the group providing liaison as the dominant emphasis (one intervention) suggested a benefit in the treatment group (SMD = -0.24, 95% CI -0.47 to -0.01, $p=0.04$). There was no benefit seen for the larger subgroup whose dominant emphasis was on social support (SMD = 0.00, 95% CI -0.07 to 0.08, $p=0.94$). Overall there was significant subgroup heterogeneity ($\chi^2 p=0.02$) suggesting that the contrast between social support and the other aspects of the stroke liaison role reflected a real difference in the intervention.¹⁶

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Patients whose stroke liaison worker was a nurse by professional background appeared to have a significant reduction in depression scores compared to the control group. This effect also differed significantly from other subgroups suggesting that the intervention, when delivered by a nurse, differed in nature from interventions delivered by other professions.¹⁶

- ☒ NHS Board areas should consider developing specialist stroke nurse led support services that include education, information provision and liaison, in the community for people who have had a stroke and their carers.

3.3.5 EDUCATION AND TRAINING

Effective stroke unit care includes programmes of education and training for staff to provide them with the knowledge and skills to deliver effective therapeutic care and rehabilitation. A variety of approaches have been described, from weekly short seminars to less frequent study days.¹¹

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A programme of training and education for members of the stroke unit multidisciplinary team has been reported in four case studies (which contributed to the systematic review for the effectiveness of stroke units).¹² These ranged from informal weekly educational events, to a programme of formal education ranging from one to six days per year.

3

There was concern that employing specialist staff would reduce the skills of junior staff, however, this was felt to be easily overcome by rotating staff and students through the unit.

Education and training programmes currently available to healthcare professionals in Scotland include:

- the Chest, Heart and Stroke Scotland/NHS stroke training programme¹⁷
- the Stroke Training and Awareness Resources (STARs) Project e-learning resource led by Chest, Heart & Stroke Scotland, NHS Education for Scotland (NES) and the University of Edinburgh¹⁸
- NHS Education for Scotland (NES) core competencies for staff working with people affected by stroke.¹⁹

- B** Members of the multidisciplinary stroke team should undertake a continuing programme of specialist training and education.

- ☒ Healthcare providers should provide adequately funded training opportunities.

4 Management and prevention strategies

Stroke patients may experience a whole range of barriers to recovery of normal activities and participation. These can take the form of impairments directly caused by the stroke or other complications of the stroke (see *Table 1*).^{20,21} This section looks at general rehabilitation principles and specific treatment strategies addressing commoner impairments, limitations and complications after stroke. A range of interventions are covered, many of which are viewed as profession-specific, however, as stroke care is usually delivered by the multidisciplinary team it is useful to consider management and prevention strategies from a more holistic and shared care perspective.

It should be noted that not all impairments or complications have been addressed in this guideline, eg fever is covered by SIGN 108.⁷

Table 1: Common impairments, limitations and complications after stroke

Common impairments after a first ever stroke include:	
<ul style="list-style-type: none">▪ Aphasia▪ Apraxia of speech▪ Arm/hand/leg weakness▪ Cognitive impairment▪ Dysarthria▪ Dysphagia▪ Facial weakness	<ul style="list-style-type: none">▪ Gait, balance and coordination problems▪ Perceptual impairments, including visuospatial dysfunction▪ Sensory loss▪ Upper limb impairment▪ Visual problems
Common activity limitations include:	
<ul style="list-style-type: none">▪ Bathing▪ Communication▪ Dressing and grooming▪ Eating and drinking▪ Participation restrictions (eg returning to work)▪ Psychological (eg decision making)	<ul style="list-style-type: none">▪ Sexual function▪ Toileting▪ Transferring▪ Urinary and/or faecal incontinence▪ Walking and mobility
Common complications for stroke patients include:	
<ul style="list-style-type: none">▪ Anxiety▪ Confusion▪ Depression▪ Emotionalism▪ Falls▪ Fatigue▪ Infection (especially urinary tract and chest)▪ Malnutrition/under-nutrition	<ul style="list-style-type: none">▪ Pain▪ Pressure sore/skin break▪ Recurrent stroke▪ Shoulder pain▪ Shoulder subluxation▪ Spasticity▪ Venous thromboembolism

4.1 GENERAL REHABILITATION PRINCIPLES

4.1.1 SUMMARY OF RECOMMENDATIONS

Recommended
<ul style="list-style-type: none">▪ early mobilisation▪ therapeutic positioning▪ personal ADL training

4.1.2 EARLY MOBILISATION

A number of post-stroke complications are associated with immobility. In the systematic review of stroke unit trials, there was a high degree of consistency in the reporting of policies of early mobilisation, usually beginning on the day of admission.¹¹ A survey of stroke unit trials indicated that early mobilisation was a component of stroke unit care in eight out of nine relevant trials. It is difficult to assess the clinical impact as the available information describes one part of a much larger package of stroke unit care, but the current evidence suggests that early mobilisation benefits patients.

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A more recent systematic review of RCTs identified one trial (71 participants) where very early mobilisation was provided less than 48 hours after stroke.²² This trial found a non-significant reduction in the number of patients dying or having a poor outcome in the very early mobilisation group (23/38, 60.5%) compared with the control group (23/33, 69.7%) at three months (odds ratio, OR 0.67, 95% CI 0.25 to 1.79, $p=0.42$). Although there were significantly fewer non-serious adverse events in the very early mobilisation group compared with the control group at three months (experimental group 61, control group 76, $p=0.04$) the evidence is insufficient to support the introduction (or removal) of very early mobilisation (less than 48 hours after stroke).

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B

Stroke patients should be mobilised as early as possible after stroke.

4.1.3 THERAPEUTIC POSITIONING

The most appropriate position in which to nurse and place a patient following a stroke remains unclear. The aim of positioning the patient is to try to promote optimal recovery by modulating muscle tone, providing appropriate sensory information and increasing spatial awareness and to prevent complications such as pressure sores, contractures, pain and respiratory problems and assist safer eating.²³

The five main positions recommended are lying on the unaffected side, lying on the affected side, lying supine, sitting up in bed and sitting up in a chair.²⁴ There is no RCT evidence to support the recommendation of any one position over another. The consensus from a literature review is that in the upper limb the affected shoulder should be protracted with the arm brought forward and the fingers extended to counteract the tendency for the shoulder to adduct and rotate internally.²⁴ The trunk should be straight and in the midline avoiding forward or side flexion. For the lower limb there should be avoidance of external rotation and abduction of the hip through the use of support such as pillows. The affected hip should be brought forward maintaining flexion of the affected hip to counteract increased extensor tone. Generally knee flexion was advocated but opinion remains divided.²⁴

A survey of physiotherapists' current positioning practices found the most commonly recommended positions to be: sitting in an armchair as recommended by 98% of respondents (95% CI 97 to 100%); side lying on the unaffected side (97%, 95% CI 95 to 98%) then side lying on the affected side (92%, 95% CI 89 to 95%). Sitting in a wheelchair (78%, 95% CI 74 to 82%) and supine lying (67%, 95% CI 63 to 72%) were less commonly recommended.²³

3

A meta-analysis of five studies examining the effectiveness of shoulder positioning on the range of motion of the paretic shoulder post-stroke found no evidence to support the practice of positioning as an effective intervention for preventing or reducing the decline in range of motion of the paretic shoulder following stroke.²⁵

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In the acute phase following stroke (the first 72 hours) there is evidence to support reducing the risk of hypoxia by sitting the patient in an upright position, if medically fit to do so. This position gave the highest oxygen saturation readings compared to other positions.²⁶ A further systematic review identified 28 studies evaluating the effects of different body positions on physiological homeostasis within the first week after stroke.²⁷ Sitting the patient in a chair or propped up in bed improves oxygen saturation, but there were still some patients in the trials who desaturated in these positions.

2+

Positioning also has an effect on cerebral blood flow and lying flat as opposed to elevating the head by 15 to 30 degrees improves middle cerebral artery blood flow velocity but no significant effects have been shown so far on patient outcomes.²⁸ 2-

The effects of positioning on blood pressure and orthostatic hypotension are inconclusive and require further study.²⁷

The traditional advice to nurse patients with head elevation between 30 and 45 degrees following large hemispheric stroke is largely based on studies of head trauma and reductions in intracranial pressure are likely to be at the expense of reduced cerebral perfusion pressure. 2+

C Patients should be placed in the upright sitting position, if their medical condition allows.

C Hypoxia inducing positions (*lying on the left side regardless of affected side or slumped in a chair*) **should be avoided.**

Further research is required to evaluate the benefits of therapeutic positioning on functional recovery following stroke.

4.1.4 ACTIVITIES OF DAILY LIVING INTERVENTIONS

Activities of daily living (ADL) training is a frequently used intervention by occupational therapists in stroke rehabilitation. The intervention can be divided into personal activities (self care) and extended activities. Occupational therapists use the process of activity analysis to grade activities of daily living so that they are achievable, but challenging, in order to promote recovery after stroke. This may also include the supply and training in the use of adaptive equipment to compensate for the loss of ability to perform ADLs.

A systematic review of nine RCTs (1,258 participants) found that personal activities of daily living training provided by occupational therapy is effective for increasing independence in community-based patients with stroke.²⁹

A single RCT randomised 50 participants with stroke into one of two geriatric rehabilitation wards to receive either occupational therapy and physiotherapy or physiotherapy only. The duration of each programme was 3 hours/day for 8 weeks. The study found that personal activities of daily living training, provided by occupational therapy as part of an inpatient integrated stroke rehabilitation programme, is significantly more effective than a stroke rehabilitation programme with no occupational therapy.³⁰ A second RCT comparing 30 participants who received adaptive equipment training at home following discharge to 23 patients who received no post discharge training found that training in the use of adaptive ADL equipment is more effective than if the equipment is delivered with no training.³¹ 1++
1+

A Personal ADL training by an occupational therapist is recommended for patients with stroke in the community.

B Personal ADL training by occupational therapists is recommended as part of an inpatient stroke rehabilitation programme.

4.2 GAIT, BALANCE AND MOBILITY

4.2.1 SUMMARY OF RECOMMENDATIONS

Recommended
<ul style="list-style-type: none"> ankle foot orthoses individualised interventions gait-oriented physical fitness training repetitive task training muscle strength training to improve muscle strength increased intensity of rehabilitation
Consider
<ul style="list-style-type: none"> treadmill training in people who are independent in walking functional electrical stimulation for drop-foot electromechanical assisted gait training
Not recommended
<ul style="list-style-type: none"> routine treadmill training routine EMG biofeedback balance platform training with visual feedback
Insufficient evidence
<ul style="list-style-type: none"> routine electrostimulation walking aids

4.2.2 TREADMILL TRAINING

Two systematic reviews, one of 15 studies (622 participants)³² and one of 12 studies (374 participants)³³ concluded that treadmill training is no more effective than other conventional gait training interventions, such as physiotherapy, gait or mobility training. Treadmill training may be used effectively to increase gait speed, in people who are independent in walking at the start of treatment.

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Subgroup analyses, with limited data, suggest that people who are dependent on assistance to walk at the start of treatment may benefit from treadmill training with partial body weight support, as compared to treadmill training alone.³³

2+

- B**
- Treadmill training is not recommended as a routine gait training intervention after stroke.
 - Treadmill training may be considered to improve gait speed in people who are independent in walking at the start of treatment.

4.2.3 ELECTROMYOGRAPHIC BIOFEEDBACK

Two systematic reviews, one of 13 trials (269 participants)³⁴ and one of eight trials,³⁵ found no significant clinical benefit of electromyographic (EMG) biofeedback on gait, balance or mobility after stroke.

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- B**
- EMG biofeedback is not recommended as a routine treatment for gait, balance or mobility problems after stroke.

4.2.4 VISUAL AND AUDITORY FEEDBACK

Two systematic reviews, one of seven studies (246 participants)³⁶ and one of eight studies (214 participants)³⁷ concluded that visual feedback during balance platform training does not have an effect on balance, gait or mobility outcomes after stroke.

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A further systematic review found limited evidence that auditory feedback may be beneficial to gait speed and stride length outcome, when delivered in a way that provides a 'gait cue'.³⁸

B Balance platform training with visual feedback is not recommended for the treatment of gait, balance or mobility problems after stroke.

4.2.5 ELECTROSTIMULATION

Six systematic reviews of electrostimulation (including functional electrical stimulation (FES) and transcutaneous electrical neuromuscular stimulation (TENS), which include 57 studies of variable methodological quality, suggest that there is presently insufficient high quality evidence to support or refute the use of electrostimulation to improve gait, muscle strength or functional outcomes after stroke.³⁸⁻⁴³

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One systematic review identified 30 studies, of varied design and quality, relating to the effectiveness of functional electrical stimulation (FES) for the treatment of drop-foot following stroke.⁴⁴ Nine small before-after studies included in the systematic review provide limited evidence that FES may have a positive orthotic effect, particularly for gait speed and physiological cost index, in chronic post-stroke patients. Four randomised controlled trials included in the systematic review investigated FES combined with physiotherapy and found no clear evidence of benefit of FES combined with physiotherapy.

2+

Electrostimulation may be an effective intervention for some patients, with specific problems, when delivered in a specific way, although there is presently insufficient evidence to determine which selected patients may benefit. There is insufficient evidence relating to the potential long-term or therapeutic effect of FES.

C Functional electrical stimulation may be considered as a treatment for drop-foot, where the aim of treatment is the immediate improvement of walking speed and/or efficiency.

4.2.6 ANKLE FOOT ORTHOSES

A body of evidence from crossover studies demonstrated a positive impact of ankle foot orthoses (AFO) on outcomes of walking speed, efficiency and gait pattern and weight bearing during stance.⁴⁵⁻⁵² Five studies compared AFO with no AFO for standing balance,^{46, 47, 50, 51, 53} and two compared different types of AFO.^{48, 54} There is insufficient evidence to determine the impact of AFO on functional outcomes and long term outcomes.

2+

There is insufficient evidence to determine the comparative effects of different types of AFO (such as custom-made AFO, off-the-shelf AFOs or different designs of AFO).

C Where the aim of treatment is to have an immediate improvement on walking speed, efficiency or gait pattern or weight bearing during stance, patients should be assessed for suitability for an AFO by an appropriately qualified health professional.

☒ In patients prescribed AFOs, regular re-assessment is recommended, as the long term effects of AFO use are not known.

A best practice statement on provision of AFO following stroke gives guidance on screening and assessment.⁵⁵

4.2.7 APPROACH OF INTERVENTION

A systematic review of eight RCTs comparing task-related training (motor relearning) to other interventions found insufficient evidence to reach generalisable conclusions about the potential clinical impact of task-related training.⁵⁶

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Three systematic reviews, one comparing neurophysiological treatment approaches with other approaches or no treatment/placebo,⁵⁶ one assessing the effectiveness of the Bobath approach,⁵⁷ and one investigating the effect of 'traditional neurological approaches' including neurophysiological approaches,³⁸ found insufficient evidence to reach generalisable conclusions about the potential clinical impact of neurophysiological treatment approaches. Neurophysiological treatment approaches included all approaches which use techniques based on neurophysiological knowledge, including the methods of Bobath, Brunnström, Rood and the proprioceptive neuromuscular facilitation approach.

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There was evidence that physiotherapy intervention using a mix of components from different approaches is significantly more effective than no treatment or placebo control in the recovery of functional independence after stroke.⁵⁶

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B Physiotherapists should not limit their practice to one 'approach', but should select interventions according to the individual needs of the patient.

4.2.8 PHYSICAL FITNESS TRAINING

Three systematic reviews provided strong evidence that gait-oriented physical fitness training after stroke can improve gait speed and endurance,^{38, 58, 59} and some evidence that it may reduce the degree of dependence on other people during walking.⁵⁸

A systematic review of 24 RCTs (1,147 participants) found likely benefit from cardiorespiratory training to functional ambulation (mean difference, MD 0.72 m/min (95% CI 0.46 to 0.98), maximum walking speed (MD 6.47 m/min (95% CI 2.37 to 10.57), chosen walking speed (MD 5.15 m/min (95% CI 2.05 to 8.25), and gait endurance (MD 7.44 m (95% CI 3.47 to 11.42)).⁵⁸ A second systematic review found that gait-oriented exercise training was likely to be beneficial for gait speed (SES 0.45, 95%CI 0.27 to 0.63) and walking distance (summarised effect size, SES 0.62, 95%CI 0.30 to 0.95).⁵⁹ The third systematic review found a non-significant trend in favour of physical fitness training improving gait speed.³⁸

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A Gait-oriented physical fitness training should be offered to all patients assessed as medically stable and functionally safe to participate, when the goal of treatment is to improve functional ambulation.

4.2.9 ELECTROMECHANICAL ASSISTED GAIT TRAINING

A systematic review of eight RCTs (414 participants) found that electromechanical assisted gait training increases a patient's chance of achieving independent walking.⁶⁰ Electromechanical assisted gait training was given in addition to standard physiotherapy intervention compared to control (standard physiotherapy or usual care). Forty five per cent of patients receiving electromechanical assisted gait training achieved independent walking compared to 27% of the control group patients (NNT with electromechanical assisted gait training to avoid one dependency=4), although the time taken to achieve independent walking may be longer than in patients receiving conventional gait training. There is insufficient evidence to determine whether the effect of this intervention occurs as a result of the electromechanical device or as a result of the additional time spent in therapy.

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B Electromechanical assisted gait training may be offered to selected patients where the necessary equipment is already available and healthcare professionals are competent in the use of the equipment.

4.2.10 REPETITIVE TASK TRAINING

A Cochrane review of 14 trials (659 participants) found evidence that repetitive task training is effective at improving gait speed (standardised mean difference (SMD) 0.29, 95% CI 0.04 to 0.53), functional ambulation (SMD 0.25, 95% CI 0.00 to 0.51), sit-to-stand-to-sit after stroke (standardised effect size 0.35, 95% CI 0.13 to 0.56) and walking distance (SMD 0.98, 95% CI 0.23 to 1.73).⁶¹ Participants in the experimental groups could walk on average 55 metres further in six minutes than those in the control groups.⁶¹

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There was no evidence of a significant impact on sitting or standing balance/reaching ability.⁶¹

B Rehabilitation should include repetitive task training, where it is assessed to be safe and acceptable to the patient, when the aim of treatment is to improve gait speed, walking distance, functional ambulation or sit-to-stand-to-sit.

4.2.11 WALKING AIDS

No high quality studies were identified which adequately addressed the effect of walking aids on gait, balance or mobility after stroke.

Two small crossover design studies by the same author were identified investigating the effect of standard walking sticks and four-point walking sticks on standing balance.^{62,63} There is insufficient high quality evidence to make generalisations about the relative effects of different types of walking aids.

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Individual patients may gain confidence from using a walking aid. If walking aids improve gait, balance, quality of life and independence, or reduce falls, after stroke, they could provide a cost-effective intervention. However, walking aids may have adverse effects on gait pattern and the achievement of independent walking (without an aid). At present there is insufficient evidence to assess the size of these potential impacts.

- ☒ Walking aids should be considered only after a full assessment of the potential benefits and harms of the walking aid in relation to the individual patient's stage of recovery and presentation.

4.2.12 MUSCLE STRENGTHENING

Evidence from three systematic reviews (including 21,12 and 11 studies respectively) supports the conclusion that muscle strengthening interventions are beneficial at improving muscle strength.^{40,64,65} The evidence is insufficient to reach generalisable conclusions about the relative effectiveness of specific muscle strengthening techniques.

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There is insufficient evidence to determine if there is a relationship between muscle strength and functional outcomes. There is some evidence that suggests that muscle strengthening interventions do not have an adverse effect on spasticity.⁶⁴

- B** Muscle strength training is recommended when the specific aim of treatment is to improve muscle strength.

4.2.13 INTENSITY OF INTERVENTION

Three systematic reviews, of 20, nine and 151 studies respectively, provided evidence that increasing the intensity of rehabilitation has beneficial effects on functional outcomes, including gait.^{38,66,67} The beneficial effects were achieved by approximately doubling the 'standard' amount of physiotherapy and occupational therapy. The average therapy time was approximately 45 minutes of physiotherapy plus 14 minutes of occupational therapy daily. Across the trials 'increased intensity' equated to an average of approximately 16 hours of additional therapy given to an individual patient. The increase of 16 hours (which was across an episode of care) was the minimum required to achieve an improved outcome. There were however large variations in the amount of therapy provided to individual patients, the amount given in individual studies, and in the time period over which the additional therapy was provided.

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The evidence largely derives from and applies to patients in the first six months after stroke.

- B** Where considered safe, every opportunity to increase the intensity of therapy for improving gait should be pursued.

4.3 UPPER LIMB FUNCTION

4.3.1 SUMMARY OF RECOMMENDATIONS

Consider
<ul style="list-style-type: none"> ▪ constraint induced movement therapy ▪ mental practice ▪ electromechanical/robotic devices
Not recommended
<ul style="list-style-type: none"> ▪ repetitive task training ▪ splinting ▪ increased intensity of rehabilitation
Insufficient evidence
<ul style="list-style-type: none"> ▪ electrostimulation ▪ routine EMG biofeedback ▪ virtual reality ▪ bilateral training ▪ approach to therapy

4.3.2 ELECTROSTIMULATION

Five systematic reviews^{42,68-71} and an additional four relevant RCTs of electrostimulation, including functional electrical stimulation (FES), were identified.⁷²⁻⁷⁵ The reviews all had a slightly different focus, different inclusion/exclusion criteria and way of analysing the studies. The evidence was inconsistent.

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Limited evidence suggests that electrostimulation may be effective for some outcomes relating to the upper limb.^{68,70}

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There is currently insufficient high quality evidence to support or refute the use of electrostimulation for improving upper limb function after stroke.

4.3.3 BIOFEEDBACK

A Cochrane systematic review identified limited evidence from six studies (n=161) on the effects of electromyographic (EMG)-biofeedback on upper limb outcomes following stroke.³⁴ The trials included varied in terms of time since stroke, duration of intervention, outcome measures used, timing of outcome measurement and methodological quality. One study of 26 patients reported that EMG-biofeedback in combination with physiotherapy may result in positive effects on range of motion (ROM) at the shoulder (SMD 0.88, 95% CI 0.07 to 1.70).³⁴ Two studies with a total of 57 participants found that EMG-biofeedback in combination with physiotherapy may result in positive effects on upper limb functional ability (motor recovery; SMD 0.69, 95% CI 0.15 to 1.23).³⁴

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There is currently insufficient high quality evidence to support or refute the use of electrostimulation for improving upper limb function after stroke.

4.3.4 VIRTUAL REALITY

Two systematic reviews were identified investigating the effects of virtual reality on upper limb retraining.^{76,77} The reviews included a small number of studies (five and six respectively) relating to the upper limb, which were of limited methodological quality and small in size.

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Due to the limited amount of high quality evidence and heterogeneity between the studies conclusions about the effects of virtual reality cannot be made.

4.3.5 BILATERAL TRAINING

A systematic review of 18 studies (n=549) comparing bilateral training, including either functional tasks or repetitive arm movements, with placebo, no intervention or usual care found no statistically significant improvement in ADL performance, functional movement of the arm or the hand with bilateral training.⁷⁸

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For acute stroke patients the evidence from one large, well conducted RCT (n=106) suggests that bilateral training is no more effective than unilateral training on two upper limb functional outcomes at six and 18 weeks. No difference was found on a dexterity measure between groups at six weeks but a significant effect in favour of unilateral training was found at 18 weeks.⁷⁹

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There is insufficient evidence to recommend or refute bilateral training for improving arm function after stroke.

4.3.6 CONSTRAINT INDUCED MOVEMENT THERAPY

A body of evidence suggests that constraint induced movement therapy (CIMT) interventions confer a modest improvement in upper limb function in stroke patients.^{61, 80-83} The evidence mainly relates to individuals with at least 10 degrees of finger extension, limited balance problems and intact cognition, which limits the generalisability of the evidence to all stroke patients. The studies included varied in terms of quality, type and duration of intervention, settings (inpatient or outpatient), comparator used, length of intervention, outcome measures used, and timing of outcome measures. There was no evidence of long term benefit.

1++

This is a resource-intensive intervention, often involving up to six hours a day of intensive therapy in addition to restraint of the non-affected limb for up to 90% of waking hours. Much of the research in this area has been completed in patients who are more than six months post-stroke, who have usually completed all routine rehabilitation. There may also be a question of patient compliance and concerns about the ethics of this type of intervention.

B Constraint induced movement therapy may be considered for carefully selected individuals with at least 10 degrees of finger extension, intact balance and cognition.

☒ Healthcare professionals should be trained in CIMT before offering it on an individualised basis taking into account patient preference, risks and benefits.

4.3.7 REPETITIVE TASK TRAINING

One Cochrane systematic review of eight trials (n=412) was identified.⁶¹ Trials included an intervention where an active motor sequence was performed repetitively within a single training session, and where the practice was aimed towards a clear functional goal. Trials were only included if the time duration or number of repetitions within a session could be identified. No significant effect was found for repetitive task training in terms of arm (SMD 0.17, 95% CI 0.03 to 0.36) or hand function (0.16, 95% CI -0.07 to 0.40) post-intervention. The available evidence suggests that repetitive task training has no advantage over other interventions for improving upper limb function.

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A Repetitive task training is not routinely recommended for improving upper limb function.

4.3.8 IMAGERY/MENTAL PRACTICE

Two systematic reviews, one of four RCTs and one of 10 studies suggest that mental practice may have an impact on upper limb recovery following stroke.^{84, 85} This is based on a small number of RCTs and observational studies with limited numbers of participants and methodological flaws. Heterogeneity between studies in terms of study design, outcome measures, and participants, nature of mental practice, duration and intensity of intervention makes it difficult to draw conclusions about the potential clinical impact.

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D Mental practice may be considered as an adjunct to normal practice to improve upper limb function after stroke.

4.3.9 SPLINTING

Evidence from one relatively small RCT of good methodological quality suggests that splinting the wrist in either the neutral or extended wrist position for four weeks does not reduce wrist contracture after stroke.⁸⁶ In addition, a systematic review found that splinting did not improve upper limb function in stroke patients.⁸⁷ The systematic review included 21 studies (n=230), only five of which were RCTs (n=97), and which varied in terms of methodological quality, splint designs, wearing regimes, outcome measures and study periods.

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2+

B Splinting is not recommended for improving upper limb function.

4.3.10 ELECTROMECHANICAL DEVICES

Three systematic reviews, one of 11 trials (n=328)⁸⁸, one of 10 RCTs (n=218)⁸⁹ and one of seven trials,⁹⁰ assessing the use of electromechanical devices or robotics for improving upper limb function in stroke patients were identified. The evidence suggests that arm motor function may be improved following intervention by electromechanical devices or robots compared to any other interventions.

Arm motor strength may be improved following intervention by electromechanical device or robots. No evidence of harm was found when electromechanical devices or robots were used for training. Evidence from two systematic reviews suggests that beneficial effects of robotic therapy may be specific to the area of the upper limb being trained (ie shoulder and elbow specific).^{89, 90}

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Different types of robots/machines were used in the trials therefore specific recommendations about the types of robots cannot be made. Additionally, there were variations between the trials in the duration, amount of training and type of treatment, and in the patient characteristics. It is not clear, therefore, if such devices should be applied in routine rehabilitation, or when and how often they should be used.

A Electromechanical/robotic devices may be considered to improve arm motor function and motor strength in selected patients where the necessary equipment is already available and healthcare professionals are competent in the use of the equipment.

4.3.11 APPROACH OF THERAPY

One systematic review of eight studies (n=374), of which five were RCTs, was identified.⁹¹ The review focused on the Bobath concept and the trials included were generally of poor methodological quality. Five of the studies focused on upper limb functional outcomes (other outcomes included tone, pain, etc). Three additional RCTs were identified each investigating different therapy approaches, two of which were compared to the Bobath approach.⁹²⁻⁹⁴

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There is insufficient evidence to suggest that any one approach to therapy is more effective for improving upper limb function in stroke patients.

4.3.12 INTENSITY OF INTERVENTION

One systematic review of 20 trials of poor to moderate methodological quality was identified.⁶⁶ Only five of the studies included (n=420) investigated the effects of increased intensity of therapy for upper limb function. All of the trials relevant to the upper limb were completed in the acute or early rehabilitation phase after stroke. The evidence showed no significant effect of increased intensity of therapy on improving upper limb function (SMD 0.03, 95% CI -0.13 to 0.19).

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The current evidence suggests that increased intensity of therapy does not provide beneficial effects for improving upper limb function.

B Increased intensity of therapy for improving upper limb function in stroke patients is not recommended.

4.4 COGNITION

Cognitive changes after a stroke may be general (eg slowing of information processing), or may occur within specific domains (eg orientation, attention, memory, visuospatial and visuoconstructive, mental flexibility, planning and organisation and language).¹⁴ It should also be recognised that cognitive impairment may have existed before the stroke. Some patients may experience problems with reasoning or limited awareness or lack of insight into their difficulties. Around one quarter of patients may sustain severe and generalised cognitive impairment.¹⁴ With less severe impairment, recovery occurs but residual deficits may be long lasting.

There is little consistent information on the frequency of these problems or their effect on everyday living, although they can be associated with slower progress in rehabilitation.¹⁴ Full assessment is important; an apparent lack of motivation in self care could be due to a problem of initiating or planning actions or a visuospatial disturbance or both.

- ☒ A full understanding of the patient's cognitive strengths and weaknesses should be an integral part of the rehabilitation plan.

4.4.1 SCREENING

Short, standardised cognitive screening measures can be used by a health professional with knowledge and experience of the presentations of cognitive functioning and factors influencing it. They can be used as a broad screen to reduce the possibility that problems will be missed and as a measure of progress.⁹⁵ It is important for staff to understand that these screening measures will miss some of the cognitive problems which can be most important for rehabilitation and eventual functioning. These are varied but can include such issues as poor awareness of deficits or their implications, slowing of information processing, and the ability to cope with distraction.⁹⁶ Care needs to be taken in selecting measures for use with people who have communication difficulties and, ideally, the selection should be made in collaboration with a speech and language therapist.

4.4.2 ASSESSMENT

Screening measures do not provide information about the depth and nature of the patient's problems or strengths and therefore do not constitute an assessment sufficient for rehabilitation planning or for establishing suitability for a particular work role (eg operating machinery). Administering and interpreting full assessment results requires specialist training and should be carried out in the context of clinical interviews with access to background information.

- ☒
 - Stroke patients should have a full assessment of their cognitive strengths and weaknesses when undergoing rehabilitation or when returning to cognitively demanding activities such as driving or work.
 - Cognitive assessment may be carried out by occupational therapists with expertise in neurological care, although some patients with more complex needs will require access to specialist neuropsychological expertise.

4.4.3 COGNITIVE REHABILITATION

Cognitive rehabilitation concerns efforts to help patients understand their impairment and to restore function or to compensate for lost function (eg by teaching strategies) in order to assist adaptation and facilitate independence.⁹⁷ There is not yet sufficient evidence to support or refute the benefits of cognitive rehabilitation for patients with problems of attention or memory.^{98,99} When cognitive problems are suspected and relatives report personality change, the patient can be referred to a clinical psychologist to provide assessment and where appropriate, psychological intervention which may include carer education and support. One RCT found a trend only toward reduced carer strain when this service was provided.¹⁰⁰ Assistant psychologists, not fully trained clinical psychologists, were used in this study.

It is important that cognitive rehabilitation approaches address how cognitive difficulties are manifest in a patient's life and ensure that any gains made in a formal therapy setting generalise to the daily living environment. Formal neuropsychological assessment should be conducted initially in order to identify the cognitive abilities and deficits of the patient and consider these within the individual's wider personal and social context.

4.5 VISUAL PROBLEMS

4.5.1 SUMMARY OF RECOMMENDATIONS

Recommended
<ul style="list-style-type: none"> ▪ screening for visual problems ▪ correctly prescribed eyewear
Insufficient evidence
visual restoration therapy

There are many visual problems associated with stroke, including visual field defects, disorders of eye movement and visuospatial neglect. Furthermore, given that the incidence of stroke increases with age, a significant proportion of stroke patients have concurrent age-related visual problems.¹⁰¹

The reported prevalence of visual problems after stroke varies considerably. A multicentre prospective cohort study found that a simple screening procedure was successful in identifying patients with visual difficulties.¹⁰² Of the 323 patients with 'suspected' visual difficulties who were screened, 92% were assessed as having visual difficulties, 26% had low visual acuity, 35% had ocular pathologies, 68% had eye movement deficit, 49% had visual field impairment, 20% had perceptual deficit and 55% had a combination of two or more visual impairments.¹⁰²

2+

C All stroke patients should be screened for visual problems, and referred appropriately.

☒ For inpatients, orthoptic eye examinations should assess stroke-related visual problems in addition to assessing visual acuity and other ocular pathologies. For outpatients, optometric eye examinations are recommended.

The NHS general ophthalmic services policy document, and British and Irish Orthoptic Society policy document give national guidelines for optometric eye examinations.^{103,104}

4.5.2 LOW VISUAL ACUITY AND OCULAR PATHOLOGIES

Poor visual acuity has a negative impact on rehabilitation of older people and in people with stroke.¹⁰⁵⁻¹⁰⁷ Uncorrected visual impairment resulting from age-related visual problems causes difficulties with performing activities of daily living, mobility tasks and driving (see section 5.6.3).^{101,106} Untreated age-related visual problems following stroke can adversely affect quality of life.¹⁰⁶ Some age-related visual problems can easily be corrected using glasses.

Evidence from one small cohort study shows that many stroke patients may not be wearing their correct prescribed eyewear.¹⁰⁷ There were significant benefits associated with routine optometric eye examination in this patient population.¹⁰⁷

2+

C Healthcare professionals should ensure that patients have and correctly wear their prescribed eyewear.

4.5.3 VISUAL FIELD DEFECTS

Visual field defects are common following stroke; the prevalence has been reported as being between 20 and 57% of patients.¹⁰² The extent of the loss within the visual field may vary from the loss of the entire half of the visual field, to the loss of only a portion of the affected half. Visual field defects can impact on functional ability and quality of life following stroke).^{108,109} Studies have demonstrated that patients with visual field defects have an increased risk of falling,¹¹⁰ and that visual field loss is a predictor of functional status at discharge from a stroke unit.¹¹¹

Visual field loss may also impact on a patient's ability to participate in rehabilitation, to live in their own home, to perform dynamic tasks such as safe mobility, navigation, driving and may have an impact on levels of depression, anxiety, social isolation and quality of life following stroke.¹⁰⁶

Evidence from six reviews, all with methodological limitations, identified insufficient high quality evidence upon which to reach generalisable conclusions about the effect of interventions for visual field defects.^{106, 112-114}

Limited poor quality evidence suggested that visual scanning compensatory training techniques may be effective in improving functional outcomes after stroke.^{106, 112, 113}

The evidence relating to the effectiveness of visual restoration therapy is inconsistent and of poor quality.^{112, 113}

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1-

- ☒ Patients with hemianopia should be referred to ophthalmology for visual field assessment and possible partial sight registration.

4.5.4 DISORDERS OF EYE MOVEMENTS

It has been reported that over 70% of stroke patients may have eye movement disorders,¹¹⁵ which can cause a variety of problems.^{102,106,116} The result is a range of functional disabilities; a loss of depth perception; reduced hand-to-eye coordination and marked difficulties with near tasks and reading.¹¹⁷ Reduced ability to scan the visual environment may affect visual memory, recognition, the ability to formulate plans and decision making.¹⁰¹ The disorders also impact on the effectiveness of rehabilitation therapy in regaining mobility and activities of daily living and cognitive therapy to aid memory.^{117,118}

Evidence from three reviews, all with methodological limitations, identified almost no evidence relating to interventions for eye movement disorders^{106,112,114}

1-

- ☒ Patients with disorders of eye movements should be referred for orthoptic assessment and should receive appropriate advice or interventions from appropriately trained specialists.

4.5.5 VISUOSPATIAL NEGLECT

Visuospatial neglect is a perceptual disorder which can reduce a person's ability to look, listen or make movements towards one half of their environment. This can also affect their ability to carry out many everyday tasks, such as eating, reading and getting dressed.¹¹⁹ The reported incidence of visuospatial neglect in stroke patients has varied from as high as 90% to as low as 8%.^{120,121}

Two high quality systematic reviews including controlled trials found insufficient evidence to reach conclusions relating to the effectiveness of any interventions for visual neglect.^{122, 123}

1++

Four systematic reviews, which did not conduct any meta-analyses, included non-controlled studies in addition to controlled studies. These reviews provided limited evidence relating to the effectiveness of a variety of different interventions. Of the potentially promising interventions identified, visual scanning training appears to be the intervention with the most supporting evidence.¹²⁴⁻¹²⁶

2-

- ☒ Patients with visuospatial neglect should be assessed and taught compensatory strategies.

4.6 COMMUNICATION

4.6.1 SUMMARY OF RECOMMENDATIONS

Recommended

- referral to speech and language therapy for assessment and management of aphasia and/or dysarthria

4.6.2 APHASIA

Aphasia is an acquired multimodal language disorder. It can affect the person's ability to talk, write and understand spoken and written language leaving other cognitive abilities relatively intact. Aphasia is a long term, life changing condition which affects both the individual and others around them in terms of communication style, lifestyle, identity and life roles.¹²⁷ It can coexist with other cognitive deficits. Although a distinction had sometimes been made between aphasia and dysphasia, aphasia now tends to be used regardless of severity level. The reporting of the proportion of stroke cases demonstrating aphasia at initial assessment varies from 20% to 38%.^{21,128} In one study 12%, 6% and 20% have mild, moderate and severe impairment, respectively and 19% continue to have aphasia at six months.¹²⁸ Aphasia is usually associated with left hemisphere damage, but symptoms such as subtle communication deficit, affecting communication interaction, notably non-verbal communication, and communication of non-literal or inferred information, may also occur following right hemisphere stroke.¹²⁹

The role of the speech and language therapist (SLT) in aphasia includes assessment, differentiation of aphasia from other communication difficulties, advice and education about maximising communication, counselling, provision of alternative or augmentative communication (AAC) and direct intervention.

A recent Cochrane review examining the effectiveness of speech and language therapy for aphasia following stroke included 30 trials. This review concluded that there is some indication of the effectiveness of speech and language therapy with more intensive therapy being more favourable. However there continues to be insufficient evidence from RCTs to recommend one SLT approach over another.¹³⁰ A meta-analysis which included group quasi-experimental studies where aphasia was not necessarily of stroke origin concluded that outcomes for treated individuals are superior to those for untreated individuals in all stages of recovery, and especially in the acute stages.¹³¹ Overall, there is good evidence that people with aphasia benefit from speech and language therapy.

In a study of global aphasia where subjects were randomised to intensive therapy (daily sessions) and regular therapy (three sessions per week), more patients in the intensive group achieved significant improvement.¹³⁴ The meta-analysis similarly indicated amounts of treatment and magnitude of change to be positively related, with the outcome of low intensity treatment being only slightly better than no treatment.¹³¹ Treatment length in excess of two hours per week brought about gains exceeding those that result from shorter durations.¹³¹

The Aphasia in Scotland Project was commissioned by NHS Quality Improvement Scotland to examine services offered to people with aphasia following stroke. The findings of this project were published in November 2007 and NHS QIS published their recommendations for clinical improvements to stroke and aphasia services in 2008.^{135,136}

B

Aphasic stroke patients should be referred for speech and language therapy. Where the patient is sufficiently well and motivated, a minimum of two hours per week should be provided.

1+
2+

- ☑ Where appropriate, treatments for aphasia may require a minimum period of six months to be fully effective.
- ☑ Referral to the volunteer stroke service (through CHSS) should be considered as an adjunct (see section 7.3.1).

4.6.3 DYSARTHRIA

Dysarthria is a motor speech impairment of varying severity affecting clarity of speech, voice quality and volume, and overall intelligibility.¹³⁷ Frequencies of between 20% and 30% have been reported for dysarthria following stroke.^{21,138,139} It may also coexist with other communication disorders such as aphasia. Communication and quality of life can be significantly affected.

SLTs offer a diagnostic and management service for this condition. A Cochrane review determined that evidence for the effectiveness of intervention is restricted to small-group or single-case studies or to expert opinion.¹⁴⁰ At this time, expert opinion remains firmly in favour of the effectiveness of SLT interventions.^{137,141-143} Service providers will need to take into account the possible provision of prosthetic devices and of AAC systems which range from basic to highly sophisticated electronic devices.¹⁴⁴ Advice on the provision of AAC systems is available from the national Scottish Centre of Technology for the Communication Impaired (see section 7.3.1).

3

D Patients with dysarthria should be referred to an appropriate speech and language therapy service for assessment and management.

4.7 NUTRITION AND SWALLOWING

4.7.1 SUMMARY OF RECOMMENDATIONS

Recommended
<ul style="list-style-type: none"> ▪ assessment of nutritional risk ▪ assessment of ability to eat independently ▪ ongoing monitoring of nutritional status ▪ referral to a dietitian ▪ oropharyngeal swallowing rehabilitation programme
Consider
<ul style="list-style-type: none"> ▪ oral nutritional supplements for undernourished patients
Insufficient evidence
<ul style="list-style-type: none"> ▪ food fortification and specific dietary advice ▪ biofeedback to enhance interventions for dysphagia ▪ scopolamine, Botulinum toxin type A or B or electron beam radiotherapy to reduce sialorrhea ▪ routine tricyclic antidepressants or glycopyrrolate for the treatment of sialorrhea

Careful assessment of nutritional status and of swallowing impairment, careful fluid management, and routine use of intravenous fluids are consistent features of early management for patients in stroke units.

4.7.2 NUTRITIONAL SCREENING AND ASSESSMENT

It is recommended that nutritional screening to identify those patients undernourished on admission and those at risk of a reduction in nutritional status should be carried out within 48 hours of admission to hospital.⁶ Nutritional screening is described in SIGN 119.⁶

Stroke population based studies concluded that nutritional deficits develop throughout the rehabilitation phase indicating the need for more structured monitoring of nutritional status.¹⁴⁵ In one study 57% of patients were found to have lost weight from week one to six months post-stroke and 22% were undernourished at six months post stroke.¹⁴⁶

2+
2-

Ongoing assessment of nutritional risk requires monitoring of a number of different parameters. A systematic review on identifying eating difficulties post stroke highlights the need to observe independent eating and volume of food consumed.¹⁴⁷ Other identified predictors of nutritional risk are severe stroke, higher dependence, low pre-albumin levels and impaired glucose metabolism and unintentional weight loss.^{145,148}

2⁺
2⁻

The evidence supports the need to combine the results from these parameters to provide an accurate assessment of ongoing nutritional status rather than relying on any single measure.¹⁴⁹

D Assessment of nutritional risk should be carried out within the first 48 hours with regular re-assessment thereafter during the patient's recovery and be recorded prior to discharge.

D Assessment of a patient's nutritional risk should include an assessment of their ability to eat independently and a periodic record of their food consumption.

D Ongoing monitoring of nutritional status after a stroke should include a combination of the following parameters:

- biochemical measures (*ie low pre-albumin, impaired glucose metabolism*)
- swallowing status
- unintentional weight loss
- eating assessment and dependence
- nutritional intake.

4.7.3 NUTRITIONAL INTERVENTIONS

Poor nutritional status post stroke increases the length of hospital stay and risk of complications, and undernourishment on admission is an independent marker of poor outcome at six months post stroke.^{149,150}

A large multicentre RCT of 5,033 patients did not support the routine use of oral nutritional supplements in unselected patients with stroke.¹⁵¹ A meta-analysis combining data from the FOOD trial with data from the general elderly hospitalised population, however, demonstrated a reduced mortality and fewer complications with the prescription of oral nutritional supplementation for patients identified as undernourished.¹⁵² This study highlighted the problem of patient compliance with supplementation over longer periods.

2⁺⁺
2⁺

There continues to be a lack of evidence on nutritional support such as food fortification and specific dietary advice.

C Following nutritional screening, those identified as undernourished, and those at risk of becoming undernourished, should be referred to a dietitian and considered for prescription of oral nutritional supplements as part of their overall nutritional care plan.

4.7.4 DYSPHAGIA THERAPY

Dysphagia is a prominent symptom across the continuum of stroke recovery. Clinical evaluation of swallowing after stroke is described in SIGN 119.⁶

4

Management of dysphagia is frequently based around a compensatory approach. Facilitatory therapy approaches are active therapeutic approaches which aim to have a direct and lasting effect on the swallowing physiology after stroke. A shift to increased use of facilitatory therapy approaches would have implications for therapy time and resources, which may be balanced by improved recovery to normal oral intake and less dependence on non-oral feeding.

A single RCT which compared the standard compensatory approach to dysphagia management with the inclusion of active behavioural therapy intervention demonstrated a consistent trend towards more positive outcomes with an increased proportion of patients returning to normal diet and improved swallowing at six months post stroke.¹⁵³ There was also a trend towards improved outcome in those treated more intensively.

1⁺

Muscle-strengthening exercises

A small RCT of the effectiveness of a suprahyoid muscle-strengthening exercise programme demonstrated significant improvements. Fourteen of the 27 patients had chronic post-stroke dysphagia and were tube fed prior to the intervention.¹⁵⁴ Suprahyoid strengthening programmes are designed to have an effect on the pharyngeal biomechanics of the swallow by increasing upper oesophageal opening, increasing anterior laryngeal excursion and reducing post-swallow aspiration.

1+

A cohort study examining the effectiveness of lingual exercises showed a positive effect on all patients in the sample, even those patients who were up to four years post stroke.¹⁵⁵

2-

Electrical stimulation

An RCT examining the effectiveness of oral stimulation treatment for dysphagia after stroke found no evidence of functional change in swallowing following treatment.¹⁵⁶

Poorly conducted studies examining the effectiveness of neuromuscular stimulation therapy in patients with dysphagia after a stroke present conflicting findings.^{157,158}

1-

A cohort study in patients with chronic stable pharyngeal dysphagia, at risk of aspiration for six months or more, raised concerns about the potential worsening biomechanical effect on the swallow following a trial of electrical stimulation and the need for caution in selecting treatment parameters.¹⁵⁹ The studies available paid limited regard to the need to specify the chosen treatment parameters to demonstrate effectiveness or safety.

2-

Biofeedback

There was no good quality evidence available on the application of biofeedback to enhance the effectiveness of therapy interventions for dysphagia.

D All patients who have dysphagia for more than one week should be assessed to determine their suitability for a rehabilitative swallowing therapy programme. Consideration should be given to:

- the nature of the underlying swallowing impairment
- patient suitability in terms of motivation and cognitive status.

B Patients with dysphagia should have an oropharyngeal swallowing rehabilitation programme that includes restorative exercises in addition to compensatory techniques and diet modification.

4.7.5 SIALORRHEA

No systematic reviews, randomised trials or controlled studies evaluating differing interventions for sialorrhea (drooling) were identified.

One report of two stroke patients with sialorrhea noted a short term reduction in salivary flow with a transdermal scopolamine (hyoscine) using a 1 mg/2.5 cm² patch, applied behind the ear every 72 hours.¹⁶⁰ One patient experienced worsening urinary retention. Two case series in patients with sialorrhea of mixed aetiology (each with two stroke patients only) evaluating *Clostridium botulinum* toxin type A injected into the parotid and submandibular glands bilaterally under ultrasound guidance showed a short term reduction in salivary volume and improvement of symptoms.^{161,162}

3

A retrospective case series of 31 patients (13 with stroke) evaluated radiotherapy given bilaterally to the parotid and submandibular glands of patients who had previously had unsuccessful anticholinergic treatment. Salivary volume was reduced with an improvement in symptoms lasting weeks to years (particularly with electron beam treatment > 7 MeV). Side effects were described as generally mild.¹⁶³

No studies evaluating the use of tricyclic antidepressants or glycopyrrolate for the treatment of sialorrhea in post-stroke patients were identified.

There is insufficient good quality evidence to recommend interventions to reduce sialorrhea.

- ☒ Biofeedback and positioning techniques (as used by physiotherapy and speech and language therapy) should support management of patients who experience drooling problems.

4.8 CONTINENCE

4.8.1 SUMMARY OF RECOMMENDATIONS

Recommended
<ul style="list-style-type: none"> ▪ assessment, investigation, documentation and treatment of urinary incontinence ▪ behavioural therapies for incontinence
Insufficient evidence
<ul style="list-style-type: none"> ▪ interventions for bowel management problems

Incontinence of urine and faeces is dramatically increased following stroke. The prevalence of urinary incontinence is reported as 40-60% in patients admitted with acute stroke, with 25% continuing to experience problems at hospital discharge and 15% remaining incontinent at one year post stroke.¹⁶⁴ Faecal incontinence is a less common but more distressing problem. There is little useful evidence of the effectiveness of interventions specifically relating to patients who are incontinent following stroke.¹⁶⁵ Usual continence management should be appropriate,¹⁶⁶ although special attention should be paid to the practical problems faced by patients with stroke, eg functional activity limitations, aphasia and cognitive impairment. In the absence of evidence from well conducted RCTs there are good practice guidelines available, which should be applied.^{167,168}

- ☒ Every service caring for patients with stroke should develop and adhere to local urinary and faecal continence guidelines including advice on appropriate referral.
- ☒ Healthcare professionals should inform and discuss the implications of continence dysfunction with patients, carers and family.
- ☒ Continence advisers should be consulted.

Annex 2 has been produced by the SIGN guideline review group as an example of an approach to management of incontinence after stroke.

4.8.2 URINARY INCONTINENCE

Urinary incontinence is a significant issue for patients and their families.

Professional input that is systematic in the assessment and management of continence problems may improve outcomes and the greatest impact may be in the acute phase of post-stroke rehabilitation.¹⁶⁴

3

Every patient with urinary incontinence should be assessed in order to identify the type of urinary incontinence. Routine assessment should include a standard medical and nursing assessment.¹⁶⁵

4

The continence assessment of every patient with urinary incontinence should be documented and include:

- a history of how long incontinence has been a problem
- a history of urinary and bowel symptoms experienced
- current drug history
- obstetric history for women
- prostatic symptoms for men
- abdominal examination to detect palpable bladder
- rectal examination (both sexes) for constipation, haemorrhoids, fissures and prolapse
- vaginal examination (to exclude prolapse, vaginitis and neoplasia)
- cognitive status
- urinalysis (for glucose, protein, blood, white cells, specific gravity)
- midstream urine if proteinuria or haematuria (for microscopy and culture)
- urea and electrolytes
- three day bladder diary or a frequency volume chart
- post-micturition bladder volume.

The available evidence suggests that behavioural strategies currently used in non-stroke patients can be effective in some stroke patients. For example:¹⁶⁴

- Toileting assistance programmes such as timed voiding or prompted voiding for stroke patients unaware of their bladder status or those with cognitive impairment.
- Bladder retraining with urge suppression for those with urge symptoms who are independent of caregivers and motivated (in combination with pelvic floor exercises in men).¹⁶⁹

3

Further guidance on the assessment of urinary incontinence as well as physical and pharmacological therapies is available in SIGN 79 Management of urinary incontinence in primary care.¹⁶⁶

- D All stroke patients should be assessed, investigated and treated for urinary incontinence.**
- D The presence or absence of incontinence of urine should be documented for all patients after a stroke.**
- D Behavioural therapies for incontinence should be trialled on an individual basis after stroke.**

4.8.3 URINARY CATHETERISATION

Stroke services should have urinary catheter protocols. The decision to insert an in-dwelling urethral or supra-pubic catheter should be made in collaboration between the medical and nursing staff, the stroke patient and carers (where appropriate).

Short term in-dwelling catheters should be used to treat symptomatic urinary retention without delay. Once precipitating causes have been removed or treated, the patient's care plan should include a planned trial without catheter. Intermittent (self or assisted) catheterisation may be appropriate as guided by local specialist continence advisors.¹⁶⁶

Occasionally, in-dwelling catheters may be considered to protect the vulnerable skin of patients with chronic urinary incontinence but this should only be when all other curative and containment strategies have been tried. The continued use of such catheterisation should be reviewed regularly and a planned trial without catheter undertaken.

Long term urinary catheterisation should only be considered when an accurate diagnosis of the cause of the incontinence has been documented together with a reason why a curative treatment has not been, or cannot be, successful. Staff who insert catheters need appropriate and continuing professional training. Impact on sexual function needs to be considered when long term urinary catheterisation is considered.

4.8.4 FAECAL INCONTINENCE

Faecal incontinence is a distressing potential consequence of stroke that, if present, is likely to impact heavily on the quality of life of the patient and their carers and family.

No stroke specific interventions for bowel management problems were identified.

The assessment of patients with faecal incontinence is very similar to that of urinary incontinence and will identify most causes of faecal problems. Constipation is a problem and needs management. The importance of rectal examination cannot be overemphasised. Faecal incontinence after stroke can be improved in most patients after faecal loading and infective diarrhoea (eg due to *Clostridium difficile*) have been treated, and there are a number of management strategies that can help achieve continence. These include:

- manipulation of the gastrocolic reflex where bowel evacuation is common after meals
- helping the patient to sit on the toilet after meals and ensuring correct positioning to use the toilet
- in exceptional circumstances, regular use of a constipating agent and bowel care with an enema.

☒ Patients should have individualised bowel programmes that are patient-centred and the assessment should include physical ability, availability of care, social setting, clinical issues, dietary factors, medications.

☒ There should be due cognisance of an individual's life style and care preferences when designing a bowel programme.

☒ Information provision, education and support for patient and carer are essential.

4.9 POST-STROKE SPASTICITY

4.9.1 SUMMARY OF RECOMMENDATIONS

Not recommended
<ul style="list-style-type: none"> ▪ routine resting splinting of the upper limb ▪ <i>Clostridium botulinum</i> toxin type A
Insufficient evidence
<ul style="list-style-type: none"> ▪ routine functional electrical stimulation ▪ robot-mediated passive therapy ▪ oral antispasticity agents ▪ intrathecal antispasticity agents ▪ alcohol neurolysis ▪ tibial nerve neurotomy

Spasticity is defined as intermittent or sustained involuntary hyperactivity of the skeletal muscles associated with an upper motor lesion.¹⁷⁰ Following stroke there is uncertainty regarding the frequency of upper limb spasticity with one study estimating a prevalence of 20% of patients with upper limb spasticity at five days and 18% at three months,¹⁷¹ and another study estimating that 31% of patients have upper limb spasticity at 12 months.¹⁷²

4.9.2 SPLINTING

A well conducted RCT examined the use of overnight splinting using custom-made palmar mitt splints for up to 12 hours nightly for a four week period.⁸⁶ Three groups of 21 patients were included: controls, neutral splinting and extended wrist splinting. All participants received standard rehabilitation therapy in addition to the study intervention. Splint compliance was greater with neutral rather than extension splints. During the six weeks of the study there was a loss of range of motion of the wrist and finger flexors in all groups, that was unaffected by either the neutral or extension splints. There were no significant effects on upper limb function, spasticity or activity limitations.⁸⁶

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A

Routine use of resting splinting of the upper limb to reduce spasticity in the wrist and finger flexors following stroke is not recommended.

4.9.3 FUNCTIONAL ELECTRICAL STIMULATION

A single systematic review of functional electrical stimulation (FES) in post-stroke rehabilitation included four RCTs (n = 132), all of poor quality.³⁹ Two of the studies included examined ankle dorsiflexion, one wrist extension and one knee extension. The control groups of the studies were standard physiotherapy in three trials and sham FES in one. Although there was an increase in muscle force generated following FES there was no evidence of clinical benefit and no effect on muscle spasticity.

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One small RCT of 14 patients with hemiparetic upper limb, eight receiving power-assisted FES and six receiving passive movements and stretching of wrist and fingers, demonstrated a trend to lower spasticity scores in the finger flexor muscles in the treatment group but this may be due to injections of 5% phenol to the finger flexor muscles to reduce spasticity prior to the intervention.¹⁷³

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There is insufficient evidence to recommend the use of functional electrical stimulation (FES) for the treatment of post-stroke spasticity.

4.9.4 ROBOT-MEDIATED PHYSIOTHERAPY

One small RCT examined the feasibility of using robot-mediated upper limb physiotherapy for spastic upper limb hemiparesis following stroke and brain injury.¹⁷⁴ Thirty patients were included with 15 receiving the robot-mediated passive movement of the shoulder and elbow as an adjunct to routine physiotherapy and 15 control patients receiving only routine physiotherapy. This amounted to 30 minutes of robot-mediated therapy per session totalling 150 minutes during the trial. The treatment was well tolerated with no adverse effects. Spasticity scores on the Modified Ashworth Scale were significantly reduced for shoulder adductors and elbow flexors in the robot therapy group but unchanged in the control group. Both groups showed improved upper limb function and range of motion at the elbow.

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Robot-mediated passive therapy for post-stroke spasticity requires further evaluation in larger RCTs and examination of the cost effectiveness of the intervention compared to standard therapy.

4.9.5 ORAL ANTISPASTICITY AGENTS

A single systematic review examined the effect of oral antispasticity agents in non-progressive neurological diseases including cerebral palsy, spinal cord injury, cerebrovascular disease and head trauma.¹⁷⁵ Stroke and head trauma were taken together as a single group from six RCTs including 228 patients. Trials studied the effects of tizanidine, dantrolene, baclofen, diazepam and gabapentin but due to heterogeneity the results could not be combined in a meta-analysis. When individual drugs were compared to placebo the active drugs were more effective on muscle spasticity but the effects were modest and with common side effects (25-91%) including drowsiness, fatigue and weakness. Of the two placebo-controlled studies with significant reductions in muscle tone (25% decrease in Ashworth score) one was in acquired brain injury patients where tizanidine reduced muscle tone by 20-26%. When tizanidine was compared to baclofen and to diazepam in patients with cerebrovascular disease no significant differences in efficacy between the agents were found.

1+

The only head-to-head trial of an oral antispasticity agent against *Clostridium botulinum* toxin type A injections showed no significant difference between tizanidine and placebo at six weeks.¹⁷⁶ Tizanidine had higher rates of adverse events than either placebo or *Clostridium botulinum* toxin type A.

1++

No recommendations can be made for specific oral agents to be used routinely in the reduction of post-stroke spasticity.



Where considered, oral agents should be monitored regularly for efficacy and side effects and withdrawn where ineffective following a therapeutic trial.

4.9.6 *Clostridium botulinum* TOXIN TYPE A

A systematic review of five RCTs (n=329) showed that, compared to placebo, *Clostridium botulinum* toxin type A (both Dysport® and Botox®) reduced spasticity (measured by the modified Ashworth Scale or Global Assessment Scale) in upper limb following stroke (OR 3.38, 95% CI 1.34-8.52). Maximum effects were seen 4-6 weeks after injection regardless of dose and return to baseline within 10-16 weeks.¹⁷⁷

Clostridium botulinum toxin type A reduced spasticity and muscle tone in lower limbs following stroke more effectively than phenol injection but with inconsistent effects on walking speed and step length.¹⁷⁸ Although there was a trend towards an increased passive range of movement following *Clostridium botulinum* toxin type A injection this was not statistically significant.¹⁷⁸

No significant effects on functional ability or quality of life measures were seen following *Clostridium botulinum* toxin type A treatment.¹⁷⁸⁻¹⁸⁰ *Clostridium botulinum* toxin type A is well tolerated with generally only minor adverse events noted (similar to those noted for placebo), although there was the risk of excessive muscle weakness in overdose.¹⁷⁸⁻¹⁸⁰

1++

1+

When compared directly to the oral antispasticity agent tizanidine, *Clostridium botulinum* toxin type A produced greater reductions in the modified Ashworth Scale in wrist flexor and finger flexor tone than tizanidine and placebo.¹⁷⁶ Tizanidine was no better than placebo in this study. The adverse effects of *Clostridium botulinum* toxin type A were similar to placebo. No significant effects on measures of function or activity limitations were observed apart from an improvement in the cosmesis subscale of the Disability Assessment Scale compared to both tizanidine and placebo.¹⁷⁶

Guidance on the use of *Clostridium botulinum* toxin type A is available from the Royal College of Physicians of London 2009.¹⁸¹

Clostridium botulinum toxin type A (Dysport® or Botox®) is not currently recommended for use within NHS Scotland for the treatment of focal spasticity, including arm symptoms associated with focal spasticity (see section 8.3).

4.9.7 INTRATHECAL ANTISPASTICITY AGENTS

Two uncontrolled case series examined the use of intrathecal baclofen administered by both intermittent bolus and by continuous infusion for the relief of post-stroke spasticity.^{182,183} Modified Ashworth Scale (MAS) scores for spasticity improved significantly in both upper and lower limbs but muscle strength in the unaffected limbs was not altered. Functional Independence Measure scores improved at three months and were maintained to 12 months with improvements noted mainly in the motor and self care subscores.¹⁸² One small study of eight patients with short term follow up of only 3-5 hours following administration of intrathecal bolus of baclofen or adjustment of the intrathecal infusion found reduced mean MAS scores with greater reductions in lower limbs and reduced reflex scores.¹⁸³ In this study lower limb muscle strength reduced and there was a reduction in the modified exercise units (EU) walking score.

3

Intrathecal baclofen may be an effective intervention in intractable painful spasticity where other treatment options have failed. It requires specialist supervision and facilities for the insertion of intrathecal catheters and implantation of infusion pumps (eg a tertiary neurorehabilitation centre).

Further studies to evaluate intrathecal baclofen for painful spasticity are required before a recommendation can be made.

4.9.8 CHEMICAL NEUROLYSIS

One case series using alcohol neurolysis in upper limb spasticity improved tone and passive range of movement lasting up to six months but caused temporary painful dysaesthesia in 15% of patients.¹⁸⁰ Another case series of 22 patients with lower limb spasticity of the ankle plantar flexor muscles limiting walking reported that injection of 50% ethyl alcohol into the tibial nerve motor branches resulted in reductions of spasticity measured by the modified Ashworth Scale and increased range of passive ankle dorsiflexion both immediately following injection and maintained up to six months.¹⁸⁴

3

Another observational study of phenol for shoulder pain due to spasticity showed that phenol improved the passive range of movement.¹⁸⁰

Alcohol neurolysis may be an effective intervention in the treatment of spasticity in both the upper and lower limbs following stroke. Further evaluation is required in RCTs before a recommendation for its use can be made.

4.9.9 SURGERY

Tibial nerve neurotomy performed 6-12 months after administration of *Clostridium botulinum* toxin type A into the lower limb muscles for post-stroke spasticity resulted in a significantly greater reduction in spasticity at six months following neurotomy than after *Clostridium botulinum* toxin type A injection at 15 days post-injection. Muscle strength and amplitude of movements were increased in ankle dorsiflexion and reduced in ankle plantar flexion after neurotomy. Balance and walking improved following surgery with a significant improvement in gait velocity seen at one year. There were additional subjective improvements in daily living and a reduction in the use of walking aids following surgery. Alterations in sensation with dysaesthesia (13/34) and hypaesthesia (12/34) occurred following surgery.¹⁸⁵

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Tibial nerve neurotomy may be effective in reducing spasticity in the lower limbs following stroke. Further evaluation is required in RCTs before a recommendation for its use can be made.

4.10 PREVENTION AND TREATMENT OF SHOULDER SUBLUXATION

4.10.1 SUMMARY OF RECOMMENDATIONS

Consider
▪ electrical stimulation
Insufficient evidence
▪ slings or supportive devices

Inferior glenohumeral joint displacement is more commonly known as shoulder subluxation. Its prevention is an important aspect of stroke rehabilitation as it is associated with poor upper limb function.¹⁸⁶ Post-stroke incidence may range from 7% to 81%.^{187,188} Patients with greater active shoulder motion have a lower incidence, whereas those with little or no active movement have the highest incidence.

- ☒ Patients with little or no active shoulder muscle activity should be considered for subluxation prevention strategies.

4.10.2 SUPPORTIVE DEVICES

A systematic review of supportive devices including slings, wheelchair attachments and external shoulder orthoses such as strapping, to reduce shoulder subluxation, reduce pain and increase function found one trial on slings and three on strapping (total n = 142). There was insufficient evidence to show whether slings, strapping or wheelchair devices are effective at reducing or preventing subluxation, reducing pain or increasing function.¹⁸⁹

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A further cohort study evaluating the effectiveness of the GivMohr® sling compared to the Roylan® hemi arm sling (n = 25 with 20 stroke participants) found that the GivMohr® sling was more effective at reducing subluxation than the Roylan® hemi arm sling (minimal reduction of subluxation) through radiograph imaging and measurement.¹⁹⁰ This study did not investigate the long term impact of using this device for pain, function or subluxation.

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There is insufficient evidence to support or refute using any sling or supportive device.

4.10.3 ELECTRICAL STIMULATION

Three systematic reviews included the same studies published prior to 1999.^{71, 191, 192} Two of the reviews also included three more recent RCTs relating to shoulder treatment.^{71, 191} One review also included an RCT with a mixed sample of brain injury and stroke.⁷¹

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Electrical stimulation was applied to a group of stroke patients who were likely to or had developed subluxation. The intervention group did not include high tone patients or patients who demonstrated sufficient levels of muscle activity around the shoulder girdle to retain shoulder joint stability. Electrical stimulation (specifically early stimulation) in addition to conventional therapy prevents or reduces the degree of shoulder subluxation more than conventional therapy alone.^{71, 191}

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Intramuscular electrical stimulation is not more effective than the use of a hemisling in reducing the degree of vertical subluxation.¹⁹³

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Meta-analysis of three randomised controlled trials found that electrical stimulation improves shoulder function when used early after stroke.¹⁹¹

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A Electrical stimulation to the supraspinatus and deltoid muscles should be considered as soon as possible after stroke in patients at risk of developing shoulder subluxation.

4.11 PAIN

4.11.1 SUMMARY OF RECOMMENDATIONS

Consider
▪ amitriptyline, lamotrigine or carbamazepine for central post-stroke pain
Insufficient evidence
▪ treatment of post-stroke related complex regional pain syndrome

Stroke patients are particularly prone to pain, most commonly associated with the musculoskeletal ramifications of paralysis and immobility, and particularly involving the hemiplegic shoulder (see section 4.13). Age-related co-pathologies resulting from joint changes due to osteoarthritis cause added discomfort, particularly during handling and positioning procedures. Pain may develop many months after a stroke and may be related to movement. Headache and central post-stroke pain also occur in some stroke patients.

☒ Patients should be asked about pain and the presence of pain should be assessed (for example, with a validated pain assessment tool) and treated appropriately, as soon as possible.

4.11.2 CENTRAL POST-STROKE PAIN

Some one to twelve per cent of stroke patients experience central post-stroke pain (CPSP) syndrome,¹⁹⁴ with an annual incidence of between 2,000 and 6,000 in the UK, and a prevalence of as many as 20,000.¹⁹⁵

A small RCT of amitriptyline (final dose 75 mg), in selected patients, led to a clinically significant reduction (mean 20%) in CPSP in two thirds of patients, without side effects leading to dose reduction.¹⁹⁶ In the same trial carbamazepine (final dose 800 mg), in selected patients, led to a reduction in CPSP in one third of patients, but with more significant side effects.¹⁹⁶ The population studied (mean age 66 years, range 53-74) is atypical of patients seen in usual clinical practice so side effects are likely to be more common and/or significant in older, frailer patients with more comorbidities and complex polypharmacy.

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A small RCT of lamotrigine (final dose 200 mg/day) showed a moderate reduction in CPSP, but with a high drop-out rate because of adverse events (10%).¹⁹⁷

1

B In patients with central post-stroke pain unresponsive to standard treatment, and where clinician and patient are aware of potential side effects, amitriptyline (titrated to a dose of 75 mg) may be considered.

B If amitriptyline is ineffective, or contraindicated, lamotrigine or carbamazepine are alternatives although the high incidence of side effects should be recognised.

4.11.3 COMPLEX REGIONAL PAIN SYNDROME

Complex regional pain syndrome (CRPS) is an uncommon and complex complication of stroke. It is seen as a consequence of many other neurological and non-neurological conditions affecting limb function and sensation and can occur in any limb (although the upper limb is most often affected in stroke).

Due to the lack of evidence, the effectiveness of varying therapies in the treatment of post-stroke related CRPS cannot be proven or refuted.

☒ Patients with suspected CRPS should be referred to a clinician with expertise in the management of the condition

4.12 PREVENTION OF POST-STROKE SHOULDER PAIN

4.12.1 SUMMARY OF RECOMMENDATIONS

Not recommended
<ul style="list-style-type: none"> overhead pulleys functional electrical stimulation
Insufficient evidence
<ul style="list-style-type: none"> prolonged shoulder positioning enhanced physical therapy (including EMG-biofeedback, behavioural interventions or device-delivered continuous passive motion) shoulder strapping slings transcutaneous electrical nerve stimulation <i>Clostridium botulinum</i> toxin type A in patients with shoulder spasticity but without pain at baseline intra-articular steroid injections non-steroidal anti-inflammatory agents ultrasound intramuscular electrical stimulation complementary therapies compared to standard care in at-risk individuals

Shoulder pain is common in stroke patients, with a prevalence of 24% up to 16 months post-stroke reported in a large prospective population based study.¹⁹⁸ Post-stroke shoulder pain may contribute to poor upper limb recovery and prolonged hospital stay,¹⁹⁹ as well as depression, sleeplessness and poor quality of life for patients following stroke.^{198, 200}

Prevention of the development of post-stroke shoulder pain is therefore an important aim. The evidence for specific interventions to prevent shoulder pain is discussed in the following sections. An example of a simple algorithm for the management of post-stroke shoulder pain, including preventative measures, is shown in Annex 3.

4.12.2 POSITIONING

A systematic review identified one RCT which demonstrated a non-significant trend towards the prevention of post-stroke shoulder pain with specific prolonged shoulder positioning, 10 weeks or more after stroke onset, as compared to usual care.²⁰¹

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In an RCT of 32 patients, static positional stretches of the affected shoulder (abduction to 90° for 20 minutes once daily whilst both sitting and lying) did not reduce the incidence of shoulder pain when compared to routine therapy.²⁰²

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Further studies to evaluate prolonged shoulder positioning to prevent shoulder pain are required before a recommendation can be made.



Careful positioning and handling of the affected shoulder and upper limb in the early phase is recommended.

4.12.3 PHYSICAL THERAPY

No conclusive evidence for preventing pain was seen with enhanced therapy compared to conventional physiotherapy.²⁰¹ Enhanced therapy included EMG-biofeedback and Bobath exercises plus behavioural methods to enhance patient and family participation for up to seven weeks.

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Device-delivered continuous passive motion did not prevent shoulder pain when compared to therapist-supervised self range of motion exercises in an RCT of 35 patients with arm weakness post stroke.²⁰³

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Further studies to evaluate enhanced physical therapy (including EMG-biofeedback, behavioural interventions or device-delivered continuous passive motion) to prevent shoulder pain are required before a recommendation can be made.

4.12.4 STRAPPING

A systematic review identified one small study (n=8) showing that shoulder strapping applied within 48 hours of hemiplegic onset was associated with reduced incidence of shoulder pain.²⁰¹ This was not replicated in an RCT of 98 patients that was included (although strapping was delayed for two weeks in the latter study).²⁰¹

Although strapping delayed the onset of shoulder pain, there was insufficient evidence to support the use of strapping for preventing shoulder pain post stroke.¹⁸⁹

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In one RCT of 32 patients, shoulder strapping (using the Ancliffe technique) in high-risk patients (eg with upper limb weakness) was associated with fewer patients developing shoulder pain in the short term (four weeks) when compared to placebo strapping or standard care.²⁰⁴ Longer term effects, however, are unknown.

There is insufficient evidence to recommend or refute the use of shoulder strapping to prevent shoulder pain in high risk individuals.

4.12.5 SLINGS

A single quasi-RCT, which compared the use of a hemi arm sling versus no sling in 14 patients, was identified by two systematic reviews.^{189,201} No immediate or longer term (3-7 month) difference in pain incidence was found.

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There is insufficient evidence to support the use of slings for preventing shoulder pain post stroke.

4.12.6 OVERHEAD PULLEYS

Use of an overhead pulley was associated with a greater incidence of pain compared to passive exercises in one small RCT (n=28) identified in a systematic review.²⁰¹

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Overhead pulleys to prevent shoulder pain are not recommended.

4.12.7 ELECTRICAL STIMULATION

There are two main types of surface electrical stimulation: functional electrical stimulation (FES), which is designed to produce muscle contraction, and transcutaneous electrical nerve stimulation (TENS), which is given mainly for analgesic effect. In the literature the definitions of these interventions often overlap.

A Cochrane review of four trials (170 participants) found no evidence to confirm or refute the use of FES or TENS for preventing post-stroke shoulder pain, despite possible benefits in improving passive rotation and subluxation.¹⁹²

A further systematic review found that electrical stimulation (ES) administered within two months of stroke onset, to induce contraction of the supraspinatus and/or posterior deltoid muscles, did not prevent the tertiary outcome of shoulder pain (despite modest improvements in shoulder function).¹⁹¹

In the largest single RCT to date (n = 176), surface neuromuscular electrical stimulation (NMES) given at 30 Hz for one hour, three times a day for four weeks to induce contraction in the supraspinatus and posterior deltoid muscles failed to prevent the development of shoulder pain at three months in patients with post-stroke upper limb weakness.²⁰⁵

In an RCT of 23 patients with complete post-stroke arm paresis, FES (given at 25 Hz to induce muscle twitch in proximal and distal muscles for a 30 minute period, three times per week) was compared to conventional motor training (three occupational therapy sessions per week) over a four week period.²⁰⁶ FES did not prevent the development of shoulder pain at either four weeks or six months, when compared to conventional motor training.

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Functional electrical stimulation is not recommended as a means of preventing shoulder pain in patients with upper limb weakness post stroke.

4.12.8 OTHER INTERVENTIONS

No RCTs were identified evaluating the following interventions for prevention of post-stroke shoulder pain:

- *Clostridium botulinum* toxin type A in patients with shoulder spasticity but without pain at baseline
- intra-articular steroid injections
- non-steroidal anti-inflammatory agents
- ultrasound.

No studies were identified evaluating the following interventions for prevention of post-stroke shoulder pain:

- intramuscular electrical stimulation
- complementary therapies compared to standard care in at-risk individuals.

4.13 TREATMENT OF POST-STROKE SHOULDER PAIN

4.13.1 SUMMARY OF RECOMMENDATIONS

Not recommended
<ul style="list-style-type: none"> shoulder strapping intra-articular steroids in the absence of inflammatory disorders
Insufficient evidence
<ul style="list-style-type: none"> physical therapy EMG-biofeedback slings or wheelchair attachments transcutaneous electrical nerve stimulation routine functional electrical stimulation intramuscular electrical stimulation <i>Clostridium botulinum</i> toxin type A <i>Clostridium botulinum</i> toxin type B NSAIDS ultrasound cryotherapy massage acupuncture/acupressure

There are many causes of shoulder pain in stroke patients. Some are as a consequence of the stroke (possibly related to spasticity, subluxation, poor positioning, (etc) but others may be related to pre-existing joint disorders, inflammatory joint conditions (eg inflammatory arthritis, adhesive capsulitis) and associated trauma (fractures and soft tissue injuries, eg rotator cuff disorders).¹⁰

It is important to consider potential causes of post-stroke shoulder pain and investigate and treat it accordingly. In the absence of pre-existing disorders or injury, in addition to analgesia, therapeutic strategies are usually based on the severity of upper limb weakness, amount of tone in the surrounding musculature (flaccid, normal or spastic), associated sensory impairment and/or neglect, the degree of joint subluxation and the presence of adhesive capsulitis.

- ☒ Given the complexity of post-stroke shoulder pain consideration should be given to use of algorithms (such as the simple example shown in Annex 3) or an integrated care pathway for its diagnosis and management.¹⁰

4.13.2 PHYSICAL THERAPY

A systematic review found limited evidence that exercise using the Bobath technique is superior to application of ice packs (cryotherapy) combined with exercise at reducing post-stroke shoulder pain.²⁰¹

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There is insufficient evidence to support the use of the Bobath technique for treating shoulder pain post stroke.

4.13.3 EMG-BIOFEEDBACK

A systematic review identified a small crossover study of 20 patients which showed a possible reduction in pain with EMG-biofeedback (when combined with relaxation techniques) compared to standard treatment.²⁰¹ Caution was advised in the interpretation of the results due to likely confounding effects.

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There is insufficient evidence to support the use of EMG-biofeedback for treating shoulder pain post stroke.

4.13.4 STRAPPING

A Cochrane review of four studies (142 participants) found some evidence from three RCTs that strapping the shoulder delays the onset of pain but does not decrease it.¹⁸⁹

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A

Shoulder strapping to treat post-stroke shoulder pain is not recommended.

4.13.5 SLINGS/WHEELCHAIR ATTACHMENTS

A systematic review found insufficient evidence to conclude whether or not slings and wheelchair attachments decrease shoulder pain post stroke.¹⁸⁹

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4.13.6 ELECTRICAL STIMULATION

A Cochrane review of four trials (170 participants) found no evidence to confirm or refute that FES or TENS is effective in reducing post-stroke shoulder pain when compared to conventional treatment, despite possible benefits in improving passive rotation and subluxation.¹⁹²

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In a later systematic review FES administered two months post stroke to induce contraction of the supraspinatus and/or posterior deltoid muscles was found to improve pain-free shoulder abduction (by up to 10 degrees), but the evidence was limited.¹⁹¹

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There is insufficient evidence to support FES as a treatment for post-stroke shoulder pain.

4.13.7 INTRAMUSCULAR ELECTRICAL STIMULATION

In an RCT of 61 patients with pre-existing shoulder pain and subluxation, percutaneous intramuscular neuromuscular electrical stimulation (NMES) given into selected muscles for six hours/day (2-3 sessions) for six weeks resulted in significant improvement in pain scores at six months when compared to use of a cuff-type sling.²⁰⁷ The benefit persisted to 12 months although no benefit on function was seen at any point.¹⁹³ Although the trial was reasonably well conducted, it is not certain whether the difference seen was due to a beneficial effect of NMES or an adverse effect of slings and was affected by a high drop-out rate.

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There is insufficient evidence to recommend the use of intramuscular electrical stimulation for the treatment of post-stroke shoulder pain.

4.13.8 BOTULINUM TOXIN

A well conducted RCT evaluated the use of *Clostridium botulinum* toxin type A (Dysport® 500 units injected once into the subscapularis muscle) versus a placebo injection in 20 patients with painful post-stroke spasticity (1+ on the Ashworth Scale) and limited shoulder rotation (10° or <30° relative to the unaffected side).²⁰⁸ A significant improvement in pain scores (on a 10 point verbal scale) at four weeks was seen with *Clostridium botulinum* toxin type A compared to placebo (four point improvement v one point respectively, p=0.025). The longer term benefit is unknown.

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Clostridium botulinum toxin type A (Dysport® injected into the pectoralis major and biceps muscles, total 500 units) was not superior to placebo in reducing pain levels at 12 weeks in an RCT of 17 patients with post-stroke shoulder pain and moderate adductor and elbow spasticity (2+ on the Ashworth Scale).²⁰⁹

In an RCT of 22 patients, *Clostridium botulinum* toxin type A injected at two locations in the subscapular muscle (Botox® total 100 units) was not superior to placebo in reducing pain levels in patients with moderate pain and spasticity (Ashworth score at the elbow 1+) with restricted passive external rotation (≤50% relative to unaffected arm).²¹⁰

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In a well conducted RCT in 29 patients with moderate to severe shoulder pain associated with moderate spasticity (≥3 on the modified Ashworth Scale), a single injection of *Clostridium botulinum* toxin type A (Dysport® total dose 500 units) given into four sites in the pectoralis major muscle, together with six weeks of TENS, was superior to placebo (plus TENS) in reducing pain levels at six months.²¹¹

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In an RCT of 29 hemiplegic patients with moderate shoulder pain and limited passive external rotation due to spasticity (limited by $\geq 20^\circ$ compared to the unaffected side), *Clostridium botulinum* toxin type A (Botox® injected into the infraspinatus, pectoralis major and subscapularis muscles at a maximum dose of 50 units per muscle; 100 units total) was superior to intra-articular triamcinolone acetonide 40 mg in reducing shoulder pain levels at 12 weeks.²¹²

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No studies were identified evaluating the efficacy of *Clostridium botulinum* toxin type B in the treatment of shoulder pain.

Clostridium botulinum toxin type A (Dysport® or Botox®) is not currently recommended for use within NHS Scotland for the treatment of focal spasticity, including arm symptoms associated with focal spasticity (see section 8.3).

4.13.9 INTRA-ARTICULAR STEROID INJECTIONS

A systematic review identified one RCT and one time series study evaluating the use of repeated intra-articular triamcinolone acetate in patients with non-inflammatory post-stroke shoulder pain.²⁰¹ A positive effect was seen in the time series, but the sample size was small ($n = 7$) and there was no control group. In the small multicentre RCT ($n = 37$), triamcinolone was no better than placebo at reducing pain levels and side effects were frequent. Overall there was no clear evidence of benefit of steroid treatment.

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A In the absence of inflammatory disorders, intra-articular steroids should not be used for treatment of post-stroke shoulder pain.

☒ Intra-articular steroids may be appropriate if shoulder pain is due to inflammatory conditions (eg inflammatory arthritis, adhesive capsulitis, etc). Limited external rotation due to adhesive capsulitis may be difficult to distinguish from that due to spasticity. In such cases specialist opinion is advised.

4.13.10 NON-STEROIDAL ANTI-INFLAMMATORY AGENTS

No RCTs were identified evaluating the use of non-steroidal anti-inflammatory drugs (NSAID) for treatment of post-stroke shoulder pain.

☒ NSAIDs may form part of a therapeutic strategy together with other analgesics for the symptomatic treatment of post-stroke shoulder pain.

4.13.11 ULTRASOUND

No RCTs were identified evaluating the use of ultrasound for the treatment of post-stroke shoulder pain.

4.13.12 CRYOTHERAPY

A systematic review found limited evidence that application of ice packs (cryotherapy) when combined with exercise in treating shoulder pain was inferior to exercise using Bobath technique.²⁰¹

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4.13.13 MASSAGE

In an RCT of 102 patients, slow-stroke back massage performed for 10 minutes at bedtime for seven consecutive days resulted in significantly lower median pain scores on a visual analogue scale at the end of the treatment period than controls (standard nursing care).²¹³ It is unknown whether the apparent beneficial effect persisted beyond the treatment phase. The trial was also heavily biased toward the intervention arm. There is insufficient evidence that slow-stroke back massage confers any benefit compared to conventional nursing treatment in post-stroke shoulder pain.

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4.13.14 ACUPUNCTURE/ACUPRESSURE

Deep dry needling acupuncture of myofascial pain syndrome trigger points (for five minutes, four times a day, for 5-7 days in total) in 101 patients with post-hemiparetic stroke shoulder pain resulted in significantly lower mean pain scores at 21 days than controls.²¹⁴ However this was an open label RCT subject to bias.

1-

In an RCT of 30 cases, aromatherapy acupressure (using lavender, rosemary and peppermint oils given at selected acupressure points around the shoulder for 20 minutes twice a day for two weeks) resulted in lower median pain scores at two weeks when compared to 'dry acupressure'. Sham oil was not used in the control group.²¹⁵

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There is insufficient evidence to recommend acupuncture or acupressure for treatment of post-stroke shoulder pain.

4.14 POST-STROKE FATIGUE

4.14.1 SUMMARY OF RECOMMENDATIONS

Insufficient evidence

- fluoxetine
- tirilizad
- chronic disease self-management programme
- modafinil

A case definition of post-stroke fatigue has been made for both community and hospital patients:

Post-stroke fatigue in community patients: Over the past month, there has been at least a two week period when the patient has experienced fatigue, a lack of energy or an increased need to rest every day or nearly every day. This fatigue results in difficulty taking part in everyday activities.²¹⁶

Post-stroke fatigue in hospital patients: Since their stroke, the patient has experienced fatigue, a lack of energy or an increased need to rest every day or nearly every day. This fatigue has led to difficulty taking part in everyday activities (for inpatients this may include therapy and may include the need to terminate an activity early because of fatigue).²¹⁶

Post-stroke fatigue is present in 68% of patients at six months after a stroke, 74% at 12 months and 58% at three years.²¹⁷ Fatigue is significantly associated with limitation in instrumental activities of daily living but this association is mostly related to associated depression and severity of the hemiparesis. Fatigue also impacts adversely on health-related quality of life.²¹⁷ Fatigue is rated as the worst symptom post stroke in 40% of patients and is a predictor of decreased functional independence, institutionalisation and mortality.²¹⁸ Fatigue is associated with older age following stroke and at three years post stroke there is a higher case-fatality rate.²¹⁹

In a community cohort fatigue was more common in patients at six months following a stroke (56%) than after a transient ischaemic attack (TIA) (29%) ($p=0.0008$). Fatigue was greater in those with increased initial severity of stroke (87% for those with National Institutes of Health stroke scale (NIHSS) >3 and 48% with NIHSS ≤ 3 ; $p=0.0087$). Patients who felt they had not made a full recovery from their stroke were more likely to be fatigued than those who felt they had made a full recovery.²²⁰

Few interventions have been studied in post-stroke fatigue. A systematic review of three small RCTs (239 participants) looking at the effect of fluoxetine (20 mg/day), tirilizad (100ml of 1.5 mg/ml for 10 days after subarachnoid haemorrhage) or a chronic disease self-management programme for post-stroke fatigue found no difference in fatigue between intervention and placebo groups at follow up.²²¹

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Modafinil has also been studied in post-stroke fatigue but there is insufficient evidence to support its use for post-stroke fatigue.^{222, 223}

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There is insufficient evidence to recommend interventions for management of post-stroke fatigue.

- ☒ Patients with post-stroke fatigue should be screened for depression.

4.15 DISTURBANCES OF MOOD AND EMOTIONAL BEHAVIOUR

4.15.1 SUMMARY OF RECOMMENDATIONS

Consider
<ul style="list-style-type: none"> ▪ antidepressants to treat post-stroke emotionalism ▪ education programmes based on psychological principles ▪ antidepressants to treat post-stroke depression
Not recommended
<ul style="list-style-type: none"> ▪ antidepressants or one-to-one psychological therapies to prevent post-stroke depression
Insufficient evidence
<ul style="list-style-type: none"> ▪ psychological interventions, patient education, advice or support for post-stroke emotionalism ▪ psychological (talking-based) therapy in the treatment of post-stroke depression ▪ psychological therapies (eg family therapy, interpersonal psychotherapy, behavioural activation treatment)

Mood disturbance is a very common problem after stroke, although there is some uncertainty about just how frequent different types of mood problems are, and about the precise psychosocial and physical factors associated with their onset.²²⁴ Diagnosis may be complicated by the similarity of symptoms of depression and anxiety to physical and cognitive changes associated with the stroke.²²⁵ Care must be taken not to see patients' and carers' natural emotional reactions as pathological.

Depression is particularly common, affecting one in three people who have had a stroke at some point during follow up, and is associated with slower progress in rehabilitation and a longer stay in hospital.²²⁶

Anxiety, with or without panic, may be generalised or may be associated with specific issues such as fear of falling or social embarrassment, which can lead to avoidance of certain situations.

Emotionalism or emotional lability is a lessening of control over emotions leading to a greater tendency to cry or laugh. These symptoms tend to get better with time, though emotionalism is long lasting for some individuals.²²⁷ The condition can be acutely embarrassing, and may interfere with rehabilitation efforts.

In the first instance, standardised screening assessments for depression and anxiety offer some indication that a mood problem exists, and can also be used as a standardised measure of an individual's progress during treatment. Members of staff can use these measures after appropriate training and support from a clinical or health psychologist. A number of different measures exist, each with their strengths and limitations. Verbal scales may be contraindicated where aphasia is present and an alternative may need to be sought.²²⁸ Visual and visuospatial problems may affect an individual's ability to fill in assessment questionnaires independently. Emotionalism can be confirmed by clinical interview by appropriately trained staff.

- ☑ Appropriate referral to health and clinical psychology services should be considered for patients and carers to promote good recovery/adaptation and prevent and treat abnormal adaptation to the consequences of stroke.
- ☑
 - All stroke patients (including those cared for in primary care) should be screened for mood disturbance.
 - Some form of screening should occur, eg using the Stroke Aphasic Depression Questionnaire (SAD-Q) or General Health Questionnaire of 12 items (GHQ-12):
 - as early as appropriate and definitely before discharge, and
 - at regular intervals thereafter
 - Clinical judgement should be used to determine how regularly mood should be re-assessed.

All screening measures have limitations (eg in specificity and sensitivity) so that some patients' problems will be missed or overestimated. Screening does not constitute a diagnosis of mood disturbance, and screening assessments in themselves do not provide a comprehensive insight into individuals' psychological difficulties.

- ☑ If an individual is suspected of having a mood disorder they should be referred to an appropriately trained professional for a full assessment, or to a rehabilitation team member who has received training in the identification of psychological distress.

Different kinds of mood disturbance may coexist and therefore the presence of one problem should not exclude assessment for others.²²⁹

4.15.2 EMOTIONAL LABILITY

Emotional lability is common following stroke, affecting approximately 1 in 10 survivors at one year post stroke, and more individuals immediately after stroke onset.²²⁷

A Cochrane review of treatments for post-stroke emotional lability identified five small (n < 30) RCT or quasi-RCT studies of antidepressant therapy.²²⁷ A more recent study (n = 152 participants) investigated the effect of antidepressant medication on post-stroke emotional lability.²³⁰ Antidepressant medication appears to reduce the frequency of emotional lability after stroke. Many factors that may influence the use of antidepressant medication, such as which patients benefit most, type of antidepressant to prescribe, duration of treatment, remain to be elucidated.²²⁷

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There is an absence of evidence for psychological interventions for post-stroke emotionalism and no group studies of patient education, advice or support were identified by a Cochrane review.²²⁷

Most existing studies are small and it is unclear how much clinical improvement antidepressant medication brings about. In addition, the impact of antidepressants has typically been assessed after short durations of treatment and it is not known how long patients should remain on treatment or whether treatment gains are maintained in the long term.

The evidence suggests that side effects are often experienced and treatment drop-outs in studies have ranged from 5% to 30%. Although antidepressants may be an efficacious treatment for post-stroke emotionalism, their impact may be limited if patients choose to discontinue them prematurely. Ultimately, patients and their clinicians may need to balance the potential risks and benefits of antidepressant treatment.

B Patients with post-stroke emotionalism may be considered for a course of antidepressant medication.

- ☑ Possible side effects of antidepressant treatment should be explained to patients prior to commencing treatment.

- ☑ Patients and carers should be offered a clear explanation and advice about emotionalism, and considered for psychological (talking-based) support if they have a poor response to antidepressant medication and show evidence of distress about their condition. Local psychological support, education and advice should be considered on an individual basis as available. Such advice should be embedded in general education programmes.

4.15.3 PREVENTING POST-STROKE DEPRESSION

Three systematic reviews included a total of 33 studies assessing serotonin reuptake inhibitors (SSRI) and tricyclic antidepressants (TCA) with mixed dosing regimens (fixed and variable) and varying treatment duration were identified.^{225, 231, 232} One review also included a range of psychological therapies involving problem solving and motivational interviewing given by a variety of healthcare professionals in differing environments.²²⁵

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There was no clear benefit from using antidepressants, or other drugs such as psychostimulants, to prevent depression and to improve recovery following stroke.²²⁵ There was no evidence of their acceptability to patients.

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A Cochrane review reported that motivational interviewing and problem solving strategies had a small positive effect, but the therapies themselves were delivered in one to one format, by staff who received high levels of supervision.²²⁵

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Equivalent therapy to prevent depression may prove difficult to provide in usual clinical care, however, motivational interviewing and problem solving techniques could be incorporated into structured (eg group) education sessions in order to promote post-stroke emotional adjustment.

A Routine prescription of antidepressants is not recommended to prevent post-stroke depression.

- B**
- Offering routine psychological therapies in one-to-one format following a stroke is not recommended to prevent post-stroke depression.
 - Psychological principles from motivational interviewing and problem solving should be incorporated into education programmes for people who have had a stroke.

- ☑ Stroke rehabilitation services should consider structured, psychologically-based programmes (incorporating education and advice) to target individuals' emotional adjustment to the impact of stroke, and to increase their sense of control over their recovery. Such programmes require staff training and ongoing evaluation to ensure clinical benefit.

4.15.4 TREATING POST-STROKE DEPRESSION

A Cochrane review identified 13 trials of antidepressants and four trials of psychological intervention for post-stroke depression (1,655 participants).²²⁵ Different antidepressants were used in different studies, usually for short time periods. The psychological therapies were similarly heterogeneous.

Antidepressants are effective for treating post-stroke depression, in terms of improving scores on mood scales, though confidence intervals tend to be wide. Most studies reported significantly more adverse events (ie side effects) in individuals receiving antidepressants than those receiving placebo. Many issues about antidepressant use in clinical practice (eg which patients should receive them; how long they should be prescribed; choice of antidepressant drug and optimal dosage; risk of relapse) remain unaddressed by the research literature. The effect sizes were generally small.

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No robust evidence was identified for the effectiveness of psychological (talking-based) therapy in the treatment of post-stroke depression. Trials that have been conducted have methodological weaknesses. Many psychological therapies (eg family therapy, interpersonal psychotherapy, behavioural activation treatment) have not been investigated in patients post stroke. There is, however, evidence from a single study that listening to music can have a positive impact on self reported depression scores.²³³

- A Patients with post-stroke depression should be considered for antidepressant treatment, with decisions made on an individual basis. Clinicians should monitor response to treatment, plan regular reviews and should be vigilant to the possible occurrence of unwanted side effects, issues of adherence to medication and the possibility of symptom relapse.**
- ☒ Clinicians need to make decisions on the choice of antidepressant on a case-by-case basis, taking into account factors such as risk of seizures, falls and delirium.
 - ☒ Patients who fail to respond to antidepressant therapy, or who do not wish to take medication, should be considered for a trial of talking-based therapy, with clinicians carefully monitoring response to treatment.
 - ☒ Clinicians should be aware that environmental factors (eg opportunities for social interaction, noise levels) often have an impact on mood, and should consider whether it is possible to alter these factors when individuals experience post-stroke depression.

4.15.5 POST-STROKE EMOTIONAL ADJUSTMENT

Many factors influencing the emotional impact of stroke have been described in qualitative studies.²³⁴ It has been proposed that the attitudes and beliefs of people who have had a stroke and their informal caregivers towards their recovery have a large impact on clinical outcome.²³⁵⁻²³⁷ In practice there are examples of cases where people who have had a stroke have made a better recovery than clinically expected.

No systematic reviews were identified that specifically focused on post-stroke adjustment and attitudes and beliefs about stroke and recovery.

Several RCTs, which varied in quality, were relevant to post-stroke adjustment, but the interventions were often broad based and some studies did not fully describe their interventions and often reported no outcomes.²³⁸⁻²⁴⁰

One study testing a stroke workbook intervention (the workbook provided information about stroke and recovery, guidance on coping skills and self-management, all along cognitive behavioural lines) found that after having a stroke, people who received the workbook had higher self efficacy (confidence in recovery) at the end of treatment than those who did not receive it.²⁴¹

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- ☒ People who have had a stroke should be considered for workbook approaches that aim to address their beliefs and attitudes about their recovery.

4.16 SEXUALITY

Having a stroke does not mean an end to a sex life for the patient. The wider concept of sexuality encompasses expression of attractiveness and intimacy, as well as sexual relations. The effects of stroke, such as motor or sensory impairment, urinary problems, perceptual alterations, tiredness, anxiety, depression, and changes in self image, self confidence and self worth can cause sexually-related difficulties. Medication, particularly antihypertensives, can also interfere with sexual function. The most common fear is that resuming sex may cause another stroke. The evidence indicates this is not true.²⁴²⁻²⁴⁴ After a stroke sexual activity can be resumed as soon as the patient feels ready to do so. During sex, heart rate rises no more than in normal daily activity and blood pressure does not rise significantly. Patients with known hypertension should be advised to take their medication as prescribed, and consult their doctor if they have any problems.

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- ☒ Healthcare professionals should provide advice and information to patients and partners about sexuality and sex after stroke on an individualised basis.

4.17 INFECTION

Infections are relatively common during stroke rehabilitation, particularly chest infection or urinary tract infection while in hospital.²⁰ Staff providing rehabilitation services should be aware of the possibility of infection.

- ☒ Stroke unit staff should recognise, assess, investigate and treat common infections such as chest or urinary tract infections.

4.18 PRESSURE ULCER PREVENTION

With adequate nursing resources and expertise, pressure ulcers should not develop during immobility after stroke. Risk assessment for pressure sores is a generic nursing skill and should be a part of routine hospital nursing care and community care. Guidance on the prevention and management of pressure ulcers is available.²⁴⁵

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- D**
 - Hospital managers should ensure that nursing expertise, staffing and equipment levels are sufficient to prevent pressure ulcers.
 - Hospitals should have up-to-date policies on risk assessment, pressure ulcer prevention and treatment.

4.19 VENOUS THROMBOEMBOLISM

4.19.1 SUMMARY OF RECOMMENDATIONS

Recommended
▪ aspirin in the first two weeks following stroke
Not recommended
▪ above-knee graduated compression stockings
Insufficient evidence
▪ below-knee graduated compression stockings

Hospital care in an organised stroke unit (see section 3.2) is likely to reduce the incidence of thromboembolism due to:

- early mobilisation rehabilitation policies (see sections 4.1.2 and 14.9.5)
- early hydration with normal saline
- specialised nursing care (see section 6.1).

4.19.2 EARLY MEDICAL TREATMENT

Anticoagulant therapy in the first two weeks after ischaemic stroke can cause haemorrhagic stroke or haemorrhagic transformation of the ischaemic stroke and has no net benefit.²⁴⁶ Low-dose aspirin has been shown to be safe and effective in preventing deep vein thrombosis (DVT) and pulmonary embolism.²⁴⁷

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- A** Aspirin (300 mg/day) should be given to all patients with acute ischaemic stroke in the first two weeks following stroke onset to help prevent deep vein thrombosis and pulmonary embolism (provided there are no known contraindications to aspirin therapy).

- ☒ Aspirin can be given by nasogastric tube or rectally (using 300 mg/day suppositories) for those who are unable to swallow.

Patients at a particularly high risk of early DVT following an ischaemic stroke (eg those with a history of previous DVT, known thrombophilia or active cancer) can be given prophylactic heparin. Low molecular weight heparin (LMWH) is recommended in preference to unfractionated heparin (UFH).⁷

4.19.3 MEDICAL TREATMENT TWO WEEKS FROM STROKE ONSET

It is not known when the early risk of haemorrhagic transformation of cerebral infarction returns to normal pre-stroke levels (or acceptable levels). It may be prudent to delay the use of heparin for patients at continued risk of DVT.

- ☑ Two weeks following acute ischaemic stroke, clinicians should re-assess the patient's risk for DVT and consider starting additional prophylactic medical treatment (eg heparin).

4.19.4 GRADUATED ELASTIC COMPRESSION STOCKINGS

A Cochrane review of physical methods for preventing DVT in acute stroke, which included two small randomised controlled trials totaling 220 patients, did not provide conclusive evidence on the balance of risk and benefit of GECS in stroke and concluded that there was insufficient evidence to support their use in routine clinical practice.²⁴⁸

A further RCT randomised 1,256 patients to thigh length GECS applied between admission and day three following acute stroke and 1,262 patients to usual care.²⁴⁹ No significant difference was reported between the two groups for the primary end point (symptomatic or asymptomatic popliteal or femoral vein DVT on Doppler ultrasound within 30 days). A significant increase in local skin damage was reported with GECS (OR 4.18, 95% CI 2.40 to 7.27). A non-significant trend towards lower limb ischaemia/amputation was reported with the GECS (OR 3.53, 95% CI 0.73 to 17.03).

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- A** Above-knee graduated elastic compression stockings to reduce the risk of deep vein thrombosis after acute stroke are not recommended.

4.19.5 EARLY MOBILISATION

A Cochrane review identified only one small RCT of early mobilisation in 71 patients, in which data on thromboembolism were not available. There is currently no evidence to support or refute the use of very early mobilisation (within 48 hours of stroke onset) to prevent venous thromboembolism (see section 4.1.2).²²

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4.20 FALLS

Falls are a common feature for patients after stroke. As some falls can lead to devastating complications, measures should be taken to minimise the risk of falling. Evidence from studies including older people support a multidisciplinary multifactorial approach, a common feature of organised stroke unit care (see section 3.2). Individually prescribed muscle strengthening and balance retraining programme, withdrawal of psychotropic medication and home hazard assessment and modification in people at high risk, for example with severe visual impairment, have been shown to be of benefit in reducing falls.²⁵⁰ These interventions are likely to be an integral component of well organised stroke care.

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Guidance is available on the assessment and prevention of falls,²⁵¹ and the Prevention and Management of Falls Community of Practice facilitates exchange of knowledge, information, good practice and resources to support the development of services for older people in Scotland at risk of falling (www.fallscommunity.scot.nhs.uk).

Osteoporosis needs to be recognised and guidance is available on the management of osteoporosis.²⁵²

4.21 RECURRENT STROKE

Recurrent stroke is outside the remit of this guideline as it is included in SIGN 108 Management of patients with stroke or TIA: assessment, investigation, immediate management and secondary prevention.⁷

5 Transfer from hospital to home

Early assessment of discharge needs and the involvement of patients and carers are important in discharge planning. Discharge planning should be divided into three parts: pre-discharge, discharge and post-discharge.

The level of intervention required by an individual will depend on their ability to participate.

5.1 PRE-DISCHARGE

5.1.1 SUMMARY OF RECOMMENDATIONS

Recommended	
▪	pre-discharge home visits

For many stroke patients and their carers the transition between the protective environment of the hospital to independence at home can be an overwhelming and challenging experience.

☒ The pre-discharge process should involve the patient and carer(s), the primary care team, social services and allied health professionals as appropriate. It should take account of the domestic circumstances of the patient or, if the patient lives in residential or sheltered care, the facilities available there.

☒ Essential alterations to the patient's home should be completed and necessary aids installed prior to discharge.

5.1.2 PRE-DISCHARGE HOME VISITS

Pre-discharge home visits are often considered a vital part of the discharge planning process.²⁵³

Pre-discharge home visits performed by various members of the multidisciplinary team (usually an OT) aim to give staff (hospital and community), stroke patients and carers the opportunity to identify actual and likely problems, as well as to address any other needs that the stroke patient/carer may have.

The UK College of Occupational Therapists defines a home visit as a visit to the home of a hospital inpatient which involves an occupational therapist accompanying the patient to assess his/her ability to function independently within the home environment or to assess the potential for the patient to be as independent as possible with the support of carers.²⁵⁴

D Pre-discharge home visits should be undertaken for patients who require them.

5.2 DISCHARGE

5.2.1 DISCHARGE PLANNING AND TRANSFER OF CARE

Discharge planning should be documented in a discharge document (*example shown in Annex 4*). Discharge documents may be paper or electronic (eg in Electronic Clinical Communications Implementation (ECCI) format).

The following information should be accurately and legibly displayed in the discharge documents:

- Diagnosis(es)
- Investigations and results
- Medication and duration of treatment if applicable
- Levels of achievement, ability and recovery
- Team care plan
- Further investigations needed at primary care level with dates
- Further investigations needed at hospital and dates
- Further hospital attendance with dates
- Transport arrangements
- The hospital name, hospital telephone number, ward name or number, ward telephone number
- Consultant's name and named nurse
- The date of admission and discharge.

Consideration should be given to such information being retained by the patient as a patient-held record, to allow all members of the primary care team, AHPs and care agencies to clearly see what the care plan for the patient should be. The wishes of the patient in respect of the confidentiality of this record should be paramount. There is evidence that patient-held records may enhance the patient's understanding and involvement in their care.²⁵⁵ There is also evidence to show that discharge planning increases patient satisfaction.²⁵⁶

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Patient-held records should have a minimum font size of 12 or larger as appropriate for those with visual impairment and be available in easy-access format for patients with aphasia. Information provided should include clear details of who to contact if there are problems after hospital discharge. Medical information given to patients or their carers should be in plain English (or alternative language if necessary), and discussed with the patient. The form must be signed by the staff member giving the information, and ideally also by the patient or their relative/carer to confirm that the discussion took place. Any information that has been given to the patient or their carer(s) should be included in the information given to the general practitioner (GP) (*see section 7 for guidance on information provision*).

- ☒ At the time of discharge, the discharge document should be sent to all the relevant agencies and teams.

5.3 EARLY SUPPORTED DISCHARGE AND POST-DISCHARGE SUPPORT

5.3.1 SUMMARY OF RECOMMENDATIONS

Recommended
<ul style="list-style-type: none">▪ early supported discharge for mild/moderate stroke▪ multidisciplinary ESD teams
Insufficient evidence
<ul style="list-style-type: none">▪ early supported discharge in remote and rural locations

A well conducted systematic review including 12 trials (1,659 patients) showed that early supported discharge (ESD) reduces death and dependency in patients with mild/moderate stroke when compared to conventional treatment.²⁵⁷ ESD services reduced length of hospital stay by an average of eight days, had no positive or negative impact on patients' subjective health or mood status and had no positive or negative impact on carer outcomes (including health status, mood and satisfaction). ESD appeared to be most effective when provided by a specialist multidisciplinary ESD team.

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ESD appears to be less expensive than conventional care.²⁵⁷

A Patients with mild/moderate stroke should be able to access stroke specialist early supported discharge services in addition to conventional organised stroke inpatient services.

B ESD teams should consist of a specialist multidisciplinary group including nursing, medical, physiotherapy, speech and language therapy and occupational therapy staff.

More research is required on the role of ESD in remote and rural locations.

5.4 HOME BASED OR OUTPATIENT REHABILITATION?

5.4.1 SUMMARY OF RECOMMENDATIONS

Consider

- home based or hospital based rehabilitation

The efficacy of home based rehabilitation after discharge from inpatient care compared to outpatient (or hospital based/day hospital) rehabilitation was addressed by a number of RCTs,²⁵⁸⁻²⁶² including two large trials (DOMINO and the Bradford Community Stroke Trial).^{263, 264} The small RCTs were of variable quality; the DOMINO and Bradford trials were good, well designed studies and although over 10 years old have not been superseded by better research. The trials found no difference in effectiveness between post-stroke rehabilitation provided in a domiciliary setting compared to a hospital based (outpatient or day hospital) setting.

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A Home based or hospital based (outpatient or day hospital) rehabilitation should be considered for people after stroke.

- ☒ Service planners should base decisions on local circumstances.

5.5 LONGER TERM STROKE REHABILITATION IN THE COMMUNITY

5.5.1 SUMMARY OF RECOMMENDATIONS

Recommended

- specialist therapy-based rehabilitation services

A Cochrane review of therapy-based rehabilitation services for stroke patients at home included trials comparing a therapy intervention with a control group who received either an alternative form of therapy or no therapy intervention.²⁶⁵ A total of 1,617 patients, who were treated after hospital discharge or who were never admitted to hospital, were included.

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Three types of therapy-based rehabilitation service for stroke patients living at home within one year of stroke were included.²⁶⁵ These were provided by physiotherapy, occupational therapy or multidisciplinary teams. The nature of therapy-based rehabilitation services evaluated varied across groups, however, they were taken together due to their common aim of reducing physical activity limitations by altering task orientated behaviour.

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Data on death or poor outcome (ie deterioration or dependency) were available for 1,350 (83.4%) patients in 12 trials. The pooled results show that overall, outcome was improved. Therapy-based rehabilitation services reduced the odds of a poor outcome (Peto odds ratio 0.72, 95% CI 0.57 to 0.92, $p=0.009$) and increased personal activity of daily living scores (standardised mean difference 0.14, 95% CI 0.02 to 0.25, $p=0.02$). For every 100 stroke patients resident in the community receiving therapy-based rehabilitation services, 7 patients (95% CI 2 to 11) would avoid a poor outcome, assuming 37.5% would have had a poor outcome with no treatment.²⁶⁵

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The authors concluded that therapy-based rehabilitation services targeted towards stroke patients living at home appear to improve independence in personal activities of daily living, however, the evidence was derived from a review of heterogeneous interventions and therefore further exploration of the interventions is required.

The Scottish Government 'Better Heart and Stroke Care Action Plan' suggests that NHS Boards, through their stroke MCNs, should investigate self referral to AHP services by those recovering from a stroke.¹⁵

A Stroke patients in the community should have access to specialist therapy-based rehabilitation services.

☒ NHS Boards should consider providing self-referral for stroke therapy services.

5.6 MOVING ON AFTER A STROKE

5.6.1 SUMMARY OF RECOMMENDATIONS

Recommended
<ul style="list-style-type: none"> referral to the local Disabled Drivers' Assessment Centre

After hospital discharge, the members of the primary care team, community rehabilitation team and care agencies, should continue to assess the patient's progress in partnership with the patient and carer(s). In the event that there is cause for concern, the first point of contact (usually the stroke liaison worker) is responsible for the appropriate referral of the patient to the correct team member or agency for assessment or treatment of the problem. This may include referral for readmission to hospital. Voluntary services or charities and social services provide a variety of different support schemes including stroke nurses, young stroke support workers, stroke clubs, day care, respite and communication support (see section 7.3).

5.6.2 RETURNING TO WORK

Twenty five per cent of stroke patients are aged under 65 years and the UK annual cost of lost work productivity due to stroke is estimated to be around £1.8 billion.²⁶⁶ Vocational rehabilitation, defined as 'the process of overcoming the barriers an individual faces when accessing, remaining in or returning to work', is therefore important not only to people who have had a stroke and their families but also to the wider community. Work may be paid employment or other purposeful activities, for example volunteering or undertaking adult education. The Scottish Government 'Better Heart and Stroke Care Action Plan' directs health services to provide vocational rehabilitation as part of their stroke rehabilitation services.¹⁵

Barriers to return to work identified by patients include lack of access to specialist vocational rehabilitation staff, pessimistic healthcare professionals, and insufficient scope of rehabilitation. Enablers included support and advice about employment, appropriately trained occupational therapists, and effective liaison between rehabilitation professionals and employers.²⁶⁶ Fatigue, memory impairment and difficulty concentrating can be as important as physical disabilities in decisions about appropriate work. Part-time work may be achievable even if full-time employment is not.

- ☑ Early in the rehabilitation pathway patients should be asked about vocational activities and liaison initiated with employers. Once work requirements are established patients should have appropriate assessments made of their ability to meet the needs of their current or potential employment.
- ☑ NHS Boards should consider providing a specific local expert therapist to provide advice to rehabilitation teams including signposting to relevant statutory services such as Disability Employment Advisors at Job Centres, organisations specifically providing opportunities for people with disabilities, eg Momentum, or voluntary services who can provide help and support, eg CHSS, Stroke Association, Disability Alliance (see section 7.3).
- ☑ People wishing to return to work should have access to advice on benefits, employment and legal rights and referral to social work if appropriate.
- ☑ Employers should be encouraged to provide skills retraining and flexible work opportunities to people returning to work after a stroke.

5.6.3 DRIVING AFTER A STROKE

Stroke can have a major impact on a person's ability to drive and/or their ability to use public transport, as well as their ease of use of both. Stroke teams should focus on maximising both mobility and safety. An inquiry should be made about pre-stroke driving and transport, and an assessment and rehabilitation should address the impact of stroke on transportation and implement strategies to advise, remediate, and where appropriate, compensate for any relevant deficits. This may require access to specialist on-road driving assessment.

The rules regarding driving after stroke are summarised in a guide published by the Driver and Vehicle Licensing Agency (DVLA).²⁶⁷ Stroke teams should be aware of this guide as these rules are governed by law. Doctors have a duty to inform patients of the rules regarding driving. Patients have a responsibility to act on this advice. Patients need to inform their insurance company.

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The DVLA also gives some guidance and links for people who may be considering using a power wheelchair or invalid carriage following their stroke.

Impaired executive function decreases driving safety but may be difficult to detect during routine clinic appointments.²⁶⁸⁻²⁷⁰

- ☑ Patients with stroke should be advised that they must not drive for at least one month after their stroke.
- ☑ Patients with residual activity limitations at one month must inform the DVLA (particularly if there are visual problems, motor weakness or cognitive deficits) and can only resume driving if their physician/GP agrees, or after formal assessment.
- ☑ When assessing whether a patient has made a satisfactory recovery, clinicians should be vigilant to possible executive function impairment.

D If there is doubt about a patient's ability to drive, patients should be referred to the local Disabled Drivers' Assessment Centre (details available from the DVLA).

5.6.4 PHYSICAL ACTIVITY AFTER STROKE

A stroke may have a considerable impact on a person's ability to participate in physical activity. After stroke physical fitness may be reduced to a level that is insufficient for undertaking even basic household tasks.²⁷¹ Impaired physical fitness after stroke presents a risk for recurrent stroke, cardiac disease and fall-related fractures,^{272,273} while it may also affect reintegration into the community.²⁷⁴

A systematic review of studies mainly including people who were ambulant, and who did not have severe cognitive or communication difficulties found that people who have had a stroke may benefit from physical fitness training (see section 4.2.8).²⁷⁵ Although there is insufficient evidence for the effectiveness and feasibility of exercise for people who are more severely disabled, national clinical guidelines recommend that people with stroke should be encouraged to participate in regular exercise and aerobic training where possible, and that this be promoted as part of a long term strategy.^{7,14} Advice to increase physical activity, even if this is repeated, is not sufficient to increase actual physical activity.²⁷⁶

The guidelines recommend that services need to be available in the community to encourage people with stroke to engage in physical activity. Currently, partnerships are developing between NHS Boards and the leisure industry.¹⁵ The following service models exist:

- exercise classes provided by physiotherapists and stroke nurses in rehabilitation settings
- exercise services run by community based leisure centres. These may be stroke-specific or mixed
- physical activity sessions run by local stroke charities, based on demand from members. This is implemented either through seated exercise, incorporated into existing support groups, or alternatively more structured gym based sessions delivered through opportunistic collaborations with local health and/or exercise professionals.

Good practice guidelines for exercise after stroke services are currently being developed.²⁷⁷ Key recommendations include:

- The service should be governed appropriately, eg by a multidisciplinary group comprising service users, local stakeholder organisations, and representatives from Stroke Managed Clinical Networks.
- Robust procedures should be followed for screening and referral. People with stroke should be referred to stroke-specific or general exercise referral sessions by their GP or hospital consultant or other pre-agreed healthcare professional, for example a physiotherapist.
- It is recommended that exercise practitioners have completed accredited training on exercise after stroke (ie a Level 4 qualification endorsed by SkillsActive).²⁷⁸

It is also important for service providers to consider the psychosocial aspects of physical activity. Evidence from qualitative studies suggests that people with stroke undertaking exercise may benefit from the social aspects of the service.^{279, 280} It needs to be acknowledged that not every person with a stroke who would benefit from an increase in physical activity wishes to participate in exercise training classes. Therefore, to increase the level of physical activity after stroke in a manner that is safe, effective, and enjoyable for participants, further research is required into barriers and motivators for physical activity, in order to inform the development of other types of physical activity that are likely to encourage long term participation.²⁸¹

5.7 GENERAL PRACTITIONER CARE

The GP also has an integral role in the multidisciplinary management of patients with stroke.¹² GPs have particular strengths in problem solving, treating comorbidities in the patient, and helping carers who may have illnesses of their own to cope with the additional burden of caring. GPs have knowledge of services available both in the hospital and in the community, giving them a role in coordinating the various services including hospital based services, social services and AHPs. The GP is responsible for key decisions at certain points in the patient journey, such as whether and where to admit the patient. The GP is responsible and accountable for prescribing to patients in the community. The GP's role is critical at the time of first diagnosis when decisions regarding further investigation and possible admission have to be made with the patient and the carers.

D If the patient is to be admitted, the GP should communicate with the hospital staff the basis of the diagnosis, the pre-morbid condition of the patient, any relevant social factors and past medical history, including current medication and known allergies.

- ☑ Out of hours, the referring GP should ensure that the Emergency Care Summary which details essential information for out of hours doctors obtained from the patient's own general practitioner, is provided for the admitting hospital staff with the consent of the patient.

The GP also plays a pivotal role in the discharge of patients back to the community. These patients often have a complex treatment and rehabilitation strategy with multiple co-morbidities.

D For successful discharge, the GPs and community staff should receive adequate information from the hospital prior to discharge.

- ☑
 - Detailed information on continuing medication as well as prescribing changes made in hospital and the reason for such changes should be provided.
 - GPs should aim to enable patients to receive appropriate rehabilitation to maintain and improve levels of functioning while monitoring the patient's physical and emotional well-being.
 - Secondary prevention, medication and lifestyle interventions for patients after stroke should also be monitored in primary care.
 - Pain should be identified, assessed and treated. Where pain is unresponsive to standard treatment, patients should be assessed for central post-stroke pain.

The GP plays a key part in ongoing medical care of the patient, and in reinforcing education, support, lifestyle alterations and secondary prevention and is well placed to identify deterioration in function which may occur post discharge and arrange for referral for further therapy.

6 Roles of the multidisciplinary team

This section addresses the important components of multidisciplinary team care in terms of the roles of the team members as defined by stroke unit trials, observational studies or expert opinion. Table 2 emphasises the importance of communication within the multidisciplinary team.

Table 2: Role of multidisciplinary team members

Communication between team members:
▪ attending multidisciplinary meetings and case conferences
▪ specific liaison with other professionals, teaching staff, patients and relatives
▪ setting and meeting appropriate goals
▪ supporting patients and families
▪ liaison with other healthcare professionals through networks and specific training in the management of stroke.

6.1 NURSING CARE

Stroke nursing focuses on the holistic needs of the patient and family, involving the physical, psychological, cognitive, emotional, spiritual and social care. The impact of these aspects is varied and unique to each patient and family. The nurse considers the individual's needs working collaboratively with the patient and their families to involve them in a meaningful way with decision making and their recovery. Stroke nursing is delivered within a context of multidisciplinary working enabling the sharing and integration of clinical practice. Stroke nursing is a continuous 24 hour process throughout the patient's journey of care, wherever the setting. Nursing people with stroke requires nurses with knowledge, clinical skills, confidence and interest to deliver effective therapeutic care and rehabilitation. Nurses require education, training and practice development in stroke care.

6.1.1 THE KEY ELEMENTS OF GOOD STROKE UNIT NURSING CARE

The key elements of good stroke unit nursing care are:¹¹

- removing the competition for nursing time
- recognition of stroke nursing as a specialisation, eg swallow screening
- empowering nurses to become facilitators of rehabilitation, therapeutic interventions and enabling independence
- knowledge, clinical skill, confidence and interest
- multidisciplinary team working and collaboration
- enabling nurses to coordinate patient care
- nursing assessment of the care needs of the patient, including a formal scoring of pressure sore risk and swallow screening
- nursing management of the patient's care needs, maintaining the patient in a correct posture and position and regular observation of key characteristics, such as airway, swallowing, nutritional status, continence and skin integrity
- active patient and family contact and interaction.

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B Stroke inpatients should be treated 24 hours a day by nurses specialising in stroke and based in a stroke unit.

6.2 PHYSICIAN CARE

The physician members of the stroke multidisciplinary team will comprise consultant(s), other career grade physicians and trainees at various stages of training. Roles will vary depending on experience and responsibility.

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The physician should have a background and training in general medicine, clinical pharmacology, geriatric medicine, neurology, or rehabilitation medicine, and be able to call on skills of colleagues when referral is appropriate.

The general role of the physician is to carry out appropriate responsibilities (as defined by the British Association of Stroke Physicians)²⁸² and in many cases to lead, coordinate and develop the skills and decisions of the multidisciplinary team (see *Table 3*). Physicians will understand the concept of multidisciplinary working in stroke rehabilitation and the criteria for successful multidisciplinary working. There will be an appreciation of the roles of other professionals within stroke rehabilitation and an in depth understanding of the role of the stroke physician within multidisciplinary stroke rehabilitation. Particular skills and responsibilities will be appropriate to the nature and emphasis of the stroke unit (acute, rehabilitation).

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Table 3: The key elements of physician care

The role of the stroke physician	
<ul style="list-style-type: none"> ▪ Diagnosing stroke syndrome ▪ Providing acute stroke treatment ▪ Investigating stroke aetiology ▪ Preventing secondary stroke ▪ Providing information ▪ Diagnosing and treating complications arising from stroke, inter-current illness or comorbidity 	<ul style="list-style-type: none"> ▪ Leadership of the stroke team ▪ Service development ▪ Education ▪ Audit ▪ Research ▪ Providing local clinical guidelines ▪ Translating up-to-date research into clinical practice

D Consultants with an interest in stroke, after adequate training and with appropriate continuing professional development, should be available to coordinate every stroke service or unit.

6.3 PHYSIOTHERAPY

Physiotherapists are experts in the assessment and treatment of movement disorders. Physiotherapy involves the skilled use of physical interventions in order to restore functional movement, reduce impairment and activity limitations and maximise quality of life after a stroke. These interventions commonly involve exercise, movement and the use of electrical treatments. Physiotherapists are generally involved in the care and rehabilitation of patients from the onset of the stroke, often daily and for many months and, in some cases, years.¹² Physiotherapists work with stroke patients in a variety of settings, including stroke units, acute admission wards, general medical wards, rehabilitation units, day hospitals, community day centres, outpatient clinics and their own homes (see *Table 4*).

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Table 4: The key elements of physiotherapy

Assessment:	Intervention:
<ul style="list-style-type: none"> ▪ assessing, planning and initiation of acute stroke rehabilitation ▪ identifying current movement capabilities and movement potential, eg <ul style="list-style-type: none"> - respiratory function - muscle tone - body alignment and range of joint motion - movement status - sensation - visuospatial awareness - undesirable compensatory activity - balance - mobility, eg walking, transfers, stair climbing 	<ul style="list-style-type: none"> ▪ providing planned, staged rehabilitation to meet agreed goals ▪ liaising and involving family/carers in rehabilitation ▪ providing rehabilitation leadership skills ▪ service development ▪ education ▪ clinical audit and research ▪ translating up-to-date research into clinical practice ▪ participating in development of local clinical guidelines

As stroke frequently results in physical deficits which impair the ability to move, a central aim of physiotherapy will be to work with other team members to promote the recovery of movement and mobility. Physiotherapists will plan and implement treatments for individual patients, based on the assessment of their unique problems. Key elements of these patient-specific treatment strategies may involve restoring balance, re-educating mobility, and promoting functional movement. Physiotherapists should set and meet relevant short and long term goals, which have been discussed, where appropriate, with patients, carers and other team members.

Physiotherapists work closely and intimately with stroke patients and should have the ability to empathise and communicate with patients in the most challenging of circumstances. Physiotherapists should aim to achieve an evidence based approach to stroke management through regular training and updating and should be involved in appropriate investigation, audit and research activity.

D All patients who have difficulties with movement following stroke should have access to a physiotherapist specialising in stroke. Physiotherapy treatment should be based on an assessment of each patient's unique problems.

6.4 SPEECH AND LANGUAGE THERAPY

Speech and language therapists are an integral part of the stroke care team. Their particular field of expertise lies in the assessment and management of communication disorders and dysphagia following stroke (see section 4.6, 4.7 and Table 5). Dysphagia is the subject of a separate SIGN guideline (SIGN 119).⁶

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Table 5: The key elements of speech and language therapy

Providing a diagnostic service:	Identifying an individualised speech and language therapy care programme, eg:
for disorders of communication and swallowing	<ul style="list-style-type: none"> rehabilitating specific processes teaching compensatory strategies supporting achievement in personal short and longer term goals supporting patients and family during a period of adjustment
Providing information:	Facilitating access to information regarding:
to patients, carers and healthcare staff about impairments/disabilities, related abilities and management of disorders of communication and swallowing	<ul style="list-style-type: none"> coping strategies therapies available support groups eg Chest Heart and Stroke Scotland, Speakability
Detailed assessment:	Facilitating referral:
using both formal and informal approaches to identify strengths and weaknesses, impact on the individual and family and psychosocial situation and general well-being	to other professional support

D Speech and language therapists should be involved in stroke management at all stages in the recovery process and should liaise closely with all related healthcare professionals, with outside agencies, both statutory and voluntary, with the individual who has had a stroke and with his/her carers.

6.5 OCCUPATIONAL THERAPY

Occupational therapists treat people who have impairments, restricted activity levels and limited ability to participate as a result of injury or illness, in order to achieve the highest level of independence possible.²⁸³ The state registered occupational therapist works in partnership with the patient, carer and other healthcare and voluntary personnel at all stages from acute through to outpatient and community care.

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The occupational therapist will identify the individual aspects that make up a person's ability to carry out selected activities, (ie physical, cognitive, perceptual, psychological, social, environmental and spiritual) and will include jointly agreed goals and purposeful activity in their interventions (see *Table 6*). They will use purposeful activity to promote the restoration of function and to maximise participation in meaningful activities, ie occupations of self care, domestic, social and work roles.¹²

A Cochrane review of nine randomised controlled trials including 1,258 patients found that occupational therapy focused on improving personal activities of daily living after stroke improves performance and reduces the risk of deterioration in these abilities. Occupational therapy delivered to patients after stroke and targeted towards personal activities of daily living increased performance scores (SMD 0.18, 95% CI 0.04 to 0.32, $p=0.01$) and reduced the risk of poor outcome (death, deterioration or dependency in personal activities of daily living) (OR 0.67, 95% CI 0.51 to 0.87, $p=0.003$).²⁸³

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Table 6: The key elements of occupational therapy

Assessment:	Intervention:
<ul style="list-style-type: none"> ▪ using activity analysis, in which the components of an activity are identified, along with the individual's limitations in carrying it out ▪ assessing skills which impact on present activity (eg sensorimotor, cognitive, perceptual and psychosocial impairments) ▪ assessing skills for the performance of self care (eg washing, dressing, feeding), domestic (eg shopping, cooking, cleaning), work and leisure occupations ▪ assessing social environment (eg family, friends, relationships) ▪ assessment of physical environment (eg home and workplace) 	<ul style="list-style-type: none"> ▪ helping each patient achieve the highest level of independence possible ▪ redeveloping physical, sensory, cognitive, and perceptual skills through activity and practice ▪ promoting the use of purposeful, goal orientated activity ▪ teaching new strategies to aid optimum level of function ▪ assessing and advising on appropriate equipment and adaptations to enhance independent function ▪ assessing for and providing appropriate seating and advising on positioning ▪ assessing, advising and facilitating transport and mobility issues such as driving ▪ facilitating the transfer of care from acute stages through rehabilitation and discharge ▪ liaising, working with, and referring to other professionals as part of a multidisciplinary team ▪ educating the patient and carer in all relevant aspects of stroke care ▪ liaising with support groups, and voluntary bodies

B

All patients who have problems with activities of daily living following stroke should have access to an occupational therapist with specific knowledge and expertise in neurological care. Occupational therapy treatment should be based on an assessment of each patient's unique problems.

6.6 SOCIAL WORK

The social worker is a member of the multidisciplinary team delivering care to stroke patients.¹² The social worker, who is employed by the local authority, should have an understanding of the illness and its effect on the patient, the carers and family. As well as being aware of the physical problems of a stroke, the social worker should also be aware of the psychological and emotional effects of stroke illness so that he/she can best understand the patient's needs.

The social worker works closely with individual members of the multidisciplinary team and is especially aware of therapist's reports in thinking about the needs of the patient. Social workers become involved with patients at different stages of the rehabilitation process, depending on what problems the patient, carers and family may have. Some patients will need advice and information from the social worker early in their journey of care because of financial, relationship or housing problems.

The social worker requires a wide knowledge of resources in the community so that he/she is able to advise the team and the patient about what is available for the patient on discharge. It is the social worker's role to advise the team about the timescale for implementing care packages and for discussing alternative forms of care if that is required.

As the time for discharge approaches, the social worker will normally become more involved with patients, especially those who have complex needs. The social worker will complete community care assessments for patients in consultation with the multidisciplinary team, patient and the family. It is important for the social worker to be aware of the patient's own goals and expectations and to be able to assess any risk to the patient. The social worker will then organise the appropriate care, either in the community or in residential homes as may be required. The social worker will then go on to work with the patient and family for a period of time after discharge to ensure that rehabilitation plans are meeting their needs in whatever setting and to support patients and families in organising and re-assessing any difficult situations that may arise.

D

A social worker should be a member of the multidisciplinary team and should have a key role in the discharge planning process.

6.7 CLINICAL PSYCHOLOGY

Emotional and personality changes and some degree of cognitive impairment are present in many patients after a major stroke. These problems can be a significant concern for relatives and a source of stress-related illness.

The role of the clinical psychologist working within this field is to define neuropsychological impairment, to alleviate psychological distress and promote well-being and quality of life by developing, applying and promoting the proper application of psychological knowledge, skills and expertise (see *Table 7*).²⁸⁴ This is carried out through direct clinical work or indirect consultancy, as judged appropriate by the clinical psychologist. Indirect work may include supervision, teaching, research and audit. Clinical psychologists who are members of the division of Clinical Neuropsychology of the British Psychological Society have additional training and experience in neuropsychology, and are able to provide higher level specialist skills within this field.

Table 7: The key elements of clinical psychology

Direct work with people after a stroke includes:	Services to carers and professionals include:
<ul style="list-style-type: none"> ▪ a detailed neuropsychological assessment of intellectual/cognitive impairment, behaviour, daily functioning, difficulties with interpersonal relationships and emotional problems ▪ teaching of new skills and strategies to circumvent intellectual/cognitive impairments including difficulties with attention, memory and perception ▪ using skilled therapeutic interventions to alleviate mental health problems such as depression, anxiety in patients and their carers and to manage changes such as mood disturbance if these become a problem (see section 4.15) ▪ using appropriate techniques to manage difficult behaviour which can result in reduced stress to the individual, their carers and health professionals 	<ul style="list-style-type: none"> ▪ working within a multidisciplinary team to use the results of psychological assessments in order to develop appropriate individual care programmes ▪ training, supervising or consulting with other professionals to aid them in their direct clinical work ▪ working with families on adjusting and understanding the cognitive deficits experienced by their relatives
	Services to planners include:
	<ul style="list-style-type: none"> ▪ designing service evaluation and audit projects to identify psychological needs within a service and to provide information about service use and outcome ▪ undertaking research aimed at improving the understanding of psychological problems in this client group and the efficacy of assessment and treatment methods

D Each multidisciplinary stroke team should have access to a clinical psychologist.

Other professionals are also qualified to work with patients with mood disorders or emotional changes after a stroke. For example psychiatrists have a role in working with complex mood and behavioural disorders while counselling may be generic or may be offered by a more highly trained professional using specific theoretical models.

6.8 DIETETIC CARE

Dietitians can offer specialist advice to patients with nutritional problems post stroke. This may include assessing patients who are deemed nutritionally at risk during an initial nutrition screen, advising on the nutritional adequacy of modified texture diets, advising on the transition from artificial nutrition onto oral diet, and addressing secondary prevention.

Dietitians are able to deliver complex dietary advice in layman's terms, and are experts in advising patients who may have multifaceted dietetic needs (eg diabetes mellitus, hyperlipidaemia, hypertension as well as dysphagia; see Table 8).

Table 8: The key elements of dietetic care

The role of the dietitian	
<ul style="list-style-type: none"> ▪ Raising awareness of the impact of malnutrition on recovery post stroke ▪ Overseeing the implementation and monitoring of nutritional screening ▪ Assessing nutritional requirements, and advising patients on how to achieve good nutrition using artificial nutrition, food fortification or supplements as appropriate ▪ Advising staff, patients and carers on meeting nutritional requirements on a texture modified diet ▪ Reviewing, monitoring and advising patients and carers during the transition from artificial nutrition support to oral diet 	<ul style="list-style-type: none"> ▪ Advising patients and carers on secondary prevention of stroke ▪ Adapting the nutrition care plan to take into account existing/newly diagnosed medical conditions (ie diabetes mellitus, hyperlipidaemia, coeliac disease, renal impairment) ▪ Liaising with catering departments to ensure provision of appropriate, nutritionally adequate meals for dysphagic patients ▪ Facilitating discharge for patients requiring ongoing artificial nutrition ▪ Liaising closely with SLT

Adapted from The Value of Nutrition and Dietetics for Stroke Survivor, produced by British Dietetic Association, 2007 (www.bda.uk.com).

6.9 ORTHOPTIC CARE

Orthoptists are experts in the assessment and treatment of eye movement disorders and visual impairment following stroke. Diplopia, reduced vision, ocular muscle imbalance, visual field deficits and visual inattention are common visual deficits that occur following stroke. Orthoptists can assist with many of these problems by providing information on compensatory strategies, suggesting reading aids, using prisms and occlusion for diplopia or visual disturbances and advising on visual search techniques for visual field loss and inattention. Orthoptists provide a direct link through to further specialist eye services such as optometry and ophthalmology, the latter being essential for registration of visual impairment. Orthoptists can provide quantitative assessment of vision required for driving standards.

Table 9: The key elements of orthoptic care

Assessment:	Intervention:
<ul style="list-style-type: none"> ▪ using quantitative and qualitative tests to investigate the visual status of the patient ▪ providing an explanation regarding the presence of nystagmus and explaining the symptoms of oscillopsia, vertigo or blurring ▪ assessing visual field loss and arranging formal visual field assessment; providing the patients with the option of referral to ophthalmology for consideration for partially sighted registration where applicable ▪ assessing and identifying the extent of visual inattention/spatial neglect ▪ providing written/verbal information to the MDT on the ocular status of the patient such as: identifying the patient's glasses that are required for reading and distance tasks; identifying if the patient has any difficulty with their vision that may affect balance, judging distances and mobility 	<ul style="list-style-type: none"> ▪ advising, in the presence of ocular motility disorders and in particular gaze palsies, how to use residual visual functions including compensatory head postures/ movements and positioning of objects ▪ helping to alleviate symptoms of diplopia or asthenopia using prisms, occlusion, orthoptic exercises or compensatory head postures ▪ advising on the strategies available to manage visual field loss and visual inattention/spatial neglect ▪ providing advice, in the presence of nystagmus, on compensatory head postures or positioning and using prisms or occlusion where appropriate to lessen symptoms

6.10 PHARMACEUTICAL CARE

Pharmacists work as part of the multidisciplinary team to provide patient-focused medication-related care. This 'pharmaceutical care' has been defined as 'The responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life'.²⁸⁵

In providing medicines, pharmacists share the responsibility of ensuring best use of the medicines, whilst protecting the patient from harm from those medicines.

Pharmacists aim to ensure the exact purpose of drug treatment and the desired patient outcomes are clear and shared by doctors, patients and other multidisciplinary team members. Where possible, the outcome of treatment is expressed in terms of the patient's quality of life (see *Table 10*).

Table 10: The key elements of pharmaceutical care

The role of the pharmacist	
<ul style="list-style-type: none"> ▪ Providing information to patients, carers and healthcare staff about medicines and their safe use ▪ Providing individualised pharmaceutical care plans eg: <ul style="list-style-type: none"> - appropriate and evidence based medicines - safe administration of medicines, eg liquids or by enteral feeding tubes - minimising side effects - avoiding medicine interactions 	<ul style="list-style-type: none"> ▪ Assessing an individual's ability to manage their own medicines, and identifying suitable support to enable this, eg: <ul style="list-style-type: none"> - medication charts - easy-open containers - large print labels ▪ Facilitating transfer of care for patients by communicating with both health and social care staff about individual needs ▪ Ensuring the continued provision of medicines from both secondary and primary care, eg <ul style="list-style-type: none"> - organising delivery of medication - weekly supply if necessary

Adapted from the United Kingdom Clinical Pharmacy Association (UKCPA) Statement on Pharmaceutical Care.²⁸⁶

7 Provision of information

This section reflects the issues likely to be of most concern to patients and their carers. These points are provided for use by health professionals when discussing rehabilitation after stroke with patients and carers and in guiding the production of locally produced information materials.

7.1 INFORMATION NEEDS OF PATIENTS AND CARERS

A characteristic feature of stroke unit care is the provision of information about stroke and stroke rehabilitation to patients and carers. What is less clear is how best to disseminate such information.

Six systematic reviews were identified: one focusing on patients and carers (17 studies of 1,773 patients and 1,058 carers),²⁸⁷ five focusing on the needs of carers only (65 studies in total),²⁸⁸⁻²⁹² one also considering reintegration into society following stroke,²⁹² and another, whilst of poor quality and inconclusive about how best to provide information, highlighting carer information needs.²⁹¹ The evidence suggests that information should be provided routinely using active information provision strategies which involve patients and carers, and include a mixed approach of education and counselling.

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Active information provision was defined as an intervention which, following the provision of the information, includes a purposeful attempt to allow the participant to assimilate the information and which incorporates planned follow up for clarification and consolidation or reinforcement, for example offering repeated opportunities to ask questions. Active information provision has been shown to improve knowledge of stroke, increase aspects of patient satisfaction and reduce patient depression scores as measured by the Hospital Anxiety and Depression Scale (HADS). However, the reduction in depression scores was small and probably clinically insignificant.²⁸⁷

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Research examining the information needs of patients is, in isolation, of poor quality but collectively suggests that patients, carers and health professionals all have differing information needs which need to be considered individually and collectively.²⁹³⁻²⁹⁷

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However, the provision of consistent information is regarded as a very important task for all members of the multidisciplinary team.

How function and mood may benefit as a result of active information strategies remains unclear. There is a need for clarity regarding definitions of terms associated with patient and carer information provision. A range of useful resources and tool kits is available to support the development of and provision of information for people with communication support needs:

- Communication Forum Scotland. Talk for Scotland. A practical toolkit for engaging with people with communication support needs (www.communicationforumscotland.org.uk)
- Scottish Accessible Information Forum, SAIF (www.saifscotland.org.uk)
- www.improvingsupport.org.uk/equalityanddiversity
- www.communicationpeople.co.uk

D Stroke patients and their carers should be offered information about stroke and rehabilitation.

A Information should be available to patients and carers routinely and offered using active information strategies, which include a mixture of education and counselling techniques.

A Information should be tailored to the information needs of individual patients and carers, followed up to check understanding and ensure clarity, and repeated as appropriate.

D Information should be tailored to the communication needs and visual needs of individual patients and carers. Patients with aphasia should be provided with accessible and easy to read material, be given sufficient time for assimilation and be followed up by health professionals to ensure understanding.

A

Information needs should be monitored and information should be provided at appropriate time points during the recovery trajectory, as information needs change over time.

7.2 CARER SUPPORT

It is common for carers to experience strain, including anxiety and/or depression at some point after the stroke, which may persist into longer term care.^{298,299} In other areas of acquired brain injury, anxiety has been associated with the presence of cognitive deficits or behavioural changes in the patient. Studies of carers of stroke patients have also found this but not consistently. Patients who are irritable or depressed may be more likely to have a depressed spouse. There is no evidence that any of these associations are causative. However, these factors may serve as warning signs to those assessing whether a family is under strain.

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Where a carer is suspected of being clinically depressed or anxious, they should be encouraged to seek help by contacting the appropriate member of the general practice team.

A list of some of the organisations that provide support and information for stroke patients and their carers is included in section 7.3.

7.3 SOURCES OF FURTHER INFORMATION

7.3.1 NATIONAL ORGANISATIONS SPECIFIC TO STROKE

Aphasia Now

www.aphasianow.org

People with aphasia helping each other to become independent, communicate with other aphasic people and overcome aphasia together.

Aphasia Help

www.aphasiahelp.org

Explains about stroke and aphasia.

Chest, Heart and Stroke Scotland

65 North Castle Street, Edinburgh, EH2 3LT

Tel: 0131 225 6963 • Advice Line: 0845 077 6000 • Fax: 0131 220 6313

www.chss.org.uk • Email: admin@chss.org.uk

Offers communication support through the volunteer stroke service (VSS), the CHSS Advice Line, website and patient information, stroke nurses and young stroke support workers, local stroke support groups, stroke training programmes, Stroke Voices, enabling patients and carers to participate meaningfully in MCNs and other NHS stroke planning groups, backed up by free booklets, fact sheets DVDs and videos.

Connect: the communication disability network

16-18 Marshalsea Road, London, SE1 1HL

Tel: 020 7367 0840

www.ukconnect.org • Email: info@ukconnect.org

Works to promote effective services, new opportunities and a better quality of life for people living with aphasia. Useful publications for people with aphasia and carers of people with aphasia are available.

Different Strokes (Scotland)

53 Elmore Avenue, Glasgow, G44 5BH

Tel: 0141 569 3200

www.differentstrokes.co.uk • Email: glasgow@differentstrokes.co.uk

Helps people of working age who have had a strokes to optimise their recovery, take control of their own lives and regain as much independence as possible by providing a national network of weekly exercise classes, practical, easy to use information, newsletters, interactive website and 'StrokeLine' telephone service.

Speakability

1 Royal Street, London, SE1 7LL

Helpline: 080 8808 9572

www.speakability.org.uk • Email speakability@speakability.org.uk

Offers impartial information and support and self-help for people with aphasia and their carers through its helpline, website and training courses, and distributes its own fact sheets, low-cost publications and videos.

Stroke Association

Links House, 15 Links Place, Edinburgh, EH6 7EZ

Tel: 0131 555 7240 • National stroke helpline: 0845 30 33 100 • Fax: 0131 555 7259

www.stroke.org.uk • Email: scotland@stroke.org.uk

Funds research into prevention, treatment and better methods of rehabilitation. It also produces publications including patient leaflets, Stroke News (a quarterly magazine) and information for health professionals.

7.3.2 OTHER ORGANISATIONS

Befriending Network Scotland

45 Queensferry Street Lane, Edinburgh, EH2 4PF

Tel: 0131 225 6156

www.befriending.co.uk • Email: info@befriending.co.uk

Provides an online directory of befriending projects in Scotland to help patients and carers find a befriender in their area.

Carers Scotland

91 Mitchell Street, Glasgow, G1 3LN

Tel: 0141 221 9141

www.carerscotland.org • Email: info@carerscotland.org

Provides information and advice to carers on all aspects of caring.

Crossroads Scotland

24 George Square, Glasgow, G2 1EN

Tel: 0141 226 3793

www.crossroads-scotland.co.uk

Provides practical support to carers.

DVLA Drivers Group

DVLA, Swansea, SA99 1TU

Tel: 0300 790 6806 • Fax: 0845 850 0095

www.direct.gov.uk/en/Motoring/DriverLicensing/MedicalRulesForDrivers/index.htm • Email: eftd@dvla.gsi.gov.uk

Medical conditions can be notified by post, telephone or fax, or by email.

Momentum

Pavilion 7 Watermark Park, 325 Govan Road, Glasgow G51 2SE

Tel: 0141 419 5299 • Fax: 0141 419 0821

www.momentumsotland.org • Email: headoffice@momentumsotland.org

Enables and empowers disabled people to remain active citizens through the provision of mainstream employment and personal support services.

NHS 24

Tel: 0854 24 24 24

www.nhs24.com

NHS 24 is a 24 hour nurse-led helpline providing confidential healthcare advice and information.

Princess Royal Trust for Carers

Charles Oakley House, 125 West Regent Street, Glasgow, G2 2SD

Tel: 0141 221 5066

www.carers.org.uk • Email: infosotland@carers.org

Provides information, advice and support to Scotland's carers and young carers.

Royal National Institute for the Blind (RNIB) Scotland

12-14 Hillside Crescent, Edinburgh, EH7 5EA

Tel: 0131 652 3140

www.rnib.org.uk/aboutus/contactdetails/scotland/Pages/scotland.aspx

Email: rnibscotland@rnib.org.uk

Offers information, support and advice to people with sight loss.

The RNIB provides guidelines on the use of large font size, etc: www.rnib.org.uk/professionals/accessibleinformation/pages/accessible_information.aspx

Scottish Centre of Technology for the Communication Impaired (SCTCI)

WESTMARC, Southern General Hospital, 1345 Govan Road, Glasgow, G51 4TF

Tel: 0141-201-2619 • Fax: 0141-201-2618

Email: sctci@ggc.scot.nhs.uk

Provides a Scotland-wide service for people who have severe communication disorders to help these people, their families and the professionals involved with them to get the most out of alternative communication technology.

Scottish Driving Assessment Service at SMART Centre

Astley Ainslie Hospital, 133 Grange Loan, Edinburgh, EH9 5HL

Tel: 0131 537 9192

SMART is the accredited centre for assessment of disabled drivers in Scotland.

Smokeline

Tel: 0800 84 84 84

Open 12 noon – 12 midnight

Free advice including the booklet 'You can stop smoking' is available.

7.3.3 USEFUL WEBSITES

Department for Work and Pensions (DWP)

www.dwp.gov.uk

The DWP website can give you details on benefits you may be entitled to.

Disability Alliance

Universal House, 88-94 Wentworth Street, London, E1 7SA

Tel: 020 7247 8776 (Voice and Minicom) • Fax: 020 7247 8765

www.disabilityalliance.org • Email: office@disabilityalliance.org

Provides information on social security benefits, tax credits and social care to disabled people, their families, carers and professional advisers. Disability Alliance works to relieve the poverty and improve the living standards of disabled people.

Exercise after Stroke

www.exerciseafterstroke.org.uk/

Provides information on exercise services for people after stroke and best practice guidelines.

Healthtalkonline

www.healthtalkonline.org

Healthtalkonline lets you share in other people's experiences of health and illness. You can watch or listen to videos of the interviews, read about people's experiences and find reliable information about conditions, treatment choices and support.

Later Life Training

www.laterlifetraining.co.uk/ExerciseAfterStroke.html

Provides an accredited Level 4 specialist instructor training course for healthcare professionals working with people after a stroke.

Register for Exercise Professionals

www.exerciseregister.org/index.htm

Strokeinfoplus

www.strokeinfoplus.scot.nhs.uk

7.3.4 DVD/VIDEO

Stroke Matters, CHSS and HEBs obtainable from CHSS website

7.3.5 OTHER PUBLICATIONS

Obtainable from bookshops.

My Stroke of Luck, Kirk Douglas, Piatkus Books (2009)

My year off, Robert McCrum, Pan Macmillan (2008)

The Diving Bell and the Butterfly, Jean-Dominique Bauby, Vintage Books (1998).

The Diving Bell and the Butterfly DVD, Mathieu Amalric (2007)

Time out of mind, Jane Lapotaire, Virago, 2004

Falling and Laughing: The Restoration of Edwyn Collins, Grace Collins, Ebury Press, 2009

7.4 CHECKLIST FOR PROVISION OF INFORMATION

This section gives examples of the information patients/carers may find helpful at some of the key stages of the patient journey. The checklist was designed by members of the guideline development group based on their experience and their understanding of the evidence base. The checklist is neither exhaustive nor exclusive.

Diagnosis and assessment
<ul style="list-style-type: none"> ▪ Ensure patients (and their carers) who have not been admitted to hospital are aware of the reasons and the alternatives to hospital admission (eg neurovascular clinic review). ▪ Fully inform patients and carers of the purpose and results of all investigations. ▪ Inform patients that they may be asked to take part in a clinical trial. Explain what this involves and ensure patients and carers are aware of the risks involved.
Acute care and rehabilitation
<ul style="list-style-type: none"> ▪ Advise patients and carers of the treatment setting, eg stroke unit or general rehabilitation ward. <ul style="list-style-type: none"> - Ensure patients are aware that regardless of the treatment setting, they will be treated by staff who have specialist knowledge and skills in stroke. ▪ Discuss the following problems with patients and carers: <ul style="list-style-type: none"> - shock and disbelief - anxiety - fear - depression - frustration - fatigue - difficulty in comprehending what has happened. ▪ Discuss the following with patients and their carers at the appropriate times during rehabilitation: <ul style="list-style-type: none"> - employment issues/vocational rehabilitation - driving - impact on children and families - finances - sex. ▪ Ensure patients and carers are aware of the importance of early mobilisation. ▪ Actively involve patients and carers in setting and meeting rehabilitation goals. Patients and their carers need to understand: <ul style="list-style-type: none"> - the rehabilitation process and the probable course of recovery - the patient's and carer's role in their recovery - the action taken to reduce the risk of future strokes (FAST). ▪ Advise carers of the need for encouragement from them at home to help with the patient's recovery. ▪ Offer reassurance to patients and carers that exercise and 'getting out' will not cause another stroke. ▪ Provide a range of information in a variety of formats suited to their individual needs, eg booklets, DVDs, CDs, CHSS Advice Line. ▪ Advise patients that CHSS can also arrange visits by trained volunteers to hospital patients ▪ Inform patients that they may be asked to take part in a clinical trial. Explain what this involves and ensure patients and carers are aware of the risks involved.

Communication
<ul style="list-style-type: none"> ▪ Provide information to patients with communication difficulties or cognitive dysfunction in an appropriate manner (eg, accessible and easy to read information resources and communication aids, as appropriate). ▪ Acknowledge that patients with communication difficulties can still be fully involved in discussions and making decisions with appropriate communication support. ▪ Provide encouragement to patients and carers that the condition may improve. ▪ Ensure that time is made available to discuss the conditions and answer questions. ▪ Give written information to patients and carers to read in their own time. ▪ Ensure patients and carers are aware of what help is available in the community for people who have had a stroke, including communication partners and, where appropriate, telerehabilitation services, including speech and language therapy.
Discharge planning
<ul style="list-style-type: none"> ▪ Keep patients and carers fully informed and involved at each stage of the discharge process. ▪ Ensure patients and carers are aware of the importance of attending follow-up appointments. ▪ Advise patients that their GP and primary care team will be fully informed about their hospital admission and will provide long term follow up at home. ▪ Encourage patients and carers to make and attend appointments with their GP or practice nurse as necessary. ▪ Inform patients and carers of the joint working with local authority and primary care to ensure that the full community care package is available to patients and carers immediately on discharge. ▪ Advise patients and carers of the need to carry out assessments for occupational therapy aids, adaptations and equipment, eg bath rails, toilet frames, hand rails. ▪ Advise patients and carers of local arrangements for follow up. ▪ Discuss referral to vocational rehabilitation services for all patients who might benefit. ▪ Advise that recovery can go on for a long time and that patients and carers should try to remain active in their recovery even if progress seems slow. ▪ Provide telephone contact details for a nominated member of the MDT to deal with any immediate problems following discharge.
Community support
<ul style="list-style-type: none"> ▪ Encourage patients to take responsibility for their own recovery with the help and support of healthcare professionals. ▪ Supply information about how to self refer at a later stage for further therapy. ▪ Provide information about statutory benefits such as Disability Living Allowance, Carers Allowance and Attendance Allowance, for which they may qualify. Refer as appropriate to the Department for Work and Pensions, local Benefits Agency, Citizens Advice Bureau, or any other agency that might be able to help. ▪ For patients who drive, advise on: <ul style="list-style-type: none"> - contacting their GP to discuss the issue of driving after their stroke - the need for an assessment before returning to driving - when and how to notify their motor insurance company and DLVA - the importance of regular vision tests. ▪ Ensure information is provided about vocational rehabilitation services. ▪ Ensure patients with communication problems are aware of voluntary groups such as the CHSS Volunteer Stroke Service, Speakability, Different Strokes, Headway, and where appropriate, discuss referral. ▪ Advise patients and carers of how they can access CHSS stroke services, Exercise after Stroke, day centres and other stroke or leisure clubs. ▪ For younger patients (under 65) supply information about the groups for younger people operated by both CHSS and Different Strokes if available in their locality. ▪ Discuss with the patient's family and other carers the importance of maintaining their own health (mental and physical), leisure activities/social networks, etc, and encourage them to take advantage of befriending and respite services, etc.

8 Implementing the guideline

This section provides advice on the resource implications associated with implementing the key clinical recommendations, and advice on audit as a tool to aid implementation.

Implementation of national clinical guidelines is the responsibility of each NHS Board and is an essential part of clinical governance. Mechanisms should be in place to review care provided against the guideline recommendations. The reasons for any differences should be assessed and addressed where appropriate. Local arrangements should then be made to implement the national guideline in individual hospitals, units and practices.

8.1 RESOURCE IMPLICATIONS OF KEY RECOMMENDATIONS

Recommendation	Section	Resource implication
B The core multidisciplinary team should include appropriate levels of nursing, medical, physiotherapy, occupational therapy, speech and language therapy, and social work staff.	3.3.1	Possible resource implication in some areas due to staffing numbers especially in AHP and social work.
B Stroke patients should be mobilised as early as possible after stroke.	4.1.2	Resource implication in terms of staff time especially nurses and AHPs.
B Personal ADL training by occupational therapists is recommended as part of an in-patient stroke rehabilitation programme.	4.1.4	Resource implication in terms of staff (OT) but may incur a saving in terms of length of hospital stay.
B Treadmill training may be considered to improve gait speed in people who are independent in walking at the start of treatment.	4.2.2	Resource implication in terms of staff time (physiotherapy) and on location of therapy (eg in hospital in physiotherapy department or in the leisure service).
C Where the aim of treatment is to have an immediate improvement on walking speed, efficiency or gait pattern or weight bearing during stance, patients should be assessed for suitability for an AFO by an appropriately qualified health professional.	4.2.6	Resource implication in terms of cost of the AFO and staff to fit AFO, but may incur a saving in terms of length of hospital stay.
A Gait-oriented physical fitness training should be offered to all patients assessed as medically stable and functionally safe to participate, when the goal of treatment is to improve functional ambulation.	4.2.8	Resource implication in terms of staff time (physiotherapy) and on location of therapy (eg in hospital in physiotherapy department or in the leisure service).
B Rehabilitation should include repetitive task training, where it is assessed to be safe and acceptable to the patient, when the aim of treatment is to improve gait speed, walking distance, functional ambulation or sit-to-stand-to-sit.	4.2.10	Resource implication in terms of staff time (physiotherapy) and on location of therapy (eg in hospital in physiotherapy department or in the leisure service).

Recommendation		Section	Resource implication
B	Where considered safe, every opportunity to increase the intensity of therapy for improving gait should be pursued.	4.2.13	Resource implication in terms of staff (physiotherapy).
B	Splinting is not recommended for improving upper limb function.	4.3.9	Cost saving in terms of reducing inappropriate intervention.
<input checked="" type="checkbox"/>	<ul style="list-style-type: none"> Stroke patients should have a full assessment of their cognitive strengths and weaknesses when undergoing rehabilitation or when returning to cognitively demanding activities such as driving or work. Cognitive assessment may be carried out by occupational therapists with expertise in neurological care, although some patients with more complex needs will require access to specialist neuropsychological expertise. 	4.4.2	Resource implication in terms of staff time (especially nursing, OT and psychology), but adequate assessment of cognitive issues is likely to improve rehabilitation outcomes.
C	All stroke patients should be screened for visual problems, and referred appropriately.	4.5.1	Resource implication in terms of staffing (orthoptics and ophthalmology).
D	<p>Ongoing monitoring of nutritional status after a stroke should include a combination of the following parameters:</p> <ul style="list-style-type: none"> biochemical measures (ie low pre-albumin, impaired glucose metabolism) swallowing status unintentional weight loss eating assessment and dependence nutritional intake. 	4.7.2	Possible resource implication in terms of dietetic staff time.
<input checked="" type="checkbox"/>	Every service caring for patients with stroke should develop and adhere to local urinary and faecal continence guidelines including advice on appropriate referral.	4.8.1	Short term resource implications in terms of local guideline development, printing and implementation strategies.
A	Electrical stimulation to the supraspinatus and deltoid muscles should be considered as soon as possible after stroke in patients at risk of developing shoulder subluxation.	4.10.3	Resource implication in terms of equipment purchase and maintenance, staff training and time.
<input checked="" type="checkbox"/>	Given the complexity of diagnosis and management of post-stroke shoulder pain consideration should be given to use of algorithms or use of an integrated care pathway.	4.13.1	Resource implication in implementing an algorithm. May be offset by preventing inappropriate use of strapping and other interventions (see sections 4.13 and 4.14).

	Recommendation	Section	Resource implication
☑	Appropriate referral to health and clinical psychology services should be considered for patients and carers to promote good recovery/adaptation and prevent and treat abnormal adaptation to the consequences of stroke.	4.15.1	Resource implication in terms of psychological services
A	Patients with mild/moderate stroke should be able to access stroke specialist early supported discharge services in addition to conventional organised stroke inpatient services.	5.3.1	Resource implication in terms of specialised stroke services in the community. May be offset in terms of length of hospital stay.
☑	NHS Boards should consider providing a specific local expert therapist to provide advice to rehabilitation teams including signposting to relevant statutory services such as Disability Employment Advisors at Job Centres, organisations specifically providing opportunities for people with disabilities, eg Momentum, or voluntary services who can provide help and support, eg CHSS, Stroke Association, Disability Alliance.	5.6.2	Resource implication in terms of appointing new staff and/or training staff.
A	Information provision should be available to patients and carers routinely and offered using active information strategies, which include a mixture of education and counselling techniques.	7.1	Resource implications in terms of staff time developing and delivering information, printing and other production costs.

8.2 AUDITING CURRENT PRACTICE

A first step in implementing a clinical practice guideline is to gain an understanding of current clinical practice. Audit tools designed around guideline recommendations can assist in this process. Audit tools should be comprehensive but not time consuming to use. Successful implementation and audit of guideline recommendations requires good communication between staff and multidisciplinary team working.

8.2.1 MANDATORY CORE DATA SET

The clinically led Scottish Stroke Care Audit aims to improve the quality of care provided by the hospitals in all NHS Boards by collating and reporting upon data collected by the Managed Clinical Networks (see *Annexes 5 and 6*).³⁰⁰

The system collects a mandatory core data set for each episode which leads a patient to be referred to a hospital. A minimum dataset has been defined which has the mandatory core data at its centre but which aims to provide information to reflect the quality of the stroke service. This dataset includes six variables which describe case mix and allows correction of case fatality and functional outcome data. This minimum dataset will provide information on:

- patient demographics,
- the process of care and its appropriateness, and
- the performance of services in relation to the national clinical standards.

8.2.2 KEY POINTS TO AUDIT

The guideline development group has also identified the following as key points to audit to assist with the implementation of this guideline:

Recommendation		Section	Key points to audit
B	Patients and carers should have an early active involvement in the rehabilitation process.	3.3.2	Document when patients and carers are involved in decision making and what the participation involves (define early and active).
B	Stroke patients should be mobilised as early as possible after stroke.	4.1.2	Document when patients are mobilised (define early and mobilisation).
B	Personal ADL training by occupational therapists is recommended as part of an in-patient stroke rehabilitation programme.	4.1.4	Document the frequency of ADL training (define the distinction between training and assisting a patient to get washed and dressed).
B	Splinting is not recommended for improving upper limb function.	4.3.9	The proportion of patients receiving an upper arm splint (define the purpose of the splint).
<input checked="" type="checkbox"/>	Every service caring for patients with stroke should develop and adhere to local urinary and faecal continence guidelines including advice on appropriate referral.	4.8.1	Audit practice against local guideline.
<input checked="" type="checkbox"/>	Given the complexity of diagnosis and management of post-stroke shoulder pain, consideration should be given to use of algorithms or use of an integrated care pathway.	4.13.1	Audit practice against key stages in an algorithm.
<input checked="" type="checkbox"/>	Appropriate referral to health and clinical psychology services should be considered for patients and carers to promote good recovery/adaptation and prevent and treat abnormal adaptation to the consequences of stroke.	4.15.1	Document how many patients require psychological service, how many are referred and the time between referral and appointment.

8.3 ADDITIONAL ADVICE TO NHSSCOTLAND FROM THE SCOTTISH MEDICINES CONSORTIUM

In February 2007, the Scottish Medicines Consortium (SMC) advised that *Clostridium botulinum* toxin type A (Dysport®) is not recommended for use within NHSScotland for the treatment of focal spasticity, including arm symptoms associated with focal spasticity, in conjunction with physiotherapy. Dysport® produces a localised reduction in muscle tone in patients with post-stroke upper limb spasticity and can improve patient disability at 16 weeks. It continues to be effective after repeated administrations with no new adverse events apparent. However, patient numbers in the clinical studies were small and the benefits modest. The economic case has not been demonstrated.

In May 2004, the Scottish Medicines Consortium (SMC) advised that *Clostridium botulinum* toxin type A (Botox®) is not recommended for use within NHS Scotland for the treatment of focal spasticity, including the treatment of wrist and hand disability due to upper limb spasticity, associated with stroke in adults. Botox produces a localised reduction in muscle tone in patients with post-stroke hand and wrist spasticity and improves disability at least up to 12 weeks. However, there is currently very little direct evidence of the cost effectiveness of this approach.

9 The evidence base

9.1 SYSTEMATIC LITERATURE REVIEW

The evidence base for this guideline was synthesised in accordance with SIGN methodology. A systematic review of the literature was carried out using an explicit search strategy devised by a SIGN Information Officer. Databases searched include Medline, Embase, CINAHL, PsycINFO, PEDro, and the Cochrane Library. The year range covered was 2002-2009 with variations depending on topic. Internet searches were carried out on various websites including the US National Guidelines Clearinghouse and the Guidelines International Network database. A complete search narrative, including search strategies and date ranges for each key question, is available on the SIGN website. The main searches were supplemented by material identified by individual members of the development group. Each of the selected papers was evaluated by two members of the group using standard SIGN methodological checklists before conclusions were considered as evidence.

9.1.1 LITERATURE SEARCH FOR PATIENT ISSUES

At the start of the guideline development process, a SIGN Information Officer conducted a literature search for qualitative and quantitative studies that addressed patient issues of relevance to early management of patients with stroke. Databases searched include Medline, Embase, Cinahl and PsycINFO, and the results were summarised and presented to the guideline development group.

9.2 RECOMMENDATIONS FOR RESEARCH

The guideline development group was not able to identify sufficient evidence to answer all of the key questions asked in this guideline (*see Annex 1*). The following areas for further research have been identified.

Further research should be of high methodological quality, relying on randomised controlled trials whenever possible.

Key components of the Stroke Unit

Further research is required into which components of the multidisciplinary team stroke unit care are effective, cost effective and the most beneficial to patient outcome. Research into the whole time equivalent for each specialty of the MDT is also required.

The impact of stroke liaison worker interventions on patients with mild to moderate disability needs to be explored. Further work should concentrate on establishing if this benefit is a real effect of the intervention or simply reflects the ability of patients with mild to moderate disability to improve with continued health care input.

Primary research should investigate different therapy interventions, different therapy approaches, the optimum intensity of therapy, the optimum timing of such interventions and attempt to identify which patients benefit most from which interventions.

In addition, research is required in the following specific areas:

Therapy (covering all disciplines)

Further research is required into therapy provided outwith stroke units, for example community and domiciliary services, as well as the long term effects of therapy following stroke.

Additionally, specific interventions need to be evaluated in well designed, adequately powered studies. Future research should concentrate on investigating the effectiveness of clearly described individual techniques and task-specific treatments, regardless of their historical origin. These include:

- therapeutic positioning
- robot-mediated passive therapy, oral antispasticity agents, *Clostridium botulinum* toxin type A, alcohol neurolysis and tibial nerve neurotomys for post-stroke spasticity
- visual and auditory feedback, electrical stimulation, different types of ankle foot orthoses and electromechanical assisted gait training to improve balance, gait or mobility
- virtual reality, bilateral training, repetitive tasks training, imagery/mental practice, splinting, electromechanical and robot-assisted arm training to improve upper limb function
- strapping, taping, slings and wheelchair attachments for reducing or preventing shoulder subluxation, decreasing pain and increasing function
- interventions for visual field defects, treatment of eye movement disorders, visual neglect
- a Cochrane on intervention from aphasia which is due to be published soon still concludes that there is insufficient evidence to draw conclusions related to the effectiveness of one SLT approach over another
- the effectiveness of different theoretical approaches for the treatment of aphasia and different service delivery such as, intensity of treatment, computer assisted approaches and tele-rehabilitation
- interventions for dysarthria
- compensatory approaches for dysphagia in terms of improved research design and with more defined treatment protocols
- management of urinary and faecal continence
- treatment for central post-stroke pain, strapping to prevent post-stroke shoulder pain, TENS, neuromuscular electrical stimulation, massage and acupuncture to treat post-stroke shoulder pain, development of management algorithms for the assessment, prevention and treatment of post-stroke shoulder pain
- pharmacological and exercise interventions for post-stroke fatigue
- psychological interventions (eg cognitive behavioural therapy) for post-stroke mood disturbances
- attitudes and beliefs (of both patients and caregivers) about recovery and the impact they have on adjustment and recovery
- social work orientated or other interventions aimed at addressing participation restrictions.

Standardised methods to describe and define interventions need to be developed in order to facilitate the interpretation and implementation of research findings.

Further research into the cost effectiveness of electromechanical assisted gait training and electromechanical and robot-assisted arm training to improve arm motor function and motor strength is required.

10 Development of the guideline

10.1 INTRODUCTION

SIGN is a collaborative network of clinicians, other healthcare professionals and patient organisations and is part of NHS Quality Improvement Scotland. SIGN guidelines are developed by multidisciplinary groups of practising clinicians using a standard methodology based on a systematic review of the evidence. Further details about SIGN and the guideline development methodology are contained in “SIGN 50: A Guideline Developer’s Handbook”, available at www.sign.ac.uk

10.2 THE GUIDELINE DEVELOPMENT GROUP

Professor Lorraine Smith (Chair)	<i>Professor of Nursing, University of Glasgow</i>
Dr Mark Barber	<i>NHS Lanarkshire Stroke MCN Lead Clinician, Monklands Hospital, Airdrie</i>
Dr Phil Birschel	<i>Consultant Stroke Physician, Southern General Hospital, Glasgow</i>
Mrs Sheena Borthwick	<i>Speech and Language Therapist, Western General Hospital, Edinburgh</i>
Ms Gill Bowler	<i>Lay Representative, Edinburgh</i>
Miss Michelle Brogan	<i>Speech and Language Therapy Manager, Astley Ainslie Hospital, Edinburgh</i>
Mr John Brown	<i>Lay Representative, North Berwick</i>
Mr Charlie Chung	<i>Clinical Specialist Occupational Therapist (Stroke), Victoria Hospital, Fife</i>
Mr Ronald Collie	<i>Lay Representative, Aberdeen</i>
Dr Kenneth Collins	<i>General Practitioner, Glasgow</i>
Mrs Fiona Coupar	<i>Chief Scientist Office Research Training Fellow, Glasgow Royal Infirmary</i>
Dr David Gillespie	<i>Consultant Clinical Neuropsychologist, Astley Ainslie Hospital, Edinburgh</i>
Dr Niall Hughes	<i>Consultant Physician in Care of the Elderly/Stroke, Wishaw General Hospital</i>
Ms Michele Hilton Boon	<i>Information Officer, SIGN</i>
Dr Roberta James	<i>Programme Manager, SIGN</i>
Dr Sara Joice	<i>Chartered Health Psychologist, Social Dimensions of Health Institute/School of Nursing and Midwifery, University of Dundee</i>
Mr Thomas Jones	<i>Chest, Heart and Stroke Scotland Stroke Liaison Nurse, St John's Hospital, Livingston</i>
Dr Maggie Lawrence	<i>Research Fellow, Glasgow Caledonian University</i>
Dr Christine McAlpine	<i>NHS Greater Glasgow and Clyde Stroke MCN Lead Clinician, Stobhill Hospital, Glasgow</i>
Dr Alex Pollock	<i>Research Fellow, Stroke Programme, Nursing, Midwifery and Allied Health Professions (NMAHP) Research Unit, Glasgow Caledonian University</i>
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Miss Lynn Robertson	<i>Lead Physiotherapist, Stroke Rehabilitation, Dumfries and Galloway Hospital</i>

Mrs Alexandra Shearer	<i>Lay Representative, Orkney</i>
Mrs Fiona Smith	<i>Senior Dietitian, Aberdeen Royal Infirmary</i>
Dr Janice Whittick	<i>Consultant Clinical Psychologist, Stratheden Hospital, Fife</i>
Mrs Kathryn Wood	<i>Lead Clinical Pharmacist, Ashludie Hospital, Monifieth</i>

The membership of the guideline development group was confirmed following consultation with the member organisations of SIGN. All members of the guideline development group made declarations of interest and further details of these are available on request from the SIGN Executive.

Guideline development and literature review expertise, support and facilitation were provided by the SIGN Executive. In particular, the following staff are thanked for their involvement.

Ms Mary Deas	<i>Distribution and Office Coordinator</i>
Ms Lesley Forsyth	<i>Events Coordinator/Executive Secretary to SIGN Council</i>
Mrs Karen Graham	<i>Patient Involvement Officer</i>
Ms Joanna Kelly	<i>Information Officer, SIGN</i>
Mr Stuart Neville	<i>Publications Designer</i>
Ms Gaynor Rattray	<i>Senior Guideline Coordinator</i>

10.2.1 PATIENT INVOLVEMENT

In addition to the identification of relevant patient issues from a broad literature search, SIGN involves patients and carers throughout the guideline development process in several ways. SIGN recruits a minimum of two patient representatives to guideline development groups by inviting nominations from the relevant 'umbrella', national and/or local patient-focused organisations in Scotland. Where organisations are unable to nominate, patient representatives are sought via other means, eg from consultation with health board public involvement staff.

Further patient and public participation in guideline development was achieved by involving patients, carers and voluntary organisation representatives in the peer review stage of the guideline and specific guidance for lay reviewers was circulated. Members of the SIGN patient network were also invited to comment on the draft guideline section on provision of information.

10.2.2 ACKNOWLEDGEMENTS

SIGN would like to acknowledge the guideline development group responsible for the development of SIGN 64: Management of patients with stroke, rehabilitation, prevention and management of complications and discharge planning, on which this guideline is based.

SIGN would also like to thank Dr Frederike van Wijck on behalf of the Exercise after Stroke Team, Ms Hazel Fraser Stroke Coordinator, Queen Margaret Hospital, Dunfermline and Dr Jo Booth, Reader, Glasgow Caledonian University for their contribution to the guideline.

10.3 CONSULTATION AND PEER REVIEW

10.3.1 SPECIALIST REVIEW

This guideline was also reviewed in draft form by the following independent expert referees, who were invited to comment primarily on the comprehensiveness and accuracy of interpretation of the evidence base supporting the recommendations in the guideline. The guideline group addresses every comment made by an external reviewer, and must justify any disagreement with the reviewers' comments.

SIGN is very grateful to all of these experts for their contribution to the guideline.

Dr Jonathan Bannister	<i>Consultant in Pain Medicine and Anaesthesia, Ninewells Hospital, Dundee</i>
Dr Andrew Blaikie	<i>Consultant Ophthalmologist, Queen Margaret Hospital, Dunfermline</i>
Dr Niall Broomfield	<i>Consultant Clinical Psychologist, Western Infirmary, Glasgow</i>
Mrs Linda Campbell	<i>Stroke Coordinator Highland, Raigmore Hospital, Inverness</i>
Dr Alan Carson	<i>Consultant Neuropsychiatrist, Royal Edinburgh Hospital</i>
Ms Hazel Fraser	<i>Stroke Coordinator, Queen Margaret Hospital, Dunfermline</i>
Professor John Gladman	<i>Professor in Medicine for the Elderly, Queens Medical Centre, Nottingham</i>
Dr Lynne Hutton	<i>Consultant in Rehabilitation Medicine, Astley Ainslie Hospital, Edinburgh</i>
Ms Jaclyn Jones	<i>Postgraduate Programme Leader – Dietetics, Queen Margaret University, Edinburgh</i>
Dr Helen Kelly	<i>Lecturer in Speech and Hearing Sciences, Queen Margaret University, Edinburgh</i>
Mrs Anne Kinnear	<i>Principal Pharmacist, Royal Infirmary of Edinburgh</i>
Professor Peter Langhorne	<i>Professor of Stroke Medicine, Royal Infirmary, Glasgow</i>
Dr Annie McCluskey	<i>Postdoctoral Research Fellow, University of Sydney, Australia</i>
Ms Morag Medwin	<i>Coordinator, Stroke Managed Clinical Network, Edinburgh</i>
Professor Ronan O'Carroll	<i>Professor of Psychology, University of Stirling</i>
Miss Diane Rennie	<i>Senior Charge Nurse, Victoria Hospital, Kirkcaldy</i>
Dr Anne Rowat	<i>Lecturer in Adult Nursing, Edinburgh Napier University</i>
Dr Fiona Rowe	<i>Senior Lecturer and Programme Director, University of Liverpool</i>
Dr Christopher Roy	<i>Consultant in Rehabilitation Medicine, Southern General Hospital, Glasgow</i>
Dr Cameron Sellars	<i>Speech and Language Therapist, Glasgow Royal Infirmary</i>
Miss Jane Shiels	<i>Specialist Physiotherapist, Astley Ainslie Hospital, Edinburgh</i>
Mrs Claire Stewart	<i>Occupational Therapy Team Lead Stroke, Lightburn Hospital, Glasgow</i>
Mr Alan Suttie	<i>Chief Executive, Fife Society for the Blind</i>
Dr Frederike van Wijck	<i>Reader in Neurological Rehabilitation, Glasgow Caledonian University</i>

10.3.2 PUBLIC CONSULTATION

The draft guideline was available on the SIGN website for a month to allow all interested parties to comment. Comments from the public consultation were addressed alongside those of the specialist reviewers.

SIGN is very grateful to all of these experts for their contribution to the guideline.

	<i>The Association of British Neurologists, Ormond House, London</i>
	<i>Royal College of Physicians, London</i>
Dr Malcolm Alexander	<i>Associate Medical Director, NHS 24, Clydebank</i>
Dr Marian Brady	<i>Stroke Programme Manager, Glasgow Caledonian University</i>
Ms Jacquelyn Chaplin	<i>Project Manager: Palliative Care for People with Non-Malignant Conditions, Lightburn Hospital, Glasgow</i>
Mr David Clark	<i>Chief Executive, Chest, Heart & Stroke Scotland, Edinburgh</i>
Ms Yvonne Currie	<i>Stroke Coordinator Nurse, Southern General Hospital, Glasgow</i>
Dr Carole Gavin	<i>Consultant in Emergency Medicine, HRH The Princess Royal, London</i>
Mr Christian Goscirk	<i>Long Term Conditions Manager, Lawson Memorial Hospital, Sutherland</i>
Dr Jackie Hamilton	<i>Chartered Clinical Psychologist/Clinical Neuropsychologist, Aberdeen Royal Infirmary</i>
Mr Ralph Hammond	<i>Professional Adviser, The Chartered Society of Physiotherapy, London</i>
Ms Kim Hartley	<i>Royal College of Speech and Language Therapy Scotland Officer, on behalf of the RCSLT, Edinburgh</i>
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Professor Catherine McKenzie	<i>Division of Speech and Language Therapy, University of Strathclyde, Glasgow</i>
Dr David Rigby	<i>General Practitioner, Gravir Medical Practice, Western Isles</i>
Mr David Saunders	<i>Lecturer in Exercise Physiology, Sport and Leisure Studies, University of Edinburgh</i>
Miss Arlene Shaw	<i>Specialist Clinical Pharmacist, Ninewells Hospital, Dundee</i>
Ms Tracey Shipman	<i>Stroke Special Interest Group Lead, on behalf of British and Irish Orthoptic Society</i>
Mr Mark Smith	<i>Consultant Physiotherapist, Leith Community Treatment Centre, Edinburgh</i>
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10.3.3 SIGN EDITORIAL GROUP

As a final quality control check, the guideline is reviewed by an editorial group including the relevant specialty representatives on SIGN Council to ensure that the specialist reviewers' comments have been addressed adequately and that any risk of bias in the guideline development process as a whole has been minimised. The editorial group for this guideline was as follows.

Dr Keith Brown	<i>Chair of SIGN; Co-Editor</i>
Ms Beatrice Cant	<i>Programme Manager, SIGN</i>
Dr Sara Twaddle	<i>Director of SIGN; Co-Editor</i>
Dr Graeme Simpson	<i>Royal College of Physicians of Edinburgh</i>

Abbreviations

AAC	alternative or augmentative communication
ADL	activities of daily living
AFO	ankle foot orthoses
AHPs	allied health professionals
BFB	biofeedback
BNF	British National Formulary
CHSS	Chest, Heart and Stroke Scotland
CI	confidence interval
CIMT	constraint induced movement therapy
CRPS	complex regional pain syndrome
CPR	cardiopulmonary resuscitation
CPSP	central post-stroke pain
CT	computed tomography
DVLA	Driver and Vehicle Licensing Agency
DVT	deep vein thrombosis
ECCI	Electronic Clinical Communications Implementation
EMG	electromyographic
ES	electrical stimulation
ESD	early supported discharge
EU	exercise units
FACCT	Fife Assessment Centre of Communication through Technology
FAST	Face, Arm, Speech, Time (to call 999)
FSS	Fatigue Severity Score
FES	functional electrical stimulation
FOOD	feed or ordinary diet
GECS	graduated elastic compression stockings
GHQ-12	General Health Questionnaire of 12 items
GP	general practitioner
HADS	Hospital Anxiety and Depression Scale
HSP	hemiplegic shoulder pain
ICF	International Classification of Functioning, Disability and Health
ICIDH	International Classification of Impairments, Disabilities and Handicaps
ICP	integrated care pathway
LMWH	low molecular weight heparin
MAS	modified Ashworth Scale
MD	mean difference
MDT	multidisciplinary team

MRI	magnetic resonance imaging
NES	NHS Education for Scotland
NG	nasogastric
NHS QIS	NHS Quality Improvement Scotland
NIHSS	National Institutes of Health stroke scale
NMES	neuromuscular electrical stimulation
NNT	numbers needed to treat
NSAID	non-steroidal anti-inflammatory drug
OR	odds ratio
OT	occupational therapy
PEG	percutaneous endoscopic gastrostomy
PICH	primary intracerebral haemorrhage
RCT	randomised controlled trial
ROM	range of motion
SAD-Q	Stroke Aphasic Depression Questionnaire
SCTCI	Scottish Centre of Technology for the Communication Impaired
SES	summarised effect size
SIGN	Scottish Intercollegiate Guidelines Network
SMC	Scottish Medicines Consortium
SMD	standardised mean difference
SSRI	serotonin reuptake inhibitor
SMD	standardised mean difference
SLT	speech and language therapist
STARs	Stroke Training and Awareness Resources
TCA	tricyclic antidepressant
TENS	transcutaneous electrical nerve stimulation
TIA	transient ischaemic attack
UFH	unfractionated heparin
UKCPA	United Kingdom Clinical Pharmacy Association
VAS	visual analogue scale
WHO	World Health Organization
WTE	whole time equivalent

Annex 1

Key questions addressed in this update

THE KEY QUESTIONS USED TO DEVELOP THE GUIDELINE

Key question	See guideline section
<p>1 What is the evidence for the effectiveness of the following interventions in improving gait, balance and mobility in stroke patients?</p> <ul style="list-style-type: none"> (a) treadmill training (b) biofeedback (any type) (c) electrical stimulation (ES or FES) (d) orthoses (any type) (e) task-related training (f) neurophysiological training (g) physical fitness training (h) electromechanical assisted gait training (i) repetitive task training (j) walking aids (sticks, zimmers, walking frames) (k) strengthening (l) intensity. <p>Consider: duration of therapy; 5 day vs 7 day.</p>	4.2
<p>2 What is the evidence for the effectiveness of the following interventions in improving upper limb function in stroke patients?</p> <ul style="list-style-type: none"> (a) electrical stimulation (ES or FES) (b) biofeedback (c) virtual reality (d) bilateral training (e) constraint induced therapy (f) repetitive task training (g) mental practice or imagery (h) splinting (i) electromechanical/robotic devices (j) approaches of therapy (k) intensity of intervention. 	4.3
<p>3 In stroke patients with visual neglect, visual field defects or eye movement disorders, what is the effectiveness of the following interventions in improving visual function, quality of life, and functional ADL?</p> <ul style="list-style-type: none"> (a) screening and assessment (b) compensatory strategies (c) substitution strategies (d) restitution strategies. <p>(Terms to include: cognitive rehabilitation, orthoptic training, cueing, scanning, limb activation, aids, environmental adaptations, prisms/ corrective eyewear, referral, oculomotor rehabilitation, patches, compensatory head movements, visual training).</p>	4.5
<p>4 How should stroke patients be assessed for nutritional status in order to identify patients at risk who require nutritional intervention?</p>	4.7.2
<p>5 Is there evidence that stroke patients, who are nutritionally at risk and/or dysphagic, benefit from nutritional supplementation, food fortification, or dietary advice? Specify setting.</p>	4.7.3

6	In stroke patients who cannot swallow adequately, what is the evidence for the effectiveness of the following therapies? (a) facilitation exercises with or without biofeedback (b) sensory enhancement.	4.7.4
7	What interventions are effective for the reduction of sialorrhea in stroke patients? Consider: tricyclics, <i>Clostridium botulinum</i> toxin type A, radiotherapy, hyoscine.	4.7.5
8	In stroke patients with incontinence, which of the following interventions are effective in achieving continence? (a) timed voiding/bladder retraining (b) oestrogen (c) oxybutynin (d) biofeedback (e) anticholinergics (f) duloxetine.	4.8
9	What is the evidence for the effectiveness of the following interventions in the management of post-stroke spasticity? (a) exercise (b) splinting (c) electrical stimulation/functional electrical stimulation (d) anti-spastic drugs (baclofen, tizanidine, dantrolene, and diazepam) (e) botulinum toxin (f) surgery.	4.9
10	What is the evidence for the following interventions in the prevention and treatment of subluxation of the shoulder in terms of reducing subluxation, increasing function, and reduction in pain? (a) supportive devices (b) strapping (c) taping (d) electrical stimulation (e) positioning (f) hands on (manipulation, mobilisation).	4.10
11	What interventions have demonstrated effectiveness in the treatment of central post-stroke pain in stroke patients? (include: gabapentin, pregabalin) Consider: neuropathic pain Exclude: spasticity and shoulder pain.	4.11.2
12	What is the evidence that the following treatments for hemiplegic shoulder pain (HSP) improve or maintain shoulder function or decrease pain? (a) physical therapy (b) ultrasound (c) slings, supports or strapping (d) positioning (e) NSAIDS (f) TENS (g) intra-articular injections (h) acupuncture, massage and other complementary therapies (i) antidepressants. Consider: prevention and treatment.	4.12, 4.13

13	What interventions have demonstrated effectiveness in the treatment of post-stroke fatigue?	4.14
14	In stroke patients with emotional lability (emotionalism), are the following interventions effective and acceptable to patients in improving emotional control and daily functioning? (a) patient education and advice (b) antidepressants. Consider: patient preference.	4.15.2
15	What evidence is there for the effectiveness and patient acceptability of the following therapies for preventing post-stroke depression? (a) antidepressants (b) psychological therapies.	4.15.3
16	What evidence is there for the effectiveness and patient acceptability of the following therapies for treating post-stroke depression? (a) antidepressants (b) psychological therapies.	4.15.4
17	What interventions are effective in addressing an individual's: (a) post-stroke emotional adjustment and their self esteem, body image and sexuality? (b) attitudes and beliefs relating to their stroke, ie self efficacy and self confidence?	4.15.5, 4.16
18	What is the evidence for the safety and effectiveness of the following interventions to reduce the incidence of thromboembolism in stroke patients? (a) graduated elastic compression stockings (b) early mobilisation.	4.19.4, 4.19.5
19	Is early supported discharge to home beneficial in terms of improving independence and improving physical and psychological well-being in patients and carers?	5.3
20	Does home based rehabilitation as compared to outpatient (or hospital based/day hospital) rehabilitation improve independence and ADL?	5.4, 5.5
21	What information do patients and carers need upon discharge following stroke?	7.1

Annex 2

A pragmatic expert led approach to management of incontinence after stroke

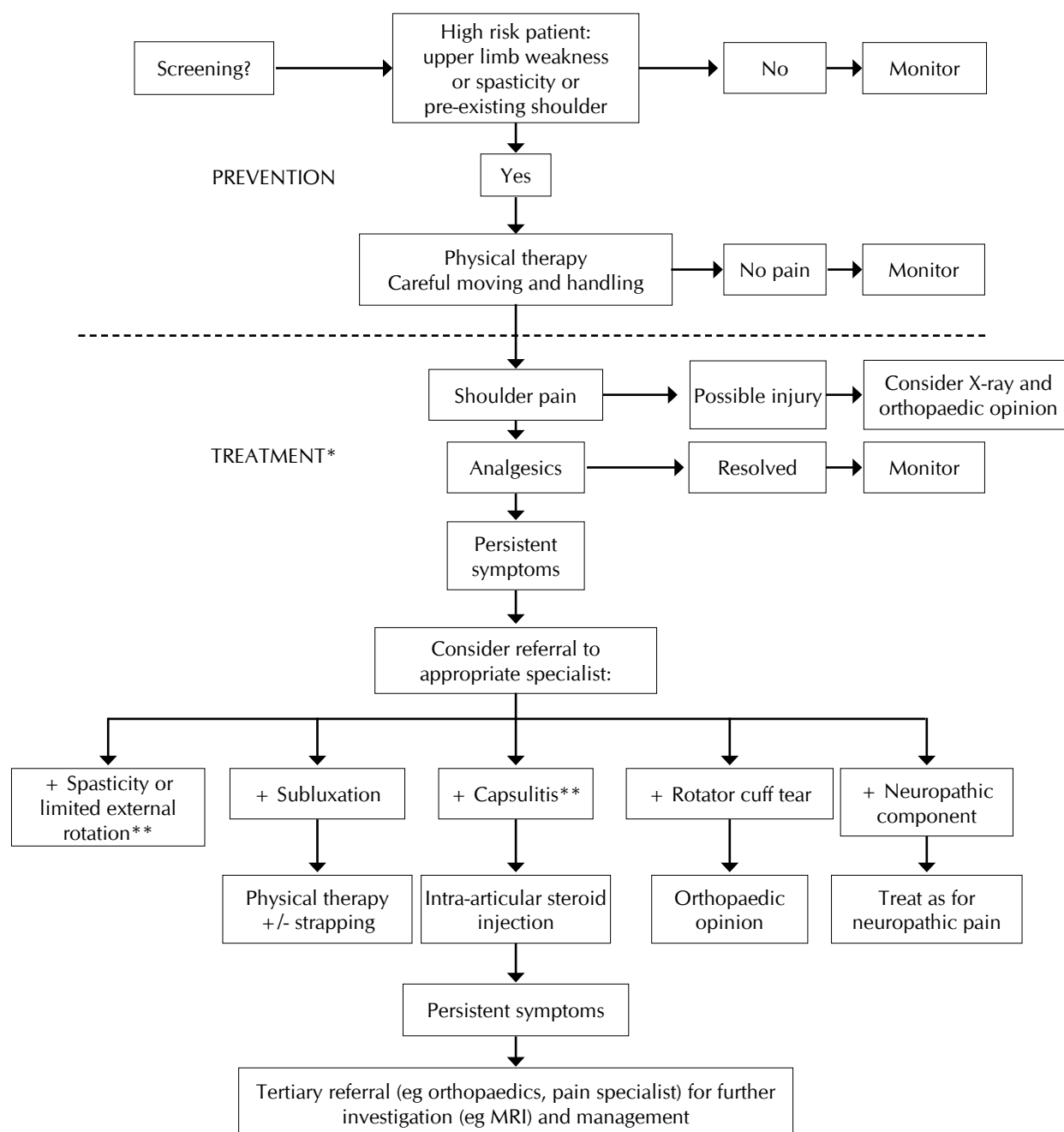
Simple management strategies targeted on the common underlying diagnoses (eg faecal impaction, urinary tract infection, vaginal prolapse) are surprisingly effective and include: stimulatory laxatives and enemas for faecal impaction or loading; treatment of urinary tract infection; changing medication (eg adjusting loop diuretic medication) and appropriate treatment of urinary retention. Painful urinary retention requires immediate catheterisation. Urinary retention may be helped by other strategies including stopping anticholinergic medication (eg tricyclic antidepressants) and changing posture for voiding (eg using a toilet rather than a bedpan).

If these simple and universally available management strategies fail to achieve full urinary continence then further investigation is required. The next assessment stage requires accurate volume and frequency urine charts to be recorded by the nursing staff and post-micturition bladder scanning. The main causes of urinary incontinence after stroke are bladder instability secondary to the stroke, bladder hypomobility (often due to diabetic neuropathy or drugs) and prostatic hypertrophy or cancer in men. As the treatment of bladder instability can involve drugs which cause urinary retention it is vital to exclude post micturition urine residual by either: a one-off urinary catheterisation to measure urine residual; bladder scanning (using a portable machine on the ward performed by a trained stroke nurse) or an abdominal ultrasound examination. If the bladder is empty after micturition and the bladder charts and history suggest unstable bladder then a care plan of regular toileting and possibly anticholinergic medication would be appropriate.

If prostatic obstruction is suspected, men should be appropriately treated and referred. If patients still have urinary incontinence, consideration should be given to appropriate referral or urodynamic studies. Patients requiring continence aids (eg pads, waterproof bedding or special laundry service) must have an agreed future source of supplies prior to transfer of care (eg discharge from hospital stroke unit).

Annex 3

Example algorithm for the assessment and management of new onset post-stroke shoulder pain



* Applies to new-onset shoulder pain ie no pre-existing condition. Conditions may co-exist.

** Limited external rotation due to adhesive capsulitis or spasticity may be difficult to distinguish clinically. In such cases specialist opinion is advised.

Annex 4

Example discharge/team care plan

Hospital name:	
Hospital address:	
Hospital telephone number:	

Patient details	
Patient name	
CHI number	
Patient address	
Date of birth	

Hospital details	
Hospital name	
Ward name or number	
Ward direct dial telephone number	
Patient's named nurse	
Patient's key worker	
Date of admission	
Date of discharge	

Diagnosis(es)

Drug Name	Strength	Dosage	Duration	Amount Supplied	Pharmacy

Inpatient investigations		
Investigation	Date	Result

Current AHPs treatment	
Allied Health Professionals	Current treatment regime
Occupational therapy	
Physiotherapy	
SLT	
Other:	

Special needs

Annex 4 continued

Investigations to be arranged by primary care team		
Primary care investigation needed	Date which investigation is needed	Comments

Investigations arranged as out/inpatient		
Hospital investigation needed	Date for which investigation is arranged	Comments

Further hospital attendances		
Hospital attendance date	Reason for attendance	Transport arranged?



For details of transport arrangements, or if they are to be changed contact:

Continuing care after discharge	
Date	Comments

Record of level of achievement

Annex 5

Scottish stroke care audit form - inpatients



	SCOTTISH STROKE CARE AUDIT FORM – Inpatients Version 1.0 Finalised December 2009 (For review December 2010)	
Key: Codes for boxes <input type="checkbox"/> Yes [Y] No [N] Unknown [?] Not recorded [*] Ambiguous/ illegible [#] Where there are choices indicate your choice clearly, e.g. by circling answer(s)		
Demographics		
CHI Number: <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	GP Name: _____	
Surname: _____	GP Practice/ Surgery: _____ <small>(NB: Postcode not required for Scottish GPs)</small>	
Forename: _____	(Non-Scottish - Address): _____	
	GP Postcode: <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
Patient Postcode: <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	Gender: <i>Female / Male / Not Known</i>	
	Ethnicity: <i>White Scottish / White Other British / White Irish / Any other White background/ Other</i> <small>(NB. For selection of 'other' ethnicity please refer to Quick Notes)</small>	
Date of Birth: <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		
History		
Arrival at first hospital:	Date: <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/>	Time: <input type="text"/> <input type="text"/> : <input type="text"/> <input type="text"/> hrs
	First Hospital: _____	
Admitted for hyperacute/ acute stroke care:	Admitting Hospital: _____	Date: <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/>
	Time: <input type="text"/> <input type="text"/> : <input type="text"/> <input type="text"/> hrs	
Admitted from: <i>Home or Sheltered / Care Home / NHS Continuing Care / Rehabilitation / Acute Hospital / Other</i>		
Source of referral to first hospital: <i>999 / GP / NHS24 / Other Out of Hours / Self / This Hospital / Other Hospital / Other</i>		
Consultant responsible for hyperacute/ acute stroke care: _____		
Onset of symptoms relating to current event:		
Q1. Did the patient wake from sleep with the symptoms of stroke/ TIA? <input type="checkbox"/>		
Q2. Is time of onset of symptoms known to within 15 minutes? <input type="checkbox"/>		
Q3. Onset of symptoms relating to current event:		
	Date: <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/>	Time: <input type="text"/> <input type="text"/> : <input type="text"/> <input type="text"/> hrs
Does the patient have a past medical history of Atrial Fibrillation or Atrial Flutter? <input type="checkbox"/>		
Was the patient on anticoagulation, e.g. Warfarin, at onset of current cerebrovascular event or involved in a relevant clinical trial? <input type="checkbox"/>		
Was stroke or TIA included in an early differential diagnosis made in hospital? <input type="checkbox"/>		
Case Mix		
Was the patient independent in Activities of Daily Living (ADL) before the current event? <input type="checkbox"/>		
In their normal place of residence did the patient live alone? <input type="checkbox"/>		
Can the patient talk at first assessment? <input type="checkbox"/>		
Is the patient orientated to time, place and person at first assessment? <input type="checkbox"/>		
Can the patient lift both arms off the bed at first assessment? <input type="checkbox"/>		
Is the patient able to walk without help from another person? <input type="checkbox"/>		

Annex 5 continued

Investigations			
Has brain imaging been done since current event?	<input type="checkbox"/>	Date and time of brain imaging for current event	<input type="text"/> / <input type="text"/> / <input type="text"/> Time: <input type="text"/> : <input type="text"/> hrs
Did the brain imaging results clearly indicate <u>only a non-stroke diagnosis</u> ? <input type="checkbox"/>			
Has imaging of Internal Carotid Artery (ICA) stenosis been performed since current event?	<input type="checkbox"/>	Date of 1 st imaging of ICA for current event	Date: <input type="text"/> / <input type="text"/> / <input type="text"/>
Was Atrial Fibrillation or Atrial Flutter confirmed during current hospital inpatient stay? <input type="checkbox"/>			
Diagnosis			
Did the final diagnosis include stroke?	<input type="checkbox"/>	Stroke pathology:	<i>Ischaemic / Haemorrhagic / Haemorrhagic transformation of infarct / Uncertain / Not recorded</i>
Did the final diagnosis include TIA?	<input type="checkbox"/>		
Acute Management			
Was the patient managed in an acute/ integrated stroke unit?	<input type="checkbox"/>	Date of entry to acute/ integrated stroke unit	<input type="text"/> / <input type="text"/> / <input type="text"/>
Was swallow screen recorded for current event?	<input type="checkbox"/>	Date of first swallow screen for current event	<input type="text"/> / <input type="text"/> / <input type="text"/>
Was Aspirin given in hospital?	<input type="checkbox"/>	Date and time of first dose of Aspirin	<input type="text"/> / <input type="text"/> / <input type="text"/> <input type="text"/> : <input type="text"/> hrs
If Aspirin is not given:			
Why was Aspirin not given?	<i>Died before scan / Died while Aspirin embargoed due to other medical condition or treatment / Haemorrhagic stroke / Haemophilia or bleeding disorder / On Warfarin or Heparin / Recent GI Bleed / Active Peptic Ulcer / Known Allergy / Under 12 years / Breast Feeding / Patient refused / Unambiguous other</i>		
Was alternative antiplatelet given in hospital?	<input type="checkbox"/>	Date and time of first dose of alternative antiplatelet	<input type="text"/> / <input type="text"/> / <input type="text"/> <input type="text"/> : <input type="text"/> hrs
Further specialist management			
Date of exit from acute/ integrated stroke unit	<input type="text"/> / <input type="text"/> / <input type="text"/>		
Was the patient managed in a stroke rehabilitation unit (SRU)?	<input type="checkbox"/>	Date of entry to SRU	<input type="text"/> / <input type="text"/> / <input type="text"/> SRU: _____
		Date of exit from SRU	<input type="text"/> / <input type="text"/> / <input type="text"/> Responsible consultant: _____
Patient Pathway			
Discharged to	<i>Home or Sheltered / Care Home / NHS Continuing Care / Rehabilitation / Acute Hospital / Died / Other</i>		Discharge date from stroke care: <input type="text"/> / <input type="text"/> / <input type="text"/>
Was anticoagulation prescribed or recommended at discharge? <input type="checkbox"/>			
Was thrombolysis given or clot retrieval performed? <input type="checkbox"/>			
Was the patient <u>referred</u> for a carotid intervention? <input type="checkbox"/> Did the patient <u>have</u> a carotid intervention? <input type="checkbox"/>			
NB: If the patient <u>has had</u> carotid intervention the relevant form should be completed.			
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Annex 6

Scottish stroke care audit form - outpatients

	SCOTTISH STROKE CARE AUDIT FORM – Outpatients Version 1.0 Finalised December 2009 (For review December 2010)	
<div style="border: 1px solid black; padding: 5px;"> Key: Codes for boxes <input type="checkbox"/> Yes [Y] No [N] Unknown [?] Not recorded [*] Ambiguous/ illegible [#] Where there are choices indicate your choice clearly, e.g. by circling answer(s) </div>		
Demographics		
CHI Number: <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	GP Name: _____ GP Practice/ Surgery: _____ <small>(NB: Postcode not required for Scottish GPs)</small> (Non-Scottish - Address): _____ GP Postcode: <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
Surname: _____ Forename: _____ Patient Postcode: <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	Gender: <i>Female / Male / Not Known</i> Ethnicity: <i>White Scottish / White Other British / White Irish / Any other White background/ Other</i> <small>(NB. For selection of 'other' ethnicity please refer to Quick Notes)</small> _____	
Date of Birth: <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		
Patient Pathway		
Date of first attendance at clinic: <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/>		
Consultant responsible for care during attendance at outpatient clinic: _____		
Unit where seen: _____		
Date of referral: <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/>		
Source of referral: <i>GP / Medical assessment (MA) / Accident & Emergency (A&E) / Acute Receiving Unit (ARU) / Combined assessment / Outpatient clinic / Out of Hours (OOH) / Inpatient episode (ward) / Ophthalmology / Transfer from other hospital / Other</i>		
Date referral received: <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/>		
Date of first appointment offered: <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/>		
Was the patient <u>referred for</u> a carotid intervention? <input type="checkbox"/> Did the patient <u>have</u> a carotid intervention? <input type="checkbox"/>		
NB: If the patient <u>has had</u> carotid intervention the relevant form should be completed.		

Annex 6 continued

Diagnosis			
Date of most recent TIA/ stroke/ eye attack	<input type="text"/> <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/>		
Is the most likely diagnosis non-cerebrovascular?	<input type="checkbox"/>	Non-cerebrovascular diagnosis:	<input type="text"/>
Is stroke the most likely diagnosis?	<input type="checkbox"/>	Stroke pathology:	<i>Ischaemic / Haemorrhagic / Haemorrhagic transformation of infarct/ Uncertain / Not recorded</i>
Is TIA the most likely diagnosis?	<input type="checkbox"/>		
Was monocular blindness, duration \geq 24hrs (Retinal Artery Occlusion (RAO) the most likely diagnosis?	<input type="checkbox"/>		
Was monocular blindness, duration < 24hrs (Transient Monocular Blindness (TMB) the most likely diagnosis?	<input type="checkbox"/>		
History			
Does the patient have a past medical history of Atrial Fibrillation or Atrial Flutter (AF):	<input type="checkbox"/>		
Was the patient on anticoagulation, e.g. Warfarin, at onset of current event or involved in a relevant clinical trial?	<input type="checkbox"/>		
Investigations			
Has brain imaging been done since current event?	<input type="checkbox"/>	Date of first brain imaging for current event	<input type="text"/> <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/>
Has imaging of Internal Carotid Artery (ICA) stenosis been performed since current event?	<input type="checkbox"/>	Date of 1 st imaging of ICA for current event	<input type="text"/> <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/>
Was Atrial Fibrillation or Atrial Flutter confirmed at outpatient appointment?	<input type="checkbox"/>		
Medication			
Was the patient on Aspirin at 1 st assessment?	<input type="checkbox"/>	Was the patient on alternative antiplatelet at 1 st assessment?	<input type="checkbox"/>
Was Aspirin commenced or recommended at 1 st assessment?	<input type="checkbox"/>	Was alternative antiplatelet commenced or recommended at 1 st assessment?	<input type="checkbox"/>
Was anticoagulation, e.g. Warfarin or other anticoagulant commenced or recommended at 1 st assessment?	<input type="checkbox"/>		

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