

2009 Annual Evidence Update on Stroke Rehabilitation

Introduction

I am delighted to introduce this 2009 Evidence Update on Stroke Rehabilitation, the result of collaboration between NHS Evidence – stroke, the Society for Research in Rehabilitation and the NHS Stroke Improvement Programme, published online to coincide with the UK Stroke Forum in Glasgow.

Evidence Updates provide an overview of new information in a given topic area. Usually this covers a twelve month period, but in some circumstances where evidence is rapidly changing, Updates may be conducted more frequently. In particular, Evidence Updates highlight any new evidence that might challenge current practice, as described in the most recent, accredited national guidance, and provide a commentary on the likely impact. The Updates also provide a list of relevant national policy, guidelines and systematic reviews, and other significant primary research in the area of interest. Our publication should also be of value to NICE as they begin the process of developing a guideline on stroke rehabilitation.

The process of developing Evidence Updates also contributes to the UK DUETs (Database of Uncertainties about the Effects of treatments) by assessing relevant new guideline publications and systematic reviews in their area of interest to identify potential research recommendations/uncertainties.

This Update builds on the work we published last year in the [2008 Annual Evidence Update on Stroke rehabilitation](#) and I am once again grateful to the NHS Evidence – stroke team at the University of Surrey, and to our expert reviewers who have provided commentaries on the systematic reviews identified by our comprehensive search strategy.

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2009 Annual Evidence Update on Stroke Rehabilitation - Organisation of Care

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Stroke rehabilitation is a broad subject that encompasses a range of interventions from individual treatment approaches to complex systems of delivering care. Nine recent reviews were identified which cover aspects of the organisation of stroke rehabilitation, with a particular emphasis on care outside hospital.

It has been recognised for some time ([Legg et al 2004](#)) that therapy-based rehabilitation in the community can improve patient's performance in the first few months after stroke. However a recent review ([Aziz et al 2008](#)) focussing on later interventions – more than one year after stroke - was inconclusive.

Delivering such rehabilitation interventions to older people in long term care settings may also be effective ([Foster et al 2009a](#)) although it was difficult to be prescriptive. The overall message appears

to be that therapy-based rehabilitation interventions can have an influence on a patients' level of activity.

Three recent reviews have explored the question of the most appropriate setting for rehabilitation to take place. Two of these reviews ([Rousseaux et al 2009](#), [Shepherd et al 2009](#)) have updated earlier analyses of early supported discharge services for stroke patients. Both indicate that providing services that allow an earlier discharge home from hospital and provide more rehabilitation in the home setting, can increase the number of patients who remain at home and independent in the longer term. The relative costs are similar to those of care in hospital.

These reviews are supported by a broader area of research on the transition from hospital to home for individuals with acquired brain injury ([Turner et al 2008](#)) which highlighted the need for post-discharge support as well as further research in this area.

The three remaining reviews explore different components of the content of rehabilitation services.

[Rensink et al \(2009\)](#) reviewed the evidence for task-orientated training (which focuses on the repetitive training of common practical tasks) in stroke rehabilitation and concluded that this is a practical and effective approach.

[Schwamm et al \(2009\)](#) reviewed the evidence for the use of tele-medicine within stroke care. They concluded that there was moderate evidence for the use of teleconferencing systems for the delivery of occupational therapy or physiotherapy for stroke patients when direct patient assessment was not practical.

Finally [Purvis et al \(2009\)](#) reviewed the available measures to monitor the quality of stroke care. They identified a number of factors which show promise as being indicators of quality of care.

References

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Additional evidence added by reviewer

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Upper Limb

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Nine reviews were identified relevant to the management of the hemiparetic upper limb following stroke. This summary is based on a methodological examination of the review papers ([Ashford 2008 et al](#), [Kwakkel et al 2008](#), [Mehrholtz et al 2008](#), [Meilink et al 2008](#), [Timmermans et al 2009](#)) using criteria described in (appendix 1.)

All reviews of methods of treatment were of good methodological quality. The papers were based on a comprehensive literature search (i.e. search terms were appropriate and all-inclusive), papers were screened by two or more authors independently to ensure methodological rigour of the primary studies, and meta-analyses were carried out from primary data ([Kwakkel et al 2008](#), [Mehrholtz et al 2008](#), [Meilink et al 2008](#)). Based on the findings from these studies one can conclude that in patients who had adequate cognitive capabilities and some level of active movement capability in the upper limb,

(a) Robot-assisted therapy added no significant benefit over and above that of routine therapy ([Kwakkel et al 2008](#), [Mehrholtz et al 2008](#))

(b) EMG triggered neuromuscular electrical stimulation therapy added no significant benefit over and above that of routine therapy ([Meilink et al 2008](#)).

The remaining papers did not evaluate rehabilitation treatments but two of these reviewed the literature with a view of informing clinical practice ([Ashford et al 2008](#), [Tuke 2008](#)) and the third was an expert opinion on the future design requirements for robotic rehabilitation ([Timmermans et al 2009](#)).

A common theme highlighted by these reviews is a paucity of robust clinical trials, therefore evidence is lacking to guide practice both in terms of the stroke population as a whole and, in particular, those with severe levels of disability ([Kwakkel et al 2008](#), [Mehrholtz et al 2008](#), [Meilink et al 2008](#), [Tuke 2008](#)). This lack of knowledge is further compromised by a lack of valid and reliable direct measures for social participation or the burden of care that often falls on the informal care givers ([Ashford et al 2008](#)). A particularly important gap, highlighted by [Tuke \(2008\)](#) in the context of constraint induced rehabilitation, is the limited external validity in much of the primary research that has high internal validity.

There are key gaps, as identified from these reviews, which clinicians who participate in research need to consider and could be bridged by work that:

1. Ensures inclusion of patients with severe levels of impairment (motor or cognitive) into research practice – much of the research to date exclude such patients [Meilink et al \(2008\)](#). (The lack of significant differences in the clinical trials may be a reflection of this exclusion.)
2. Develops a clear scientific rationale (and objective markers) for matching the patient to an appropriate method of treatment, especially those that can be applicable to a severely impaired stroke patient.
3. Incorporates measures of social participation, even though many of the existing measures are indirect, in addition to measures of impairment and activity in any clinical research study (Phase 1 onwards).
4. Develops robust measures of social participation that have clinical relevance.

The reviewed research shows that current practice is of some benefit to patients but further research is required to determine the contribution of recently developed techniques. It is hoped that future updates will provide more positive guidance for clinicians.

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Additional evidence

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Mobility

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There is strong evidence that exercise and intensive tasks specific functional training can improve mobility after stroke ([Van Peppen et al 2004](#), [Van de Port et al 2007](#)). Detail of interventions which can be operationalised to achieve these goals and the need for a paradigm shift within UK Stroke physiotherapy is now emerging.

Treadmill training can improve mobility in people who can already walk when the speed and incline of the treadmill is adjusted to reach intensity targets for cardio-respiratory training effect ([Eich et al 2004](#); [Hesse 2008](#)) and underlying neuroplastic changes in brain activity have been identified thereby confirming the mechanism of action. ([Luft et al 2008](#), [Forrester et al 2008](#)). It is also known that electromechanical gait training can enable more patients to regain the ability to walk after a stroke; for every four immobile patients with stroke treated using electro-mechanical gait training during their rehabilitation, one extra person will regain the ability to walk, compared to conventional therapy ([Merholz et al 2007](#)) and interventions involving repetitive task-orientated practice (such as exercise, treadmill training and electro-mechanical training) have been shown to be cost-effective ([French et al 2007](#)).

There is however some debate about which type of intervention might be most effective; 'low technology' interventions such as exercise and over-ground gait training may be as effective as 'high technology' interventions such as treadmill training and electro-mechanical training for people with chronic stroke ([States et al 2009](#), [Dickstein 2008](#)), however there are few studies that specifically compare interventions and comparative studies of cost-effectiveness and patient satisfaction are particularly lacking.

There is also growing evidence of the effectiveness of exercise for mobility after stroke. Recent systematic reviews have confirmed the effectiveness of task-orientated circuit

training ([Wevers et al 2009](#)) and strength training ([Ada 2006](#)). The evidence to support exercise and intensive task-specific functional training to improve mobility after stroke is convincing; the challenge now is to establish the best way to implement these interventions into clinical practice. Further research to establish the optimal 'dose' of therapy (intensity, frequency, duration), type of exercise or task practice, time point during the stroke journey and characteristics of the patients who are, and are not, able to benefit of these interventions are now imperative. Further novel interventions are needed for those for whom exercise and task-specific practice is not effective.

As the evidence of the clinical and cost-effectiveness of exercise and intensive task-specific functional training grows, evidence that the 'traditional' treatment approaches used in the UK are not effective is becoming clearer. Most UK stroke physiotherapists base their treatment choices on the Bobath Concept ([Tyson et al 2009a](#), [Tyson et al 2009b](#)) but an authoritative review found little or no evidence to support traditional treatment approaches, such as Bobath ([Van Peppen et al 2004](#)). In 2009 a review specifically of the Bobath Concept found strong evidence in favour of other approaches compared to Bobath for mobility after stroke ([Kollen et al 2009](#)). However the 'other approaches' were varied (problem oriented willed movement, rhythmic auditory stimulation and treadmill training) so it was not possible to specify which alternative interventions were superior.

The strength of evidence that exercise and task-specific functional training are effective while Bobath is not indicates that a paradigm shift is needed within UK Stroke physiotherapy if evidence based practice is to be implemented; as has occurred in other countries in Europe. Physiotherapists need to urgently explore ways in which exercise and intensive task-specific functional training can be utilised within their practice in preference to Bobath based interventions. It is increasingly difficult to justify the continued use of the Bobath Concept and its associated treatment techniques.

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Additional evidence

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Speech and Language

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The use of constraint induced language therapy (CILT) for aphasia after stroke is currently not common in the clinical intervention repertoire of UK SLTs but its use is more common in mainland Europe. This systematic review identified 9 studies in long term aphasia and 1 in acute aphasia which met criteria and concluded that there was only modest evidence of effectiveness ([Cherney et al 2009](#)).

Stroke is one aetiology which may result in dysarthria. No studies in this systematic review of dysarthria intervention in children aged 3-16 years with acquired brain injury met the inclusion criteria (RCT, experimental design), suggesting an urgent need for research in this area ([Morgan & Vogel 2008](#)).

Disorders of swallowing (dysphagia) in acute stroke are frequent. This review considered dysphagia secondary to neurological disorder and concluded that there were a number of

studies which met the inclusion criteria but only limited evidence for a range of behavioural interventions ([Ashford et al 2009](#)).

Tools to assess communicative function in people with stroke are crucial. Scrutiny of the individual items suggest that only a proportion may be relevant and acceptable to people with communication disability ([Doyle et al 2008](#)).

This systematic review of 8 studies meeting the criteria concluded that malnutrition in acute stroke is a greater risk for individuals with dysphagia ([Foley & Martin 2009](#)).

There are too few studies of acupuncture intervention for dysphagia after acute stroke to be able to draw conclusions ([Xie et al 2008](#)).

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Basic Personal Needs

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Eating and drinking

Two related reviews focusing on malnutrition after stroke have been published in 2009. One study ([Foley et al. 2009a](#)) explored possible reasons for the wide variation in estimates of the prevalence of malnutrition after stroke, by considering how nutritional status has been assessed in previous studies. Only four out of the 17 methods found were validated assessment tools. The authors suggest that this variation in measurement may have contributed to the variation in prevalence estimates, and conclude that valid and reliable assessment tools are needed.

A second study ([Foley et al. 2009b](#)) looked at the relationship between swallowing difficulties (dysphagia) and malnutrition after stroke, by reviewing studies that had measured both dysphagia and nutritional status in the same people. The review found that the chances of having malnutrition were greater in the presence of dysphagia, but only in the trials conducted several weeks following stroke onset. However, the results for this group were only just statistically significant. The authors suggest that the results of the pooled trials are ambiguous, and that the methods and timing of the assessments, and the possible effects of other modifying factors need to be better understood. The implications of the reviews are that dysphagia should be considered as a potential risk factor for reduction in nutritional status in the rehabilitation period after stroke, but methods of assessing nutritional status need further

development, and other factors potentially influencing nutritional status need investigating.

Incontinence

[Thomas et al.](#) (2008) have updated their Cochrane systematic review of trials evaluating interventions to promote urinary continence after stroke. Their review found five new studies, but these did not substantially affect the conclusion of the review, which is that there is insufficient evidence to recommend any specific intervention. This is because the interventions are very varied, some of the studies are of poor quality, and only three out of 12 trials confirmed that continence problems were subsequent to stroke. Their suggestions for practice remains that there is some evidence to suggest that specialised input and individualised care management can improve the symptoms of urinary incontinence.

Experiences of stroke survivors

A meta-synthesis of the qualitative literature on the experience of living with stroke ([Salter et al 2008](#)) reviewed nine studies, and identified five common themes: change, loss, uncertainty, social isolation and adaptation/reconciliation. There is enough detail of the original studies given in the paper to support the provenance of these broad themes, but the comprehensiveness and robustness of the synthesis may need confirmation. In practice, the study draws attention to the common themes of people's experience after stroke, and could inform the development of interventions to meet people's needs.

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Cognition and Perception

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Cognitive impairment is common after stroke ([National Clinical Guidelines for Stroke 2008](#)) and there is little robust research evidence to inform practice. Four recent reviews provide new evidence on aspects of cognitive impairment after stroke and its rehabilitation.

The breadth of impairments and interventions is clear from a meta-analysis ([Rohling et al 2009](#)) of studies previously reviewed ([Ciccerone at al 2000](#); [Ciccerone at al 2005](#)). The analysis includes studies of patients with acquired brain injury (some of whom have had stroke), using various research designs and clinical objectives. The work is huge in scope but, inevitably, detail is lost and it is hard to draw conclusions to inform decisions on any particular impairment or intervention. However, the non-trial studies (which provide less robust evidence) suggest that interventions have a moderate effect on global cognitive functioning within 12 months of stroke. (No effect is found in patients with earlier onset). The included studies are separated according to domain (such as memory, attention) but studies of stroke patients are not reported separately and so it is not possible to recommend any specific intervention directed at an individual domain.

The impact of stroke on sensation can be disabling, in that impairment may restrict the ability to feel pain, and impairment of the sensations of temperature, vibration and pressure can impact on fine movements and safety. Recent work ([Schabrun et al 2009](#)) argues that sensation is relatively neglected, both clinically and in research. Interventions are classified as active (such as attempting to retrain sensory function, including exercises to localise and discriminate) or passive (such as stimulating sensory regions without muscle contraction). There is no evidence that active interventions are effective. The results of three passive intervention studies are combined, to conclude that it has benefits for sensory recovery and hand function. However, the studies are small and non-controlled, so this evidence should not be overstated until larger or higher-quality studies are available.

Motor skills are an important part of rehabilitation and a review reports on interventions to assist patients in re-acquisition ([McEwen et al 2009](#)). It includes studies using any research design, and classifies interventions either as task-specific (impacting on a particular motor skill) or task-general. The combination of motor imagery and general training is shown to have a positive effect on activities of daily living, with some evidence that effects are maintained after interventions cease. General strategy training also improves performance in activities of daily living in patients with apraxia. Skills taught in the task-specific studies include turning of book pages and raising a cup. Motor imagery is the predominant intervention. There is preliminary evidence that this approach impacts positively on task-specific skills. That the review included single case studies and did not offer a detailed critique of included trials (to check for known factors associated with exaggerated treatment effects), means that any conclusions are tentative. Finally, the published evidence on the treatment and assessment of neglect after stroke has been reviewed from the perspective of patients' physical performance ([Vahlberg and Hellstrom 2008](#)). Both scanning training and constraint-induced movement therapy show benefits, but the authors argue that the effects on patients' mobility and gait, for example, are given less attention than is warranted. As such, the intervention trials and assessment tools exclude pertinent aspects of the patient's rehabilitation.

Included studies

[McEwen SE, Huijbregts MPJ, Ryan JD, Polatajko HJ](#). Cognitive strategy use to enhance motor skill acquisition post-stroke: a critical review. *Brain Injury* 2009; 23: 263-277.

Bottom-line conclusion: A broad database search was undertaken to find studies of any design that had attempted to help stroke patients re-learn general or task-specific motor skills after stroke. 26 studies were found, of which 19 were task-specific and 7 were general. Motor imagery was most frequently studied and there was some evidence that, when combined with passive interventions, it has benefits on task-specific skills. Larger studies, using randomized controlled designs are needed to verify the tentative findings of the review.

[Rohling ML, Faust ME, Beverly B, Demakis G](#). Effectiveness of cognitive rehabilitation following acquired brain injury: A meta-analytic re-examination of Cicerone et al's (2000, 2005) systematic reviews. *Neuropsychology* 2009; 23: 20-39.

Bottom-line conclusion: The authors conducted a meta-analysis of studies already reported in two previously published systematic reviews. The analysis included 199 studies (of a combined total of 2,014 patients with acquired brain injury, of which stroke patients were a sub-set). The analysis combined two group studies (ie 'trials') and single group studies (ie pre-post study designs). Overall, interventions have an effect on global cognitive functioning in patients with more recent onset of stroke, but have no effect on those whose stroke occurred more than 12 months previously. It is not possible to determine the effect of interventions on particular aspects of cognitive function after stroke, such as language and memory. The effects on stroke patients specifically should be examined in future meta-analysis, ideally with the analysis restricted to

randomised controlled trials.

[Schrabrun SM, Hillier S.](#) Evidence for the retraining of sensation after stroke: a systematic review. *Clinical Rehabilitation* 2009; 23: 27-39.

Bottom-line conclusion: Databases were searched for studies that had aimed to retrain sensation after stroke. 14 studies were found, 6 of passive interventions and 8 that were active. Methodological quality of the studies varied considerably. The small size of studies and variation in design makes it difficult to draw robust conclusions. Larger studies, using randomised controlled designs are needed to verify the tentative findings of this review.

[Vahlberg B, Hellstrom K.](#) Treatment and assessment of neglect after stroke – from a physiotherapy perspective: A systematic review. *Advances in Physiotherapy* 2008; 10: 178-187.

Bottom-line conclusion: The authors searched databases for RCTs and systematic reviews that had examined either treatment for neglect after stroke or tools used in assessing neglect. The paper reports 8 articles: 4 RCTs and 4 reviews. There is strongest evidence for scanning training, while there is some evidence for the benefits of Constraint-Induced Movement Therapy, which needs replication. Tools and trials have tended to exclude physical performance (such as mobility and gait) in their assessment of the outcomes of neglect.

References for review

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Living with Stroke

Jill Lockhart

National Lead for Rehabilitation, Stroke Improvement Programme

The effect of Early Supported Discharge on stroke survivors and care givers

A systematic review undertaken by [Pringle et al](#) (2008) focuses on a less well considered impact of the discharge process: the effect on carers and families

The first month is identified as the main transition period, a crucial time for stroke carers, possibly because it is only once home that patients and carers begin to comprehend the full consequences of the illness.

At one and three months post discharge, individuals were in the middle of grasping their new situation, with a need identified for professionals to acknowledge the real goals of stroke survivors and their role in facilitating acceptance and adjustment post stroke. Changes regarding quality of life and mood during this period could be taken into greater account by those involved in planning, delivery, and measurement of community rehabilitation services, in order to align these more closely with the true needs of patients and carers.

There is evidence that some survivors liken the return home to bereavement, and although this emotional impact is widely acknowledged, it should be seen as part of the wider context of overall stroke recovery. Thus the importance of acknowledging the stroke patient's wider social circle and community networks, in conjunction with the main caregiver(s), is increasingly identified as relevant to this time and must be acknowledged alongside the continuing shift towards care in the community.

An improved understanding of the issues facing stroke patients and carers during their early days at home should facilitate improvements in the preparation for discharge in the hospital setting and allow more focused follow-up services in the community.

The experiences of living with stroke on survivors

[Salter et al](#) (2008) in their qualitative meta synthesis identified 5 interrelated themes (i) Change, Transition and Transformation, (ii) Loss, (iii) Uncertainty, (iv) Social Isolation, (v) Adaptation and Reconciliation, all of which were interrelated and interacted against an ever-present background of change and transformation.

Survivors view stroke as an experience that separates them from everyday life forcing them into a new and foreign existence; with a significant impact on emotions, personality abilities activities roles and social relationships. Stroke is seen as something that is always present, mediating experiences, creating effort where there had been none and disrupting the survivors' sense of self.

This raises challenges for those involved in provision of services, support and rehabilitation as much delivery of care is based on the medical model, whilst the evidence suggests that, for the patient, suffering a stroke challenges the assumptive identity, self-concept and role-capacity of the individual in the face of acquired deficits and requires of the individual adjustment to these challenges while simultaneously adapting to functional disabilities. The meta synthesis offers further challenges to those who are involved in delivering conventional rehabilitation, including:

- some evidence suggesting there is no fully successful adjustment to stroke

- the process of adjustment for survivors is influenced by constant reference back to life before stroke – not to milestones in recovery
- that, for some patients the comparison results in a “grudging acknowledgement and self criticism of progress made” while for others, it is a process of transformation; of negotiating a new identity that included their changed abilities

Social support networks are well known to have a positive influence on both physical recovery and quality of life post-stroke, with relationships being perceived as important, not only for comfort and support, but also for maintaining a sense of continuity; however the majority of studies in the meta synthesis described loss of roles and relationships, decreased social interaction and increasing isolation.

Recovery from stroke is marked by what matters to the individual, i.e. return to a life that is meaningful. Factors such as hope, and increasing a sense of control over recovery, i.e. individual's personal goals and values, not the goals of the stroke rehabilitation team are essential for sustained forward progress after stroke.

Evidence suggests that healthcare professionals tend to set very different sorts of goals from patients. For them, the processes of adaptation and reconciliation, including the development of new ways to interact with the social world, may be the focus for recovery, rather than concrete physical or functional ability alone.

Lessons can be taken from this for those delivering stroke services. Models that are based solely on clinical interpretations of the recovery process may be of little relevance to the individual. Whereas those based on an understanding of the experiences of individuals may result in more successful and relevant recovery for the survivor and consequently improved outcomes. It may support the improvement in co-ordination of appropriate services and recognition of existing service gaps.

Information provision to stroke survivors and care givers: the effect of different approaches:

Stroke survivors and their carers often feel they have been given inadequate information about stroke and feel unprepared for life after discharge from hospital. However, the best way to provide information after stroke is unclear.

[Smith et al. \(2008\)](#) suggest that providing information to patients and carers improved knowledge of stroke and increased patient satisfaction with some, but not all, of the information received and that information may reduce patient depression scores, although the effect was small and probably clinically insignificant.

Their findings suggest that a strategy based on an active, rather than passive intervention approach should be adopted and more effective information provision strategies after stroke need to be developed. Meta-analysis of patient teaching strategies showed that the greatest effect size was associated with reinforcement, independent study, and the use of multiple strategies

Aspects deemed as passive intervention comprised written generic information about stroke (booklets, leaflets, including individually tailored packages containing medical history, clinical résumés, test results and leaflets). Passive delivery strategies included an individualized multimedia computer programme, or explanation by a research registrar. Active intervention included programmes of lectures providing information about stroke and services available, combined with an opportunity to ask questions and an emphasis on the importance of self-esteem and coping strategies. Some comprised instruction in a range of topics plus hands-on training for carers. Another intervention consisted of a recovery plan, an interactive workbook and a weekly phone call. One programme for carers of aphasic patients included communication strategies, relaxation and stress management. Others took the form of reviews by a stroke nurse specialist, selected written information, and personalized records detailing individual risk factors and recommended risk factor targets. Active information had both a significantly greater effect than passive information on patient anxiety scores, and satisfaction with information about the causes and nature of stroke. However there was no significant difference in satisfaction with information about allowances and services.

All three reviews highlight the importance of considering of the 360° effect of stroke on patients and their caregivers, at all parts of the pathway. Whilst it is commonly acknowledged that this is key to any practice, the evidence from these reviews demonstrates that there is still much room for improvement. Further attention to the content

and methods of information provision, goal setting in the context of adjustment after stroke is necessary, and relevant to the delivery, timing, planning and effective outcomes from rehabilitation, with more research required to further inform this.

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Miscellany

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Key Documents

GUIDELINES

- **Department of Health** - Demonstrating how to deliver stroke care for adults in the community. [\[fulltext\]](#)
- **NICE** - Critical illness rehabilitation: costing report [\[fulltext\]](#)
- **CKS** - Stroke and TIA. [\[fulltext\]](#)
- **SIGN** - Management of patients with stroke or TIA [\[fulltext\]](#)
- **Royal college of Physicians** - Stroke [\[fulltext\]](#)

AUDIT AND STATISTICS

- **American Heart Association** - Heart disease and stroke statistics [\[fulltext\]](#)
- **British heart Foundation** - Stroke statistics [\[fulltext\]](#)
- **Royal College of physicians** - National sentinel stroke audit 2008 [\[fulltext\]](#)

USEFUL WEBSITES

- **NHS Choices** - Stroke [\[fulltext\]](#)
- **The Stroke Association** [\[stroke information link\]](#)
- **European Stroke Organisation** [\[weblink\]](#)

COCHRANE PROTOCOLS

- Audrey Bowen, Peter Knapp, David Gillespie, Andy Vail. Non-pharmacological interventions for perceptual disorders following stroke and other adult, acquired, non-progressive brain injury. [\[fulltext\]](#)
- Tracey E Howe, Amanda H Trees, Brian R Durward, Lorna Paul. Mental practice for treating upper extremity deficits in individuals with hemiparesis after stroke. [\[fulltext\]](#)
- Alex Pollock, Brian R Durward, Peter Langhorne. Interventions for improving sit-to-stand ability in patients with stroke [\[fulltext\]](#)

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- **Contributors**

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Beverley French is a Reader in Evidence Based Healthcare at the University of Central Lancashire, specialising in systematic review and knowledge transfer. She has completed reviews in stroke for HTA, NIHR, and the Stroke Association. Her research interests include behavioural mechanisms and organisational context for evidence-based change in health and social care.

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Dr Peter Knapp is a Senior Lecturer in the School of Healthcare at the University of Leeds, UK, where his main research activities are in the area of information for patients and psychological outcomes in stroke. This work has been funded by the UK National Institute for Health Research, the Wellcome Trust and the Drug Information Association, among others, and has been published and presented widely.

Professor Peter Langhorne

After completing undergraduate and postgraduate work in Zoology, Peter Langhorne studied medicine at the University of Aberdeen and undertook postgraduate medical training in Edinburgh and Glasgow. He was appointed as a Senior Lecturer (1994) and then personal Professor (2001) in the Academic Section of Geriatric Medicine of the University of Glasgow. Since 1994 he has also been an Honorary Consultant for Greater Glasgow Health Board with clinical interests in geriatric medicine and stroke medicine. He was lead clinician for stroke in East Glasgow (1997-2007) and continues to contribute to the East Glasgow Stroke Service.

Jill Lockhart

Jill Lockhart is a Chartered Physiotherapist with a background in stroke. For more than 20 years she was involved in delivering hands on care to stroke patients, and supporting carers in a variety of settings across the pathway. More latterly her career has diversified to include the role of Lead Practitioner for Stroke, which included setting up and running the Integrated Stroke Unit in an Acute Trust, in a role traditionally occupied by a Senior Nurse, and her current role, as National Improvement Lead for Stroke within the Stroke Improvement Programme, part of NHS Improvement, with a particular responsibility for the rehabilitation part of the Stroke pathway. Her particular interests are rehabilitation, and the long term effects of stroke on survivors and their families.

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Jane Maxim is an Emeritus Professor at University College, London. She has wide research interests which include Speech and language processing in normal and abnormal

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Dr. Anand Padyan

Anand Padyan is a Senior Lecturer with the School of Health and Rehabilitation and the Research Institute for Science Technology and Medicine (Keele University). His current, externally funded, research portfolio is aimed at: (a) Developing a better understanding of the pathophysiological basis of spasticity and it's impact on people with upper motor neurone lesions; (b) Exploring the mechanisms for disordered motor control following stroke and cerebral palsy; (c) Identifying the therapeutic benefits (and mechanism of action) associated with treatment involving electrical stimulation; (d) Exploring the effects of early antispasticity treatment; (e) Exploring the impact of exercise on motor recovery, independence and well being.

Dr. Sarah Tyson

Sarah Tyson trained as a physiotherapist at Sheffield Hallam University. After clinical work specialising in neurological rehabilitation, she completed Masters and Doctoral study at the University of Southampton and Brunel University. She is now a Reader in Rehabilitation at the University of Salford where she leads the neurological rehabilitation research programme is President of the Physiotherapy Research Society, and Chairs of the North West Stroke Local Research Network steering group.

Professor Tom Quinn

Professor Tom Quinn is one of the UK's leading cardiovascular nurses and has made a significant contribution to practice, policy and research both nationally and internationally. He was the UK's first Professor of Cardiac Nursing (at Coventry University), and took up post as Professor of Clinical Practice at the University of Surrey in January 2009. He has published extensively on acute cardiac and stroke care and his current responsibilities include being clinical lead for the NHS Evidence cardiovascular, stroke and vascular collections, part of the National Institute for Health and Clinical Excellence. He continues to advise the Department of Health as a member of the Emergency Cardiac Care Board, is a member of the group developing the Stroke Specific Educational Framework sponsored by the Department of Health, and chairs the steering group for development of primary angioplasty for the NHS in Surrey. He is Honorary Clinical and Research Adviser to South East Coast Ambulance Service NHS Trust. Tom Quinn is a member of the advisory committee for the European Society of Cardiology (ESC) Council of Cardiovascular Nursing and Allied Health Professions, a member of the ESC Working Group on Acute Cardiac Care, and a former Chairman of the ESC Working Group on

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The Society for Research in Rehabilitation(SRR) provides a forum for high quality rehabilitation research:
Raising the profile of rehabilitation research
Encouraging the evaluation of rehabilitation practice through well-designed studies
Fostering a climate in which people can develop and share research skills
Enabling active researchers to share the results of their research
Advancing rehabilitation practice for acute and chronic disabling conditions

Methodology

Our literature search was designed to add to the body of knowledge in last year's Stroke Rehabilitation Evidence Update. Searches were designed with a slight overlap period to ensure a good fit.

In collaboration with the Stroke RR and NHS Improvement we brought together a panel of experts to support us by summarising key evidence and commenting on key developments in the field.

We identified systematic reviews published between July 2008 and September 2009 and sifted them for relevance and quality. Material included in the last evidence update was excluded, with exceptions made for reviews amended within the search period and a small number not previously considered by an expert reviewer. Our reviewers were able to identify additional evidence relevant to any section.

In addition to a wide range of databases, we hand searched other Key sources for relevant guidance, statistics and reports. We were able to include some evidence published after the main search period.

In collaboration with

