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Nursing Best Practice Guideline
Shaping the future of Nursing

Stroke Assessment
Across the Continuum of Care



RNAO

Registered Nurses' Association of Ontario
L'Association des infirmières et infirmiers
autorisés de l'Ontario

NURSING BEST PRACTICE GUIDELINES PROGRAM

Finding answers. For life.



Greetings from Doris Grinspun
Executive Director
Registered Nurses Association of Ontario

It is with great excitement that the Registered Nurses' Association of Ontario is partnering with the Heart and Stroke Foundation of Ontario in the development, evaluation and dissemination of the guideline *Stroke Assessment Across the Continuum of Care*. Evidence-based practice supports the excellence in service that nurses are committed to deliver in our day-to-day practice, and we are pleased to be able to provide this key resource for nursing practice.

The RNAO offers our endless thanks to the many individuals and institutions that are making our vision for Nursing Best Practice Guidelines a reality. The Government of Ontario recognized RNAO's ability to lead this program and is providing multi-year funding. Tazim Virani – program director – with her fearless determination and skills, is moving the program forward faster and stronger than ever imagined. The nursing community, with its commitment and passion for excellence in nursing care, is providing the knowledge and countless hours essential to the creation, evaluation and revision of each guideline. Employers have responded enthusiastically by getting involved in nominating best practice champions, implementing and evaluating the guidelines and working towards an evidence-based practice culture. Partnerships such as this one with the HSFO provide a tremendous opportunity to network and share expertise for the development of guidelines and allow a synergy in dissemination and uptake efforts.

Successful uptake of these guidelines require a concerted effort of nurse clinicians and their healthcare colleagues from other disciplines, nurse educators in academic and practice settings and employers. After lodging these guidelines into their minds and hearts, knowledgeable and skillful nurses and nursing students need healthy and supportive work environments to help bring these guidelines to life.

We ask that you share this guideline with members of the interdisciplinary team. There is much to learn from one another. Together, we can ensure that Ontarians receive the best possible care every time they come in contact with us. Let's make them the real winners of this important effort!

The RNAO is pleased to have had the opportunity to work with the HSFO in this important initiative and we look forward to future opportunities for collaboration.

Doris Grinspun, RN, MScN, PhD(c), OOnt.



Executive Director
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Mary Lewis

*Director, Government Relations and Partnership Programs
Heart and Stroke Foundation of Ontario*

The Heart and Stroke Foundation of Ontario (HSFO) is pleased to partner with the Registered Nurses' Association of Ontario in the creation of a nursing best practice guideline on *Stroke Assessment Across the Continuum of Care*.

In 1997, the Heart and Stroke Foundation convened a group of stroke experts from across the province to develop a framework for stroke care in Ontario. Through its work, the Foundation became aware of several local efforts to address the issue of enhancing stroke care. It was agreed that a collaborative project would maximize the impact of these efforts. As a result, the Heart and Stroke Foundation championed the Coordinated Stroke Strategy to develop and test a regionally based model of coordinated stroke care spanning the full continuum of care.

In 2000, the Ministry of Health and Long-Term Care committed funding to support the development of a province-wide strategy, the Ontario Stroke System, for organizing stroke care based on the success of the Coordinated Stroke Strategy. The Ontario Stroke System promotes a model that is comprehensive, integrated, evidence-based and province-wide. The overall goal of the stroke system is to decrease the incidence of stroke and improve care and outcomes by reorganizing stroke care to ensure that all Ontarians have access to appropriate, quality stroke care in a timely manner.

One of the key components of the Ontario Stroke System is professional education. Professional education resources and programs have been developed along the continuum of care for stroke care providers to ensure that best practices for stroke care are implemented. Developing and disseminating best practice guidelines for stroke is an important part of professional education. Participating with RNAO in the Nursing Best Practice Guidelines program has allowed the Ontario Stroke System to further implement best practice guidelines for stroke across Ontario. We are especially appreciative of the support of RNAO and the tremendous work of the guideline panel, led by Linda Kelloway.

We are pleased to be part of this important initiative and look forward to working with RNAO on future nursing best practice guidelines.

Mary Lewis, MSW

A handwritten signature in black ink that reads "Mary Lewis".

Director, Government Relations and Partnership Programs
Heart and Stroke Foundation of Ontario



Finding answers. For life.

Stroke Assessment Across the Continuum of Care

Disclaimer

These best practice guidelines are related only to nursing practice and not intended to take into account fiscal efficiencies. These guidelines are not binding for nurses and their use should be flexible to accommodate client/family wishes and local circumstances. They neither constitute a liability or discharge from liability. While every effort has been made to ensure the accuracy of the contents at the time of publication, neither the authors nor the Heart and Stroke Foundation of Ontario nor the Registered Nurses' Association of Ontario give any guarantee as to the accuracy of the information contained in them nor accept any liability, with respect to loss, damage, injury or expense arising from any such errors or omissions in the contents of this work. Any reference throughout the document to specific pharmaceutical products as examples does not imply endorsement of any of these products.

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How to Use this Document

This nursing best practice guideline is a comprehensive document providing resources necessary for the support of evidence-based nursing practice. The document needs to be reviewed and applied, based on the specific needs of the organization or practice setting/environment, as well as the needs and wishes of the client. Guidelines should not be applied in a “cookbook” fashion but used as a tool to assist in decision making for individualized client care, as well as ensuring that appropriate structures and supports are in place to provide the best possible care.

Nurses, other healthcare professionals and administrators who are leading and facilitating practice changes will find this document valuable for the development of policies, procedures, protocols, educational programs, assessments and documentation tools. It is recommended that the nursing best practice guidelines be used as a resource tool. Nurses providing direct client care will benefit from reviewing the recommendations, the evidence in support of the recommendations and the process that was used to develop the guidelines. However, it is highly recommended that practice settings/environments adapt these guidelines in formats that would be user-friendly for daily use. This guideline has some suggested formats for such local adaptation and tailoring.

Organizations wishing to use the guideline may decide to do so in a number of ways:

- Assess current nursing and healthcare practices using the recommendations in the guideline.
- Identify recommendations that will address identified needs or gaps in services.
- Systematically develop a plan to implement the recommendations using associated tools and resources.

The HSFO and RNAO are interested in hearing how you have implemented this guideline. Please contact us to share your story. Implementation resources will be made available through the RNAO website at www.rnao.org/bestpractices to assist individuals and organizations to implement best practice guidelines.

Stroke Assessment Across the Continuum of Care

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Stakeholders representing diverse perspectives were solicited for their feedback and the Heart and Stroke Foundation of Ontario and the Registered Nurses' Association of Ontario wish to acknowledge the following for their contribution in reviewing this Nursing Best Practice Guideline:

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Summary of Recommendations

RECOMMENDATION		*LEVEL OF EVIDENCE
Practice Recommendations		
Secondary Prevention	<p>1.0 Nurses in all practice settings should screen clients for risk factors related to stroke in order to facilitate appropriate secondary prevention. Clients with identified risk factors should be referred to trained healthcare professionals for further management.</p>	IV
Stroke Recognition	<p>2.0 Nurses in all practice settings should recognize the new onset of the signs and symptoms of stroke as a medical emergency to expedite access to time dependent stroke therapy, as <i>"time is brain"</i>.</p>	IV
Neurological Assessment	<p>3.0 Nurses in all practice settings should conduct a neurological assessment on admission, and when there is a change in client status. This neurological assessment, facilitated with a validated tool (such as the Canadian Neurological Scale, National Institutes of Health Stroke Scale or Glasgow Coma Scale), should include at minimum:</p> <ul style="list-style-type: none"> ■ Level of consciousness; ■ Orientation; ■ Motor (strength, pronator drift, balance and coordination); ■ Pupils; ■ Speech/Language; ■ Vital signs (TPR, BP, SpO₂); and ■ Blood glucose. 	IV
	<p>3.1 Nurses in all practice settings should recognize that signs of decline in neurological status may be related to neurological or secondary medical complications. Clients with identified signs and symptoms of these complications should be referred to a trained healthcare professional for further assessment and management.</p>	IV
Complications	<p>4.0 Nurses in all practice settings should assess the client's risk for pressure ulcer development, which is determined by the combination of clinical judgment and the use of a reliable risk assessment tool. The use of a tool that has been tested for validity and reliability (such as the Braden Scale for Predicting Pressure Sore Risk) is recommended.</p>	IV
	<p>4.1 Nurses in all practice settings should assess the stroke client's fall risk on admission and after a fall using a validated tool (such as the STRATIFY or timed <i>"Up and Go"</i>).</p>	IV
	<p>4.2 Nurses in all practice settings should assess stroke clients for the following stroke complications: painful hemiparetic shoulder, spasticity/contractures, and deep vein thrombosis in order to facilitate appropriate prevention and management strategies.</p>	IV
Pain	<p>5.0 Nurses in all practice settings should assess clients for pain using a validated tool (such as the Numeric Rating Scale, the Verbal Analogue Scale or the Verbal Rating Scale).</p>	IV

*Please refer to Page 16 for an Interpretation of Evidence.

	RECOMMENDATION	LEVEL OF EVIDENCE
Dysphagia	<p>6.0 Nurses should maintain all clients with stroke NPO (including oral medications) until a swallowing screen is administered and interpreted, within 24 hours of the client being awake and alert.</p> <p>6.1 Nurses in all practice settings, who have appropriate training, should administer and interpret a dysphagia screen within 24 hours of the stroke client becoming awake and alert. This screen should also be completed with any changes in neurological or medical condition, or in swallowing status. This screening should include:</p> <ul style="list-style-type: none"> ■ Assessment of the client’s alertness and ability to participate; ■ Direct observation of signs of oropharyngeal swallowing difficulties (choking, coughing, wet voice); ■ Assessment of tongue protrusion; ■ Assessment of pharyngeal sensation; ■ Administration of a 50 ml water test; and ■ Assessment of voice quality. <p>In situations where impairments are identified, clients should be referred to a trained healthcare professional for further assessment and management.</p>	<p>Ila</p> <p>IV</p>
Nutrition	<p>7.0 Nurses in all practice settings should complete a nutrition and hydration screen within 48 hours of admission, after a positive dysphagia screen and with changes in neurological or medical status, in order to prevent the complications of dehydration and malnutrition. In situations where impairments are identified, clients should be referred to a trained healthcare professional for further assessment and management.</p>	IV
Cognition/ Perception/ Language	<p>8.0 Nurses in all practice settings should screen clients for alterations in cognitive, perceptual and language function that may impair safety, using validated tools (such as the Modified Mini-Mental Status Examination and the Line Bisection Test). This screening should be completed as follows:</p> <p>Within 48 hours of regaining consciousness:</p> <ul style="list-style-type: none"> ■ Arousal, alertness and orientation; ■ Language (comprehensive and expressive deficits); and ■ Visual neglect. <p>In addition, when planning for discharge:</p> <ul style="list-style-type: none"> ■ Attention; ■ Memory (immediate and delayed recall); ■ Abstraction; ■ Spatial orientation; and ■ Apraxia. <p>In situations where impairments are identified, clients should be referred to a trained healthcare professional for further assessment and management.</p>	IV
Activities of Daily Living	<p>9.0 Nurses in all practice settings should assess stroke clients’ ability to perform the activities of daily living (ADL). This assessment, using a validated tool (such as the Barthel Index or the Functional Independence Measure™), may be conducted collaboratively with other therapists, or independently when therapists are not available. In situations where impairments are identified, clients should be referred to a trained healthcare professional for further assessment and management.</p>	IV

Stroke Assessment Across the Continuum of Care

	RECOMMENDATION	LEVEL OF EVIDENCE
Bowel and Bladder Function	10.0 Nurses in all practice settings should assess clients for fecal incontinence and constipation.	IV
	10.1 Nurses in all practice settings should assess clients for urinary incontinence and retention (with or without overflow).	IV
Depression	11.0 Nurses in all practice settings should screen clients for evidence of depression, using a validated tool (such as the Stroke Aphasia Depression Questionnaire, Geriatric Depression Scale, Hospital Anxiety and Depression Scale or the Cornell Scale for Depression in Dementia) prior to discharge throughout the continuum of care. In situations where evidence of depression is identified, clients should be referred to a trained healthcare professional for further assessment and management.	IV
	11.1 Nurses in all practice settings should screen stroke clients for suicidal ideation and intent when a high index of suspicion for depression is present, and seek urgent medical referral.	IV
Caregiver Strain	12.0 Nurses in all practice settings should assess/screen caregiver burden, using a validated tool (such as the Caregiver Strain Index or the Self Related Burden Index). In situations where concerns are identified, clients should be referred to a trained healthcare professional for further assessment and management.	III
Sexuality	13.0 Nurses in all practice settings should screen stroke clients/their partners for sexual concerns to determine if further assessment and intervention is necessary. In situations where concerns are identified, clients should be referred to a trained healthcare professional for further assessment and management.	IV
Client and Caregiver – Readiness to Learn	14.0 Nurses in all practice settings should assess the stroke client and their caregivers' learning needs, abilities, learning preferences and readiness to learn. This assessment should be ongoing as the client moves through the continuum of care and as education is provided.	IV
Documentation	15.0 Nurses in all practice settings should document comprehensive information regarding assessment and/or screening of stroke clients. All data should be documented at the time of assessment and reassessment.	IV

RECOMMENDATION	LEVEL OF EVIDENCE
Education Recommendations	
<p>16.0 Basic education for entry to practice should include:</p> <ul style="list-style-type: none"> ■ Basic anatomy and physiology of the cerebrovascular system; ■ Pathophysiology of a stroke; ■ Risk factors of a stroke; ■ Signs and symptoms of a stroke; ■ Components of a client history and assessment specific to stroke; ■ Common investigations (tests); and ■ Validated screening/assessment tools. <p>16.1 Nurses working in areas with a focus on stroke should have enhanced stroke assessment skills.</p>	<p>IV</p> <p>IV</p>
Organization & Policy Recommendations	
<p>17.0 Organizations should develop a plan for implementation that includes:</p> <ul style="list-style-type: none"> ■ An assessment of organizational readiness and barriers to education. ■ Involvement of all members (whether in a direct or indirect supportive function) who will contribute to the implementation process. ■ Ongoing opportunities for discussion and education to reinforce the importance of best practices. ■ Dedication of a qualified individual to provide the support needed for the education and implementation process. ■ Opportunities for reflection on personal and organizational experience in implementing guidelines. <p>Nursing best practice guidelines can be successfully implemented only where there are adequate planning, resources, organizational and administrative support, as well as appropriate facilitation. In this regard, RNAO (through a panel of nurses, researchers and administrators) has developed the <i>Toolkit: Implementation of Clinical Practice Guidelines</i> based on available evidence, theoretical perspectives and consensus. The <i>Toolkit</i> is recommended for guiding the implementation of the HSFO-RNAO best practice guideline <i>Stroke Assessment Across the Continuum of Care</i>.</p>	<p>IV</p>
<p>18.0 Organizational policy should clearly support and promote the nurses' role in stroke assessment, either independently or in collaboration with other members of the interdisciplinary team.</p>	<p>IV</p>

Interpretation of Evidence

Levels of Evidence

- Ia Evidence obtained from meta-analysis or systematic review of randomized controlled trials.
- Ib Evidence obtained from at least one randomized controlled trial.
- IIa Evidence obtained from at least one well-designed controlled study without randomization.
- IIb Evidence obtained from at least one other type of well-designed quasi-experimental study without randomization.
- III Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies.
- IV Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities.

Please Note:

The Heart and Stroke Foundation of Ontario has used an alternative framework to describe the levels of evidence in the *Best Practice Guidelines for Stroke Care: A Resource for Implementing Optimal Stroke Care* (2003a). The taxonomy used in this document is summarized below:

1	At least one prospective, randomized controlled study has found the intervention to be effective.
2	At least one non-randomized cohort comparison, multicentre case-study series, or chronological series has found the intervention to be effective. Evidence may also be part of extraordinary results from randomized clinical trials.
3	Canadian professional association guidelines, standard practice in other jurisdictions, descriptive studies, reports of an expert committee, collective experience of a consensus panel, or expert opinion have judged the interventions to be effective.

Responsibility for Development

As a support to nurses in applying evidence to their practice, the Heart and Stroke Foundation (HSFO) and the Registered Nurses' Association of Ontario (RNAO) have joined together in partnership, with funding from the Government of Ontario, to develop and evaluate a best practice guideline focusing on nursing assessment of persons who have experienced stroke, across the continuum of care. This guideline was developed by a panel of nurses, conducting its work independent of any bias or influence from the Government of Ontario.

Purpose & Scope

Best practice guidelines are systematically developed statements to assist practitioners' and clients' decisions about appropriate health care (Field & Lohr, 1990). This best practice guideline focuses on assisting nurses working in diverse practice settings in the assessment and/or screening of stroke survivors.

The goal of this document is to provide nurses with evidence-based recommendations regarding the assessment and/or screening of stroke survivors across the continuum of care.

Nurses working in partnership with the interdisciplinary healthcare team, stroke survivors and their families, have an important role in assessment and/or screening across the continuum of care. It is acknowledged that from a comprehensive client assessment, planning, interventions and evaluation of care follow. The scope of this document addresses the first phase of the nursing process, assessment, and does not incorporate recommendations related to stroke management interventions.

This guideline focuses on adults (over age 18) who have experienced a stroke. It is recognized that the experience of stroke impacts on the entire family, and nurses have a role to play in the assessment of the family and family caregivers. However, the focus of this document is on the screening and/or assessment of the adult stroke survivor. This is not meant to exclude the pediatric client, but children have unique assessment needs related to developmental stages that are beyond the scope of this guideline. For the purpose of this guideline, types of stroke include transient ischemic attacks (TIAs), ischemic and hemorrhagic stroke.

This guideline contains recommendations for Registered Nurses and Registered Practical Nurses on best nursing practices in the area of stroke assessment. It is intended for all nurses (who are not experts in stroke care), who work with stroke survivors in a variety of practice settings across the continuum of care. However, it is not meant to exclude those who have expertise in this area. Nurses have knowledge of client assessment principles, and the focus of this guideline is to emphasize a holistic, focused stroke assessment. It is acknowledged that the individual competencies of nurses vary between nurses and across categories of nursing professionals and are based on knowledge, skills, attitudes, critical analysis and decision making which are enhanced over time by experience and education. It is expected that individual nurses will perform only those aspects of stroke assessment/screening for which they have appropriate education and experience and that they will seek consultation in instances where the client's care needs surpass the nurse's ability to act independently.

It is acknowledged that effective delivery of healthcare depends on a coordinated interdisciplinary approach incorporating ongoing communication between health professionals and clients/families.

Development Process

In September of 2003, a panel of nurses with expertise in stroke care from a range of practice settings across the continuum of stroke care was convened under the auspices of the HSFO and the RNAO.

The panel members established the scope of the guideline by reviewing which components of stroke assessment were consistent across the continuum and where there were unique assessment requirements. Existing evidence and tools related to assessment/screening were identified and obtained through a structured literature search (See *Appendix A*).

The panel members divided into subgroups to review existing practice guidelines for stroke management, primary studies, other literature and documents for the purpose of drafting recommendations for nursing assessment/screening. This process yielded a draft set of recommendations. The panel members reviewed the first draft of recommendations, discussed gaps, documented the supporting evidence and came to consensus on a final draft set of recommendations.

This draft was submitted to a set of external stakeholders for review and feedback – an acknowledgement of these reviewers is provided at the front of this document. Stakeholders represented various healthcare professional groups, clients and families, as well as professional associations. External stakeholders were provided with specific questions for comment, as well as the opportunity to give overall feedback and general impressions. The results were compiled and reviewed by the development panel – discussion and consensus resulted in revisions to the draft document.

Subsequent to the stakeholder review phase, members of the guideline development panel met with representatives of the Stroke Canada Optimization of Rehabilitation by Evidence (SCORE) Project to ensure congruence between the work of both projects. The panel team leader and a staff member from the RNAO also met with a representative of the Canadian Stroke Quality of Care Study to discuss linkages with both projects. Following these stakeholder meetings, additional revisions were made to the guideline prior to publication and evaluation.



Definition of Terms

For clinical terms not defined here, see *Appendix B – Glossary of Terms*.

Assessment: Determining the scope, importance and value of a medical or psychological condition, social or environmental situation, or treatment (AHCPR, 1995).

Clinical Practice Guidelines or Best Practice Guidelines: Systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical (practice) circumstances (Field & Lohr, 1990).

Consensus: A process for making policy decisions, not a scientific method for creating new knowledge. Consensus development makes the best use of available information, be that of scientific data or the collective wisdom of the participants (Black et al., 1999).

Continuum of Stroke Care: Includes stroke recognition, stroke prevention, pre-hospital care; emergency management; acute treatment; transition management; rehabilitation management; and community re-engagement (Heart and Stroke Foundation of Ontario, 2003).

Education Recommendations: Statements of educational requirements and educational approaches/strategies for the introduction, implementation and sustainability of the best practice guideline.

Organization & Policy Recommendations: Statements of conditions required for a practice setting that enables the successful implementation of the best practice guideline. The conditions for success are largely the responsibility of the organization, although they may have implications for policy at a broader government or societal level.

Practice Recommendations: Statements of best practice directed at the practice of healthcare professionals that are evidence-based.

Screening: Examinations aimed at detecting medical conditions early in their course or before they become symptomatic, often with the purpose of implementing treatment that will prevent or ameliorate the problem (AHCPR, 1995).

Stroke Assessment Across the Continuum of Care

Stroke: Acute stroke is a brain injury, resulting in persistent neurologic deficits caused by a sudden interruption in the cerebral circulation. Stroke can be due either to blockage of an artery (ischemic stroke) or to arterial rupture (hemorrhagic stroke) (StopSTROKE 2004). The majority of strokes, 80%, are ischemic, and the remaining 20% are hemorrhagic in origin.

Ischemic stroke: Ischemic stroke is most commonly caused by blockage of an artery (StrokeSTOP, 2004). This blockage is usually the result of a blood clot, which may be either thrombotic or embolic in nature. However, blockage may also occur because of progressive blood vessel occlusion, due to atherosclerosis.

Hemorrhagic stroke: Hemorrhagic stroke is caused by arterial rupture. A hemorrhagic etiology is responsible for approximately 20% of all strokes, and results from either an intracerebral or subarachnoid hemorrhage. Of all hemorrhagic strokes, approximately half are due to intracerebral hemorrhage (ICH), including hypertensive intracerebral hemorrhage and lobar intracerebral hemorrhage. The remaining half are due to subarachnoid hemorrhage (SAH) or bleeding from an arteriovenous malformation (StopSTROKE, 2004; The Internet Stroke Center, 2004).

Transient Ischemic Attack (TIA): Ischemic stroke may be preceded by one or more transient ischemic attacks (The Internet Stroke Center, 2004), the sudden occurrence of a focal neurologic deficit that disappears completely within 24 hours. Symptoms of most TIAs, however, usually resolve within minutes to approximately an hour, and in 50% of individuals with TIA, the deficit resolves within 30 minutes.



Background Context

Impact of stroke

Regardless of treatment advances, stroke remains a devastating disease, a leading cause of morbidity and mortality, and one of the most expensive diseases to treat. In addition, as the population ages, the economic burden of stroke is expected to increase. Statistics analyzing health outcomes after stroke vary, but it has been estimated that 29% of individuals who experience a stroke die within a year, with 20% dying within three months; 25% becoming dependent; and 46% remaining independent (Hankey & Warlow, 1999). Stroke is one of the most costly medical conditions, accounting for a significant portion of overall Canadian healthcare dollars and costing the Canadian economy \$2.7 billion annually (HSFO, 2002b).

Stroke in Canada

Stroke mortality

Stroke is the fourth leading cause of death in Canada, with approximately 7% of all deaths attributable to stroke (Wilson et al., 2001). In 2000, some 15,409 Canadians died of stroke. The overall population mortality rate for stroke, 47.8 per 100,000, increases substantially with age. For individuals 65-69 years of age, stroke mortality is 73.4 per 100,000 and for individuals over 90 years of age, mortality increases to 2003 per 100,000 (Wilson et al., 2001).

Stroke morbidity

Although stroke is an increasingly treatable disease, the residual disability attributable to stroke remains significant. It is estimated that 4.1% of Canadians over 65 years of age (approximately 300,000 individuals) currently live with the effects of stroke (Hankey & Warlow, 1999). Disabilities are severe enough in a minority of stroke survivors to preclude living in the community. However, even many of those who return to the community suffer permanent consequences after stroke.

Stroke in Ontario

Incidence of stroke

It is estimated that 14,863 individuals were hospitalized for stroke in Ontario in 2000 (Canadian Institute for Health Information, 2002). The true incidence is higher however, because this figure excludes individuals who were not hospitalized and those who experienced a TIA. The Heart and Stroke Foundation estimates that between 15,000 and 20,000 strokes occur annually in Ontario. Stroke is the third most common diagnosis in long-term care (PriceWaterhouseCoopers, 2001) and about 22% of residents of long-term care facilities age 65 or older have had a stroke (Ministry of Health and Long-Term Care and the Heart and Stroke Foundation of Ontario, 2000).

Stroke Assessment Across the Continuum of Care

Incidence and morbidity of TIA

Hospital data indicate that 3,496 TIA patients were discharged in 2000 (CIHI, 2002). This figure may substantially underestimate the true incidence of TIA, as the majority of TIA patients are no longer admitted to hospital. In fact, stroke experts estimate that only 10-25% of patients who experience a TIA are admitted, a percentage that has decreased sharply over the past decade. Applying age- and sex-adjusted incidence rates for TIA to the Ontario population yields an annual TIA incidence of 6,300 (Ministry of Health and Long-Term Care and the Heart and Stroke Foundation of Ontario, 2000).

A recent study of the Ontario Stroke Registry (Gladstone, Kapral, Fang, Laupacis & Tu, 2004) found that individuals with TIA represent a high-risk group for future stroke. Individuals diagnosed with TIA had a high risk of stroke within 30 days. The 30-day stroke risk following discharge from the emergency department was 5% overall, and 8% for patients with a first TIA. For TIAs resulting in a speech deficit, the 30-day risk of stroke or death was 9%, and for TIAs with a motor deficit the risk increased to 12%. It is of significance to note that the risk of stroke is more likely immediately following stroke – half of all the strokes occurring within the 30-day window happened in the first two days following the experience of a TIA.

Stroke mortality

In Ontario, mortality attributable to stroke is increasing annually, according to Canadian Institute of Health Information (CIHI) data (Ministry of Health and Long-Term Care and the Heart and Stroke Foundation of Ontario, 2000). CIHI found that 4,955 deaths were due to stroke in 1997.

Stroke morbidity

Estimates of the number of stroke survivors in Ontario vary (Ministry of Health and Long-Term Care and the Heart and Stroke Foundation of Ontario, 2000). Calculations based on the population prevalence of stroke survivors yield a figure of 50,000 stroke survivors in Ontario, whereas data from the National Population Health Survey (NPHS) 1996-97 suggest that 88,000 stroke survivors are living in the community in Ontario (Ministry of Health and Long-Term Care and the Heart and Stroke Foundation of Ontario, 2000). The higher NPHS figure underestimates the true prevalence of stroke survivors, as it does not include individuals who are living in long-term care facilities.

Cost of stroke

The cost of stroke is a significant drain on the Ontario economy. The annual acute care hospital cost of stroke in Ontario is estimated at \$252.2-273.7 million (Ministry of Health and Long-Term Care and the Heart and Stroke Foundation of Ontario, 2000). The total annual direct cost of stroke, which includes emergency health services, acute care, drugs, and other costs, is estimated at \$528.7 million. Annual indirect costs of stroke, including productivity and pension losses, are estimated at \$244.5-375.8 million. Stroke costs the Ontario economy a staggering \$719-964 million every year (Ministry of Health and Long-Term Care and the Heart and Stroke Foundation of Ontario, 2000).

Reducing the Impact of Stroke

Currently, the impact of stroke on Canadian society is substantial, and is expected to increase as the population ages. Canadian healthcare professionals, institutions, and organizations recognize the importance of improving stroke prevention and management. There is recognition that the magnitude of the issue requires a systems approach (Wilson et al., 2001).

Ontario is taking a leadership role in transforming stroke care through the Ontario Stroke System by developing systems and processes to deliver organized stroke care in regional stroke centres and integrate stroke management across the entire continuum of care throughout Ontario.

Overview of the Ontario Stroke System

(Contributed by the Heart and Stroke Foundation of Ontario)

In early 1997, the Heart and Stroke Foundation of Ontario convened a group of stroke experts from across the province to develop a framework for stroke care in Ontario. Through its work, the Heart and Stroke Foundation became aware of several local efforts to address the issues of enhancing stroke care. It was agreed that a collaborative project to develop and test the model of stroke care would maximize the impact of these efforts. As a result, the Heart and Stroke Foundation of Ontario championed the Coordinated Stroke Strategy to develop and test a regionally based model of coordinated stroke care spanning the full continuum of care. Four geographic areas (South West, Central West, South East and West Greater Toronto Area) served as demonstration sites for the three-year pilot project which was launched in 1998.

The overall goal of the stroke strategy is to decrease the incidence of stroke and improve care and outcomes by reorganizing stroke care to ensure that all Ontarians have access to appropriate, quality stroke care in a timely manner.

In 2000, a joint working group of the Ministry of Health and Long-Term Care and the Heart and Stroke Foundation of Ontario produced the document *Towards An Integrated Stroke Strategy for Ontario, Report of the Joint Stroke Strategy Working Group*, calling for the organization of stroke care on a regional basis across the province. This document provides a detailed vision of what is meant by “integrated stroke care” and its benefits.

In June 2000, the Ministry of Health and Long-Term Care allocated funds for the four-year implementation phase and ongoing annual support towards the development of a provincial stroke strategy. The key elements of a provincial stroke strategy are:

- Full continuum of care within a region;
- Knowledge transfer and implementation of best practices;
- Focus on improving access;
- Collaboration and strategic alliances;
- Local and regional commitment;
- Local and regional care plans;
- Data and information;
- Education of the public, clients and providers; and
- Provincial system of linkages.

Stroke Assessment Across the Continuum of Care

In February 2001 the Ministry of Health and Long-Term Care designated the first six Regional Stroke Centres. Regional Stroke Centres provide the leadership in the development of a stroke strategy for their respective region. As of 2004, nine Regional Stroke Centres, two enhanced District Stroke Networks and 18 District Stroke Centres have been designated. They are responsible for managing acute stroke care, developing secondary prevention clinics, providing leadership in the development of a rehabilitation service delivery system and supporting training initiatives for health care providers.

The Heart and Stroke Foundation continues to work with the Ministry and Regional Stroke Centres to organize stroke care in Ontario. There are three major components of the stroke strategy: systems change, public awareness and professional education. The overall goal of *systems change* is to increase access to stroke services, improve the quality of stroke care and to increase efficiency in the organization and delivery of stroke care. The *public awareness* component includes a combination of television advertising and public relations to establish awareness of the signs and symptoms of stroke. *Professional education* resources and programs have been developed along the continuum of care for stroke care providers to ensure that best practices for stroke care are implemented. Developing and disseminating best practice guidelines and care guides for stroke is an important part of this initiative.

Initiatives in Stroke

There are many initiatives underway to improve stroke care, to raise awareness of the signs and symptoms of stroke and to increase knowledge of stroke through evidence-based research. The following projects are just two examples of these initiatives.

Canadian Stroke Network

The Canadian Stroke Network's (CSN) mission is to reduce the effects of stroke on the lives of Canadians through its multi-disciplinary research program, high-quality training for Canadian scientists and clinicians, and national and global partnerships. The CSN is dedicated to decreasing the physical, social, and economic consequences of stroke on the individual and on society (Canadian Stroke Network, 2004). The Heart and Stroke Foundation of Ontario is a founding partner of the CSN.

The Canadian Stroke Network has created a stroke registry, the first national prospective database of stroke patients. In Phase I and II of the Registry, collaborators from 21 Canadian hospitals in eight provinces collected clinical data that characterized the entire stroke event from the onset of symptoms to the patient's status six months post-stroke. From the analysis of data on almost 10,000 patients collected in Phase I and II, the CSN will formulate recommendations for best practice in stroke management. Phase III is being developed to provide a population-based sampling of stroke patients that will complement the Phase I and II data.

Best Practice Guidelines for Stroke Care

Best Practice Guidelines for Stroke Care: A Resource for Implementing Optimal Stroke Care (www.heartandstroke.ca/bpg) is a compendium of 19 best practice guidelines for the prevention and management of stroke, developed by a management team convened by the Heart and Stroke Foundation of Ontario. The compendium provides healthcare professionals with a practical guide for implementing optimal stroke management in their institutions, across the continuum of care from pre-hospital to community re-engagement. In addition to the best practice guidelines themselves, the compendium will incorporate supporting evidence, proposed care guides, sample protocols, and assessment and outcome measurement tools.

Organized stroke care

Organized stroke care is an integrated evidence-based approach to managing stroke. The objective of organized stroke care is to improve stroke outcomes by ensuring that the time to definitive diagnosis and treatment is minimized and that optimal treatment is offered. Optimal care is defined as collaborative, high-quality, standardized, effective and cost-effective care, carried out by an interdisciplinary stroke team using protocols based on best practices. The stroke survivor, family, and support network are central to the team, working in collaboration with healthcare professionals. The composition of the stroke team will vary, depending on the stage of care.

Effective organized stroke care is characterized by rapid response, excellent communication systems, continuing education, and continuous process evaluation and improvement. The principles of organized stroke care can be adapted to different care models, depending on resource availability, from a single physician using a stroke care guideline, an interdisciplinary stroke team with or without a specialized acute stroke care unit, to a full-service regional stroke centre with full neurosurgery and interventional radiology support.

Outcomes achieved by delivering organized acute stroke care in a stroke unit are superior to those achieved when stroke care is delivered in the absence of a stroke unit. Generally, speedy diagnosis and rapid and appropriate treatment of an acute stroke is most efficiently carried out with specialized stroke unit support. New evidence confirms the finding that acute stroke care delivered in a stroke unit significantly improves patient outcomes (Stroke Unit Trialists' Collaboration, 1997; 2003).

Organized integrated stroke care ensures that stroke survivors have access to interventions requiring specialized expertise and investigations, ensures continuity of care as stroke survivors move between healthcare providers and organizations and facilitates a client-centred approach. A client-centred approach to care is based on a philosophy of respect for, and partnership with, individuals receiving services. This approach also recognizes the importance of individual autonomy, individual choice, and service flexibility and accessibility. In the management of stroke, client-centred care has been shown to reduce client anxiety, facilitate the establishment of trust, and improve client satisfaction, adherence with health services' programs, and functional outcomes (Heart and Stroke Foundation of Ontario and University of Toronto, 2002).

Practice Recommendations

This Best Practice Guideline has been developed recognizing the following standards of practice of the College of Nurses of Ontario:

- *Practice Standard: Professional Standards – Revised 2002* (June 2004b), which outlines professional expectations of all Ontario nurses in the areas of service to the public, knowledge, application of knowledge, ethics, continued competence and accountability/responsibility.
- *Practice Standard: Documentation* (June 2004c), which outline nurses' professional accountability in record keeping, and the expectations for documentation for all nurses in direct practice.

It is acknowledged by the development panel that a comprehensive stroke assessment includes an interdisciplinary approach, and nurses play a role in conducting screening and assessment, as well as identifying a need for referral to other healthcare professionals. The focus of this guideline includes those assessments that are within the scope of independent nursing practice, building on a baseline client history and assessment. These recommendations are intended for nurses in all practice settings, but the focus of assessment will vary based on the phase of the continuum.

As a result of limited available research in the area of nursing assessment of stroke clients, the level of evidence for the majority of the recommendations in this document has been rated as Level IV (consensus). However, with the intent to strengthen the recommendations, the suggested tools have been selected, where possible, based on their validated psychometric properties and relevance to the stroke population. Further research is needed regarding nursing assessment of stroke.



Secondary Prevention

Recommendation 1.0

Nurses in all practice settings should screen clients for risk factors related to stroke in order to facilitate appropriate secondary prevention. Clients with identified risk factors should be referred to trained healthcare professionals for further management. *Level of Evidence = IV*

Risk factors for stroke include modifiable, non-modifiable and probable factors. The following table summarizes the commonly accepted risk factors for stroke:

Modifiable	Non-modifiable	Probable
Hypertension	Age	Drug & alcohol abuse
Diabetes Mellitus	Family history	Stress
Hyperlipidemia	Male sex	Sleep apnea
Smoking	Ethnicity	Migraine headache
Sedentary lifestyle	Heredity	Oral contraceptive use
Overweight	Socioeconomic status	Congenital cardiac anomalies
Atrial fibrillation		Elevated homocysteine levels
Coronary artery disease		Sympathomimetic agents
Cardiac disease		
Previous stroke		
Previous TIA		
Asymptomatic carotid stenosis		
Peripheral vascular disease		
Atherosclerosis		
Coagulation disorders		
Hormone replacement therapy		

(Heart and Stroke Foundation of Ontario, 2003a; Ministry of Health and Long Term Care and Heart and Stroke Foundation of Ontario, 2000).

Discussion of Evidence

Cerebrovascular disease is the fourth leading cause of death in Canada with approximately 7% of all deaths attributable to stroke (HSFO, 2003a). Several risk factors significantly increase the risk of stroke.

Johnston, Gress and Sidney (2000) found that the short term risk of stroke and other adverse events is high amongst clients who present to emergency departments with a diagnosis of transient ischemic attack (TIA). Specifically, 10.5% within 90 days; 50% of these clients will have a stroke within 48 hours. Approximately 15% of individuals experiencing a stroke report a history of TIA. Overall, 8.8% of stroke survivors will have a recurrent stroke within six months and 15% within five years (O'Rourke, Dean, Akhtar & Shuaib, 2004).

Stroke Assessment Across the Continuum of Care

Early detection and treatment of disease has a significant impact on client outcomes. A nursing assessment is imperative to determine those at risk for stroke in order to prevent a further event that may be more devastating. Nursing assessment facilitates the identification of issues for primary and secondary prevention. The Heart and Stroke Foundation of Ontario (2003a) state that “optimal management of stroke risk factors has been conclusively demonstrated to significantly reduce an individual’s risk of a first stroke, and it is critical to reduce the risk of stroke and other ischemic vascular events” (Gorelick, 2002, p.31).

There are a number of factors that significantly increase a person’s risk of having a stroke. It has been estimated that about 90% of the people who have a stroke have one or more of the major risk factors. The more risk factors a person has, the greater the risk of stroke (Ministry of Health and Long Term Care and Heart and Stroke Foundation of Ontario, 2000).

Sacco (1995) describe the prevalence of the following risk factors:

Hypertension	25-40%
Smoking	20-40%
Cardiac disease	10-20%
Hyperlipidemia	6-50%
Alcohol	5-30%
Diabetes	4-8%
Atrial fibrillation	1%

For further resources regarding nursing interventions for specific stroke risk factors, refer to *Appendix K*.

Stroke Recognition

Recommendation 2.0

Nurses in all practice settings should recognize the new onset of the signs and symptoms of stroke as a medical emergency to expedite access to time dependent stroke therapy, as *“time is brain”*.

Level of Evidence = IV

The signs and symptoms of stroke include:

- **Weakness:** Leg, arm or facial weakness on one side of the body (hemiparesis) or numbness and tingling in the face, arm or leg (dysesthesia)
 - **Trouble speaking:** Slurred speech (dysarthria) or inability to speak and/or understand (aphasia)
 - **Visual disturbances:** Loss of vision, particularly in one eye or double vision
 - **Headache:** Sudden, severe and unusual headache
 - **Dizziness:** Sudden onset vertigo, associated with nausea and lack of coordination (ataxia)
- (HSFO, 2003b)

Discussion of Evidence

As the “time is brain” concept is applied to stroke, it is important for the nurse to recognize the signs and symptoms, regardless of their cause, and treat them as a medical emergency. Nurses in all practice settings can play a key role by recognizing the signs and symptoms of stroke in the individuals they come in contact with, and treating these symptoms as medical emergencies. Individuals who have previously experienced a stroke are at higher risk of a subsequent stroke (HSFO, 2003a), therefore nurses working with those who have had a stroke should have a heightened vigilance in identifying these symptoms. Symptoms of stroke that resolve within 24 hours should be followed up with a medical assessment – these symptoms could signify a TIA, which is a risk factor for subsequent stroke.

Improving stroke outcomes by increasing the number of stroke survivors eligible to receive time-dependent stroke therapy rests on broad recognition by the public and healthcare professionals of the possibility of stroke in an individual, and on taking immediate action. A useful principle when dealing with suspected stroke is “**time is brain**”. Rapid and appropriate emergency management during the first few hours after a stroke can substantially improve health outcomes. The American Stroke Association (2003) report that the intravenous administration of rtPA (recombinant tissue plasminogen activator) is currently the only approved therapy for the treatment of those with acute ischemic stroke, and its use is associated with improved outcomes for a broad spectrum of carefully selected clients who can be treated within three hours of the onset of stroke. Early treatment (within 90 minutes) may be more likely to result in positive outcomes at three months post stroke, however later treatment (90-180 minutes) is also beneficial (Adams et al., 2003).

It is important to note that there are non-cerebrovascular conditions that may present with symptoms similar to stroke – a “stroke mimic”. Some of the conditions that mimic stroke include: seizures; systemic infection; brain tumor; toxic-metabolic; positional vertigo; cardiac; syncope; and trauma (Libman, Wirkowski, Alvir & Rao, 1995).

Neurological Assessment

Recommendation 3.0

Nurses in all practice settings should conduct a neurological assessment on admission, and when there is a change in client status. This neurological assessment, facilitated with a validated tool (such as the Canadian Neurological Scale, National Institutes of Health Stroke Scale or Glasgow Coma Scale), should include at minimum:

- Level of consciousness;
- Orientation;
- Motor (strength, pronator drift, balance and coordination);
- Pupils;
- Speech/Language;
- Vital signs (TPR, BP, SpO₂); and
- Blood glucose.

Level of Evidence = IV

Discussion of Evidence

Performing a neurological assessment at initial presentation and monitoring throughout the continuum of care provides a standardized method to detect neurological change. Although many factors influence the rate and degree of recovery after stroke, the single most important variable is the severity of the initial neurological deficit (Heinemann, 1989). Monitoring of neurological status helps to identify emerging neurological deterioration that could lead to early intervention (Hachinski & Norris, 1980). Prompt early assessment, both globally and a neurological assessment, can influence client outcomes. Included in the assessment should be vital signs and a baseline blood glucose level.

The Agency for Health Care Policy and Research Post-Stroke Rehabilitation Panel (AHCPR, 1995) recommends the use of well-validated, standardized instruments in evaluating stroke clients to ensure reliable assessment and documentation of a client's neurological status (Gresham, Duncan, & Stason, 1995). Stroke scales have primarily been used to:

- compare the baseline stroke severity of client groups
- quantify neurological recovery over time.

There are three neurological assessment tools that are available for nurses to use: Canadian Neurological Scale (CNS); the National Institutes of Health Stroke Scale (NIHSS); and the Glasgow Coma Scale (GCS). The selection of a tool will be dependent on the needs of the client, the resources of the organization, the educational support available and the point in the continuum in which the nurse practices. Examples of these tools are provided in *Appendix C*. Nurses should be cognizant that the scoring system varies between scales. A rise (NIHSS) or a decline (CNS, GCS) from baseline assessment would indicate a decline in client status which would require a more detailed assessment by the medical team.

Canadian Neurological Scale (CNS):

The Canadian Neurological Scale was designed in 1985 specifically as an assessment tool for evaluating and monitoring the neurological status of acute stroke clients. It has been found to be brief, valid and reliable, and can be administered in approximately 5 minutes (Duncan, Lai, Culin, Clausen & Wallace, 1999). It has demonstrated validity, reliability and inter-rater reliability (Cote, 1989). It assesses:

- level of consciousness;
- orientation;
- speech; and
- motor function of the face, arms and legs (Cote & Hachinsk, 1986).

A limitation of the scale may be that some useful measures are omitted (Duncan et al., 1999), as it does not include assessment of cerebellar or brainstem function.

National Institutes of Health Stroke Scale (NIHSS):

The National Institutes of Health Stroke Scale has demonstrated reliability and validity for clients with stroke (D'Olhaberriague, 1996; Goldstein, 1989), and it can be administered by non-neurologists. It can be administered in 5-10 minutes (Duncan et al., 1999), and assesses:

- level of consciousness;
- visual fields;
- motor response;
- sensation;
- language; and
- neglect.

A limitation of the scale is that it has a low sensitivity (Duncan et al., 1999).

Glasgow Coma Scale (GCS):

The Glasgow Coma Scale was developed in 1974 as the standardized and valid neurological assessment tool for assessing level of consciousness or coma (Teasdale, Knill-Jones & Van Der Sande, 1978). It is a neurological assessment that is widely used by the neurological and neurosurgery community and is found in the curriculum of most undergraduate nursing programs. However, the Glasgow Coma Scale is felt to be not sensitive enough to be used with stroke clients as most do not have impaired levels of consciousness and have cognitive and/or communication deficits that would not be detected using this tool (Weber, 1995). It can be administered in two minutes (Duncan et al., 1999) and assesses the client's best response in the area of:

- arousal:
- orientation: and
- motor response.

Assessment of Coordination:

Clients who have experienced brainstem/cerebellar/posterior hemispheric strokes will experience limb or gait ataxia, motor or sensory loss, dysarthria, amnesia, visual field deficits, and/or nystagmus (Weber, 1995). Adding simple coordination and gait testing neurological assessment tools can identify deficits in these areas to detect changes and facilitate early intervention. Common tests of coordination and balance are:

- finger-nose-finger test
- heel-shin test
- tandem gait.

The finger-nose-finger test and heel-shin test are universally used methods of assessing upper and lower extremity coordination that has become the accepted gold standard of assessment (Swaine & Sullivan, 1992). Some studies have questioned the sensitivity and reliability of these tests (Merbitz, Morris & Grip, 1989) to more objective instrumented measurement systems, but Dittiger, Bohannon and Andrews (2001) found that timed large amplitude rapid alternating movement patterns such as the finger-nose-finger and heel-shin tests were internally consistent, responsive and valid in stroke clients. If the client is able to ambulate, the tandem gait is a routine clinical test that accentuates all the features of gait ataxia and is the most sensitive clinical test to detect gait ataxia when compared to normal locomotion (Stolze et al., 2002).

Stroke Assessment Across the Continuum of Care

Assessment of Motor Strength using the Pronator Drift:

Detection of lateralizing signs such as subtle hemiparesis in clients with cerebrovascular disease is essential to detect changes and ensure prompt intervention to prevent complications. Pronator drift is a supplemental, standard clinical test to detect such dysfunction that is simple and easy for nurses working at any point in the continuum to learn and perform. Pronator drift, when used for 45 seconds, is a sensitive and specific test that has good external validity and positive predictive value and negative predictive value (Teitelbaum, Eliasziw, & Garner, 2002). Refer to *Appendix C* for an illustration of assessing pronator drift.

To complete a comprehensive neurological assessment, pupils (size and reaction), vital signs (temperature, pulse, respirations, blood pressure, SpO₂, where applicable) and blood glucose should be assessed with any of the scales discussed above.

Vital Signs

It is extremely important for nurses to assess temperature in the pre-hospital, emergency and acute care units using well calibrated equipment so that measures can be taken to treat fever of any cause to avoid possible progression of the stroke deficits (Thornhill & Corbett, 2001). A number of studies have found hyperthermia within the first 72 hours of stroke onset to be associated with significantly increased mortality and morbidity which is independent of other factors (Azzimondi et al., 1995; Castillo, Davalos, Marrugat & Noya, 1998; Hajat, Hajat & Sharma, 2000; Thornhill & Corbett, 2001; Wang, Hsieh, Chen & Lai, 2001). In both animal and human studies, hyperthermia has been shown to exacerbate ischemic neuronal injury and physiological dysfunction. Ischemic neuronal injury may be increased significantly with even mild hyperthermia of up to 2 degrees above normal body temperature (Wang et al., 2001). A number of mechanisms that explain the relationship between hyperthermia and neuronal injury and dysfunction have been suggested. Neurotransmitters, such as glutamate, aminobutyric acid and glycine, have been shown to increase during hyperthermia and have been associated with poor cerebral infarct outcome. Increased free radical production during hyperthermia is another possible mechanism. Increased metabolic demand, associated with the rise in core temperature, is harmful to ischemic neurons which are not provided with an appropriate blood supply to meet the increased demand for energy. Protein transfer across the temperature sensitive blood brain barrier is another possible means of stroke progression (Thornhill et al., 2001).

Pulse, respiration and blood pressure are also a component of this assessment. Arrhythmias, shortness of breath, and hypertension may occur post stroke, and ongoing monitoring of these vital signs, particularly in the acute phase, may provide details regarding the cause of the stroke and prognosis. Irregularity in the heart rate may indicate atrial fibrillation; significant elevation in blood pressure may indicate hypertensive encephalopathy or an increase in the risk of primary intracranial hemorrhage (Adams et al., 2003).

Acute stroke clients require monitoring of respiratory function with pulse oximetry to prevent hypoxia and monitor for respiratory complications. Hypoxia can exacerbate and extend ischemic injury in the penumbra (Hacke, 2003). Acute stroke clients are at risk for developing respiratory complications but those with decreased level of consciousness and brain stem stroke are at the greatest risk. Common causes of respiratory compromise in the stroke client are partial airway obstruction, hypoventilation, aspiration pneumonia and atelectasis. Acute stroke clients should be monitored with pulse oximetry with a target oxygen saturation level of $\geq 95\%$. Supplemental oxygen should be administered only if there is evidence of hypoxia (Adams et al., 2003). A study by Ronning and Guldvog (1999) evaluated if mild and moderate stroke clients who routinely received supplemental oxygen would have reduced mortality, impairment or disability. Outcomes of the study revealed that there was no difference between the control and treatment group on disability or impairment at seven months and no statistically significant difference in survival rates, demonstrating that supplemental oxygen in the absence of hypoxia is of no clinical benefit.

Blood Glucose

In addition, a baseline blood glucose level should be assessed. Institutions should establish a process such as a medical directive to facilitate timely assessment of the blood glucose. Although it is not within the nurses' scope of practice to order blood glucose tests, nurses should advocate for medical directives within their practice setting to allow for this assessment to ensure clients are gluconormal (CNO, 2004a).

In clients with acute ischemic stroke, higher admission blood glucose levels are associated with significantly lower odds for desirable clinical outcomes and significantly higher odds for symptomatic intracranial hemorrhage regardless of tPA (tissue plasminogen activator) treatment (Bruno et al., 2002). It is estimated that up to one third of acute stroke clients have diagnosed diabetes but a major proportion of clients have stress hyperglycemia. Hyperglycemia initiates anaerobic metabolism, lactic acidosis and free radical production in damaged brain tissue. Increased blood glucose has been found to further the metabolic state in the ischemic penumbra. Experimental studies have shown that infarcts expanded more in hyperglycemic clients and that hyperglycemia was independently associated with the infarct volume change (Bruno et al., 2002; Lindsberg & Roine, 2004). It is recommended that blood glucose levels >8.3 mmol/L be communicated to the physician for further management (HSFO, 2003b).



Recommendation 3.1

Nurses in all practice settings should recognize that signs of decline in neurological status may be related to neurological or secondary medical complications. Clients with identified signs and symptoms of these complications should be referred to the trained health care professional for further assessment and management.

Level of Evidence = IV

Changes or decline in neurological status may be related to:

Neurological complications:

- New stroke event
- Increased intracranial pressure
- Seizures
- Hemorrhagic transformation
- Vasospasm, hydrocephalus, and/or re-bleeding post subarachnoid hemorrhage.

Secondary medical complications:

- Metabolic imbalance (hypoglycemia, electrolyte imbalance)
- Aspiration pneumonia and respiratory compromise
- Myocardial infarction
- Medication side effects
- Pulmonary embolism
- Urinary tract infection
- Sepsis.

Discussion of Evidence

Neurological Complications

Approximately 25% of stroke survivors will experience a recurrent stroke within five years. The risk of recurrent stroke is highest immediately after a stroke, the risk decreasing over time. Three percent of stroke survivors experience a second stroke within 30 days of the initial event, and 33% experience a second stroke within two years (HSFO, 2003b). Changes in neurological status of a stroke client may range from subtle to profound. These may include symptoms such as restlessness, confusion, combativeness, severe headache, lethargy, decline in motor strength, decrease in coordination, change in balance and change in speech/language.

Brain edema and increased intracranial pressure mainly occur with occlusions of the major intracranial arteries leading to multilobar infarctions (Adams et al., 2003). Brain edema often peaks at 3-5 days after stroke, and is usually not a significant concern within the first 24 hours, except in those clients with large cerebellar infarctions. Less than 10-20% of clients develop clinically significant edema requiring medical intervention, however increased intracranial pressure can also result from acute hydrocephalus secondary to obstruction of the flow of cerebrospinal fluid (CSF) pathways by large cerebellar lesions (Adams et al., 2003).

The occurrence of post-stroke seizures ranges between 5-43%, with an average of 10% usually occurring during the first 1-2 weeks following a stroke (Teasell, Foley, Bhogal & Speechley, 2003). There is no consensus whether clients with hemorrhagic strokes (intracranial hemorrhage) have increased incidence over those with infarctions (Reith, Jorgensen, Nakayama, Raaschou & Olsen, 1997). However, hemorrhagic strokes in the cortical regions appear to be associated with the development of seizures – deeper ones rarely cause seizures (Kilpatrick et al., 1990; Sung & Chu, 1989).

Hemorrhagic transformation is a secondary complication of stroke that may result in vasospasm, hydrocephalus and/or re-bleeding. The size, location and etiology of the stroke influence the impact of this complication (Adams et al., 2003). A prospective study (Hornig, Dorndorf & Agnoli, 1986) has estimated that approximately 5% of infarctions will spontaneously develop symptomatic hemorrhagic transformation or hematoma. Small petechiae are less significant than hematomas, which can result in neurological decline (Adams et al., 2003). Vasospasm is a focal or diffuse narrowing of the intracranial vessels, considered to arise from the local presence of blood products which produces decreased regional cerebral blood flow. This may cause ischemic neurological deficits. The incidence of symptomatic vasospasm following subarachnoid hemorrhage is at least 33%. A client with subarachnoid hemorrhage secondary to a ruptured aneurysm is at risk for vasospasm. The peak period for vasospasm is between day four and 14 post subarachnoid hemorrhage.

Hydrocephalus develops in a significant number of clients with subarachnoid hemorrhage, the range being between 10-43%. The development of hydrocephalus must be carefully monitored for both acutely and chronically in all individuals with subarachnoid hemorrhage. Individuals with an aneurysm must be monitored and protected from acute re-bleeding. Kassel et al. (1990), in the International Cooperative Aneurysm Study, showed that the peak incidence for re-bleeding was within 48 hours following subarachnoid hemorrhage and the cumulative risk was almost 20% at two weeks.

Secondary Medical Complications

Hypoglycemia can result in focal neurological signs that mimic stroke, while severe hypoglycemia can lead to brain injury (Adams et al., 2003). Metabolic disturbances such as hyponatremia should be considered when there is a change in the stroke survivor's neurological condition. Hyponatremia can occur due to a net gain of water, or a loss of sodium rich fluids that are replaced by water. Hyponatremia is typically defined as serum sodium concentration of less than 134 mmol/L (Yeates, Singer & Morton, 2004). Cross sectional studies suggest that hyponatremia may be present in 15-18% of patients in chronic care facilities (Kugler & Husted, 2000).

Clinical indicators depend upon the cause and whether it is associated with a normal, decreased or increased extracellular fluid (ECF) volume. Potential factors associated with a risk of decreased ECF volume include: gastrointestinal losses (diarrhea, vomiting), renal losses (diuretics, salt wasting kidney disease, adrenal insufficiency), and skin losses (wound drainage). Clinical symptoms include irritability, apprehension, dizziness, personality changes, poor skin turgor, postural hypotension, dry mucous membranes, seizures, and cold, clammy skin. Hyponatremia associated with a normal or increased ECF volume may be the result of hypothyroidism or syndrome of inappropriate antidiuretic hormone, heart failure, excessive administration of hypotonic fluids or excessively dilute enteral feedings, and impaired ability to excrete free water. Clinical symptoms associated with hyponatremia in these situations include headache, lassitude, apathy, confusion, weakness, edema, elevated blood pressure, hyperreflexia, muscle spasms, convulsions and coma (Swearingen & Keen, 2001).

Stroke Assessment Across the Continuum of Care

Aspiration pneumonia is a potential complication of stroke that has been shown to have negative client outcomes. Schmidt et al. (1994) found that the odds ratio for the development of pneumonia was 7.6 times for those who aspirated compared to those who did not. Teasell et al. (1996) found that the incidence of pneumonia was 11.9% in known aspirators, compared to 0.6% of non-aspirators. Twenty percent of individuals with stroke related dysphagia die within the first year from aspiration pneumonia, and mortality rates up to 62% have been reported (Cowen, Sampson & Vettesse, 1997; Schmidt, Snurnov & Ryabova, 1988). Approximately 50% of stroke clients with dysphagia severe enough to require video fluoroscopy developed aspiration pneumonia (Johnson, McKenzie & Sievers, 1993).

Cardiac irregularities are prevalent among clients with stroke, and the individual may have an acute cardiac condition that requires urgent management. Myocardial infarction can lead to stroke, while acute stroke can result in myocardial infarction (Adams et al., 2003). Pulmonary embolism is the fourth most common cause of death in the 30 days after stroke (Bounds, Wiebers, Whisnaut & Okazaki, 1981). It can be detected in approximately 1% of persons who have had a stroke, and up to 10% of individuals with pulmonary embolisms will die (Sioson, Crowe & Dawson, 1988). Urinary tract infection and secondary sepsis may develop in approximately 5% of stroke survivors (Ween, Alexander, D'Esposito & Roberts, 1996).

Complications

Recommendation 4.0

Nurses in all practice settings should assess the client's risk for pressure ulcer development, which is determined by the combination of clinical judgment and the use of a reliable risk assessment tool. The use of a tool that has been tested for validity and reliability (such as the Braden Scale for Predicting Pressure Sore Risk) is recommended.

Level of Evidence = IV

Recommendation 4.1

Nurses in all practice settings should assess the stroke client's fall risk on admission and after a fall using a validated tool (such as the STRATIFY or timed "Up and Go").

Level of Evidence = IV

Recommendation 4.2

Nurses in all practice settings should assess stroke clients for the following stroke complications: painful hemiparetic shoulder, spasticity/contractures, and deep vein thrombosis in order to facilitate appropriate prevention and management strategies.

Level of Evidence = IV

Discussion of Evidence

Pressure Ulcers

The US National Survey of Stroke found that 14.5% of stroke clients develop pressure ulcers (Roth, 1991). This significant potential secondary complication of stroke requires risk assessment to facilitate prevention of pressure ulcer development. Several guidelines for pressure ulcer risk assessment (AHCPR, 1992a; Registered Nurses' Association of Ontario, 2005a; Royal College of Nursing, 2000) recommend the use of a standard risk assessment tool. The Braden Scale for Pressure Sore Risk (Bergstrom, Braden, Laguzza & Holman, 1987; Braden, 2001) is one such tool that has been tested sufficiently for reliability and validity. It has good sensitivity (83-100%) and specificity (64-77%), with a positive predictive value documented as approximately 40% (Lyder, 2002). Refer to *Appendix D* for a sample of this tool.

There is discussion in the literature that indicates the need to look beyond risk assessment tools in considering risk, as the development of pressure ulcers may be influenced by factors not addressed in these tools, such as acute illness, level of consciousness, extremes in age, previous history of pressure damage, current medications, and/or vascular disease (RNAO, 2005a). Refer to the RNAO Nursing Best Practice Guidelines *Risk Assessment and Prevention of Pressure Ulcers* (2005a) for assessment and prevention strategies and *Assessment and Management of Stage I to IV Pressure Ulcers* (2002a) for assessment criteria and management strategies for existing pressure ulcers.

Falls

Falls are the most common cause of injury after stroke (Gresham et al., 1995). In a series of 607 individuals admitted to hospital with stroke, falls were reported in 22% of cases (Davenport, Dennis, Wellwood & Warlow, 1996). Stroke survivors are at an increased risk of falling in both the hospital and community setting (Herndon et al., 1997; Salgado, Lord, Ehrlich, Janji & Rahman, 2004). Falls are more common among those with cognitive impairments, visual or sensory loss, incontinence, neglect, impaired postural stability and bilateral motor impairments (Nyberg & Gustafson, 1997; Schleenbaker, McDowell, Moore, Costich & Prater, 1994; Tutuarima et al., 1997). Assessment of fall risk is important to reduce the potential for injury, however although there are many fall risk assessment tools, there is not one specifically designed for use in stroke. The tool used must be appropriate for the setting, and for the specific client population. Therefore, it is necessary to assess the client population and the phase of the continuum of care prior to selecting a risk assessment tool. The following tools are consistent with those recommended by the SCORE Project (SCORE, 2005). For further discussion of falls risk assessment tools and recommendations for nursing practice related to falls, refer to the RNAO Nursing Best Practice Guideline *Prevention of Falls and Fall Injuries in the Older Adult* (2005b).

Stroke Assessment Across the Continuum of Care

The risk assessment tool STRATIFY (St. Thomas's Risk Assessment Tool in Falling Elderly Inpatients) is a clinically useful falls risk assessment tool for nurses. STRATIFY was initially developed to predict falls among elderly hospital inpatients, including stroke rehabilitation clients (Oliver et al., 1997). Five factors were used to construct the assessment tool. These factors, including: fall as a presenting complaint, unstable gait, agitation, frequent toileting, and visual impairment, were independently associated with a higher risk of falls. A risk assessment score (range 0-5) was derived by scoring one point for each of these five factors. A cut-off score of two was used to define high risk. Initially sensitivity of 93% and specificity of 88% were reported. In a validation study of 331 acute and rehabilitation clients, sensitivity of 92% and specificity of 68% were reported. STRATIFY has been suggested as a simple, pragmatic assessment tool, which takes about one minute to complete, requires no formal measurements, additional training or equipment (Oliver et al., 1997; Oliver, Daly, Martin & McMurdo, 2004; Perell et al., 2001). The STRATIFY tool can be used upon admission and then periodically during the client's stay, depending on his/her acuity level. It can be used to target prevention programs to clients at high risk of falling.

The Timed "Up and Go" test is a useful and practical measure of physical mobility for assessing frail elderly persons who are ambulatory, such as in the outpatient setting. It is quick and easy to administer, and does not require special training. This test measures, in seconds, the time taken by an individual to stand up from an arm chair, walk a distance of three meters, turn, walk back to the chair and sit down again. No physical assistance is given, and the individual uses a walking aid, if applicable. A study conducted on community dwelling elderly people found that the timed "Up and Go" score correlated with the person's balance, gait speed and functional capacity. The time score on the "Up & Go" related well to their scores on the Berg Balance Scale ($r = -0.72$), their gait speed ($r = -0.55$) and their scores on the Barthel Index of ADL ($r = -0.51$) (Podsiadlo & Richardson, 1991). The timed "Up & Go" had a sensitivity of 87% and specificity of 74% as reported in a review of fall risk assessment measures (Perell et al., 2001).

Complications

The assessment of risk for complications is a component of a baseline assessment that should be conducted on all stroke survivors. Identifying stroke complication potential and initiating prevention and management strategies as soon as possible supports positive outcomes.

The reported incidence of painful hemiparetic shoulder is estimated to range from 5-84% of hemiplegic stroke survivors, and can result in significant disability (Najenson, Yacubovich & Pikielni, 1971; Poduri, 1993; Vanspall, Richardson, Moreland, 1999). Pain may occur as early as two weeks post-stroke, but more commonly occurs 2-3 months post-stroke (Poduri, 1993). While observing the stroke survivor during activities of daily living (or passive range of motion exercises), movement tasks that contribute to shoulder pain should be identified.

The prevalence of spasticity has been determined to range from 19-38% in most studies of clients investigated 3-12 months after stroke (Sommerfeld, Eek, Svensson, Holmqvist & von Arbin, 2004; Watkins et al., 2002). In one study (Watkins et al., 2002), the prevalence of spasticity in clients who had experienced a first stroke in comparison with clients who had experienced a previous stroke revealed little difference (39% in first ever strokes, and 44% in recurrent strokes). While shoulder subluxation is not always associated with shoulder pain, spasticity generally is. Hemiplegic shoulder appears to be due to a combination of spastic muscle imbalance and a frozen contracted shoulder (HSFO, 2001). Spasticity is related to poorer function (Watkins et al., 2002), although it is not known if this is a causal relationship. Early intervention such as proper positioning, range of motion exercises, prevention of complications or selective prophylactic treatment may reduce or even prevent the development of spasticity after stroke (Leathley et al., 2004).

Deep vein thrombosis (DVT) and pulmonary embolism have been found to be a significant cause of morbidity and mortality in stroke clients in rehabilitation (Desmukh, Bisignani, Landau & Orchard, 1991). There is wide variability in the reported incidence of DVT following stroke, ranging from 22%-73% (Izzo & Aquini, 1986; Landi et al., 1992; Miyamoto & Miller, 1980). The incidence of DVT which are both clinically apparent and silent may be 30% or higher in acutely post-stroke clients. This rate may fall to 10% or lower in clients in the subacute phase of stroke receiving rehabilitation (Teasell et al., 2003). Without prophylaxis, over 60% of dense hemiplegics develop a deep vein thrombosis, and 9-15% develop pulmonary embolism. The peak onset of DVT development is between day 2 and 7 of stroke onset (Brandstater, Roth & Siebens, 1992). Brandstater et al. (1992) reported that in a review of six studies, clinical symptoms of DVT, such as pain, swelling and erythema occurred in only 52 of 138 cases, and were absent when diagnostic tests were positive. The “gold standard” for the diagnosis of DVT is an ultrasound.

Pain

Recommendation 5.0

Nurses in all practice settings should assess clients for pain using a validated tool (such as the Numeric Rating Scale, the Verbal Analogue Scale or the Verbal Rating Scale). *Level of Evidence = IV*

Discussion of Evidence

Pain may result from many different etiologies, and may not be directly related to stroke. Individuals may have pain from pre-existing conditions, such as arthritis. However, there are unique pain experiences that are specific to the stroke population. Central post stroke pain is neurogenic pain caused by a lesion affecting the spinothalamic pathways with sensory deficit. It occurs in 2-8% of stroke survivors. Common symptoms include decreased sensation to temperature in the area of pain and evoked dysesthesias. The time of onset varies: 1 month in 63% of clients, 1-6 months in 19% of clients and > 6 months in 19% of clients (Anderson, Vesergaard & Ingeman-Neilson, 1995; Meschia & Bruno, 1998). The incidence of painful hemiparetic shoulder has been discussed previously (see *Recommendation 4.0*).

Stroke Assessment Across the Continuum of Care

A baseline assessment should be completed on all clients who report the presence of pain and/or have physiological and behavioural indicators of pain (AHCPR, 1992b; McCaffery & Pasero, 1998; Royal College of Nursing, 2000). A simple validated assessment tool such as the Numerical Rating Scale (NRS) which rates pain intensity and relief on a scale of 0-10 should be used in the ongoing assessment of pain (AHCPR, 1994; SIGN, 2000). Other tools include the Visual Analogue Scale (VAS) and the Verbal Rating Scale (VRS), which are considered to have good reliability and construct validity (Briggs & Closs, 1999). The choice of the most appropriate scale should be based on the client's cognitive function and language, and the same scale should be used each time pain is assessed (AHCPR, 1992b; American Pain Society, 1999). In the stroke population, it may be necessary to use an observer behaviour checklist if consistency cannot be obtained with a self-report scale. See *Appendix E* for examples of assessment tools. Refer to the RNAO Nursing Best Practice Guideline *Assessment and Management of Pain* (2002c) for a comprehensive description of pain assessment and management.

Dysphagia

Recommendation 6.0

Nurses should maintain all clients with stroke NPO (including oral medications) until a swallowing screen is administered and interpreted, within 24 hours of the client being awake and alert.

Level of Evidence = IIa

Recommendation 6.1

Nurses in all practice settings, who have appropriate training, should administer and interpret a dysphagia screen within 24 hours of the stroke client becoming awake and alert. This screen should also be completed with any changes in neurological or medical condition, or in swallowing status.

This screening should include:

- Assessment of the client's alertness and ability to participate;
- Direct observation of signs of oropharyngeal swallowing difficulties (choking, coughing, wet voice);
- Assessment of tongue protrusion;
- Assessment of pharyngeal sensation;
- Administration of a 50 ml water test; and
- Assessment of voice quality.

In situations where impairments are identified, clients should be referred to a trained healthcare professional for further assessment and management.

Level of Evidence = IV

Discussion of Evidence

Dysphagia is one of the most common complications following acute stroke, affecting at least 50% of stroke survivors (HSFO, 2002a). Only one half recovers early in the acute phase while the remaining half may live with dysphagia for months. Dysphagia may result in increased mortality and other co-morbidities such as dehydration, malnutrition and aspiration pneumonia (HSFO, 2002a). It is felt that half of aspirations are "silent" and go unrecognized until there is pulmonary compromise (Galvan, 2001). With the increasingly aging population, it is expected that the incidence of stroke and dysphagia will increase as well.

The Scottish Intercollegiate Guidelines Network (SIGN, 2004) indicates that, as the complications from dysphagia (dehydration, malnutrition and pneumonia) may be avoidable or reversible, all stroke clients should be screened in order to identify those at risk. This screen should be conducted before the individual is given food (including oral medications) or drink (SIGN, 2004). Early detection and management incorporating best practice guidelines is necessary to prevent the complications related to dysphagia. Healthcare professionals must be trained by a speech language pathologist to screen using a standardized approach. Ideally, these healthcare professionals can include nurses, dietitians, and/or occupational therapists (HSFO, 2002a). In reality, nursing is typically the most available professional and therefore likely the most appropriate to take on the responsibility of dysphagia screening (HSFO, 2002a). Screening is especially important where a speech-language pathologist is not readily available to conduct more detailed dysphagia assessments. In these circumstances, screening will direct only those clients at highest risk for a full assessment by a speech language pathologist. In settings where a speech language pathologist is not available, another healthcare professional with adequate training in the detailed examination and interpretation of swallowing assessment may assess the client (College of Audiologist and Speech Language Pathologists of Ontario, 2000). Proper administration of dysphagia screening will alert nurses to properly refer clients at dysphagia risk to speech-language pathologists or other properly trained healthcare professionals (HSFO, 2004a).

Several tools have been evaluated to screen for swallowing difficulties. There are commonalties to most screening tools and some of the screening procedures are better predictors of dysphagia than others. The Toronto Bedside Swallowing Screening Test (TOR-BSST) is one of these screening tools. It is the only one that has been developed from a systematic review of the literature (Martino et al., 2000) and therefore is considered the tool based on the best available evidence (Martino, Pron & Diamant, 2002). The TOR-BSST is still being studied, however because of the evidence from which it is based, it offers the best potential for value. TOR-BSST has been designed as a brief initial test that can accurately and reliably detect the presence of dysphagia, defined as the presence of aspiration or any physiological abnormality in stroke clients, regardless of time post-stroke. The TOR-BSST is intended for use by any healthcare professional trained in both the proper administration and interpretation of this screening tool in post-stroke clients, from inpatient acute, rehabilitative or chronic facilities. Five clinical tests, 50-ml water test, impaired pharyngeal sensation, impaired tongue movements, dysphonia and general muscle weakness, all of which have the highest likelihood to predict dysphagia, form the TOR-BSST. Currently, the study of the TOR-BSST tool is at the last stages of data collection.

In order to adequately screen clients for aspiration risk they must be **alert and have the ability to participate** in the screening process. Although there is little documented support for this statement, according to the Scottish Intercollegiate Guidelines Network (2004) this parameter has reasonable sensitivity (62-75%) and specificity (72-80%). If the client is already eating, **direct observation** may be conducted during these times. The nurse should assess for: choking; stifled, suppressed or overt coughing during and after the swallow; wet voice; delay in initiating a swallow (longer than five seconds); uncoordinated chewing/swallowing; extended time to eat/drink; pocketing food; or loss of food from the **mouth** (Joanna Briggs Institute, 2000; Martino et al., 2000; Smith & Connolly, 2003).

Stroke Assessment Across the Continuum of Care

Assessing **tongue protrusion** by using the impaired tongue movements test (sensitivity of 64% and specificity of 71%) has been used to detect impaired swallowing (Martino et al., 2000). This screen is performed by having the client stick out his/her tongue. The examiner observes for deviation to either side. If there is no deviation, the client is then asked to move the tongue from side to side. The screening is deemed to be abnormal if there is initial deviation, difficulty moving the tongue or a preference of movement to one side.

Screening for alteration in **pharyngeal sensation** is performed by stimulating alternate sides of the back of the throat at the base of the tongue. The sensation is felt to be normal if there is movement of the soft palate and the walls of the oropharynx, with or without a gag. Given sensitivity of 100% and specificity of 60%, this test is felt to be a good indicator of dysphagia (Kidd, Lawson, Nesbitt & MacMahon, 1993; Martino et al., 2000). The value of this particular aspect has not been consistent (SIGN, 2002); therefore, we look forward to the results from the current TOR-BSSST research to delineate its value in the future.

The **water swallow test** is performed by appropriately positioning the client to be able to manage fluids. The client is given small amounts of water and observed. The screener is observing for stifled, suppressed or overt coughing during or after the swallow attempt and a change in the voice quality that suggests wetness. The 50-ml water test (sensitivity of 80% and specificity of 86%) is felt to be a strong predictor of potential aspiration (Martino et al., 2000). Variable accuracy of prediction of a water swallowing test has been documented: sensitivity of >70% and specificity of 22-66% (SIGN, 2002), sensitivity of 78% and specificity of 58% (Smith & Connolly, 2003). It is important, however, to use the water swallowing test that is most sensitive and specific, since not all water tests are alike (Martino et al., 2000).

Dysphonia and **wet voice quality** have been accepted in the literature as clinical features of aspiration risk. In a study by Daniels et al. (1998), nine clinical indicators were significantly associated with aspiration, and included dysphonia and wet phonation. Identification of dysphonic voice quality was made and classified as wet hoarseness, strained, breathy or non-specific hoarseness. The variables predicted aspiration with 78% accuracy (sensitivity of 69.6% and specificity of 84.4%). Presence of two or more of the clinical features may accurately predict aspiration risk (Daniels et al., 1998).

The gag reflex is not a good indicator as it is a poor predictor of swallowing function and should not be used for screening for dysphagia in stroke patients (Martino et al., 2000; SIGN, 2002).

Nutrition

Recommendation 7.0

Nurses in all practice settings should complete a nutrition and hydration screen within 48 hours of admission, after a positive dysphagia screen and with changes in neurological or medical status, in order to prevent the complications of dehydration and malnutrition. In situations where impairments are identified, clients should be referred to a trained healthcare professional for further assessment and management.

Level of Evidence = IV

Discussion of Evidence

Dysphagia has been estimated to affect 15,000 to 21,000 new stroke clients each year. This may resolve quickly or last for months, leading to potential complications of dehydration and malnutrition. It is felt that rates of dehydration and malnutrition could be as high as 50% in the rehabilitation population two weeks post-stroke (Finestone & Finestone-Greene, 2003). The risk is actually much higher for the estimated 16% of stroke clients that are malnourished prior to hospitalization (HSFO, 2004a). Decreased functional outcomes, increased complication rates and prolonged hospitalizations are associated with malnourished states (Finestone & Finestone-Greene, 2003).

Healthcare professionals must not assume the absence of risk if clients do not exhibit any signs of difficulty swallowing. Other factors that contribute to diminished oral intake include; depression, visual and sensory disturbances, extremity weakness and apraxias, cognitive changes or agnosia (Finestone & Finestone-Greene, 2003). Nurses are in a position to screen for nutritional risk and facilitate referrals to other healthcare professionals including, but not limited to, dietitians, psychologists, occupational therapists, and recreation therapists.

All stroke clients should have a nutritional screen within 48 hours of admission (HSFO, 2002a), after a positive dysphagia screen and ongoing assessments should be performed at all stages of the continuum, especially if neurological deterioration is noted. Nutrition and hydration screening should include:

- Assessment of physical appearance, signs of body fat or muscle loss which include thin, weak or cachetic appearance, pinch test of posterior upper arm, malnutrition indicators (Halsted, 2003; Shils, Olson & Shike, 1994).
- Assessment of recent weight loss of more than 4.5 kgs (10 pounds) (Hudson, Daubert & Mills, 2000).
- Assessment of recent nutritional intake.
- Co-morbid conditions, such as diabetes with uncontrolled glucose, chronic renal failure with potassium restriction, cancer, AIDS (Brody, Touger-Decker, VonHagen, O'Sullivan, 2000).

In 2003, the Heart and Stroke Foundation of Ontario, with support from the Ministry of Health and Long Term Care, conducted a dysphagia pilot project which included the development of a simple nutrition screening questionnaire. This questionnaire complements routine dysphagia screening and identifies if nutritional concerns other than dysphagia exist (HSFO, 2004a).



Cognition/Perception/Language

Recommendation 8.0

Nurses in all practice settings should screen clients for alterations in cognitive, perceptual and language function that may impair safety, using validated tools (such as the Modified Mini-Mental State Examination and the Line Bisection Test). This screening should be completed as follows:

Within 48 hours of regaining consciousness:

- Arousal, alertness and orientation;
- Language (comprehensive and expressive deficits); and
- Visual neglect.

In addition, when planning for discharge:

- Attention;
- Memory (immediate and delayed recall);
- Abstraction;
- Spatial orientation; and
- Apraxia.

In situations where impairments are identified, clients should be referred to a trained healthcare professional for further assessment and management.

Level of Evidence = IV

Discussion of Evidence

Currently there are no valid tools to screen for safety risk in relation to cognitive deficits in the stroke population. Recognition of potential cognitive deficits early and referral to the appropriate healthcare provider facilitates further detailed assessment of safety risks, and aids in discharge planning. The screening process incorporates a systematic evaluation of risk of injury to the client. Both hospital based and community based studies have demonstrated a high risk of cognitive impairment three months after a mild to moderate stroke (Srikanth et al., 2003).

Figure 1 provides an algorithm that illustrates the sequence of the cognition/perception/language screen.

The screening process should be initiated within 48 hours of the client regaining consciousness and when his/her level of **arousal, alertness and orientation** can be assessed. The Canadian Neurological Scale (CNS), the National Institutes of Health Stroke Scale (NIHSS) and the Glasgow Coma Scale (GCS) (*Appendix C*) assess the client's level of alertness and orientation (see *Recommendation 3.0*). If the client is not alert and is disorientated to person/place, there is no need to proceed further with the screen at this time. An ongoing monitoring and evaluation of the client's medical and neurological status is required.

Screening for **language** is an important next step, as approximately 30% of all stroke clients have some language dysfunction which may interfere with their return to independent living. Screening for deficits in client's comprehension and expression will identify those who may be at safety risk at discharge. The CNS and NIHSS (*Appendix C*) both have a component of language screening that allows for identification of a language deficit. It should be noted that the Glasgow Coma Scale, if used to monitor neurological status for alertness and orientation, does not assess language. Screening should be initiated prior to ambulation and/or within 48 hours post-stroke. If a comprehension and/or expression language deficit has been identified, or if the client's first language is not English, further screening can be terminated and a referral to a speech language pathologist initiated.

Visual neglect is one of the disabling features of a stroke, and is defined as a failure to report, respond or orient to visual stimuli presented to the side opposite a brain lesion (Heilman, 1993). Clinically, the presence of a severe visual neglect is apparent when an individual frequently collides into his/her surroundings, ignores food on one side of the plate or only attends to one side of the body. These observations can be made during functional activities of daily living. More subtle forms of visual neglect can go undetected and put a client at risk for falls. Therefore, early detection of visual neglect prior to mobilization and/or promoting independent activities of daily living is essential. The Line Bisection Test is a screening test for visual neglect. It requires the client to cross through the midpoint of a series of lines. If the client is not able to cross through the midpoint, this may indicate the presence of a visual neglect and need for a further, more detailed assessment. This test has been evaluated by numerous authors and found to have excellent validity and reliability (Schenkenberg et al., 1980). *Appendix F* provides more details about the Line Bisection Test.

Attention, memory, abstraction, spatial orientation and apraxia are all important functions of the brain that can be affected after a stroke. Sometimes it may be very apparent through conversation and observation that the client has deficits and needs further assessment. More formal screening should be done using the Modified Mini-Mental State Examination (3MS). This valid screening tool will provide information to flag for deficits in the above areas and to facilitate a referral for more detailed assessment.

Although the Mini-Mental State Examination (MMSE) is widely utilized, and is sensitive in clients with moderate to severe levels of cognitive impairment, it is not as sensitive in clients with mild cognitive impairment or in clients with right hemispheric brain involvement (Salmon, Thal, Butters & Heindel, 1990). The Modified Mini-Mental State (3MS) Examination is recommended for use in an older, at risk stroke population. In the context of aging and stroke, the modifications made to the MMSE in the development of the 3MS can generally be described as increasing the depth and range of functions associated with cognition. The wider scoring range allows for improved differentiation, particularly in clients with mild cognitive impairment. Age-related category fluency ability, thought to differentiate between early and advanced dementia states, is captured in the 3MS. Items testing abstraction and conceptual thinking are expanded when compared to the MMSE (Grace et al., 1995; Teng & Chang Chui, 1987; Tombaugh & McIntyre, 1992). If clinicians choose to use the original MMSE, it is recommended that semantic fluency tests also be included in the assessment.

Stroke Assessment Across the Continuum of Care

The 3MS is the preferred tool, as recommended by the SCORE Project (SCORE, 2005). It is relatively brief, and easy to administer. The administration allows for cueing, which is particularly important in testing older adults with mild memory recall problems. Psychometric properties for the 3MS have been established. Age and education specific norms are available. The MMSE is contained within the 3MS and both scores can be calculated. However, both the MMSE and the 3MS are well known to be inadequate measures in the presence of frontal lobe dysfunction requiring additional measures to test for visual-spatial and executive functions (Grace et al., 1995; Teng et al., 1987; Tombaugh & McIntyre, 1992). Suggested tools to assess these functions include the Cognitive Abilities Screening Instrument (CASI) and the Clock Drawing Test.

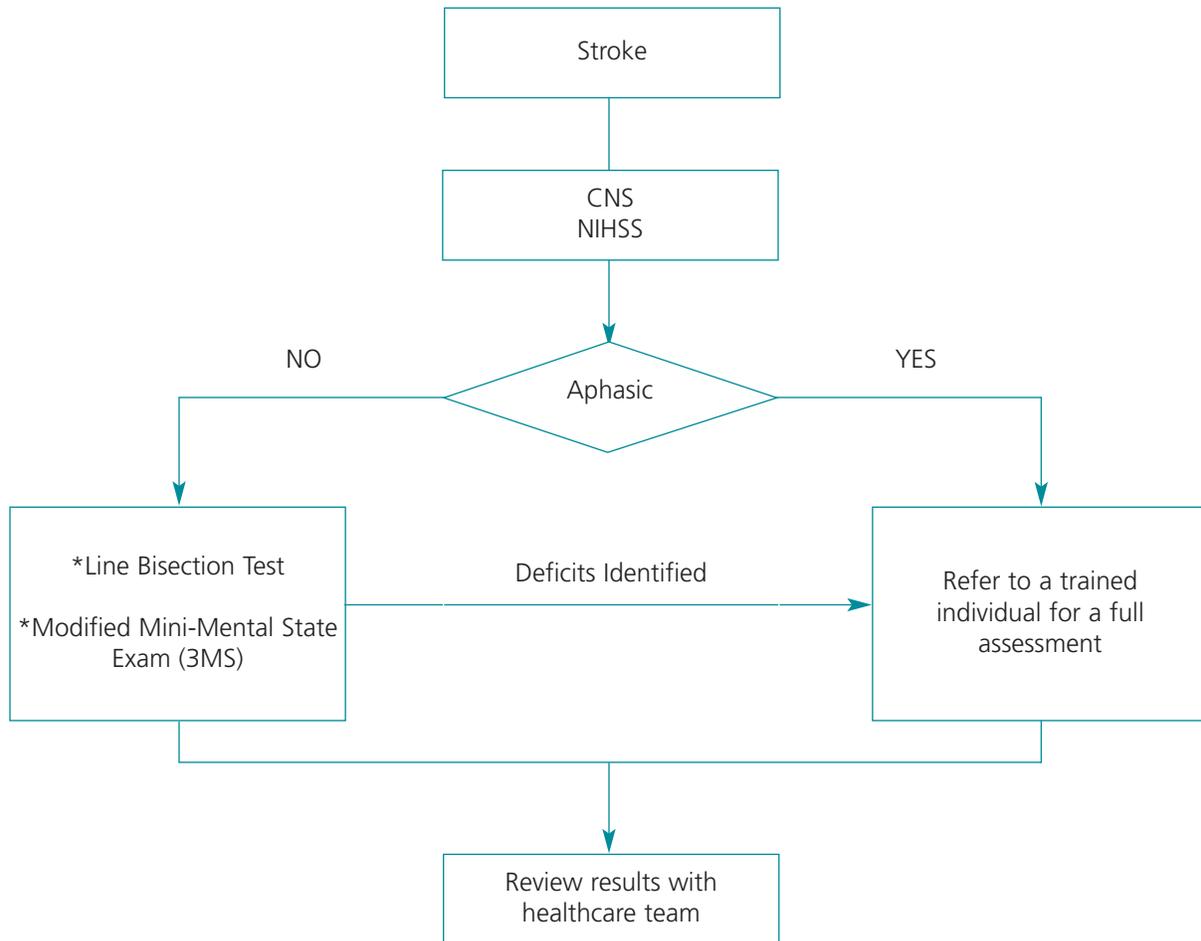
An example of the Modified Mini-Mental State Examination is provided in *Appendix F*.

It is important to remember that cognitive impairment can be associated with depression; therefore, screening for cognitive impairment should precede screening for depression. Symptoms of depression can be manifested as cognitive deficits, including difficulties with orientation, memory, language, and distractibility. In clients with mild to moderate cognitive impairment 53% were found to have depression at three months and of those clients, 9% had a major depression (Kauhanen et.al., 2004). For details regarding screening for depression, refer to *Recommendation 11.0*.

With changes in neurological/medical status and/or environment, a reassessment of the client's cognition/perception/language is warranted. If delirium is suspected, refer to the RNAO Nursing Best Practice Guideline (2003) *Screening for Delirium, Dementia and Depression in the Older Adult*.



Figure 1: Algorithm for Cognitive Screening in Stroke Clients



Note:

* Client needs to be alert to participate in the cognitive screen.

* With changes in medical status and/or environment, a reassessment of the client's cognition is warranted.

Reference: The Stroke Canada Optimization of Rehabilitation by Evidence (SCORE) Project Team (February 2005). Post-stroke Evidence-based Recommendations for Upper Extremity, Lower Extremity and Risk Assessment of Pressure Ulcers, Dysphagia, Falls, Cognition and Depression. Toronto: SCORE.

Activities of Daily Living

Recommendation 9.0

Nurses in all practice settings should assess stroke clients' ability to perform the activities of daily living (ADL). This assessment, using a validated tool (such as the Barthel Index or the Functional Independence Measure™), may be conducted collaboratively with other therapists, or independently when therapists are not available. In situations where impairments are identified, clients should be referred to a trained healthcare professional for further assessment and management.

Level of Evidence = IV

Two validated tools are commonly used to assess activities of daily living. These include the Barthel Index of Activities of Daily Living (BI) which may be used in all settings across the continuum of care, and the Functional Independence Measure (FIM) which is used specifically in rehabilitation settings, where appropriate training and support can be provided. Activities of Daily Living include:

- feeding
- grooming
- bathing
- dressing
- toileting
- ambulation
- transfers
- stair climbing (AHCPR, 1995).

Discussion of Evidence

Basic “activities of daily living” (ADL) include mobility, self-care functions, and transfers that a person must be able to perform to be independent (AHCPR, 1995). These areas fall within the domain of nursing care, collaboratively with other therapists or independently when therapists are not available (Booth, Davidson, Winstanley & Waters, 2000). Findings from population-based studies (Dombovy, 1993) indicate that independence in self-care ADL improves with time (AHCPR, 1995). Measures of disability in basic ADL reflect the impact of neurological impairments and the ability to compensate for losses. They focus on actual task accomplishment rather than on a theoretic ability to perform a task (AHCPR, 1995). The information is obtained by observing performance. The Barthel Index of Activities of Daily Living (BI) (Mahoney & Barthel, 1965) and the Functional Independence Measure™ (FIM) are by far the most commonly used measures of functional disability (Salter, Jutai & Teasell, 2003).

The BI is widely used as a disability scale to assess ADLs in stroke clients. Its reliability, validity and responsiveness have been well established (Salter et al., 2003). It is a simple, concise, easy to use clinical tool which can take 2-5 minutes to complete by self-report and up to 20 minutes by direct observation (Finch et al. 2002). It does not require training to administer and has been shown to be equally reliable when administered by skilled and unskilled individuals (Collin, Wade, Davies & Horne, 1988). The BI measures client's performance in 10 common activities of daily living. These are assessed for independence/dependence and scored via an arbitrary weighting system. Seven of the ten items represent activities related to personal care (feeding, grooming, bathing, dressing, bowel and bladder care, and toilet use); the remaining three are related to mobility (ambulation, transfers and stair climbing). The activities are rated using a two-point, three-point or four-point ordinal scale. The maximum score is 100, indicating that the client is fully independent, whereas the score of 0 indicates severe disability (Carod-Artal et al., 2002; Collin et al., 1988; Salter et al., 2003; Wade & Collin, 1988). The BI has been used to predict length of stay and discharge destination after stroke (Bohannon & Maljanian, 2002). The most common criticism of the BI has been its relative insensitivity and lack of comprehensiveness, reflected in large reported ceiling and floor effects (Duncan et al., 1999). Despite the limitations, simplicity, ease of administration, convenience and cost effectiveness of the BI have enabled its established, widespread use with high degree of familiarity and interpretability (Salter et al., 2003). See *Appendix G* for details regarding the Barthel Index (BI).

The Functional Independence Measure™ (FIM) has become the predominant measure of disability in rehabilitation settings in North America. The FIM instrument was developed for use in the medical remuneration system in the United States (McDowell & Newell, 1996; Uniform Data System for Medical Rehabilitation, 1993). The FIM was historically derived from the Barthel Index, and was intended to address issues of sensitivity and comprehensiveness. Its reliability, validity and responsiveness have been well established (Salter et al., 2003). FIM evaluates 18 items assessing six areas of function (self-care, sphincter control, transfers, locomotion, communication and social cognition). These consist of two basic domains: physical (13 items), referred to as motor-FIM and cognitive (five items), referred to as cognitive-FIM. Items included in cognitive-FIM are limited to: problem-solving, memory, social interaction, expression and comprehension. Although some deficits in cognition and language can be identified, cognitive-FIM subscale is not a complete screen and further, more detailed assessment/screening of these domains is recommended (refer to cognitive assessment *Recommendation 8.0*). FIM is primarily an ordinal scale with some interval characteristics. Each item is scored on a 7-point Likert scale indicative of the amount of assistance required to perform each item (1= total assistance, 7 = total independence). A simple summed score of 18-126 is obtained, where 18 represents total assistance required and 126 represents no assistance required. Hence, the FIM assesses physical and cognitive disability in terms of burden of care. The most common approach to administration is direct observation and the scores are determined by consensus opinion of a team (Salter et al., 2003).

FIM has been used in rehabilitation as a screening tool in early client selection, to predict rehabilitation outcomes, to provide education about recovery, to assess the burden of care given in the home or placement at the time of discharge from the hospital, and to monitor inpatient progress (Inouye et al, 2000; Oczkowski & Barreca, 1993). The advantages of the FIM include its ability to measure social cognition and functional communication, and its increased sensitivity. However, the FIM is less feasible for nurses in some phases of the continuum of care, as it takes approximately 30 minutes to administer and score, and additional training and certification is required, which may represent significant cost associated with its use. See *Appendix G* for information regarding the Functional Independence Measure™ (FIM).

The BI and the FIM have been compared in terms of their psychometric properties and clinical use. Overall, they appear to be psychometrically similar measures of motor disability, especially when the BI is compared with the motor-FIM (Gosman-Hedstrom & Svensson, 2000; Hobart et al., 2001). Although the inclusion of communication and cognition items make the FIM more sensitive and inclusive, the contribution of this subscale to the overall tool is questionable, as it has shown less reliability and responsiveness than either the motor-FIM or the total FIM (Ottenbacher, Hsu, Granger & Fiedler, 1996; van der Putten, Hobart, Freeman & Thompson, 1999). Some of the common limitations of the BI and the FIM include: decreased sensitivity in clients with high levels of functional disability; failure to detect improvements in specific self-care activities; inability to identify the effects of specific impairments or diseases; and summation scores may be misleading because they combine functions in different areas that are not necessarily associated (AHCPR, 1995). Given the demonstrated similarity between the FIM and the BI, selection of a disability scale may be influenced by the purpose of the instrument and its practicality, rather than its psychometric properties (Salter et al., 2003).

Bowel and Bladder Function

Recommendation 10.0

Nurses in all practice settings should assess clients for fecal incontinence and constipation.

Level of Evidence = IV

Discussion of Evidence

Constipation and fecal impaction are more common after stroke than incontinence related to neurogenic impairment. Bowel function is commonly disrupted after a stroke due to immobility, inactivity, inadequate fluid or food intake, polypharmacy, depression, anxiety, cognitive deficits, and functional and environmental barriers (AHCPR, 1995).

Fecal incontinence is a common complication after stroke, affecting 30% (7-10 days), 11% (3 months), 11% (1 year) and 15% (3 years). One third of clients with fecal incontinence at three months will become continent by one year (Harari, Coshall, Rudd & Wolfe, 2003). Continued fecal incontinence signals a poor prognosis. Diarrhea, when it occurs, may be due to medications, initiation of tube feedings, infections, or leakage around a fecal impaction (AHCPR, 1995). Assessment and appropriate treatment will be based on the cause. Stroke clients are susceptible to constipation for both physiological and clinical reasons (Harari et al., 2003). Physiologically, a delayed colonic transit has been found. Clinically, risk factors for constipation in stroke clients include impaired mobility, dehydration, polypharmacy, dietary factors and impaired cognition (Ho & Goh, 1995).

The nurse should conduct a focused assessment to determine if fecal incontinence is related to constipation with overflow incontinence versus neurogenic impairments. The key components that can be assessed to rule out neurogenic impairment include:

- impaired rectal sensation and tone;
- inability to voluntarily contract rectal sphincter; and
- presence of stool in rectal vault.

If the client has all of the above, this is highly indicative of a neurogenic impairment, and requires further assessment by the appropriate healthcare provider. If rectal tone and sensation is present, fecal incontinence is more likely related to constipation with overflow incontinence. Refer to the RNAO Nursing Best Practice Guidelines (2005c) *Prevention of Constipation in the Older Adult Population* and *Appendix H* for a more detailed assessment.

Recommendation 10.1

Nurses in all practice settings should assess clients for urinary incontinence and retention (with or without overflow).

Level of Evidence = IV

Discussion of Evidence

Nurses should assess urinary function of stroke survivors. Urinary incontinence is a common sequelae of stroke, with the incidence ranging from 38% to 60% (Borrie, Campbell, Caradoc-Davies & Spears, 1986). Incontinence is a strong predictor of outcome following stroke, its presence being highly predictive of a poor outcome (Meschia & Bruno, 1998).

The symptoms and mechanisms of urinary incontinence post-stroke can vary, however urge and functional incontinence are the most common causes of incontinence in this population.

- *Urge incontinence* from bladder hyperreflexia is commonly caused by disruption of the neuromicturation pathways. Previously reported studies have found that 50-82% of clients in rehabilitation units have documented hyperreflexia. Gerber et al. (1993) reported a lower incidence at three weeks post-stroke of 37% of incontinent clients in this category.
- *Functional incontinence* is associated with normal bladder function, and may be related to cognitive and language deficits and/or physical immobility post- stroke (Gerber et al., 1993).
- *Overflow incontinence* with urinary retention from bladder hyporeflexia can occur after a stroke. It can be affected by medications or a concurrent neuropathy. Studies show that 17-25% of incontinent clients have this type of incontinence (Gerber et al., 1993).



Stroke Assessment Across the Continuum of Care

An accurate assessment of bladder function of stroke survivors is important, and is the first step in identifying potential causes and treatments for urinary incontinence. Components of this assessment should include (AHCPR, 1996; European Association of Urology, 1999):

History

- Past medical history;
- Bladder functioning pattern (pre-and post-stroke) – duration and characteristics of urinary incontinence; frequency, volume and control;
- Client's awareness of the urge to void;
- Frequency of bowel movements, alteration in bowel habits;
- Fluid intake pattern, including alcohol, caffeine-containing or other diuretic fluids;
- Mental status evaluation and assessment of mobility, environment and social factors; and
- Current medications.

Physical Examination

- Abdominal examination – pain, pressure or distention in the pubic region;
- Measuring post void urinary volumes to assess for retention (bladder scanner or in-out catheterization); and
- Presence of infection.

Based on the above assessment, nursing interventions regarding the type of incontinence or retention will be determined. Where it is identified that retention exists, refer the client to an appropriate healthcare provider for further assessment and intervention. Refer to *Appendix K* for additional resources to support a comprehensive urinary assessment.

Depression

Recommendation 11.0

Nurses in all practice settings should screen clients for evidence of depression, using a validated tool (such as the Stroke Aphasia Depression Questionnaire, Geriatric Depression Scale, Hospital Anxiety and Depression Scale or the Cornell Scale for Depression in Dementia) prior to discharge throughout the continuum of care. In situations where evidence of depression is identified, clients should be referred to a trained healthcare professional for further assessment and management.

Level of Evidence = IV

Common symptoms of depression may include (Alexopoulos, 1998):

- Mood related signs (anxiety, sadness, lack of reactivity to pleasant events, irritability)
- Behavioural disturbances (agitation, retardation, multiple physical complaints, acute loss of interest)
- Physical signs (appetite loss, weight loss, lack of energy)
- Cyclic function (diurnal variation of mood, difficulty falling asleep, multiple awakenings during sleep, early morning awakenings)
- Ideational disturbances (suicide, self-depreciation, pessimism, mood congruent delusions)

Discussion of Evidence

Depressive symptoms are often exhibited by the stroke survivor as part of the normal grieving process post-stroke, and this grief is often part of the recovery process. However, it is important to screen for evidence of clinical depression in order to facilitate further assessment and referral.

Depression, a common emotional disorder, may affect 40% of all stroke clients (Robinson, Murata & Shimoda, 1999), although variable prevalence has been reported, ranging from 23% to over 50% (Bhogal, Teasell, Foley & Speechley, 2003). Peak prevalence has been documented between six months and two years post-stroke (Robinson et al., 1986). A three year study by Astrom, Adolffson & Asplund (1993) documented a prevalence of 25-30% in the first three months, 16-19% at 1-2 years and 29% at three years. Negative thought associated with depression has been linked to greater mortality at 12-24 months post-stroke (House, Knapp, Bamford & Vail, 2001; Lewis, Dennis, O'Rourke & Sharpe, 2001; Morris, Robinson & Samuels, 1993; Schubert, Taylor, Lee, Mentari & Tamaklo, 1992). Detection of post-stroke depression is not always evident and may be easily overlooked (Schubert et al., 1992). Recognition of depression has been more challenging in clients with cognitive and communication deficits post-stroke.

Post-stroke depression has been thought to affect the rate of recovery and rehabilitation of stroke survivors and has been associated with poorer outcomes, increased length of hospital stay (Bhogal et al., 2003) and higher rates of institutionalization. Because it can occur at any stage of the continuum, ongoing screening is required. Reports suggest that depression post-stroke has a powerful negative impact on functional recovery (Loong et al., 1995; Robinson et al., 1986), cognition and social functioning (Bacher et al., 1990; Morris et al., 1992; Robinson et al., 1983). The negative effects of depression underscore the need for early detection and treatment to minimize its negative impact on recovery and rehabilitation.

Standardized depression scales may be useful in screening for depressive symptoms and monitoring responses to treatment (AHCPR, 1995). Screening for depression in stroke clients has been difficult due to limited availability of stroke-specific depression instruments. Furthermore, assessing clients with aphasia has been most problematic (Suttcliffe & Lincoln, 1998). The following scales can be used to screen stroke survivors for evidence of depression:

- Stroke Aphasia Depression Questionnaire (SADQ10) – Community Version
- Geriatric Depression Scale (GDS)
- Hospital Anxiety and Depression Scale (HADS)
- Cornell Scale for Depression in Dementia

Stroke Aphasia Depression Questionnaire (SADQ)

The Stroke Aphasia Depression Questionnaire (SADQ) was developed to detect depressed mood in aphasic clients in the community. The 21 items, derived from questionnaire measures of depression, included observable behaviours thought to be associated with depressed mood. Each item is scored on a 0-3 scale, with a high score indicating lower mood. Scores on the SADQ were moderately correlated with the HADS and WDI (Wakefield Depression Inventory) tested in a sample of aphasic patients (n=70) (Suttcliffe & Lincoln, 1998).

The 21-item SADQ was then shortened to a 10-item questionnaire (SADQ10), which is comprised of items which best differentiated those with high scores on depression questionnaires from those with low scores. This tool was validated in non-aphasic stroke clients undergoing rehabilitation. A cut-off of 14/15 on the SADQ10 was found to be optimal, with a sensitivity of 70% and a specificity of 77% (Bennett, Thomas, Austen, Morris & Lincoln, 2000).

Stroke Assessment Across the Continuum of Care

Geriatric Depression Scale (GDS)

The Geriatric Depression Scale is a self report scale designed to be simple to administer and does not require the skills of a trained interviewer. Each of the questions has a yes/no answer with scoring dependant on the answer. The GDS was found to have a sensitivity of 84% and a specificity of 95%. A 15-item version has been devised (Burns, Lawlor & Craig, 2002).

Hospital Anxiety and Depression Scales (HADS)

The Hospital Anxiety and Depression Scale (HADS) was designed to provide a screening device for anxiety and depression in a general hospital setting. Subsequent work has shown the HADS to be valid in primary and community settings. The scale contains 14 items each answered on a four point rating scale. It can be used to give measures of anxiety (seven items), depression (seven items) or emotional distress (all 14 items). It can also be used to screen for emotional disorder using cutoffs on both the anxiety and depression scales. The stroke survivor would be instructed to complete the Scale in order to reflect the present state. Psychometric investigations have shown that the HADS achieved good internal consistency and test-retest reliability, is sensitive to change and gives valid assessments (Johnston, Pollard, & Hennessey, 2000).

Cornell Scale for Depression in Dementia

The Cornell Scale for Depression in Dementia (Alexopoulos, Abrams, Young & Shamoian, 1988) is considered to be the best scale available to assess mood in the presence of cognitive impairment (Burns, Lawlor & Craig, 2002). This is a 19-item clinician administered instrument that uses information from interviews with both the client and a nursing staff member, a method suited for clients with dementia. This scale has a high inter-rater reliability, internal consistency and sensitivity, and is rated on a three-point score of 'absent', 'mild or intermittent' and 'severe' symptoms. A score of eight or more suggests significant depressive symptoms.

For further details regarding screening for depression, please refer to the RNAO (2003) Nursing Best Practice Guideline (2003) *Screening for Delirium, Dementia and Depression in Older Adults*. Refer to *Appendix I* for samples of depression screening tools.

Recommendation 11.1

Nurses in all practice settings should screen stroke clients for suicidal ideation and intent when a high index of suspicion for depression is present, and seek urgent medical referral.

Level of Evidence = IV

Discussion of Evidence

Although not exclusive to those experiencing stroke, evidence suggests that clients with depression should be carefully screened for suicide potential, as well as the potential for violence (American Psychiatric Association, 1999). Predicting suicide risk is difficult; however, there are certain factors that have been associated with a greater potential for suicide (RNAO, 2003). These may include:

Risk Factors

- Male
- Low self-esteem
- Support systems – decreased or non-existent
- Decline in cognitive status
- History of suicide attempts or violence
- Substance abuse
- Caucasian
- Family history of suicide
- Decline in physical status
- Impulsivity
- Recent loss or change in life

Behaviour

- Gives guarded answers to questions
- Increasing withdrawal
- Resolving depression
- Gives away possessions
- Drug/alcohol abuse
- Diverts interviewer off topic
- Depressed affect
- Sudden interest/disinterest in religion
- Puts affairs in order

Suicidal Intent

- Verbalizes suicidal thoughts
- Can outline a concrete, realistic plan
- Physical ability to carry out threat
- Describes suicidal intent
- Methods are available



Caregiver Strain

Recommendation 12.0

Nurses in all practice settings should assess/screen caregiver burden, using a validated tool (such as the Caregiver Strain Index or the Self Related Burden Index). In situations where concerns are identified, clients should be referred to a trained healthcare professional for further assessment and management.

Level of Evidence = III

Two validated tools are suggested to screen/assess for caregiver burden:

- Care Giver Strain Index (CSI)
- Self Related Burden Index (SRB)

The SRB can be used as a quick screening tool of caregivers at risk and the CSI may be used for further assessment of the caregiver burden.

Discussion of Evidence

It is estimated that up to 80% of stroke survivors return to their home to be cared for by informal caregivers (Han & Haley, 1999). An informal caregiver is described as the person that helps the stroke survivor the most but is not paid to do so (Bugge, Alexander & Hagen, 1999). The support of family caregivers has been shown to have an impact on whether stroke survivors remain in their homes. Caregivers have to deal with stroke survivor's difficulties in mobility, self-care, communication, cognitive impairment, depression and personality changes. One of the factors related to the caregiver burden has been the shift from institutional care to community care and the amount of caregiver strain increased with time. Nurses play a key role in screening for caregiver burden (Teel, Duncan & Lai, 2001). Caregivers under the greatest strain are those that are not normally with the stroke survivor and attempt to fit caring into their already busy schedule (Bugge et al., 1999). This strain is unrelated to where the person lives or the services received. Time and confinement have been identified as key caregiver issues within the early post-stroke phase. Studies have estimated that the prevalence of depression among caregivers ranges from 34% to 42% (Han & Haley, 1999). It has been suggested that assessment of the caregiver should include attention to the context where the caregiving occurs, the effects of caregiving, resources available and the caregiver perceptions of the caregiving situation (Teel et al., 2001).

More recently, there has been a growing consensus among healthcare researchers that caregiver burden captures mostly the negative aspects of caregiving and that the concept of quality of life may be more important as it looks at the overall impact on the caregiver and not just those aspects of the role that are burdensome. White et al. (2004) developed a conceptual framework from which to study the quality of life of family caregivers of stroke survivors. Future research will focus on validation of stroke specific quality of life scales, which may result in expanding the scope of the caregiver assessment.

The Caregiver Strain Index (CSI) and the Self Related Burden Index (SRB) are considered feasible and valid instruments for assessment of caregiver burden in stroke. The Caregiver Strain Index (CSI) is a measure of caregiver burden which consists of 13 items that focus on inconvenience, confinement, family adjustment, changes in personal plans, competing demands on time, emotional adjustments, upsetting behaviour, the stroke survivor seeming to be a difficult person, work adjustments, feeling overwhelmed, sleep disturbance, physical strain and financial strain. It was initially developed for caregivers of clients discharged from acute care post arteriosclerotic disease, fractured hip or total hip replacement, but has been used with stroke clients in clinical trials looking at burden and strain (van Exel et al., 2004). The Self Related Burden (SRB) is a self-developed single question on self-related burden, whereby respondents rate how difficult it is for them to care for the stroke survivor at that moment (van Exel et al., 2004). Both tools have been compared with the Caregiver Reaction Assessment (CRA), the Sense of Competence Questionnaire (SCQ) and have been found to be reliable and valid (van Exel et al., 2004).

Refer to *Appendix J* for examples of tools to assess for Caregiver Strain.

Sexuality

Recommendation 13.0

Nurses in all practice settings should screen stroke clients/their partners for sexual concerns to determine if further assessment and intervention is necessary. In situations where concerns are identified, clients should be referred to a trained healthcare professional for further assessment and management.

Level of Evidence = IV

Discussion of Evidence

Stroke survivors have reported having unanswered questions about sexuality, being hesitant to ask their questions, and that they would welcome the opportunity to learn more about how their stroke could affect their sexuality (Korpelainen, Nieminen & Myllyla, 1999). An opening statement to initiate a discussion regarding sexuality may be phrased:

“Some people who have had a stroke are concerned about their sexual abilities and their sexual partners. It may be helpful for us to discuss any questions or concerns you may have.” (Weinberg, 1982)

Sexual dysfunction in stroke clients is complex and multifactorial. Stroke affects physical function, psychological responses, emotion, communication, changes in body image, roles and responsibilities (care partner vs. caregiver), and intimate relationships. Nurses have a unique role of seeing the client holistically. The nurses' role lies primarily in the areas of assessment and education, but comfort and support are inherent as well.

Stroke Assessment Across the Continuum of Care

Research suggests that stroke survivors continue to have sexual feelings and desires but often are less active sexually (HSFO, 2000). Most studies have involved small samples or have included subjects younger than 60 years old. In a study of 192 clients and 94 spouses conducted in Finland (Korpelainen et al., 1999), the majority of participants reported a significant decline in all sexual functions. Prior to stroke, 79% of clients and 84% of spouses reported an active sexual life. After stroke, 33% of clients and 27% of spouses ceased sexual intercourse. Approximately half of participants reported an interest in sexual counselling and considered it as an essential part of rehabilitation, but only a few had received it. Fifty-seven percent of clients and 65% of spouses reported diminished post-stroke libido; 75% decrease in erection capabilities, 46% decrease in vaginal lubrication and 55% decrease in orgasmic ability. Forty-nine percent of clients and 31% of spouses reported decreased satisfaction with sexual activity due to inability to discuss sexuality, unwillingness to participate in sexual activity, and functional disability.

Client and Caregiver – Readiness to Learn

Recommendation 14.0

Nurses in all practice settings should assess the stroke client and their caregivers' learning needs, abilities, learning preferences and readiness to learn. This assessment should be ongoing as the client moves through the continuum of care and as education is provided. *Level of Evidence = IV*

The following are eight assessment questions to ask stroke survivors and their caregivers in order to learn more about their readiness to learn and core concerns (Lorig, Gonzalez & Romer, 1996):

- What questions do you have regarding your/your family member's stroke?
- What concerns you most about your/your family member's stroke?
- What would you like to learn about this condition?
- When you consider the future and your/your family member's stroke, what do you imagine?
- What about your/your family member's stroke do you find frustrating?
- What about your/your family member's stroke frightens you?
- How do you manage your/your family member's stroke day-to-day?
- What have you done in the past to deal with your/your family member's stroke?

Discussion of Evidence

The general goals of client and family education are to give them the necessary information or skills to (London, 1999):

- Make informed decisions;
- Develop basic self-care skills to survive;
- Recognize problems and know what to do in response; and
- Get questions answered; find resources for answers.

The process of rehabilitation utilizes client education as a core venue for re-establishing function and minimizing disability. Stroke survivors are not static learners; their ability to learn new strategies and develop new attitudes is ongoing along the continuum of care (Johnson et al., 2000). For this reason, assessment of learning readiness is an important component in the development of educational programs and individual client care plans. Vanetzian (1997) defines learning readiness as evidence of motivation and ability to learn at a particular time; a dynamic state that influences the outcomes of client teaching. Few studies have examined learning readiness and the impact on client education in the stroke survivor population. An effective education program considers the learner's readiness, learning style and timing of delivery of education (Nolan, 2001). The readiness of the learner is a critical determinant of success in client teaching. Three factors will influence the client's readiness to learn (Lorig et al., 1996):

- Motivation – Clients become motivated when they grasp how their lives will improve by learning new skills
- Attitude – Denial, anxiety, anger or fear can stand in the way of education
- Outlook – A client's beliefs about his or her medical condition can affect readiness to learn.

Fulhrer (1998) notes that in practice most therapists use intuition gathered from their numerous experiences in client teaching. Although motivation is a key determinant in the assessment of readiness to learn, nurses need to be cautioned in labeling clients as “motivated” or “not motivated” as this often influences the care that is provided (McLean, Pound, Wolfe & Rudd, 2001). The client is ready for information at teachable moments and may indicate this by making a provocative statement or asking a question. By presenting information to clients to determine their needs and asking open-ended questions, the nurse can assist them to realize they need the information (London, 1999).

There are many barriers to learning in both the acute and rehabilitation phases. These barriers are rooted in financial, emotional, spiritual, social, physical and mental domains. In order to be successful in teaching the stroke survivor and family, the nurse must assess the existing and potential barriers for the client and their family and ensure that they are consistent with the planning and goal setting that is done.



Documentation

Recommendation 15.0

Nurses in all practice settings should document comprehensive information regarding assessment and/or screening of stroke clients. All data should be documented at the time of assessment and reassessment.

Level of Evidence = IV

Discussion of Evidence:

Documentation in the health record is an integral component of effective and safe nursing practice. All data is to be documented at the time of assessment and reassessment. This documentation supports continuity of care and the ongoing monitoring of the client's progress towards their treatment goals. Documentation that is clear, comprehensive and accurate is a record of the critical thinking and judgment used in professional nursing practice, and provides an account of nursing's unique contribution to health care (College of Nurses of Ontario, 2004c).

The Canadian Stroke Quality of Care Study (Lindsay et al., 2005), identified 23 core indicators for improving the quality of care for clients with acute stroke. The authors anticipate that by adopting these indicators and embedding them in clinical care, organizations can ensure a minimum standard of practice. Systematic documentation of these indicators on every acute stroke client's chart, using standard forms or checklists, should be encouraged. This will allow for data collection and analysis to establish benchmarks for care. Although the Canadian Stroke Quality of Care Study focused on stroke in the acute phase, documentation is a fundamental practice principle across the continuum.



Education Recommendations

Recommendation 16.0

Basic education for entry to practice should include:

- Basic anatomy and physiology of the cerebrovascular system;
- Pathophysiology of a stroke;
- Risk factors of a stroke;
- Signs and symptoms of a stroke;
- Components of a client history and assessment specific to stroke;
- Common investigations (tests); and
- Validated screening/assessment tools.

Level of Evidence = IV

Recommendation 16.1

Nurses working in areas with a focus on stroke should have enhanced stroke assessment skills.

Level of Evidence = IV

Discussion of Evidence

In order to implement the practice recommendations contained in this document, nurses in all practice settings require basic knowledge and skill in relation to anatomy and physiology of the cerebrovascular system, pathophysiology of a stroke, risk factors of a stroke, signs and symptoms of a stroke, components of a client history and assessment specific to stroke, common investigations, and the use of valid screening/assessment tools. Refer to *Appendix K* for resources to support education of nursing professionals in the various aspects of stroke assessment.

Nurses working predominantly with stroke clients require advanced stroke assessment skills. To help support practitioners specializing in the area of stroke, initiatives have been developed to facilitate a comprehensive approach to education. The *Multidisciplinary Learning Objectives for Stroke Care* (2004b) is a project that involves the development of core (shared) and discipline specific learning objectives for regulated health providers working with stroke survivors across the continuum. This project is funded by the Ministry of Health and Long-Term Care and the Heart and Stroke Foundation of Ontario and is the result of the collaborative effect between the Regional Stroke Program at the Hamilton Health Sciences Centre and the Heart and Stroke Foundation of Ontario.

The objectives of this project are:

- To give healthcare providers working with stroke survivors a framework for learning.
- To establish guidelines for knowledge and skill development for regulated health professionals working with stroke survivors recovering from the effects of stroke.
- To form the foundation for learning plans for ongoing individual professional development.

Stroke Assessment Across the Continuum of Care

Shared and Discipline Specific Learning Objectives were developed in 16 broad learning areas:

- Principles of Stroke Care
- Anatomy and Physiology of Stroke
- Cardiorespiratory
- Psychosocial Effects
- Communication
- Independence in Mobility and Prevention of Complications of Immobility
- Routine Activities of Daily Living
- Instrumental Activities of Daily Living
- Cognitive, Perceptual and Behaviour Changes following Stroke
- Sexuality
- Nutrition
- Dysphagia
- Skin Care
- Continence Management
- Primary and Secondary Stroke Prevention
- Transition Management

Shared Learning Objectives

Core competency-based objectives that are intended to articulate the knowledge, skill and value base that is important to all health professionals working with stroke survivors across the continuum, regardless of discipline. These shared learning objectives form the foundation for the development of discipline specific learning objectives for regulated health professionals.

Discipline Specific Learning Objectives

Discipline specific competency-based objectives that build on the Shared Learning Objectives and that are intended to articulate the knowledge, skill and value base that is important for that particular regulated health professional working with stroke survivors across the continuum. There are Discipline Specific Learning Objectives for the following regulated health professionals:

- Nursing
- Physiotherapy
- Occupational Therapy
- Social Work
- Speech Language Pathology
- Registered Dietitian
- Registered Respiratory Care Practitioner
- Pharmacist

The Multidisciplinary Learning Objectives for Stroke Care may form the basis of an orientation program for dedicated Stroke Units. Medical/surgical units may want to focus on a particular area of the learning objectives in a phased approach based on the needs of the organization. Practitioners may use the learning objectives as part of their individual professional development. The Multidisciplinary Learning Objectives are meant to:

- Be a guideline for learning and clinical practice
- Interface with stroke care pathways or care guides
- Form the basis of orientation as appropriate
- Assist with identifying priorities for education and training initiatives
- Provide a working document for ongoing individual professional development.

Reference: Heart and Stroke Foundation of Ontario (2004b). *The Report of the Multidisciplinary Learning Objectives for Stroke Care Project*. Toronto: Heart and Stroke Foundation of Ontario.



Organization & Policy Recommendations

Recommendation 17.0

Organizations should develop a plan for implementation that includes:

- An assessment of organizational readiness and barriers to education.
- Involvement of all members (whether in a direct or indirect supportive function) who will contribute to the implementation process.
- Ongoing opportunities for discussion and education to reinforce the importance of best practices.
- Dedication of a qualified individual to provide the support needed for the education and implementation process.
- Opportunities for reflection on personal and organizational experience in implementing guidelines.

Nursing best practice guidelines can be successfully implemented only where there are adequate planning, resources, organizational and administrative support, as well as appropriate facilitation. In this regard, RNAO (through a panel of nurses, researchers and administrators) has developed the *Toolkit: Implementation of Clinical Practice Guidelines* based on available evidence, theoretical perspectives and consensus. The *Toolkit* is recommended for guiding the implementation of the HSFO-RNAO best practice guideline *Stroke Assessment Across the Continuum of Care*.

Level of Evidence = IV

Discussion of Evidence

A critical initial step in the implementation of guidelines must be the formal adoption of the guidelines. For example, the organization may consider formally incorporating the recommendations to be adopted into their policy and procedure structure (Graham, Harrison, Brouwers, Davies, & Dunn, 2002). This initial step paves the way for general acceptance and integration of the guideline into such systems as the quality management process.

New initiatives such as the implementation of a best practice guideline require strong leadership from nurses who are able to transform the evidence-based recommendations into useful tools that will assist in directing practice. It is suggested that the RNAO (2002b) *Toolkit: Implementation of Clinical Guidelines* be considered to assist organizations develop the leadership required for successful implementation. *Appendix L* provides a description of the *Toolkit*.

A commitment to monitoring the impact of the implementation of *Stroke Assessment Across the Continuum of Care* best practice guideline is a key step that must not be omitted if there is to be an evaluation of the impact of the efforts associated with implementation. It is suggested that each recommendation to be adopted be described in measurable terms and that the healthcare team be involved in the evaluation and quality monitoring processes. A suggested list of evaluation indicators can be found in the following section of the guideline.

Recommendation 18.0

Organizational policy should clearly support and promote the nurses' role in stroke assessment, either independently or in collaboration with other members of the interdisciplinary team.

Level of Evidence = IV

Discussion of Evidence

Organizations must ensure that all healthcare professionals involved in assessing stroke survivors across the continuum work in an environment that allows them to practice according to the guidelines and have access to appropriate assessment tools. Commitment to supporting the nurse's role in stroke assessment requires a healthy work environment. Guideline implementation may be supported by:

- a critical mass of nurses educated and supported in guideline implementation;
- care delivery systems and adequate staffing that support the nurses' ability to implement these guidelines; and
- a sustained commitment to evidence-based practice in stroke care.

For effective teamwork to take place, all team members need to feel valued within the team. A qualitative study (Long, Kneafsey & Ryan, 2003) exploring the role of the nurse in rehabilitation, found that in situations where the boundaries between the roles of different professionals were blurred, or shared between different members, nurses were able to extend the boundaries of their assessment role. In the same study (Long et al., 2002), it was found that the nurse's assessment made a critical contribution to the client's rehabilitation, ensuring that complications (such as urinary infections) and potential problems (pressure ulcer development) that might impact on rehabilitation were addressed. From the nurse's primary assessment, referrals to other team members were made to ensure that clients received the input of the most beneficial combination of team members. The nurse's assessment uniquely focused on the extent to which the client would be able to live independently and on what truly mattered to the client.



Evaluation & Monitoring of Guideline

Organizations implementing the recommendations in this nursing best practice guideline are advised to consider how the implementation and its impact will be monitored and evaluated. The following table, based on a framework outlined in the RNAO (2002b) *Toolkit: Implementation of Clinical Practice Guidelines*, illustrates selected indicators for monitoring and evaluation of the implementation of the guideline *Stroke Assessment Across the Continuum of Care*:

Level of Indicator	Structure	Process	Outcome
	<ul style="list-style-type: none"> To evaluate the supports available in the organization that allow for nurses to conduct holistic stroke assessments. 	<ul style="list-style-type: none"> To evaluate changes in practice that lead towards improved stroke assessments. 	<ul style="list-style-type: none"> To evaluate the impact of implementing the recommendations.
Organization	<ul style="list-style-type: none"> Review of best practice guideline recommendations by organizational committee(s) responsible for policies or procedures. 	<ul style="list-style-type: none"> Review of policies and procedures related to nursing stroke assessment. 	<ul style="list-style-type: none"> Documented policies and procedures related to assessment of stroke are consistent with the guideline recommendations.
Nurse	<ul style="list-style-type: none"> Availability of educational opportunities re: screening/assessment of stroke within the organization. Nursing orientation includes education regarding stroke screening/assessment, specific to the phase of the continuum in which the nurse works. Standardized documentation systems for screening/assessment are available to the nurse. 	<ul style="list-style-type: none"> Percentage of nurses attending educational sessions re: stroke screening/assessment. A process is established to ensure inter-rater reliability for utilization of screening/assessment tools. Nursing documentation reflects that a comprehensive stroke assessment/screening was conducted. 	<ul style="list-style-type: none"> Nurses display increased ability to perform a comprehensive stroke assessment. *A protocol or screen for dysphagia assessment is initiated on all acute ischemic stroke clients before being given food or drink and results documented in the client chart. The interdisciplinary care plan reflects a synthesis of the stroke assessment/screening conducted by the nurse.
Stroke Survivor	<ul style="list-style-type: none"> Educational opportunities and resources re: stroke recovery are available for stroke survivors and their families. 	<ul style="list-style-type: none"> Percentage of stroke survivors/families attending educational sessions re: stroke recovery. 	<ul style="list-style-type: none"> *Stroke survivors and their caregivers receive stroke education prior to discharge from hospital and have this education documented on the chart.
Financial Costs	<ul style="list-style-type: none"> Provision of adequate financial and human resources for guideline implementation. 		<ul style="list-style-type: none"> Optimal investment of resources related to stroke assessment.

Selected indicators (*) have been identified from the Canadian Stroke Quality of Care Study (Lindsay et al., 2005).

Implementation Strategies

The Heart and Stroke Foundation of Ontario, the Registered Nurses' Association of Ontario and the guideline development panel have compiled a list of implementation strategies to assist healthcare organizations or healthcare disciplines who are interested in implementing this guideline. A summary of these strategies follows:

- Have at least one dedicated person such as an advanced practice nurse or a clinical resource nurse who will provide support, clinical expertise and leadership. The individual should also have good interpersonal, facilitation and project management skills.
- Conduct an organizational needs assessment related to stroke assessment in order to identify current knowledge base and further educational requirements. Initial needs assessment may include an analysis approach, survey and questionnaire, group format approaches (e.g., focus groups), and critical incidents.
- Establish a steering committee comprised of key stakeholders and interdisciplinary members committed to lead the change initiative. Identify short term and long term goals. Keep a work plan to track activities, responsibilities and timelines.
- Create a vision to help direct the change effort and develop strategies for achieving and sustaining the vision.
- Program design should include:
 - Target population;
 - Goals and objectives;
 - Outcome measures;
 - Required resources (human resources, facilities, equipment); and
 - Evaluation activities.
- Design educational sessions and ongoing support for implementation. The education sessions may consist of presentations, facilitator's guide, handouts, case studies, etc.. Binders, posters and pocket cards may be used as ongoing reminders of the training. Plan education sessions that are interactive, include problem solving, address issues of immediate concern and offer opportunities to practice new skills (Davies & Edwards, 2004).
- Provide organizational support such as having the structures in place to facilitate the implementation. For example, hiring replacement staff so participants will not be distracted by concerns about work and having an organizational philosophy that reflects the value of best practices through policies and procedures. Develop new assessment and documentation tools (Davies & Edwards, 2004).
- Identify and support designated best practice champions on each unit to promote and support implementation. Celebrate milestones and achievements, acknowledging work well done (Davies & Edwards, 2004).

Stroke Assessment Across the Continuum of Care

- Organizations implementing this guideline should adopt a range of self-learning, group learning, mentorship and reinforcement strategies that will, over time, build the knowledge and confidence of nurses in implementing this guideline.
- Beyond skilled nurses, the infrastructure required to implement this guideline may include access to specialized equipment and assessment resources. Orientation of the staff to the use of specific products and tools must be provided and regular refresher training planned.
- Teamwork, collaborative assessment and treatment planning with the client and family and interdisciplinary team are beneficial in implementing guidelines successfully. Referral should be made as necessary to services or resources in the community or within the organization.

In addition to the strategies mentioned above, the RNAO has developed resources that are available on the website. A *Toolkit* for implementing guidelines can be helpful if used appropriately. A brief description about this *Toolkit* can be found in *Appendix L*. A full version of the document in pdf format is also available at the RNAO website, www.rnao.org/bestpractices.



Process for Update/Review of Guideline

The Registered Nurses Association of Ontario proposes to update this best practice guideline as follows:

1. Each nursing best practice guideline will be reviewed by a team of specialists (Review Team) in the topic area every three years following the last set of revisions.
2. During the three-year period between development and revision, program staff will regularly monitor for new relevant literature in the field.
3. Based on the results of the monitor, program staff will recommend an earlier revision period. Appropriate consultation with a team of members comprising original panel members and other specialists in the field will help inform the decision to review and revise the guideline earlier than the three-year milestone.
4. Three months prior to the three-year review milestone, program staff will commence the planning of the review process by:
 - a. Inviting specialists in the field to participate in the Review Team. The Review Team will be comprised of members from the original panel as well as other recommended specialists.
 - b. Compiling feedback received, questions encountered during the dissemination phase as well as other comments and experiences of implementation sites.
 - c. Compiling new clinical practice guidelines in the field, systematic reviews, meta-analysis papers, technical reviews and randomized controlled trial research, and other relevant literature.
 - d. Developing detailed work plan with target dates and deliverables.

The revised guideline will undergo dissemination based on established structures and processes.

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Nursing Best Practice Guideline

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Appendix A: Search Strategy for Existing Evidence

DATABASE Search

A database search for existing stroke assessment guidelines was conducted by a university health sciences library. An initial search of the MEDLINE, Embase and CINAHL databases for guidelines and studies published from 1995 to 2003 was conducted using the following search terms: “stroke assessment”, “CVA assessment”, “cerebral vascular accident assessment”, “symptoms of stroke”, “clinical assessment”, “neurological assessment”, “neurological stroke assessment”, “nursing assessment”, “continuum of care – telehealth, acute, rehabilitation, community care, long-term care, home care”, “practice guideline(s)”, “clinical practice guideline(s)”, “standards”, “consensus statement(s)”, “consensus”, “evidence-based guidelines” and “best practice guidelines”.

Structured Web Site Search

One individual searched an established list of web sites for content related to the topic area in April 2003. This list of sites, reviewed and updated in October 2002, was compiled based on existing knowledge of evidence-based practice web sites, known guideline developers and recommendations from the literature. Presence or absence of guidelines was noted for each site searched as well as date searched. The web sites at times did not house a guideline but directed to another web site or source for guideline retrieval. Guidelines were either downloaded if full versions were available or were ordered by phone/email.

- Agency for Healthcare Research and Quality: <http://www.ahrq.gov>
- Alberta Heritage Foundation for Medical Research – Health Technology Assessment: <http://www.ahfmr.ab.ca/hta>
- Alberta Medical Association – Clinical Practice Guidelines: <http://www.albertadoctors.org>
- American College of Chest Physicians: <http://www.chestnet.org/guidelines>
- American Medical Association: <http://www.ama-assn.org>
- British Columbia Council on Clinical Practice Guidelines: <http://www.hlth.gov.bc.ca/msp/protoguides/index.html>
- British Medical Journal – Clinical Evidence: <http://www.clinicalevidence.com/ceweb/conditions/index.jsp>
- Canadian Centre for Health Evidence: <http://www.cche.net/che/home.asp>
- Canadian Cochrane Network and Centre: <http://cochrane.mcmaster.ca>
- Canadian Coordinating Office for Health Technology Assessment: <http://www.ccohta.ca>
- Canadian Task Force on Preventive Health Care: <http://www.ctfphc.org>
- Centers for Disease Control and Prevention: <http://www.cdc.gov>
- Centre for Evidence-Based Mental Health: <http://cebmh.com>
- Centre for Evidence-Based Nursing: <http://www.york.ac.uk/healthsciences/centres/evidence/cebn.htm>
- Centre for Evidence-Based Pharmacotherapy: <http://www.aston.ac.uk/lhs/teaching/pharmacy/cebph>
- Clinical Resource Efficiency Support Team (CREST): <http://www.crestni.org.uk>
- CMA Infobase: Clinical Practice Guidelines: <http://mdm.ca/cpgsnew/cpgs/index.asp>
- Cochrane Database of Systematic Reviews: <http://www.update-software.com/cochrane>
- Core Library for Evidence-Based Practice: <http://www.shaf.ac.uk/scharr/ir/core.html>
- Database of Abstracts of Reviews of Effectiveness (DARE): <http://www.york.ac.uk/inst/crd/darehp.htm>
- Evidence-based On-Call: <http://www.eboncall.org>
- Institute for Clinical Systems Improvement: <http://www.icsi.org/index.asp>

- Institute of Child Health: <http://www.ich.ucl.ac.uk/ich>
- Joanna Briggs Institute: <http://www.joannabriggs.edu.au>
- Medic8.com: <http://www.medic8.com/ClinicalGuidelines.htm>
- Medscape Women's Health: <http://www.medscape.com/womenshealthhome>
- Monash University Centre for Clinical Effectiveness: <http://www.med.monash.edu.au/healthservices/cce/evidence>
- National Guideline Clearinghouse: <http://www.guidelines.gov>
- National Institute for Clinical Excellence (NICE): <http://www.nice.org.uk>
- Netting the Evidence: A SchARR Introduction to Evidence-Based Practice on the Internet: <http://www.shef.ac.uk/scharr/ir/netting>
- New Zealand Guidelines Group: <http://www.nzgg.org.nz>
- NHS Centre for Reviews and Dissemination: <http://www.york.ac.uk/inst/crd>
- NHS Nursing & Midwifery Practice Development Unit: <http://www.nmpdu.org>
- NHS R & D Health Technology Assessment Programme: <http://www.hta.nhsweb.nhs.uk/htapubs.htm>
- NIH Consensus Development Program: <http://consensus.nih.gov/about/about.htm>
- NLM Health Services/Technology Assessment: <http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=hstat>
- PEDro: The Physiotherapy Evidence Database: <http://www.pedro.fhs.usyd.edu.au/index.html>
- Queen's University at Kingston: <http://post.queensu.ca/~bhc/gim/cpgs.html>
- Royal College of General Practitioners: <http://www.rcgp.org.uk>
- Royal College of Nursing: <http://www.rcn.org.uk/index.php>
- Royal College of Physicians: <http://www.rcplondon.ac.uk>
- Sarah Cole Hirsh Institute – Online Journal of Issues in Nursing: <http://fpb.cwru.edu/HirshInstitute>
- Scottish Intercollegiate Guidelines Network: <http://www.sign.ac.uk>
- Society of Obstetricians and Gynecologists of Canada Clinical Practice Guidelines: http://www.sogc.medical.org/sogcnet/index_e.shtml
- The Qualitative Report: <http://www.nova.edu/ssss/OR>
- Trent Research Information Access Gateway: <http://www.shef.ac.uk/scharr/triage/TRIAGEindex.htm>
- TRIP Database: <http://www.tripdatabase.com>
- U.S. Preventive Service Task Force: <http://www.ahrq.gov/clinic/uspstfix.htm>
- University of California, San Francisco: <http://medicine.ucsf.edu/resources/guidelines/index.html>
- University of Laval – Directory of Clinical Information Websites: <http://132.203.128.28/medecine/>

Search Engine Web Search

A web site search for existing practice guidelines on stroke assessment was conducted via the search engine “Google”, using the search terms identified above. One individual conducted this search, noting the results of the search term results, the web sites reviewed, date and a summary of the results. The search results were further critiqued by a second individual who identified guidelines and literature not previously retrieved.

Hand Search/Panel Contributions

Additionally, panel members were asked to review personal archives to identify guidelines not previously found through the above search strategy. Results of this strategy revealed no additional clinical practice guidelines.

Appendix B: Glossary of Terms

Activities of Daily Living: Activities of daily living include those tasks that a person regularly does to prepare for, or participate in, his or her social and work roles. It includes mobility which refers to being able to turn over in bed, come to a sitting position and transfer from place to place, feeding, grooming, dressing, toileting, bathing and personal hygiene.

Aphasia: Inability to speak and/or understand language.

Ataxia: Lack of coordination.

Attention: Focused and sustained attention reflects the ability to be able to ignore distractions and pay attention to only relevant information.

Dysarthria: Slurred speech.

Dysesthesia: Numbness and tingling on one side.

Dysphagia: Any anatomical and/or physiological abnormalities which interfere with the act of swallowing and prevent the ability to transport food from the mouth to the stomach.

Fecal Incontinence: Bowel incontinence is the loss of bowel control, resulting in involuntary passage of feces. This can range from an occasional leakage of stool with the passage of gas to a complete loss of control of bowel movements.

Hemiparesis: One sided leg, arm or facial weakness.

Hydrocephalus: The abnormal buildup of cerebrospinal fluid in the ventricles of the brain.

Hyperreflexia: The reaction of the autonomic (involuntary) nervous system to over-stimulation.

Hyponatremia: The abnormally low level of sodium in the blood, often associated with dehydration.

Neurogenic Bowel: Loss of normal bowel function due to damage of the nervous system.

Primary Prevention: An individually based clinical approach to disease prevention in otherwise healthy individuals with modifiable risk factors. Primary prevention is usually implemented in the primary care setting (HSFO, 2003a).

Secondary Prevention: An individually based clinical approach to reducing the risk of recurrent events in individuals who have already experienced an event, and in those who are experiencing symptoms that place them at high risk of an event. Secondary prevention strategies encompass pharmacotherapy, surgical and neuroradiological interventions, and support in making and maintaining lifestyle modifications (HSFO, 2003a).

Seizures: The clinical expression of excessive hypersynchronous discharge of neurons in the cerebral cortex.

Sexuality: Sexuality is a central aspect of being human throughout life and encompasses sex, gender identities and roles, sexual orientation, eroticism, pleasure, intimacy and reproduction. Sexuality is experienced and expressed in thoughts, fantasies, desires, beliefs, attitudes, values, behaviours, practices, roles and relationships. While sexuality can include all of these dimensions, not all of them are always experienced or expressed. Sexuality is influenced by the interaction of biological, psychological, social, economic, political, cultural, ethical, legal, historical and religious and spiritual factors (WHO, 2002).

Tandem Gait: The tandem gait test includes having the client walk a straight line while placing the heel of the front foot against the toe of the rear foot.

Urinary Incontinence: The involuntary loss of urine that is sufficient to be a problem, and may present as any of the following types: transient, urge, stress, mixed, functional, overflow and total (RNAO, 2005d).

Urinary Retention: The inability to void voluntarily despite a distended bladder.

Vertigo: The illusion of movement; a sensation as if the external world were revolving around an individual (objective vertigo) or as if the individual were revolving in space (subjective vertigo).



Appendix C: Neurological Assessment Tools

The following tools, the Canadian Neurological Scale (CNS), the National Institutes of Health Stroke Scale (NIHSS) and the Glasgow Coma Scale (GCS) are provided as examples of validated tools that can be used by nurses for assessing neurological status.



Canadian Neurological Scale (CNS)

Reproduced with permission. The Internet Stroke Center. Stroke Scales and Clinical Assessment Tools. (Retrieved Feb 7, 2004).
 [Online] Available: <http://www.strokecenter.org/trials/scales/canadian.pdf>

Mentation

		Score
Level of Consciousness	Alert	3.0
	Drowsy	1.5
Orientation	Oriented	1.0
	Disoriented/NA	0.0
Speech	Normal	1.0
	Expressive Deficit	0.5
	Receptive Deficit	0.0
TOTAL:		<input type="text"/>

Section A 1

No Comprehension Deficit

Motor Function	Weakness	Score
Face	None	0.5
	Present	0.0
Arm: Proximal	None	1.5
	Mild	1.0
	Significant	0.5
	Total	0.0
Arm: Distal	None	1.5
	Mild	1.0
	Significant	0.5
	Total	0.0
Leg: Proximal	None	1.5
	Mild	1.0
	Significant	0.5
	Total	0.0
Leg: Distal	None	1.5
	Mild	1.0
	Significant	0.5
	Total	0.0
TOTAL:		<input type="text"/>

Section A 2

Comprehensive Deficit

Motor Function	Weakness	Score
Face	Symmetrical	0.5
	Asymmetrical	0.0
Arms	Equal	1.5
	Unequal	0.0
Legs	Equal	1.5
	Unequal	0.0
TOTAL:		<input type="text"/>

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National Institutes of Health Stroke Scale (NIHSS)

Reproduced with permission. The Internet Stroke Center. Stroke Scales and Clinical Assessment Tools. (Retrieved Feb 7, 2004). [Online] Available: <http://www.strokecenter.org/trials/scales/nihss.pdf>

- Interval: 1 () Baseline
 2 () 2 hours post treatment
 3 () 4 hours post onset of symptoms +/- 20 minutes
 4 () 7-10 days
 5 () 3 months
 6 () Other _____

- Time: 1 () am
 2 () pm

Administer stroke scale items in the order listed. Record performance in each category after each subscale exam. Do not go back and change scores. Follow directions provided for each exam technique. Scores should reflect what the patient does, not what the clinician thinks the patient can do. The clinician should record answers while administering the exam and work quickly. Except where indicated, the patient should not be coached (i.e., repeated requests to patient to make a special effort).

Instructions	Scale Definition	Score
<p>1a. Level of Consciousness (LOC): The investigator must choose a response, even if a full evaluation is prevented by such obstacles as an endotracheal tube, language barrier, orotracheal trauma/bandages. A 3 is scored only if the patient makes no movement (other than reflexive posturing) in response to noxious stimulation.</p>	<p>0 = Alert; keenly responsive. 1 = Not alert, but arousable by minor stimulation to obey, answer, or respond. 2 = Not alert, requires repeated stimulation to attend, or is obtunded and requires strong or painful stimulation to make movements (not stereotyped). 3 = Responds only with reflex motor or autonomic effects or totally unresponsive, flaccid, areflexic.</p>	<input type="text"/>
<p>1b. LOC Questions: The patient is asked the month and his/her age. The answer must be correct – there is no partial credit for being close. Aphasic and stuporous patients who do not comprehend the questions will score 2. Patients unable to speak because of endotracheal intubation, orotracheal trauma, severe dysarthria from any cause, language barrier or any other problem not secondary to aphasia are given a 1. It is important that only the initial answer be graded and that the examiner not “help” the patient with verbal or non-verbal cues.</p>	<p>0 = Answers both questions correctly. 1 = Answers one question correctly. 2 = Answers neither question correctly.</p>	<input type="text"/>

Instructions	Scale Definition	Score
<p>1c. LOC Commands: The patient is asked to open and close the eyes and then to grip and release the non-paretic hand. Substitute another one step command if the hands cannot be used. Credit is given if an unequivocal attempt is made but not completed due to weakness. If the patient does not respond to command, the task should be demonstrated to them (pantomime) and score the result (i.e., follows none, one or two commands). Patients with trauma, amputation, or other physical impediments should be given suitable one-step commands. Only the first attempt is scored.</p>	<p>0 = Performs both tasks correctly 1 = Performs one task correctly 2 = Performs neither task correctly</p>	<input type="text"/>
<p>2. Best Gaze: Only horizontal eye movements will be tested. Voluntary or reflexive (oculocephalic) eye movements will be scored but caloric testing is not done. If the patient has a conjugate deviation of the eyes that can be overcome by voluntary or reflexive activity, the score will be 1. If a patient has an isolated peripheral nerve palsy (Cranial Nerve III, IV or VI) score a 1. Gaze is testable in all aphasic patients. Patients with ocular trauma, bandages, pre-existing blindness or other disorder of visual acuity or fields should be tested with reflexive movements and a choice made by the investigator. Establishing eye contact and then moving about the patient from side to side will occasionally clarify the presence of a partial gaze palsy.</p>	<p>0 = Normal 1 = Partial gaze palsy. This score is given when gaze is abnormal in one or both eyes, but where forced deviation or total gaze paresis are not present 2 = Forced deviation, or total gaze paresis not overcome by the oculocephalic maneuver</p>	<input type="text"/>
<p>3. Visual: Visual fields (upper and lower quadrants) are tested by confrontation, using finger counting or visual threat as appropriate. Patient must be encouraged, but if they look at the side of the moving fingers appropriately, this can be scored as normal. If there is unilateral blindness or enucleation, visual fields in the remaining eye are scored. Score 1 only if a clear-cut asymmetry, including quadrantanopia is found. If patient is blind from any cause score 3. Double simultaneous stimulation is performed at this point. If there is extinction patient receives a 1 and the results are used to answer question 11.</p>	<p>0 = No visual loss 1 = Partial hemianopia 2 = Complete hemianopia 3 = Bilateral hemianopia (blind including cortical blindness)</p>	<input type="text"/>
<p>4. Facial Palsy: Ask, or use pantomime to encourage the patient to show teeth or raise eyebrows and close eyes. Score symmetry of grimace in response to noxious stimuli in the poorly responsive or non-comprehending patient. If facial trauma/bandages, orotracheal tube, tape or other physical barrier obscures the face, these should be removed to the extent possible.</p>	<p>0 = Normal symmetrical movement 1 = Minor paralysis (flattened nasolabial fold, asymmetry on smiling) 2 = Partial paralysis (total or near total paralysis of lower face) 3 = Complete paralysis of one or both sides (absence of facial movement in the upper and lower face)</p>	<input type="text"/>

Stroke Assessment Across the Continuum of Care

Instructions	Scale Definition	Score
<p>5 & 6. Motor Arm and Leg: The limb is placed in the appropriate position: extend the arms (palms down) 90 degrees (if sitting) or 45 degrees (if supine) and the leg 30 degrees (always tested supine). Drift is scored if the arm falls before 10 seconds or the leg before 5 seconds. The aphasic patient is encouraged using urgency in the voice and pantomime but not noxious stimulation. Each limb is tested in turn, beginning with the non-paretic arm. Only in the case of amputation or joint fusion at the shoulder or hip may the score be “9” and the examiner must clearly write the explanation for scoring as a “9”.</p>	<p>0 = No drift, limb holds 90 (or 45) degrees for full 10 seconds 1 = Drift, limb holds 90 (or 45) degrees, but drifts down before full 10 seconds; does not hit bed or other support 2 = Some effort against gravity, limb cannot get to or maintain (if cued) 90 (or 45) degrees, drifts down to bed, but has some effort against gravity 3 = No effort against gravity, limb falls 4 = No movement 9 = Amputation, joint fusion explain: _____</p> <p>5a. Left Arm <input type="text"/></p> <p>5b. Right Arm <input type="text"/></p> <p>0 = No drift, leg holds 30 degrees position for full 5 seconds 1 = Drift, leg falls by the end of the 5 second period but does not hit bed 2 = Some effort against gravity; leg falls to bed by 5 seconds, but has some effort against gravity 3 = No effort against gravity, leg falls to bed immediately 4 = No movement 9 = Amputation, joint fusion explain: _____</p> <p>6a. Left Leg <input type="text"/></p> <p>6b. Right Leg <input type="text"/></p>	
<p>7. Limb Ataxia: This item is aimed at finding evidence of a unilateral cerebellar lesion. Test with eyes open. In case of visual defect, insure testing is done in intact visual field. The finger-nose-finger and heel-shin tests are performed on both sides, and ataxia is scored only if present out of proportion to weakness. Ataxia is absent in the patient who cannot understand or is paralyzed. Only in the case of amputation or joint fusion may the item be scored “9”, and the examiner must clearly write the explanation for not scoring. In case of blindness test by touching nose from extended arm position.</p>	<p>0 = Absent 1 = Present in one limb 2 = Present in two limbs. If present, is ataxia in: Right arm 1 = Yes 2 = No 9 = Amputation or joint fusion, explain: _____</p> <p>Left arm 1 = Yes 2 = No 9 = Amputation or joint fusion, explain : _____</p> <p>Right leg 1 = Yes 2 = No 9 = Amputation or joint fusion, explain: _____</p> <p>Left leg 1 = Yes 2 = No 9 = Amputation or joint fusion, explain: _____</p>	<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>

Instructions	Scale Definition	Score
<p>8. Sensory: Sensation or grimace to pin prick when tested, or withdrawal from noxious stimulus in the obtunded or aphasic patient. Only sensory loss attributed to stroke is scored as abnormal and the examiner should test as many body areas [arms (not hands), legs, trunk, face] as needed to accurately check for hemisensory loss. A score of 2, “severe or total,” should only be given when a severe or total loss of sensation can be clearly demonstrated. Stuporous and aphasic patients will therefore probably score 1 or 0. The patient with brain stem stroke who has bilateral loss of sensation is scored 2. If the patient does not respond and is quadriplegic score 2. Patients in coma (item 1a=3) are arbitrarily given a 2 on this item.</p>	<p>0 = Normal; no sensory loss. 1 = Mild to moderate sensory loss; patient feels pinprick is less sharp or is dull on the affected side; or there is a loss of superficial pain with pinprick but patient is aware he/she is being touched. 2 = Severe to total sensory loss; patient is not aware of being touched in the face, arm and leg.</p>	<input type="text"/>
<p>9. Best Language: A great deal of information about comprehension will be obtained during the preceding sections of the examination. The patient is asked to describe what is happening in the attached picture, to name the items on the attached naming sheet, and to read from the attached list of sentences (see page 95). Comprehension is judged from responses here as well as to all of the commands in the preceding general neurological exam. If visual loss interferes with the tests, ask the patient to identify objects placed in the hand, repeat, and produce speech. The intubated patient should be asked to write. The patient in coma (question 1a=3) will arbitrarily score 3 on this item. The examiner must choose a score in the patient with stupor or limited cooperation but a score of 3 should be used only if the patient is mute and follows no one step commands.</p>	<p>0 = No aphasia, normal 1 = Mild to moderate aphasia; some obvious loss of fluency or facility of comprehension, without significant limitation on ideas expressed or form of expression. Reduction of speech and/or comprehension, however, makes conversation about provided material difficult or impossible. For example in conversation about provided materials examiner can identify picture or naming card from patient’s response. 2 = Severe aphasia; all communication is through fragmentary expression; great need for inference, questioning, and guessing by the listener. Range of information that can be exchanged is limited; listener carries burden of communication. Examiner cannot identify materials provided from patient response. 3 = Mute, global aphasia; no usable speech or auditory comprehension.</p>	<input type="text"/>
<p>10. Dysarthria: If patient is thought to be normal an adequate sample of speech must be obtained by asking patient to read or repeat words from the attached list (see page 95). If the patient has severe aphasia, the clarity of articulation of spontaneous speech can be rated. Only if the patient is intubated or has other physical barrier to producing speech, may the item be scored “9”, and the examiner must clearly write an explanation for not scoring. Do not tell the patient why he/she is being tested.</p>	<p>0 = Normal 1 = Mild to moderate; patient slurs at least some words and, at worst, can be understood with some difficulty. 2 = Severe; patient’s speech is so slurred as to be unintelligible in the absence of or out of proportion to any dysphasia, or is mute/anarthric. 9 = Intubated or other physical barrier, explain: _____</p>	<input type="text"/>

Stroke Assessment Across the Continuum of Care

Instructions	Scale Definition	Score
<p>11. Extinction and Inattention (formerly Neglect): Sufficient information to identify neglect may be obtained during the prior testing. If the patient has a severe visual loss preventing visual double simultaneous stimulation, and the cutaneous stimuli are normal, the score is normal. If the patient has aphasia but does appear to attend to both sides, the score is normal. The presence of visual spatial neglect or anosognosia may also be taken as evidence of abnormality. Since the abnormality is scored only if present, the item is never untestable.</p>	<p>0 = No abnormality. 1 = Visual, tactile, auditory, spatial, or personal inattention or extinction to bilateral simultaneous stimulation in one of the sensory modalities. 2 = Profound hemi-inattention or hemi-inattention to more than one modality. Does not recognize own hand or orients to only one side of space.</p>	<input type="text"/>

TOTAL:

Person Administering Scale

(Code)



NIHSS #9: Best Language

Client is asked to describe what is happening in the picture:



Client is asked to name the items in the picture:



Client is asked to read from the list of sentences.

You know how.
Down to earth.
I got home from work.
Near the table in the dining room.
They heard him speak on the radio last night.

NIHSS #10: Dysarthria

Client is asked to read and pronounce a standard list of words:

- MAMA
- TIP-TOP
- FIFTY-FIFTY
- THANKS
- HUCKLEBERRY
- BASEBALL PLAYER
- CATERPILLAR

Stroke Assessment Across the Continuum of Care

Glasgow Coma Scale (GCS)

Reproduced with permission. The Internet Stroke Center. Stroke Scales and Clinical Assessment Tools. (Retrieved Feb 7, 2004). [Online] Available: http://www.strokecenter.org/trials/scales/glasgow_coma.pdf

Activity		Score
EYE OPENING		
None	1 – Even to supra-orbital pressure	<input type="text"/>
To pain	2 – Pain from sternum/limb/supra-orbital pressure	
To speech	3 – Non-specific response, not necessarily to command	
Spontaneous	4 – Eyes open, not necessarily aware	
MOTOR RESPONSE		
None	1 – To any pain; limbs remain flaccid	<input type="text"/>
Extension	2 – Shoulder adducted and shoulder and forearm internally rotated	
Flexor response	3 – Withdrawal response or assumption of hemiplegic posture	
Withdrawal	4 – Arm withdraws to pain, shoulder abducts	
Localizes pain	5 – Arm attempts to remove supra-orbital/chest pressure	
Obeys commands	6 – Follows simple commands	
VERBAL RESPONSE		
None	1 – No verbalization of any type	<input type="text"/>
Incomprehensible	2 – Moans/groans, no speech	
Inappropriate	3 – Intelligible, no sustained sentences	
Confused	4 – Converses but confused, disoriented	
Oriented	5 – Converses and oriented	
TOTAL (3-15):		<input type="text"/>

Assessing Motor Strength:

Pronator Drift

Assessment of motor strength, as part of a neurological assessment, includes assessing for pronator drift. The following illustration depicts the assessment of pronator drift.



Appendix D: Braden Scale for Predicting Pressure Sore Risk

Patient's Name _____ Evaluator's Name _____

<p>SENSORY PERCEPTION ability to respond meaningfully to pressure-related discomfort</p>	<p>1. Completely Limited Unresponsive (does not moan, flinch or grasp) to painful stimuli, due to diminished level of consciousness or sedation, <i>OR</i> limited ability to feel pain over most of body.</p>	<p>2. Very Limited Responds only to painful stimuli. Cannot communicate discomfort except by moaning or restlessness, <i>OR</i> has a sensory impairment that limits the ability to feel pain or discomfort over 1/2 of body.</p>
<p>MOISTURE degree to which skin is exposed to moisture</p>	<p>1. Constantly Moist Skin is kept moist almost constantly by perspiration, urine, etc. Dampness is detected every time patient is moved or turned.</p>	<p>2. Very Moist Skin is often, but not always, moist. Linen must be changed at least once a shift.</p>
<p>ACTIVITY degree of physical activity</p>	<p>1. Bedfast Confined to bed.</p>	<p>2. Chairfast Ability to walk severely limited or non-existent. Cannot bear own weight and/or must be assisted into chair or wheelchair.</p>
<p>MOBILITY ability to change and control body position</p>	<p>1. Completely Immobile Does not make even slight changes in body or extremity position without assistance.</p>	<p>2. Very Limited Makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently.</p>
<p>NUTRITION <u>usual</u> food intake pattern</p>	<p>1. Very Poor Never eats a complete meal. Rarely eats more than 1/3 of any food offered. Eats 2 servings or less of protein (meat or dairy products) per day. Takes fluids poorly. Does not take a liquid dietary supplement <i>OR</i> is NPO and/or maintained on clear liquids or IVs for more than 5 days.</p>	<p>2. Probably Inadequate Rarely eats a complete meal and generally eats only about 1/2 of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take a dietary supplement <i>OR</i> receives less than optimum amount of liquid diet or tube feeding.</p>
<p>FRICTION AND SHEAR</p>	<p>1. Problem Requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance. Spasticity, contractures or agitation lead to almost constant friction.</p>	<p>2. Potential Problems Moves feebly or requires minimum assistance. During a move skin probably slides to some extent against sheets, chair restraints, or other devices. Maintains relatively good position in chair or bed most of the time but occasionally slides down.</p>

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Note: Individuals with a score of 18 or less are considered to be at risk of developing pressure ulcers.
 At risk – 15 to 18; Moderate Risk – 13 to 14; High Risk – 10 to 12; Very High Risk – 9 or below.

Braden, 2001

		Date of Assessment				
	<p>3. Slightly Limited Responds to verbal commands, but cannot always communicate discomfort or the need to be turned, <i>OR</i> has some sensory impairment which limits ability to feel pain or discomfort in 1 or 2 extremities.</p>	<p>4. No Impairment Responds to verbal commands. Has no sensory deficit which would limit ability to feel or voice pain or discomfort.</p>				
	<p>3. Occasionally Moist Skin is occasionally moist, requiring an extra linen change approximately once a day.</p>	<p>4. Rarely Moist Skin is usually dry, linen only requires changing at routine intervals.</p>				
	<p>3. Walks Occasionally Walks occasionally during day, but for very short distances with or without assistance. Spends majority of each shift in bed or chair.</p>	<p>4. Walks Frequently Walks outside the room at least twice a day and inside room at least every 2 hours during waking hours.</p>				
	<p>3. Slightly Limited Makes frequent though slight changes in body or extremity position independently.</p>	<p>4. No Limitation Makes major and frequent changes in position without assistance.</p>				
	<p>3. Adequate Eats over half of most meals. Eats a total of 4 servings of protein (meat or dairy products) each day. Occasionally will refuse a meal, but will usually take a supplement if offered <i>OR</i> is on a tube feeding or TPN regimen, which meets most of nutritional needs.</p>	<p>4. Excellent Eats most of every meal. Never refuses a meal. Usually eats a total of 4 or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation.</p>				
	<p>3. No Apparent Problem Moves in bed and in chair independently and has sufficient muscle strength to lift up completely during move. Maintains good position in bed or chair.</p>					
		TOTAL SCORE				

Facial Grimace & Behaviour Checklist Flow Charts

Name: _____ Active Resting Time: _____



Regular pain medication: _____ Rescue/PRN medication _____

Month: _____

Date or Time														
FACIAL SCORE														
10														
8														
6														
4														
2														
0														
PRN medication														

Facial Grimace Score: The facial grimace scale scores the level of pain (from 0-10 on the left) as assessed by the caregiver observing the facial expressions of the resident. Assessment is done once daily or more (14 days are indicated above). This assessment of the degree of discomfort should be done at the same time every day and during the same level of activity. **Note if rescue/PRN medication is given; yes (y), no (n) or dose.**

Behaviour Checklist

10 – always 8 – mostly 6 – often 4 – occasionally 2 – rarely 0 – never

Date or Time														
BEHAVIOUR														
eats poorly														
tense														
quiet														
indicates pain														
calls out														
paces														
noisy breathing														
sleeps poorly														
picks														
PRN medication														

Behaviour Checklist: Behaviour changes can be used to assess pain or distress, and thereby evaluate the efficacy of interventions. At the top of the scoring graph, when the specific behaviour has been observed, it can be rated from 10 (always) to 0 (never). The behaviours being rated and scored over 24 hours are listed down the left column. This chart scores 9 different behaviours over 14 days. The caregiver can expand on the checklist, i.e., rocking, screams, etc. **Note if rescue/PRN medication given. Both tools may be adapted for individual use.**

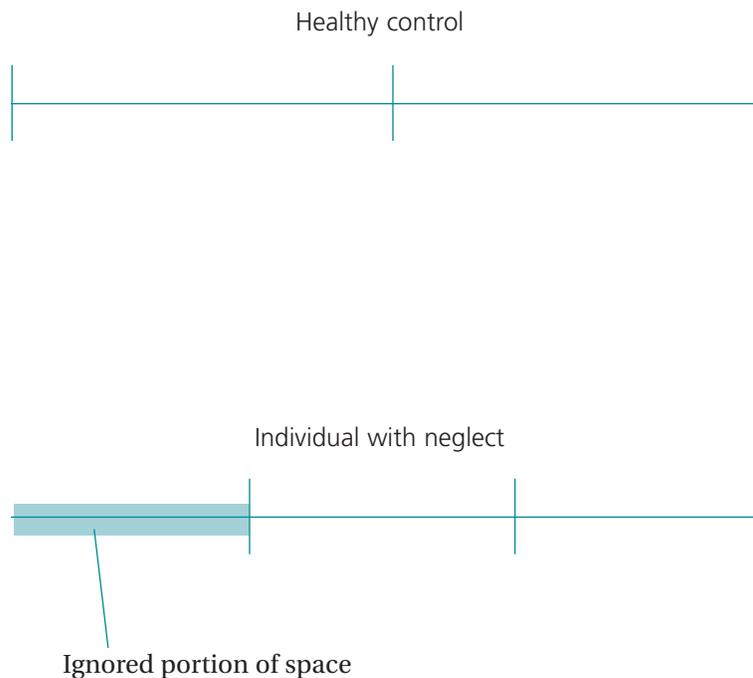
(The Facial Grimace & Behaviour Checklist are used with permission from the Palliative Care Research Team, Saint Joseph's Health Centre, Sarnia, Ontario.)

Reprinted with Permission. Brignell, A. (ed) (2000). *Guideline for developing a pain management program. A resource guide for long-term care facilities*, 3rd edition.

Appendix F: Screening for Cognition/ Perception/Language

The following tools, the Line Bisection Test and the Modified Mini-Mental State Examination (3MS) are provided as examples of validated tools that can be used by nurses for screening for cognition/perception/language.

Line Bisection Test



Appendix G: Assessing Activities of Daily Living

Reproduced with permission. The Internet Stroke Centre. Stroke Scales and Clinical Assessment Tools. (retrieved Feb 7, 2004). [Online] Available: <http://www.strokecenter.org/trials/scales/barthel.html>.

The following tools, the Barthel Index and the Functional Independence Measure (FIM)TM are provided as examples of validated tools that can be used by nurses for assessing activities of daily living.

The Barthel ADL Index: Guidelines

1. The index should be used as a record of what a client does, not as a record of what a client could do.
2. The main aim is to establish degree of independence from any help, physical or verbal, however minor and for whatever reason.
3. The need for supervision renders the client not independent.
4. A client's performance should be established using the best available evidence. Asking the client, friends/relatives and nurses are the usual sources, but direct observation and common sense are also important. However direct testing is not needed.
5. Usually the client's performance over the preceding 24-48 hours is important, but occasionally longer periods will be relevant.
6. Middle categories imply that the client supplies over 50% of the effort.
7. Use of aids to be independent is allowed.

Barthel Index

Score

Feeding

- 0 = unable
5 = needs help cutting, spreading butter, etc., or requires modified diet
10 = independent

Bathing

- 0 = dependent
5 = independent (or in shower)

Grooming

- 0 = needs help with personal care
5 = independent (face/hair/teeth/shaving, implements provided)

Dressing

- 0 = dependent
5 = needs help but can do about half unaided
10 = independent (including buttons, zips, laces, etc.)

Bowels

- 0 = incontinent (or needs to be given enemas)
5 = occasional accident
10 = continent

Bladder

- 0 = incontinent (or catheterized and unable to manage alone)
- 5 = occasional accident
- 10 = continent

Toilet Use

- 0 = dependent
- 5 = needs some help, but can do some things alone
- 10 = independent (on and off, dressing, wiping)

Transfers (bed to chair, and back)

- 0 = unable, no sitting balance
- 5 = major help (one or two people, physical), can sit
- 10 = minor help (verbal or physical)
- 15 = independent

Mobility (on level surfaces)

- 0 = immobile or < 50 yards
- 5 = wheelchair independent, including corners > 50 yards
- 10 = walks with help of one person (verbal or physical) > 50 yards
- 15 = independent (but may use any aid; for example, stick) > 50 yards

Stairs

- 0 = unable
- 5 = needs help (verbal, physical, carrying aid)
- 10 = independent

TOTAL (0 – 100):

Functional Independence Measure (FIM)[™]

The Functional Independence Measure[™] (Guide for the Uniform Data Set for Medical Rehabilitation, 1996) is a widely accepted functional assessment measure in use in the rehabilitation community. The FIM[™] is an 18-item ordinal scale, used with all diagnoses within a rehabilitation population. It is viewed as most useful for assessment of progress during inpatient rehabilitation.

The FIM[™] has become proprietary – for further information on the FIM[™], please contact:

Uniform Data System for Medical Rehabilitation

232 Parker Hall, University at Buffalo

3435 Main Street, Buffalo, NY 14214-3007

(716) 829-2076, FAX (716) 829-2080

Email fimnet@ubvms.cc.buffalo.edu or info@udsmr.org

Web site: <http://www.udsmr.org>

Appendix H: Assessment of Bowel Function

Reproduced with permission. Doughty, D. (1996). A physiologic approach to bowel training. *Journal of Wound, Ostomy and Continence Nursing*, 23(1), 49-56. Lippincott Williams & Wilkins: <http://www.lww.com>

Sex: Male ___ Female ___

Description of Problem

Describe your bowel elimination problem in your own words

Onset of problem and any related events _____

What are your treatment goals? _____

Present Management

No program ___

Use of medications: e.g., stool softeners or laxatives (specify type, amount, frequency, results)

Use of suppositories or enemas (specify type, amount, frequency, results)

Use of digital stimulation (specify frequency, time required, results)

Past Management (if different than present) and reason for changing management approach

Bowel Elimination Patterns

Usual frequency of bowel movements: Daily (approximate #) _____ QOD _____

Other (specify) _____

Usual consistency of stool: Formed ___ Soft ___ Mushy ___ Liquid ___

Variable (describe) _____

Do you ever pass stool when you don't mean to? Yes ___ No ___

If yes: Frequency of stool accidents _____

Volume of incontinent stool (large volume vs leakage vs smearing of underclothing)

Consistency of incontinent stool

Do you know when you are about to have a bowel movement? Always _____ Usually _____

Sometimes _____ Never _____

If you know you are going to have a bowel movement, can you "hold" the stool until you get to the bathroom?

Always _____ Usually _____

Sometimes _____ Never _____

Dietary and Fluid Intake

Number of glasses of fluid usually taken in each day _____

Type of fluids (milk, juices, coffee, tea, soft drinks, etc.) _____

Usual servings of fibre per day (raw fruits, vegetables, whole grains, bran) _____

Relevant Medical History

GI disorders or GI surgery _____

Pelvic or gynecologic surgery _____

Anorectal surgery or trauma _____

Spinal cord trauma or lesion (level) _____

Neurologic disease _____

Back surgery or trauma _____

Diabetes _____ Radiation therapy to pelvis _____

Urinary incontinence _____

Number of pregnancies _____ Vaginal deliveries _____ Traumatic deliveries _____

Focused Physical Assessment

Mobility/Gait _____

Ability to toilet self: Independent _____ Requires assistance (specify) _____

Abdominal palpatory findings: Soft/no palpable stool _____ Palpable stool left colon _____

Anal wink. Right: Present _____ Absent _____ Left: Present _____ Absent _____

Sphincter status at rest: Closed _____ Relaxed _____

Sphincter tone on digital exam: Normal _____ Diminished _____

Voluntary sphincter contraction: Strong _____ Diminished _____ NO discernible contraction _____

Ability to voluntarily relax sphincter/contract abdominal muscles:

Normal (sphincter relaxation, effective propulsive push) _____

Diminished/absent (no response to command or very weak push) _____

Paradoxical contraction (contracts both abdominal muscles and anal sphincter on command) _____

Stool in rectal vault: Yes _____ No _____ If yes, volume & consistency: _____

Perianal skin status: _____ Other findings: _____

Date of Assessment: _____ Assessment completed by: _____

Appendix I: Depression Assessment Scales

The following tools, the Stroke Aphasia Depression Questionnaire (SADQ-10) – Community Version, the Geriatric Depression Scale (GDS) and the Cornell Scale for Depression in Dementia, are provided as examples of validated tools that can be used by nurses for assessing depression. An additional tool, the Hospital Anxiety and Depression Scale (HADS), is available from the following source:

Zigmond, A. & Snaith, R. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatr.Scand.*, 67, 361-370.

Stroke Aphasia Depression Questionnaire (SADQ-10) – Community Version

Reproduced with permission: Sutcliffe, L. & Lincoln, N. (1998). The assessment of depression in aphasic stroke patients: The development of the Stroke Aphasic Depression Questionnaire. *Clinical Rehabilitation*, 12, 506-513.

The community SADQ-IO provides community based health care workers with a structured and reliable approach to assessing the likelihood that an individual with a speech or language impairment is suffering depressed mood.

Please indicate how often in the last week the patient has shown the following behaviours:

Does he/she have weeping spells?	Sometimes	Rarely	Never
Does he/she have restless disturbed nights?	Sometimes	Rarely	Never
Does he/she avoid eye contact when you talk to him/her?	Sometimes	Rarely	Never
Does he/she burst into tears?	Sometimes	Rarely	Never
Does he/she complain of aches and pains?	Sometimes	Rarely	Never
Does he/she get angry?	Sometimes	Rarely	Never
Does he/she refuse to participate in social activities?	Sometimes	Rarely	Never
Is he/she restless and fidgety?	Sometimes	Rarely	Never
Does he/she sit without doing anything?	Sometimes	Rarely	Never
Does he/she keep him/herself occupied during the day?	Sometimes	Rarely	Never

Geriatric Depression Scale (GDS)

Reproduced with permission. The Haworth Press Inc., 10 Alice St., Binghamton, N. Brink, T. L., YeSavage, J. A., Lumo, H. A. M., & Rose, T. L. (1982). Screening test for geriatric depression. *Clinical Gerontologist*, 1(1), 37-43.

Ask the following questions

- | | | | |
|---|--------------------------|--|--------------------------|
| Q1. Do you feel pretty worthless the way you are now? | <input type="checkbox"/> | Q9. Do you feel happy most of the time? | <input type="checkbox"/> |
| Q2. Do you often get bored? | <input type="checkbox"/> | Q10. Do you feel full of energy? | <input type="checkbox"/> |
| Q3. Do you often feel helpless? | <input type="checkbox"/> | Q11. Do you think it is wonderful to be alive now? | <input type="checkbox"/> |
| Q4. Are you basically satisfied with your life? | <input type="checkbox"/> | Q12. Do you feel that your situation is hopeless? | <input type="checkbox"/> |
| Q5. Do you prefer to stay at home rather than going out and doing new things? | <input type="checkbox"/> | Q13. Have you dropped many of your activities and interests? | <input type="checkbox"/> |
| Q6. Are you in good spirits most of the time? | <input type="checkbox"/> | Q14. Do you think that most people are better off than you are? | <input type="checkbox"/> |
| Q7. Are you afraid that something bad is going to happen to you? | <input type="checkbox"/> | Q15. Do you feel that you have more problems with your memory than most? | <input type="checkbox"/> |
| Q8. Do you feel that your life is empty? | <input type="checkbox"/> | | |

Geriatric Depression Scale Scorecard

4 or less: Indicates absence of significant depression

5-7: Indicates borderline depression

7 or more: Indicates probable depression

Is depression present?

- No:** Low GDS and no clinical signs
- Possible:** High GDS, no clinical signs
Low GDS, with clinical signs
Intermediate GDS score with or without clinical signs
Other subjective or objective indicators of depression
- Probable:** High GDS with clinical signs
- Definite Yes:** Previous history of depression with current clinical signs present
Recent medical diagnosis of depression
- Clinical Signs:** Adapted from DSM III Diagnostic Criteria For Major Depressive Disorder

Onset – Date

Course: Progression of illness **Plan:** Any treatment already initiated

Predisposing factors may include:

- | | |
|---|--|
| 1. Biological: Family history, prior episode | 2. Physical: Chronic or other medical conditions – especially those that result in pain or loss of function e.g., arthritis, CVA, CHF, etc.
Exposure to drugs e.g., hypnotics, analgesics and antihypertensives
Sensory deprivation |
| 3. Psychological: Unresolved conflicts e.g., anger or guilt.
Memory loss or dementia
Personality disorders | 4. Social: Losses of family and friends (bereavement)
Isolation
Loss of job/income |

Additional Comments: Overall impression or other related comments

Stroke Assessment Across the Continuum of Care

Cornell Scale for Depression in Dementia

Reproduced with permission of Dr. George Alexopoulos.

Client Name: _____ Date: _____

Administered at: Assessment _____ By: _____

Discharge: _____

Mood-related Signs

1. Anxiety
anxious expression, ruminations, worrying
2. Sadness
sad expression, sad voice, tearfulness
3. Lack of reactivity to pleasant events
4. Irritability
easily annoyed, short tempered

Behavioural Disturbance

5. Agitation
restlessness, handwringing, hairpulling
6. Retardation
slow movements, slow speech, slow reactions
7. Multiple physical complaints
(score 0 if GI symptoms only)
8. Loss of interest
less involved in usual activities
(score only if change occurred acutely,
e.g., less than 1 month)

Physical Signs

9. Appetite loss
eating less than usual
10. Weight loss
(score 2 if greater than 5 lbs. in 1 month)
11. Lack of energy
fatigues easily, unable to sustain activities
(score only if change occurred acutely,
e.g., less than 1 month)

Cyclic Functions

12. Diurnal variation of mood symptoms
worse in the morning
13. Difficulty falling asleep
later than usual for this client
14. Multiple awakenings during sleep
15. Early morning awakening
earlier than usual for this client

Ideational Disturbance

16. Suicide
feels life is not worth living, has suicidal
wishes, or makes suicide attempt
17. Poor self-esteem
self-blame, self-depreciation, feelings
of failure
18. Pessimism
anticipation of the worst
19. Mood-congruent delusions
delusions of poverty, illness or loss

Total:

Scoring System

Ratings should be based on symptoms and signs occurring during the week prior to interview. No score should be given if symptoms result from physical disability or illness.

0 = absent

1 = mild or intermittent

2 = severe

N/A = unable to evaluate

Appendix J: Caregiver Strain Assessment Tools

The following tools, the Caregiver Strain Index (CSI) and the Self-Related Burden (SRB), are provided as examples of validated tools that can be used by nurses for assessing caregiver strain.

Caregiver Strain Index (CSI)

Reproduced with permission. van Exel et al. (2004). Instruments for assessing the burden of informal caregiving for stroke patients in clinical practice: A comparison of CSI, CRA, SCQ and self-related burden. *Clinical Rehabilitation*, 18(2), 203-241.

Reference: Robinson, B. (1983). Validation of a caregiver strain index. *Journal of Gerontology*, 38(3), 344-348



Stroke Assessment Across the Continuum of Care

I am going to read a list of things which other people have found to be difficult when helping out after somebody comes home from the hospital. Would you tell me whether any of these apply to you? (Give examples).

	Yes	No
Sleep is disturbed (e.g., because ____ is in and out of bed or wanders around at night).	_____	_____
It is inconvenient (e.g., because helping takes so much time or it's a long drive over to help).	_____	_____
It is a physical strain (e.g., because of lifting in and out of a chair; effort or concentration is required).	_____	_____
It is confining (e.g., because helping restricts free time or cannot go visiting).	_____	_____
There have been family adjustments (e.g., because helping has disturbed routine; there has been no privacy).	_____	_____
There have been changes in personal plans (e.g., because had to turn down a job; could not go on vacation).	_____	_____
There have been other demands on my time (e.g., from other family members).	_____	_____
There have been emotional adjustments (e.g., because of severe arguments).	_____	_____
Some behaviour is upsetting (e.g., because of incontinence, _____ has trouble remembering things; or ____ accuses people of taking things).	_____	_____
It is upsetting to find that ____ has changed so much from his/her former self (e.g., because he/she is a different person than he/she used to be).	_____	_____
There have been work adjustments (e.g., because of having to take time off).	_____	_____
It is a financial strain.	_____	_____
Feeling completely overwhelmed (e.g., because of worry about _____ ; concerns about how you will manage).	_____	_____

TOTAL SCORE (count yes responses)

Note: The informal caregiver has to indicate agreement to each statement on the yes/no scale. The sum score on the CSI ranges between 0 and 13. Higher scores indicate higher burden.

Self-Rated Burden (SRB)

Reference: van Exel et al. (2004). Instruments for assessing the burden of informal caregiving for stroke patients in clinical practice: A comparison of CSI, CRA, SCQ and self-related burden. *Clinical Rehabilitation*, 18(2), 203-241.

On the scale below, “0” means that you feel that caring for or accompanying _____ at the moment is not hard at all; “100” means that you feel that caring for or accompanying _____ at the moment is much too hard. Please indicate with an “x” on the scale how burdensome you feel caring for or accompanying _____ is at the moment.



Not at all straining

Much too straining



Appendix K: Professional Education Resources

The content in the table below is reproduced with the permission of the Heart and Stroke Foundation of Ontario. For more information about the Coordinated Stroke Strategy Professional Education Resources or to obtain copies:

Telephone: 416-489-7111, ext 389

Email: csor@hsf.on.ca

Web site: www.heartandstroke.ca/profed

Continuum of Care Professional Education Resources	
Best Practice Guidelines for Stroke Care: A Resource for Implementing Optimal Stroke Care (2003)	<ul style="list-style-type: none"> ■ A compendium of current best practice guidelines for the prevention and management of stroke across the continuum of care from pre-hospital to community re-engagement. The compendium also includes care guides, sample protocols, and specific care protocols and pathways.
Best Practice Guidelines for Stroke Care Overview (2002)	<ul style="list-style-type: none"> ■ A four-page overview of the Best Practice Guidelines compendium.
Best Practice Guidelines for Stroke Care Overview (French version, 2004)	<ul style="list-style-type: none"> ■ The four-page overview of the Best Practice Guidelines compendium is also available in French.
Best Practice Guidelines Presentation Package (2004)	<ul style="list-style-type: none"> ■ A presentation package that includes PowerPoint presentations, speaker notes and handouts for each phase of the continuum.
Best Practice Guidelines Poster (2003)	<ul style="list-style-type: none"> ■ An overview of the 10 best practice guidelines in a poster format.
A Guide for Establishing a Regional Coordinated Stroke Strategy (2001)	<ul style="list-style-type: none"> ■ A “how-to” manual designed to assist new Regional Stroke Centres in organizing stroke care across a region.
Organized Stroke Care in Ontario: The Time is Now! (2003)	<ul style="list-style-type: none"> ■ Introduces the Coordinated Stroke Strategy and encourages leadership to help make organized stroke care happen.
Organized Stroke Care: Managing Change (2001)	<ul style="list-style-type: none"> ■ Provides an introduction to change management for regional and local change agents.
Starting a Self-Help Group for People Who Have Had a Stroke and for Caregivers (2003)	<ul style="list-style-type: none"> ■ A “how-to” guide providing practical information about starting a self-help group for stroke survivors and/or caregivers.
The Stroke Care Monitor	<ul style="list-style-type: none"> ■ This newsletter highlights the latest news from Ontario's Regional Stroke Centres and is published three times a year.
Prevention	
A Guide to Developing Stroke Prevention Clinics (2001)	<ul style="list-style-type: none"> ■ A step-by-step overview for implementing secondary prevention clinics.
Hypertension Guidelines: The Ups and Downs Workshop (2004)	<ul style="list-style-type: none"> ■ A full-day workshop for primary care providers and other health care providers directly involved in blood pressure monitoring, diagnosis and treatment. The workshop reflects the current best practice guidelines identified for the diagnosis and management of hypertension.
Secondary Prevention Workshop Package (2004)	<ul style="list-style-type: none"> ■ A full-day workshop designed for health care professionals directly involved in providing stroke prevention services. The package consists of a coordinator package and speaker package.
Stroke/TIA – Primary and Secondary Prevention (2001)	<ul style="list-style-type: none"> ■ Designed for family physicians participating in small group learning with the assistance of a facilitator. For more information, visit www.fmpe.org/en/programs/pbsg.html
Pre-Hospital	
Emergency Assessment and Treatment of Acute Stroke Patients Resource Manuals for Ambulance Communications Officers and Paramedics (2001)	<ul style="list-style-type: none"> ■ Resource manuals to complement the Ministry of Health's stroke training program for paramedics and ambulance communications officers.

Emergency/Acute Care	
Best Practice Admission Orders for Acute Stroke Workshop Package (2004)	<ul style="list-style-type: none"> ■ A full-day workshop designed to assist health care professionals develop or revise evidence-based admission orders for acute stroke. The package consists of a coordinator package and speaker package.
Stroke Best Practices for Nurses (2004)	<ul style="list-style-type: none"> ■ Adapted by the West GTA to introduce best practice evidence for nurses working across the continuum from acute to community care.
Canadian Neurological Scale Teaching Package (2004)	<ul style="list-style-type: none"> ■ A teaching package developed by Central South/Central West that includes a PowerPoint presentation, a teaching video and a sample policy for implementation of CNS.
A Guide to Organizing Acute Stroke Care (2001)	<ul style="list-style-type: none"> ■ Designed to assist hospitals in organizing acute stroke care as part of a regional system.
Improving Recognition and Management of Dysphagia in Acute Stroke (2002)	<ul style="list-style-type: none"> ■ Includes a vision for managing dysphagia in Ontario, guidelines based on best practice, and information on establishing procedures and policies.
Management of Acute Stroke Workshop Package and Manual (2004)	<ul style="list-style-type: none"> ■ A four-hour workshop designed to assist nurses and physicians working in emergency and acute care settings to provide optimal stroke care. The package consists of a coordinator package and speaker package. The <i>Management of Acute Stroke</i> manual has been designed to provide additional information on the main workshop topics.
Stroke – Emergency Treatment (2001)	<ul style="list-style-type: none"> ■ Designed for family physicians participating in small group learning with the assistance of a facilitator. For more information, visit www.fmpe.org/en/programs/pbsg.html
Rehabilitation	
Moving Towards a Regional Stroke Rehabilitation System (2001)	<ul style="list-style-type: none"> ■ A summary of background information to assist rehabilitation professionals in developing a system of stroke care across a region.
Practices in Stroke Rehabilitation (2002)	<ul style="list-style-type: none"> ■ A 36-hour course designed with Humber College for communication disorders assistants, registered practical nurses, occupational therapist assistants and physiotherapist assistants.
Rehabilitation Education Program for Stroke (REPS) (2002)	<ul style="list-style-type: none"> ■ A web-based program in stroke rehabilitation designed in partnership with the University of Toronto for registered nurses, occupational therapists, physiotherapists and speech-language pathologists. The program includes Internet Training Workshops, Mentor Workshops, and a mentoring program for learners. Available at http://bul.med.utoronto.ca/reps
Long-Term Care/Community	
Case Management Best Practice for Community Stroke Care Workshop (2003)	<ul style="list-style-type: none"> ■ A full-day workshop highlighting strategies and resources for case managers and educators to enhance stroke care.
Stroke Strategy Case Management: Best Practices for Community Stroke Care (2001)	<ul style="list-style-type: none"> ■ A web-based learning module for CCAC Case Managers. Available at www.bpp.oaccac.on.ca/strokestrategy.
Tips and Tools for Everyday Living: A Guide for Stroke Caregivers (2001)	<ul style="list-style-type: none"> ■ A handbook, facilitator's guide and companion video designed to assist front line caregivers in providing optimal stroke care in long-term care and community settings.
<i>Tips and Tools</i> Resource Kit	<ul style="list-style-type: none"> ■ A "how-to" of best practices and ideas for educators and facilitators interested in promoting <i>Tips and Tools</i> in community and long-term care settings. Includes teaching aids, participant exercises, and PowerPoint presentations and speaker notes.
The Toolbox: A <i>Tips and Tools</i> Information Update	<ul style="list-style-type: none"> ■ A newsletter that highlights the success of the <i>Tips and Tools</i> Outreach Project and identifies more tips for stroke care in long-term care and community care.

Stroke Assessment Across the Continuum of Care

The following resources for nurses are intended to assist in supporting stroke screening/assessment education. These are sample resources only, and are not intended to be a comprehensive listing.

- American Association of Neuroscience Nurses: www.aann.org
- American Stroke Association: www.strokeassociation.org
- American Stroke Association – Online NIH Stroke Scale Training Program: www.asatrainingcampus.org
- Aphasia Institute, The: www.aphasia.ca
- Brain Attack Coalition, The: www.stroke-site.org
- Brain Matters, The: www.thebrainmatters.org/stroke/htm
- Canadian Association of Neuroscience Nurses: www.cann.ca
- Canadian Continenence Foundation: www.continenence-fdn.ca
- Canadian Health Network: www.canadian-health-network.ca
- Canadian Stroke Network: www.canadianstrokenetwork.ca
- Caregiver Network Inc.: www.caregiver.on.ca
- Centre for Neuro Skills: www.neuroskills.com
- CT is Us: www.ctisus.com
- Dysphagiaonline: www.dysphagiaonline.com
- European Association of Urology: www.uroweb.org
- Evidence-Based Review of Stroke Rehabilitation: www.ebrsr.com
- HealthyOntario.com: www.healthyontario.com
- Heart and Stroke Foundation of Canada: www.heartandstroke.ca
- Internet Stroke Center, The: www.strokecenter.org
- National Association for Continence: www.nafc.org
- National Institute of Mental Health – Depression and Stroke: www.nimh.nih.gov/publicat/depstroke.cfm
- National Institute of Neurological Disorders and Stroke: www.ninds.nih.gov
- National Stroke Association: www.stroke.org
- Neuro-Patient Resource Centre: www.mni.mcgill.ca
- Neurosciences on the Internet: www.neuroguide.com
- Ontario Prevention Clearinghouse: www.opc.on.ca
- Stroke – TIA.org: www.stroke-tia.org
- Stroke Help: www.strokehelp.com
- Stroke Stop: www.umassmed.edu/strokestop

Clinical Practice Guidelines

- Agency for Healthcare Research and Quality (previously known as AHCPR): <http://www.ahrq.gov>
- National Guideline Clearinghouse: www.guidelines.gov
- New Zealand Guideline Network: www.nzgg.org.nz
- Registered Nurses' Association of Ontario – Nursing Best Practice Guidelines: www.rnao.org/bestpractices
- Scottish Intercollegiate Guideline Network: www.sign.ac.uk

Appendix L: Description of the Toolkit

Toolkit: Implementation of Clinical Practice Guidelines

Best practice guidelines can only be successfully implemented if there are: adequate planning, resources, organizational and administrative support as well as appropriate facilitation. RNAO, through a panel of nurses, researchers and administrators has developed the *Toolkit: Implementation of Clinical Practice Guidelines* based on available evidence, theoretical perspectives and consensus. The *Toolkit* is recommended for guiding the implementation of any clinical practice guideline in a healthcare organization.

The *Toolkit* provides step-by-step directions to individuals and groups involved in planning, coordinating, and facilitating the guideline implementation. Specifically, the *Toolkit* addresses the following key steps in implementing a guideline:

1. Identifying a well-developed, evidence-based clinical practice guideline
2. Identification, assessment and engagement of stakeholders
3. Assessment of environmental readiness for guideline implementation
4. Identifying and planning evidence-based implementation strategies
5. Planning and implementing evaluation
6. Identifying and securing required resources for implementation

Implementing guidelines in practice that result in successful practice changes and positive clinical impact is a complex undertaking. The *Toolkit* is one key resource for managing this process.

The *Toolkit* is available through the Registered Nurses' Association of Ontario. The document is available in a bound format for a nominal fee, and is also available free of charge from the RNAO website. For more information, an order form or to download the *Toolkit*, please visit the RNAO website at www.rnao.org/bestpractices.



Best Practice Guideline

STROKE ASSESSMENT ACROSS THE CONTINUUM OF CARE *Guideline Supplement*

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Supplement Integration

Similar to the original guideline publication, this document needs to be reviewed and applied, based on the specific needs of the organization or practice setting/environment, as well as the needs and wishes of the client. This supplement should be used in conjunction with the original guideline: ***Stroke Assessment Across the Continuum of Care*** (Registered Nurses' Association of Ontario [RNAO], 2005) as a tool to assist in decision-making for individualized client care, as well as ensuring that the appropriate structures and supports are in place to provide the best possible care.

Background

Nurses will continue to have an important role in assessment of clients with stroke across the continuum of care. The World Health Organization (WHO, 2011) identified that globally, non communicable diseases (heart diseases, stroke, diabetes and cancer) make up two-thirds of all deaths. In Canada, stroke is the fourth leading cause of death and the leading cause of adult disability resulting in admission to long term care facilities (Hall et al., 2011). About 300,000 Canadians are reported as living with the effects of a stroke - 1% of Canadians ages 12+ years and 7% of Canadians age 75 and older (Public Health Agency of Canada, 2009).

Nine out of ten individuals have at least one to two risk factors for cardiovascular disease (CVD) and as the number of risk factors increases, so does the risk (Heart and Stroke Foundation of Canada, 2003; Public Health Agency of Canada, 2009). Both agency reports identify as critical, the need to control risk factors such as: tobacco use; sedentary lifestyle (inactivity during leisure time); unhealthy diet (lack of fruit and vegetables); and excessive use of alcohol to reduce CVD as many other diseases (e.g. stroke) share the same risk factors.

The Public Health Agency of Canada (2009) reported the cost impact of CVD resulted in:

- the second highest total health costs in Canada for the year 2000 in all diagnostic categories,
- overall direct healthcare costs greater than \$7.6 billion, and
- indirect costs (lost economic productivity from disability & death) totaling \$14.6 billion.

Revision Process

The Registered Nurses' Association of Ontario has made a commitment to ensure that this practice guideline is based on the best available evidence. In order to meet this commitment, a monitoring and revision process has been established for each guideline.

A panel of nurses was assembled for this review, comprised of members from the original development panel as well as other recommended individuals with particular expertise in this practice area. A structured evidence review based on the scope of the original guideline and supported by three clinical questions was conducted to capture the relevant literature and guidelines published since the publication of the original guideline in 2005. The following research questions were established to guide the literature review:

1. What are the **practice recommendations** available to support screening and/ or assessment of the adult stroke survivor across the continuum of care?
 - a. Secondary Prevention
 - b. Stroke Recognition
 - c. Neurological Assessment
 - d. Complications from stroke
 - e. Pain
 - f. Dysphagia
 - g. Nutrition
 - h. Cognition/Perception/ Language
 - i. Activities of Daily Living
 - j. Bowel & Bladder Function
 - k. Depression
 - l. Sexuality
 - m. Caregiver Strain
 - n. Client readiness to learn
 - o. Documentation
2. What are the **educational recommendations** that would support nurses' use of best practices for screening and/ or

assessment of the adult stroke survivor across the continuum of care?

3. What are the **organizational and policy supports** that would support nurses' use of best practices for screening and/ or assessment of the adult stroke survivor across the continuum of care?

Initial findings regarding the impact of the current evidence, based on the original recommendations, were summarized and circulated to the review panel. The revision panel members were given a mandate to review the original guideline in light of the new evidence, specifically to ensure the validity, appropriateness and safety of the guideline recommendations as published in 2005.

Literature Review

One individual searched an established list of websites for guidelines and other relevant content. The list was compiled based on existing knowledge of evidence-based practice websites and recommendations from the literature.

Members of the panel critically appraised 19 national and international guidelines, published since January 2004, using the "Appraisal of Guidelines for Research & Evaluation II" instrument (Brouwers, et al., 2010). From this quality appraisal, the following 13 guidelines were identified to inform the review processes:

- Adams et al. (2007). *Guidelines for the early management of adults with ischemic stroke: A guideline from the American Heart Association/American Stroke Association Stroke Council, Clinical Cardiology Council, Cardiovascular Radiology and Intervention Council, and the Atherosclerotic Peripheral Vascular*

Disease and Quality of Care Outcomes in Research Interdisciplinary Working Groups. Circulation, May, 115, e478-e534.

- Furie, et al. (2011). *Guidelines for the prevention of stroke in patients with stroke or transient ischemic attack: A guideline for healthcare professionals from the American Heart Association/ American Stroke Association. Stroke, January, 42, 227-276.*
- Goldstein et al. (2011). *Guidelines for the primary prevention of stroke: A guideline for healthcare professionals from the American Heart Association/American Stroke Association. Stroke, February, 42, 517-584.*
- Institute for Clinical Systems Improvement (ICSI). (2010). *Diagnosis and treatment of ischemic stroke.* Bloomington (MN): Institute for Clinical Systems Improvement (ICSI), June, pg. 1-66.
- Lindsay et al. (2010). *Canadian best practice recommendations for stroke care (Update 2010). On behalf of the Canadian Stroke Strategy best practices and standards writing group, Ottawa, Ontario Canada: Canadian Stroke Network.*
- Miller et al. (2010). *Comprehensive overview of nursing and interdisciplinary rehabilitation care of the stroke patient: A scientific statement from the American Heart Association. Stroke, October, 41, 2402-2448.*
- Morgenstern et al. (2010). *Guidelines for the management of spontaneous intracerebral hemorrhage: A guideline for healthcare professionals from the American Heart Association/ American Stroke Association. Stroke, 41, 2108-2129.*

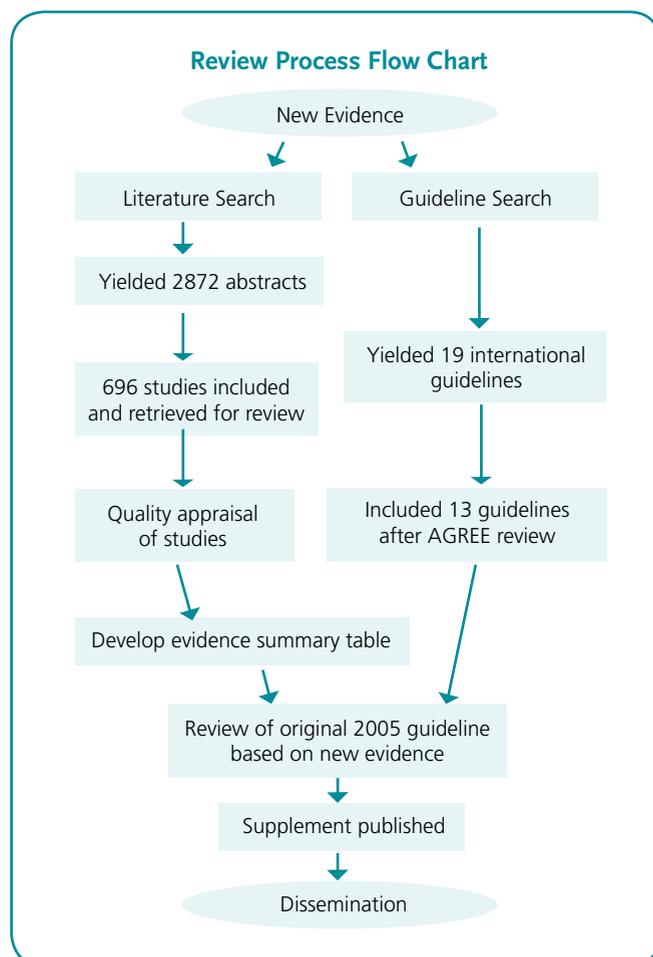
- National Collaborating Centre for Chronic Conditions. (2008). *Stroke: Diagnosis and initial management of acute stroke and transient ischaemic attack (TIA)*. National Institute for Health and Clinical Excellence (NICE).
- National Stroke Foundation (NSF). (2010). *Clinical guidelines for stroke management 2010*. Melbourne, Australia.
- Scottish Intercollegiate Guidelines Network (SIGN). (2010). *Management of patients with stroke: Rehabilitation, prevention and management of complications, and discharge planning. A national clinical guideline*. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network (SIGN); June, pg.1-101.
- Stroke Foundation of New Zealand. (2008). *New Zealand guideline: For the assessment and management of people with recent transient ischaemic attack (TIA)*. Stroke Foundation of New Zealand Incorporated, 1-37.
- Summers et al., on behalf of the American Heart Association Council on Cardiovascular Nursing and the Stroke Council. (2009). *Comprehensive overview of nursing and interdisciplinary care of the acute ischemic stroke patient: A scientific statement from the American Heart Association*. Stroke, August, 40, 2911 - 2944.
- The European Stroke Organization (ESO) Executive Committee and the ESO Writing Committee. (2008). *Guidelines for management of ischaemic stroke and transient ischaemic attack, 2008*. Cerebrovascular Disease, 25, 457-507.

was conducted with guidance from the Panel Leader. A search of electronic databases, (Medline, CINAHL and EMBASE) was conducted by a health sciences librarian. A Research Assistant (Masters prepared nurse) completed the inclusion/exclusion review, quality appraisal and data extraction of the retrieved studies, and prepared a summary of the literature findings. The comprehensive data tables and reference list were provided to all panel members.

Review Findings

In December, 2010, the panel was convened to achieve consensus on the

need to revise the existing set of recommendations. A review of the most recent literature and relevant guidelines published since January 2004 does not support dramatic changes to the recommendations, but rather suggests some refinements and stronger evidence for the approach. A summary of the review process is provided in the Review/Revision Process flow chart.



Concurrent with the review of existing guidelines, a search for recent literature relevant to the scope of the guideline

Summary of Evidence

-  unchanged
-  changed
-  additional information
-  new recommendation

The following content reflects the changes made to the original 2005 publication of the guideline: *Stroke Assessment Across the Continuum of Care*.

Changes to original guideline are summarized below **in bold**:

- **Changes have been made to the following terminology:**
 - Multidisciplinary/Interdisciplinary **changed to Interprofessional**,
 - Patient/Resident/Client **changed to Client**.
- Recommendations: **3.1, 4.0, 4.1, 4.2, 8.0, 9.0, 9.1, 10.0, 10.1, 11.0, 12.0, 13.0, 14.0, 15.0, 15.1, 16.0, 16.1, 17.0, 18.0** from the 2005 guideline has been **revised for numbering order**.
 - The following group of recommendations **has been combined into one recommendation**:
 - **4.0, 4.1 & 4.2**
- **A NEW recommendation has been added** to reflect the importance of knowing the client/family/SDM known wishes for care planning as follows:

Recommendation 4.1: Advanced Care Planning (NEW)

Nurses in collaboration with the interprofessional team will assess and support clients (family/SDM) to make informed decisions that are consistent with their beliefs, values and preferences to ensure client wishes are known and incorporated into the plan of care (includes advanced, palliative and end of life care planning).
- **Recommendations: 2.0, 3.0, 4.0, 5.0, 6.1, 8.0, 9.0, 11.0, 16.0** from the 2005 guideline **have been changed for content and wording**.

Practice Recommendations

<p>Secondary Prevention</p> <p>1.0 Nurses in all practice settings should screen clients for risk factors related to stroke in order to facilitate appropriate secondary prevention. Clients with identified risk factors should be referred to trained healthcare professionals for further management.</p> <p style="text-align: right;">(Level of Evidence = IV)</p>	
<p><i>The discussion of evidence for this recommendation found on page 27-28 of the original guideline has been revised to reflect the following additional literature support:</i></p> <p>Discussion of Evidence</p> <p>The main focus of care remains on clarifying the cause of stroke, preventing complications of stroke while preparing the client/family for long-term secondary prevention modalities and discharge home (Summers et al., 2009).</p> <p>Modifiable and non-modifiable risk factors for stroke continue to be supported in the current literature (Genest et al., 2009; Goldstein et al., 2011; Heart & Stroke Foundation of Ontario, 2011; Hinkle, Smith, & Revere, 2006; Hinkle, Smith, & Revere, 2008; Koenig et al., 2007; Lindsay et al., Update 2010; Seo & Oh, 2009). Recent research indicates drug and alcohol abuse (Hinkle et al.; Johnson-Greene, McCaul, & Roger, 2009) and obstructive sleep apnea (Chan, Coutts, Hanly, 2010; Roffe et al., 2010; Tosun, Kokturk, Karata, Ciftci, & Sepici, 2008) as modifiable not probable risk factors.</p> <p>Use of oral contraceptives continues to be controversial and Goldstein et al. (2011) suggests that in primary prevention use of hormone therapy (oral contraceptives) as possibly harmful in women with risk factors such as smoking and prior thromboembolic events. Goldstein et al. does not support post menopause hormone replacement therapy in postmenopausal women for primary prevention of stroke. The following chart (RNAO, 2005 pg. 27) has been modified in bold to reflect current literature as follows:</p>	

Modifiable	Non- Modifiable	Probable
<ul style="list-style-type: none"> • Blood & Coagulation disorders • Diabetes Mellitus • Drug and Alcohol Abuse • Heart disease (e.g. Atrial Fibrillation, Coronary Artery Disease, MI, valvular disease) • High blood cholesterol (hyperlipidemia) • *High blood pressure (hypertension) • Hormone therapy: <ul style="list-style-type: none"> - Oral contraceptive use - Post menopause hormone replacement therapy • Obesity: <ul style="list-style-type: none"> - Healthy waist circumference: Men - <i>Europid:</i> <ul style="list-style-type: none"> < 102 cm (40") MEN - <i>Chinese or South Asian:</i> <ul style="list-style-type: none"> < 90 cm (35") Women - <i>Europid:</i> <ul style="list-style-type: none"> <88 cm (35") Women - <i>Chinese or South Asian:</i> <ul style="list-style-type: none"> 80 cm (32") <p>BMI: Body weight greater than ideal range (which is 18.5 to 24.9 kg/m²)</p> <ul style="list-style-type: none"> • Obstructive Sleep Apnea (OBS) • Physical inactivity • Sedentary lifestyle • Smoking • Stress • Vascular Disease, Carotid Stenosis <p>*This is number one risk factor for Stroke</p>	<ul style="list-style-type: none"> • Age • Ethnicity: Canadians of First Nations, African or South Asian descent) • Family History • Gender • Heredity • Previous Stroke • Previous TIA 	<ul style="list-style-type: none"> • Congenital cardiac anomalies • Elevated homocysteine levels • Inflammation & Infection • Metabolic Syndrome • Migraine headache • Sympathomimetic agents

<p>Recognition of risk factors in current studies has been identified as challenging. Current literature identify women as less likely to have history of heart disease or smoking than men (Gargano, Wehner, & Reeves, 2009; Hinkle et al., 2006; Hochner, Celnikier, Manor, Garbi & Chajek-Shaul, 2005). Furthermore, females were older and more likely to be long term care residents, non-ambulatory prior to stroke and have higher rates of diabetes, hypertension and hypercholesterolemia (Gargano et al.; Hochner et al.). Studies reported men were more likely to have a history of hypertension, heart disease and to smoke, drink and use illicit drugs (Hinkle et al.). Emerging evidence (Chan, Coutts, & Hanley, 2010; Roffe et al., 2010) highlights the possibility that clients who experience TIA and minor stroke might have a high prevalence of obstructive sleep apnea (OSA) and associated hypoxia. Summers et al. (2009) identify nurses play an important role in secondary prevention for client and family education on stroke, assessment and identification of risk factors and describing secondary prevention intervention measures that include education, lifestyle modification and programs to help clients with blood pressure, sodium intake reductions and smoking cessation.</p>	
<p>Additional Literature Support Miller et al. (2010) NSF (2010) SIGN (2010)</p> <p>Websites Canadian Hypertension Education Program (CHEP) Recommendations (2011). Available at: http://hypertension.ca/chep/recommendations-2011/ Health Canada. Sodium Reduction Strategy. Available at: http://www.hc-sc.gc.ca/fn-an/nutrition/sodium/strateg/index-eng.php Heart and Stroke Foundation of Ontario. (2011):</p> <ul style="list-style-type: none"> • Atrial Fibrillation – The Heart of the Matter (2010). Available at: http://www.heartandstroke.on.ca/site/c.pv131eNWjwE/b.5052981/k.2CA6/Heart_Disease__Atrial_fibrillation.htm • Excessive Alcohol Consumption. Available at: http://www.heartandstroke.com/site/c.iklQLcMWjtE/b.3484033/k.380A/Excessive_alcohol_consumption.htm • Prevention, Risk Factors, Living With Stroke, Warning Signs and Test and Treatment. Available at: http://www.heartandstroke.on.ca/site/c.pv131eNWjwE/b.3581685/k.CE49/Stroke.htm?src=home 	+
<p>Stroke Recognition</p> <p>2.0 Nurses in all practice settings should recognize the sudden and new onset of the signs and symptoms of stroke as a medical emergency to expedite access to time dependent stroke therapy, as “<i>time is brain</i>”.</p> <p style="text-align: right;">(Level of Evidence = IV)</p>	
<p><i>The discussion of evidence for this recommendation found on page 28-29 of the original guideline has been revised to reflect the following additional literature support:</i></p> <p>Discussion of Evidence</p> <p>Current literature (Kitko & Hupcey, 2008; Mandelzweig, Goldbourt, Boyko, & Tanne, 2006; Pandian et al., 2005; Stead et al., 2008; Summers et al., 2009) continues to identify the need to increase the public’s awareness of the warning signs, symptoms and the risk factors for stroke. Awareness campaigns should emphasize that stroke is preventable and treatable and what actions the public should take. Nurses play a key role in educating the public in the: 1) warning signs and symptoms for stroke and if any individual has one or more of these signs to dial their local emergency number; 2) stroke risk factors and 3) treatments available for stroke (Kitko & Hupcey; Summers et al.).</p>	+

<p>The Heart and Stroke Foundation of Ontario (2011) public messaging identifies stroke as being treatable but it is important for the public to recall and respond to the following five warning signs:</p> <ul style="list-style-type: none"> • Weakness - Sudden loss of strength or sudden numbness in the face, arm or leg, even if temporary. • Trouble speaking - Sudden difficulty speaking or understanding or sudden confusion, even if temporary. • Vision problems - Sudden trouble with vision, even if temporary. • Headache - Sudden severe and unusual headache. • Dizziness - Sudden loss of balance, especially with any of the above signs. <p>Current literature indicates that the key for any public messaging program is the ease of recall of risk factors, warning signs and symptoms of stroke and the actions to take to get immediate help to reduce delays in assessment and treatment (Kleindorfer et al., 2007; Koenig et al., 2007; Lindsay et al., Update 2010; Mandelzweig et al., 2006; Pandian et al., 2005; Stead et al., 2008; Summers et al., 2009). Mandelzweig identified that client and family's perceptual, social and behavioural factor differences for symptom awareness, demographic and clinical variables resulted in response delays in acute ischemic stroke treatment. Accurate identification of stroke symptoms remains a critical aspect in the early treatment of stroke and the nurse plays a key role in education (Summers et al.) of client/family or caregivers (Koenig et al.) to help enhance knowledge and recognition of stroke symptoms.</p>	
<p>Additional Literature Support Morgenstern et al. (2010) NSF (2010) Miller et al. (2010)</p>	+
<p>Neurological Assessment</p> <p>3.0 Nurses in all practice settings should conduct a neurological assessment on admission using a validated tool (such as, the Canadian Neurological Scale, National Institutes of Health Stroke Scale or Glasgow Coma Scale) and continue to monitor the client's neurological status on an ongoing basis for any changes in:</p> <ul style="list-style-type: none"> • Level of consciousness; • Orientation; • Motor (strength, pronator drift, balance and coordination); • Pupils; • Speech/Language; • Vital signs (TPR, BP, SpO2); and • Blood glucose. <p style="text-align: right;">(Level of Evidence = IV)</p>	

The discussion of evidence for this recommendation found on page 29-33 of the original guideline has been revised to reflect the following additional literature support:

Discussion of Evidence

Current literature stresses the importance of incorporating into daily practice routine standard assessment in the acute care phase post stroke (Menon-Nair, Korner-Bitensky, Wood-Dauphinee, & Robertson, 2006). A study by Ohshima, Murashima, & Takahashi (2004) identified the need for care to be provided based on an assessment of the client's cognitive – physical function and spatio - temporal recognition of an action. The Canadian Neurological Scale (CNS) and the National Institutes of Health Stroke Scale (NIHSS) (Adams et al., 2007; ICSI, 2010; Lindsay et al., Update 2010; SIGN, 2010; Summers et al., 2009) continue to be seen as valid and reliable tools for stroke severity and functional assessment over time post stroke.

Nurses should have an awareness of tested validity and weakness of any tool used in neurological assessment. The NIHSS is a 15 item scale that tests for level of consciousness, gaze, visual fields, facial palsy, motor arm and leg ataxia, sensory aphasia, dysarthria and extinction and has been validated for use in clients with ischemic stroke and intracerebral hemorrhage (Lindsay et al., Update 2010; NSF, 2010). The NIHSS score has also been shown in studies to provide information on the client's short-term mortality risk and is a strong predictor of mortality (Lindsay et al.; NSF).

The CNS assesses mentation, motor functions of arm and legs and speech and was developed to provide an assessment tool to evaluate the alert or drowsy and aphasic stroke clients (Lindsay et al., Update 2010). The CNS has been found to be a significant predictor of death, morbidity, and recovery of ADL and low initial scores in clients has been shown to be a predictor of poor client outcomes within 6 months (Lindsay et al.).

The Glasgow Coma Scale (GCS) is not a stroke specific neurological assessment tool. It is not sensitive enough to detect cognitive and/or communication deficits but it does assesses the level of consciousness. The GCS is appropriate for clients with ischemic or hemorrhagic strokes who have reduced or fluctuating level of consciousness and are stuporous or comatose. The GCS can identify neurological deficits not frequently found in acute stroke such as the failure to open eyes, decerebration and decortication (Lindsay et al., 2010; NSF, 2010). Nurses should be aware that scores from any tool used, help to assess and quantify the degree of neurological deficit and should facilitate communication between interprofessional team members to help plan client appropriate interventions and consider possible complications that may arise (Adams et al., 2007).

Vital Signs

An important aim of nursing care post stroke is to decrease the clients' mortality and disability (Seo & Oh, 2009). Monitoring physiological parameters (blood pressure [BP], respiratory rate [RR], heart rate [HR], PaO₂, PaCO₂ & temperature) is important to significantly reduce the risk of secondary brain injury and improve outcomes (Lindsay et al., Update 2010; Seo & Oh). There is an association between hypertension within the first few hours of stroke and possibly doubling the risk of subsequent death or dependency for clients with intracerebral hemorrhage. Ongoing assessment and monitoring of BP by nurses is important for the first 24 hours to detect a change in the client's condition, which can occur with hematoma development and expansion (Morgenstern et al., 2010).



<p>Monitoring the BP to ensure it remains within ordered treatment parameters and avoiding any severe hypertension is very important in clients with aneurysmal subarachnoid hemorrhage (SAH) that have not had the aneurysm surgically secured (clipped) to avoid recurrent hemorrhage (Bederson et al., 2009).</p> <p>Hypoxia</p> <p>Nurses need to assess clients at risk for conditions and situations that might lead to hypoxia (Lindsay et al., Update 2010). Nurses should have an awareness and follow up with the need for further investigations of any conditions or situations that might cause hypoxia such as positioning (lying on the left side regardless of affected side or slumped in a chair [SIGN, 2010]); aspiration; altered level of consciousness (LOC); oropharyngeal dysphagia (Adams et al., 2007; Masiero, Pierobon, Previato, & Gomiero, 2008) and possible nocturnal hypoxia in conditions such as OSA (Chan et al.; Roffe et al.) to enable further assessment and initiation of client appropriate treatment.</p> <p>This guideline review cannot publish all assessment tools available to clinicians however the Stroke Engine website categorizes information by topic on the recent research on stroke to support knowledge translation for clinicians. StrokEngine-Assess has a special link for assessment tools by domain (e.g. ADL, cognition, communication or visual function).</p>	
<p>Additional Literature Support ESO (2008)</p> <p>Websites Stroke Engine. Available at: http://strokengine.ca/?page=about StrokEngine-Assess. Available at: http://www.medicine.mcgill.ca/strokengine-assess/assessmenttool-domains-en.html</p>	+
<p>Cognition/Perception/Language</p> <p>3.1 Nurses in all practice settings should screen clients within 48 hours of the stroke client becoming awake and alert, using validated tools (such as, Montreal Cognitive Assessment [MoCA®], Modified Mini-Mental Status Examination, Line Bisection Test or Frenchay Aphasia Screening Test) for alterations in cognitive, perceptual and language function including:</p> <ul style="list-style-type: none"> • Abstraction; • Arousal, alertness and orientation; • Attention; • Apraxia; • Language (comprehensive and expressive deficits); • Memory (immediate and delayed recall); • Spatial orientation, Unilateral Spatial Neglect (formally Extinction) & Visual Neglect. <p>In situations where impairments are identified, clients should be referred to a trained healthcare professional for further assessment and management.</p> <p style="text-align: right;">(Level of Evidence = IV)</p>	

The discussion of evidence for this recommendation found on page 44-47 of the original guideline has been revised to reflect the following additional literature support:

Discussion of Evidence

Two - thirds of clients experience cognitive impairment or decline post stroke and vascular dementia is the second most common type of dementia, after Alzheimer disease (Lindsay et al., Update 2010). Exploring the extent of cognitive deficit post stroke requires further investigation with tools (RNAO, rev. 2010, Appendix C: Assessment Tool Reference Guide, pg. 14-15) that have been validated to detect impairment and dysfunction.

Literature continues to support early assessment for cognitive impairments (Lee, Tang, Tsoi, Fong, & Yu, 2009; NSF, 2010; Saxena, Ng, Yong, Fong, & Koh, 2008; Stephens et al., 2005). NSF reports that 45-67% of stroke clients experience speech and communication problems related to cognitive and perceptual deficits requiring referral for more detailed assessments (including functional assessment) by trained interprofessional team members to identify the type of impairment and plan for client appropriate rehabilitation interventions.

Factors influencing communication and cognitive function such as the client's language and cultural background (Lindsay et al., Update 2010; NSF, 2010), the presence of anxiety and depression (Jaillard, Naegele, Trabucco-Miguel, Le Bas, & Hommel, 2009; Macniven, McKeown, Chambers, & Lincoln, 2005; Orfei, Caltagirone, & Spalletta, 2009; Saxena et al., 2008) and pre existing dementia (NSF) should be considered to optimize client specific rehabilitation care planning and secondary stroke prevention (including new onset dementia [NSF]). Early baseline and continuous screening for cognitive impairment is needed to be able to develop a plan of care that works towards diminishing the burden to the client/family/caregiver on discharge and enhancing QOL (Lee et al., 2009; Saxena et al.; Stephens et al.).

Unilateral Spatial Neglect (USN) (Appendix B)

USN and associated terms such as hemi-attention, visual neglect, hemi-spatial neglect has detrimental effects on all aspect of the stroke client's abilities to independently conduct activities of daily living (ADL) and is predictor of functional outcome (Menon & Korner-Bitensky, 2004; Menon-Nair et al., 2006; NSF, 2010). Menon-Nair et al. reviewed the prevalence of USN in 10 Ontario hospitals and found the prevalence to vary between 9-81%. However, only 13% of clients were assessed with a standardized assessment tool.

Tools specific to USN are required to correctly identify specific impairments for which the client requires treatment as not all tests may cover all forms of universal neglect (Appelros, Nydevik, Karlsson, Thornwalls, & Seiger, 2004; Menon & Korner-Bitensky, 2004; Menon-Nair et al. 2006; NSF, 2010). Menon & Korner-Bitensky undertook a systematic review of studies on tools to assess neglect and identified 62 published tools and created the USN Assessment Summary Guide that categorizes the 28 standardized tools according to their purpose, psychometric properties, and client and environmental factors. The USN Assessment Summary Guide can help facilitate clinical decision-making regarding the best assessment tools for clinicians to use in evaluating USN in clients post stroke.

A systematic review by Kelly, Brady, & Enderby (2010) identified studies that demonstrated the benefit of speech and language therapy in clients with post stroke aphasia however, the best timing for initiation of this intervention was not clear. A recent validation study by Flamand-Roze et al. (2011) identified the Language Screening Test (LAST), a brief language screening scale, as reliable and valid for use in acute stroke. LAST was comparable to the Boston Diagnosis Aphasia Evaluation (BDAE) and was identified as simple to use. LAST does not require administration by a speech language therapist and can assist in early intervention for language recovery in post acute stroke clients with aphasia.



Ohshima et al. (2004) outlined the importance for nursing to link the physical symptoms of higher cerebral dysfunction with cognitive deficits so nursing management consists of care related to the assessed cognitive deficits as well as the management of the physical symptoms that impact on ADLs, rehabilitation and recovery. Orfei et al. (2009) outlined that the various forms of neglect (visual, tactile, personal, spatial or extinction) requires an in depth evaluation to identify if they are related to any dimension of anosognosia. Orfei et al. suggests a holistic approach that includes the assessment and review of:

- Cognitive dysfunction (RNAO, rev. 2010, Appendix C: Assessment Tool Reference Guide, pg. 14-15) including relationship between anosognosia and global cognitive levels,
- Mnestic functions, the ability to integrate new experiences into long term memory, (e.g. education on stroke and aphasia not being recalled by client or extent of stroke deficits [Rose, Worrall, McKenna, Hickson, & Hoffmann, 2009]),
- Language functions (e.g. assess for aphasia with a validated tool such as Frenchay Aphasia Screening Test [FAST] [Salter, Jutai, Foley, Hellings, & Teasell, 2006] or the Mississippi Aphasia Screening Test [MAST] [Nakase-Thompson et al., 2005]),
- Executive functions such as planning, organizing, sequencing, abstracting (Jaillard et al., 2009), and
- Psychopathology, to understand relationship between neglect, anosognosia and the presence of other neuropsychiatric conditions (e.g. anxiety, depression [Macniven et al., 2005]).

Anosognosia is complex, and distinguishing between neglect and anosognosia is challenging yet important. Orfei's et al. identified various tools and the nurse is not expected to complete all these assessments to differentiate between neglect and anosognosia. However, the nurse should be aware of the interprofessional team members' assessment findings.

There are many validated screening instruments such as the Montreal Cognitive Assessment (MoCA[®]) and the Mini Mental Status Examination (MMSE) that have been used to assess cognitive impairment (RNAO, rev. 2010; te Winkel-Witlox, Post, Visser-Meily, & Linderman, 2008) however there is no gold standard (NSF, 2010). Studies continue to research alternatives such as R-CAMCOG (te Winkel-Witlox et al.) that are appropriate for clients with stroke and will be accepted clinically, facilitating timely assessments. Regardless of the validated assessment tool used, it does not replace ongoing clinical observation and where appropriate further neuropsychological testing.

Cognitive deficits, aphasia accompanied by depression combined with changes in functional status, can cause impairment in communication and significantly impact discharge destination, future social or occupational functioning (e.g. driving and return to work) and represent a significant decline in future QOL (Lo et al., 2008; Manders, Dammenkens, Leemans, & Michiels, 2010; Moreland et al., 2009; Okada, 2007; Ostir, Smith, Smith, & Ottenbacher, 2005; Ostir, Berges, Ottenbacher, Clow, & Ottenbacher, 2008). The nurse and interprofessional team should gather information on the client's post stroke deficits and emotional and behavioural responses to their condition. This approach considers not only the cognitive and physical health of the individual but also the social impacts and the implementation of interventions and education aimed at improving the client's QOL (Manders et al.; Pajalic, Karlsson, & Westergren, 2006; Robison et al., 2009). Figueiredo, Korner-Bitensky, Rochette, & Desrosiers (2010) reviewed the Assessment of Life Habits (LIFE-H) tool for validity in stroke clients. LIFE-H measures the level of daily activities and social roles and level of satisfaction with the ways activities are accomplished and found the tool is psychometrically sound to measure social participation and is sensitive to monitor changes over time.

<p>NOTE: Figure 1: Algorithm for Cognitive Screening in Stroke Clients can include the Montreal Cognitive Assessment (MoCA®) as an option along with the Line Bisection Test and Modified Mini-Mental State Exam (3MS).</p>	
<p>Additional Literature Support Chen et al. (2006) ICSI (2010) Miller et al. (2010) Summers et al. (2009)</p> <p>Websites LIFE-H Tool. StrokEngine-Assess. Available at: http://www.medicine.mcgill.ca/strokengine-assess/index-en.html Montreal Cognitive Assessment (MoCA®). StrokEngine-Assess. Available at: http://www.medicine.mcgill.ca/strokengine-assess/ or http://www.mocatest.org/ The USN Assessment Summary Guide. Available at: http://thomasland.metapress.com/content/kqw13hq14knm5f4u/ Montreal Cognitive Assessment (MoCA®). StrokEngine-Assess. Available at: http://www.medicine.mcgill.ca/strokengine-assess/ or http://www.mocatest.org/</p>	+
<p>Neurological Assessment</p> <p>3.2 Nurses in all practice settings should recognize that signs of decline in neurological status may be related to neurological or secondary medical complications. Clients with identified signs and symptoms of these complications should be referred to a trained healthcare professional for further assessment and management. (Level of Evidence = IV)</p>	✓
<p><i>The discussion of evidence for this recommendation found on page 34-36 of the original guideline has been changed in the following sections to reflect the current literature support:</i></p> <p>Discussion of Evidence</p> <p>Up to 30% of all stroke clients will deteriorate in the first 24 hours (Summers et al., 2009). However, during the first week, nearly 64% of clients experienced one or more complications (pain, temperature $\geq 38^{\circ}\text{C}$, progressing stroke, cardiovascular complications, infections [chest, urinary] and fall) (Adams et al., 2007; Chae et al., 2007; Czernuszenko & Czlonkowska, 2009; Hinchey et al., 2005; Grajales, Lavielle, Talavera, & Pina, 2010; Lindsay et al., Update 2010; Mackintosh, Hill, Dodd, Goldie, & Curlham, 2005; Masiero et al., 2008; McLean, 2007).</p> <p><i>On page 35 of the original document, second paragraph starting Hemorrhagic transformation... has been changed as follows:</i></p> <p>ACUTE ISCHEMIC STROKE Changes in neurological status post stroke may include non-focal symptoms such as decreased level of consciousness, headache, nausea and vomiting or focal symptoms which include the worsening of existing deficits and changes in speech, language, pupils, vision, motor strength or coordination. Mclean (2004) identified seizures as a medical complication post stroke in 1.5% in a sample population in which 82% of stroke survivors had an ischemic infarct. A retrospective study by Ogata, Yasaka, Wakugawa, Ibayashi, & Okada (2009) identified atherothrombotic brain infarction, elevated systolic blood pressure on admission and serum glucose level fluctuations (hyperglycemia/hypoglycemia [Summers et al., 2009]) and presence of paralysis, vertigo and dizziness as predisposing factors for acute deterioration after minor ischemic stroke.</p>	

Summers et al. (2009) outlined the following complications from multi-lobar infarction post stroke event for monitoring and care considerations:

- Cerebral edema and possible hydrocephalus as a result of obstruction of cerebral spinal fluid pathways. It is important to monitor intracranial pressure (ICP) in intensive care units and maintain cerebral perfusion pressure to prevent further ischemia and secondary brain injury.
- Circulatory collapse or cardiac arrest can occur in isolated ischemic stroke which may indicate that the client has acute myocardial infarction, atrial fibrillation or congestive heart failure. It is important to monitor the client to help identify any underlying cardiac conditions.
- Complications from immobility had lead to 51% of deaths in the first 30 days post ischemic stroke.
- Sudden death rate of 50% occurs within 3-120 days of stroke due to pulmonary embolism.

Nursing care needs to include prevention practices such as manual postural changes (supine, right and left lateral recumbent positioning) and passive mobilization of limbs at the onset of acute ischemic stroke as this practice has been shown to decrease the incidence of nosocomial pneumonia by 61% (Grajales et al., 2010; Mclean, 2004).

SUBARACHNOID HEMORRHAGE (SAH)

Changes in neurological status as a result of complications from SAH include nausea and vomiting, headache, nuchal rigidity, altered level of consciousness, in addition to those symptoms identified with ischemic stroke. Other symptoms may include restlessness, impulsivity, and unusual changes in behaviour (Doerkson & Naimark, 2006). The most common cause of non-traumatic SAH is secondary to a ruptured aneurysm. Bederson et al. (2009) identifies the risk of re-bleeding for untreated ruptured aneurysms as 4% on the first day, then constant at a rate of 1-2% per day over the subsequent 4 weeks. With conservative therapy, the risk of re-bleeding is between 20-30% for the first month after hemorrhage and then finally stabilizes at a rate of approximately 3% per year. Symptoms of recurrent hemorrhage include sudden worsening of headache, sudden hypertension or deterioration in level of consciousness.

Vasospasm is a focal or diffuse narrowing of the intracranial arteries, considered to arise from the local degradation of blood products. It may result in decreased regional cerebral blood flow. Vasospasm may cause subtle changes in patient behavior or focal ischemic neurological deficits dependent on the location and degree of vasospasm. The incidence of symptomatic vasospasm following SAH ranges from 15% to 35% (Bederson et al., 2009). A client with subarachnoid hemorrhage secondary to a ruptured aneurysm is at risk for vasospasm, with the peak period occurring between day 4 and 14 post SAH. It is most likely to be problematic in clients with large volume hemorrhages, although it can be present at varying degrees in all patients with SAH.

Acute hydrocephalus is a common complication and occurs in 20-30% of clients with SAH (Bederson et al., 2009). It may occur acutely at the time of presentation or in a delayed fashion. Acute hydrocephalus commonly presents with a rapid decline in level of conscious. However, delayed hydrocephalus from impaired cerebrospinal fluid (CSF) absorption can present with increased headache (pressure sensation) that is worse when supine, confusion, ataxia/imbalance and incontinence. Brain edema resulting in raised ICP may also occur. The incidence of seizures associated with SAH has been reported to range from 6–18% (Bederson et al., 2009).

<p>INTRACEREBRAL HEMORRHAGE (ICH) Changes in neurological status as a result of ICH may range from subtle to profound, and are similar to those identified for ischemic stroke. ICH may result in several complications including recurrent hemorrhage depending on the underlying etiology. Brain edema, hydrocephalus and raised ICP can also occur with ICH. However, a seizure as a medical complication of stroke remains less common but is present in 1.5% of the population (McLean, 2004).</p> <p>Morgenstern et al. (2010) identified the following key components in the nursing care of clients with ICH in critical care:</p> <ul style="list-style-type: none"> • surveillance & monitoring of intracerebral pressure (ICP), cerebral perfusion pressure & hemodynamic function; • titration and implementation of protocols to manage ICP, BP, mechanical ventilation, fever & serum glucose; and • prevention of complications from immobility (e.g. atelectasis, aspiration, pulmonary embolism [PE], deep vein thrombosis [DVT]) through positioning, airway maintenance & mobilization within physiological tolerance. <p>Nurses, in caring for clients post stroke, must remain vigilant in their assessment of clients for signs and symptoms of decline post stroke and work with the interprofessional team to ensure prevention and treatment strategies are in place to prevent and limit the more devastating outcomes of stroke.</p>	
<p>Additional Literature Support Seo & Oh, (2009)</p> <p>Websites American Heart Association. Stroke Clinical Tools Library. Available at: http://www.heart.org/HEARTORG/HealthcareProfessional/GetWithTheGuidelinesHFStroke/GetWithTheGuidelinesStrokeHomePage/Stroke-Clinical-Tools-Library_UCM_303743_Article.jsp</p> <p>Internet Stroke Centre at Washington University. Scales & Assessment Tools. Available at: http://www.strokecenter.org/trials/scales/index.htm</p> <p>Stroke Engine. Topics and Tools. Available at: http://strokenengine.ca/?page=about</p>	+
<p>Complications</p> <p>4.0 Nurses in all practice settings should assess (where feasible using a validated tool) the client’s risk for and/or presence of any of the following complications of stroke:</p> <ul style="list-style-type: none"> • fall risk: <ul style="list-style-type: none"> - fractures secondary to falls, - bone loss secondary to immobility; • fatigue; • painful hemiparetic shoulder; • pneumonia secondary to immobility and dysphagia; • pressure ulcers (e.g.: Braden Scale for Predicting Pressure Sore Risk); • spasticity/contractures; • urinary tract infection (UTI); • venous thromboembolism. <p style="text-align: right;">(Level of Evidence = IV)</p>	

The discussion of evidence for this recommendation found on page 37-39 of the original guideline has been revised to reflect the following additional literature support:

Discussion of Evidence

Literature continues to identify the following complications as experienced by many clients post stroke:

- falls (Lindsay et al., Update 2010; McLean, 2004; Tsur & Segal, 2010; Wagner, Phillips, Hunsaker, & Forducey, 2009; Watanabe, 2005) and potential for falls resulting in hip fractures (Czernuszenko & Czlonkowska, 2009; Eng, Pang, & Ashe, 2008; Mackintosh et al., 2005; Pouwells et al., 2009),
- fatigue & depression (Schepers, Visser-Meily, Ketelarr, & Lindeman, 2006; Smith, van den Broek, Renkens, & Denollet, 2008),
- nocturnal hypoxia (see Recommendation 3.0),
- potential development of pneumonia from immobility (Grajales et al., 2010; McLean, 2004; 2007) and dysphagia (Hinchey et al., 2005; Masiero et al., 2008).
- pressure ulcers (McLean, 2004; 2007),
- shoulder pain (Chae et al., 2007; Lindsay et al.; McLean, 2004; Suethanapornkul et al., 2008),
- spasticity/contractures (Sommerfeld, Eek, Svensson, Holmqvist, & von Arbin, 2004),
- urinary tract infections (Lindsay et al.; McLean, 2004 & 2007), and
- venous thromboembolism (Lindsay et al.; McLean, 2007).

A cohort study by Sackley et al. (2008) identified that mobility-related complications such as falls, contracture, pain, shoulder pain, depression and pressure sores remain common in the first year and early assessment and implementation of interventions to prevent or limit complications are necessary.

Falls

Many of the current studies (Czernuszenko & Czlonkowska, 2009; MacKintosh et al., 2005; Nakagawa et al., 2008; Olsson, Lofgren, Gustafson, & Nyberg, 2005; Pouwells et al., 2009; Tsur & Segal, 2010; Wagner et al., 2009; Watanabe, 2005; Zdobysz, Boradia, Ennis, & Miller, 2005) identify increased risk of injurious falls (hip fractures) in clients who have experienced stroke. The RNAO (rev. 2011a) guideline on Prevention of Falls and Fall Injury in the Older Adult and the Preventing Falls and Injury from Falls Getting Started Kit (SHN, 2010) identifies screening for fall risk is supported in research and is important in the identification of fall-prone individuals. On admission post stroke some variables known as predictors of first falls such as central paralysis, history of previous falls, use of psychotropic medicines, visual impairment, urinary incontinence, mode of locomotion and cognitive impairment should be assessed (Nakagawa et al., 2008).

Systematic reviews by Eng et al. (2008) and Marsden et al. (2008) identified clients with stroke are at risk for, fragility fractures due to immobility, vitamin D deficiency, gender and time since stroke. Watanabe (2005) identified the importance of nurses and the interprofessional team assessing the client for potential falls once at home as falls are common in stroke survivors. Findings of any assessment should be used to initiate prevention strategies to prevent the physical and emotional consequences of falls. A number of falls risk screening tools are available on the British Columbia Injury Research and Prevention Unit (BCIRPU) website to identify clients with risk factors who should undergo further comprehensive assessment by the interprofessional team in order to implement targeted falls prevention strategies in the individualized plan of care (RNAO, rev. 2011a; SHN, 2010).



<p>Fatigue Fatigue levels can be found in 51.5-64.1% of post stroke clients, similar to fatigue experienced by clients with CHF (Schepers et al., 2006; Smith et al., 2008). Schepers et al. identify fatigue as an increasing problem for clients in the first year post stroke and is closely related to depression and locus of control. RNAO (rev. 2010, Appendix I, J, K, L) identifies tools that can be considered for use by the nurse and interprofessional team to assess for depression. Fatigue Assessment Scale has been validated and can be used to measure fatigue in stroke survivors (Smith et al.).</p> <p>Pressure Ulcers Pressure ulcers are found in 1.5-22% of stroke clients. Nurses should continue to have an increased awareness of this potential complication of stroke and initiate early recognition and prevention strategies for clients who are more functionally dependent in self-care and at risk for pressure ulcers (McLean, 2004; Sackley et al., 2008).</p> <p>Shoulder Pain Post stroke shoulder pain is associated with reduced quality of living (QOL) interfering with general activity, mood, walking ability, normal work, interpersonal relationships, sleep, enjoyment of life (Czernuszenko & Czlonkowska, 2009) and is significantly more frequent in clients with shoulder subluxation (Suethanapornkul et al., 2008). Nurses along with the interprofessional team should assess for shoulder impairment and activity limitation from post stroke shoulder pain (Lindsay et al., Update 2010).</p>	
<p>Additional Literature Support Adams et al. (2007) ESO (2008) Furie et al. (2011) ICSI (2010) Morgenstern et al. (2010) Summers et al. (2009) Turner-Stokes & Jackson (2006)</p> <p>Websites Stroke Engine. Topics and Tools. Available at: http://strokengine.ca/?page=about The British Columbia Injury Research and Prevention Unit (BCIRPU) - Falls Assessment Tools Repository: http://www.injuryresearch.bc.ca/categorypages.aspx?catid=3&catname=Library</p>	+
<p>Advanced Care Planning</p> <p>4.1 Nurses in collaboration with the interprofessional team will assess and support clients (family/substitute decision maker [SDM]) to make informed decisions that are consistent with their beliefs, values and preferences to ensure client wishes are known and incorporated into the plan of care (includes advanced, palliative and end of life care planning). (Level of Evidence=IV)</p>	NEW

<p><i>The discussion of evidence has been added for this NEW recommendation to reflect the current literature support:</i></p> <p>Discussion of Evidence</p> <p>For each episode of care when the client enters a hospital or a new transition of care on the stroke continuum, the interprofessional team assesses and/or reviews the client's/ family/SDM's wishes including any advanced care planning directives to determine a client-centered plan of care. Approximately 20% of individuals who experience stroke may die within 30 days of the initial event so it is important to know the wishes of the client/ family/SDM (RNAO, 2011a; SIGN, 2010). Awareness of these wishes allow nurses and the interprofessional team to provide proper care and treatment according to the client/ family/SDM wishes but also when necessary provide guidance and appropriate palliative support. (Lindsay et al., Update 2010 NSF; Miller et al., 2010).</p>	<p>NEW</p>
<p>Pain</p> <p>5.0 Nurses in all practice settings should assess and monitor on an ongoing basis the client's pain severity, quality, and impact on function using a validated tool (such as, Wong-Baker Faces Pain Rating Scale [WBFPRS], Numeric Rating Scale, the Verbal Analogue Scale or the Verbal Rating Scale).</p> <p style="text-align: right;">(Level of Evidence = IV)</p>	
<p><i>The discussion of evidence for this recommendation found on page 39-40 of the original guideline has been revised to reflect the following additional literature support:</i></p> <p>Discussion of Evidence</p> <p>Literature identifies that 23.9% of clients experience pain in the first week post stroke and 53.3% of the clients report pain as a post stroke complication they experienced in the first 3 months (Lindsay et al., Update 2010) and this was exclusive of shoulder pain (See recommendation discussion of evidence for 4.0). Post stroke pain remains prevalent and clients should be assessed using a validated tool for pain throughout the continuum of care (acute, rehabilitation and home) for the presence of chronic musculoskeletal and central post stroke pain (Berges, Ottenbacher, Kuo, Smith, Smith, & Ostir, 2007; Kong, Woon, & Yang, 2004). Widar, Ek, & Ahlstron (2004) identify that assessment of the client's pain should include:</p> <ul style="list-style-type: none"> • a detailed pain assessment with validated tool, • proper diagnosis of pain and treatment with appropriate medication and other non-pharmacologic strategies, • interprofessional team communication with client to understand their personal experiences and client specific strategies for pain management, pain related problems and client specific coping strategies, and • use of stress reduction, counseling and relaxation techniques. <p>RNAO, (rev. 2007a) guideline, <i>Assessment and Management of Pain</i> outlines that pain is endorsed nationally and internationally as the 5th vital sign and supports screening all clients for pain across the continuum of care. RNAO identifies that screening should also consist of behavioural indicators and physiological parameters in the non-verbal client. RNAO identifies various tools for screening in verbal and non communicative clients (e.g. WBFPRS). Benaim et al. (2007) identified that the faces pain scale which had been previously validated for use on children can be used in stroke clients with language and cognitive disorders but should be used along with other assessments to identify pain in these clients.</p>	<p>+</p>

<p>Additional Literature Support</p> <p>Miller et al. (2010) NSF (2010) SIGN (2010) Summers et al. (2009)</p> <p>Websites</p> <p>Stroke Engine. Topics and Tools. Available at: http://strokengine.ca/?page=about Wong-Baker Faces Pain Rating Scale. Available at: http://www.partnersagainstpain.com/printouts/A7012AS6.pdf</p>	+
<p>Dysphagia</p> <p>6.0 Nurses should maintain all clients with stroke NPO (including oral medications) until a swallowing screen is administered and interpreted, within 24 hours of the client being awake and alert.</p> <p style="text-align: right;">(Level of Evidence = IIa)</p>	✓
<p>6.1 Nurses in all practice settings who have the appropriate training should screen within 24 hours of the client becoming awake and alert for risk of dysphagia using a standardized tool (such as, Gugging Swallowing Screen, Standardized Bedside Swallowing Assessment [SSA] or Toronto Bedside Swallowing Screening Test [TOR-BSST®]). This screen should also be completed with any changes in neurological or medical condition, or in swallowing status. In situations where impairments are identified, clients should be kept NPO and referred to a trained healthcare professional for further assessment and management.</p> <p style="text-align: right;">(Level of Evidence = IIa)</p>	
<p><i>The discussion of evidence for this recommendation found on page 40-42 of the original guideline has been revised to reflect the following additional literature support:</i></p> <p>Discussion of Evidence</p> <p>Lindsay et al. (Update, 2010) identifies that 55% of clients with new onset stroke experience dysphagia, or difficulty swallowing. Dysphagia is implicated in poor client outcomes that include mortality, pulmonary infection-pneumonia (Hinchey et al., 2005; Lindsay et al.; Martino et al., 2005; McMicken & Muzzy, 2009; Trapl et al., 2007), poor nutritional status and increased length of stay and rate of discharge to institutional care (McMicken & Muzzy; Smithard, Smeeton, & Wolfe, 2007; Westergren, 2006). Research continues to identify the importance of screening a client's swallowing ability using a standardized validated reliable tool as part of an initial assessment for early recognition of dysphagia in alert clients (Lindsay et al.; SIGN, 2010; Westergren). Hinchey et al. identifies a formal screening protocol should be offered to all stroke clients regardless of stroke severity and that clients presenting with features of dysphagia should receive a full clinical assessment of their swallowing ability by a speech–language pathologist (SLP) or appropriately trained specialist who is able to advise on safety and the client's swallowing ability. Referral to a dietitian for nutritional status determination and SLP for management of diet consistency and oral fluid intake is recommended (Lindsay et al.; SIGN; Westergren).</p> <p>Lees, Sharpe, & Edwards (2006) identified when nurses were trained in the use of the dysphagia screening tool they were able to reduce the amount of time the client was inappropriately “nothing by mouth” (NPO) to less than one hour. Weinhardt et al. (2008) conducted a study comparing the results of dysphagia screening between RN's trained to screen and evaluations from SLP. The findings showed a 94% agreement for clients who were able to swallow and could eat from a safe menu until formally evaluated by SLP while keeping clients with identified swallowing difficulties at risk for aspiration NPO.</p>	+

<p>The Ontario Stroke Network in partnership with Heart and Stroke Foundation of Ontario undertook a review of dysphagia screening tools and concluded from the five tools reviewed in detail, the TOR-BSST® was the most thoroughly evaluated dysphagia screening tool, based upon best available evidence (The Dysphagia Working Group, 2008). The measurement properties of the TOR-BSST® were well established in a controlled study and more details on the tool can be found at http://swallowinglab.uhnres.utoronto.ca/order.html.</p>	
<p>Additional Literature Support</p> <p>Bravata, et al. (2009)</p> <p>Miller et al. (2010, pg.1689, Recommendation 4)</p> <p>NSF (2010)</p> <p>Summers et al. (2009)</p> <p>Website</p> <p>American Heart Association. Stroke Clinical Tools Library. Available at: http://www.heart.org/HEARTORG/HealthcareProfessional/GetWithTheGuidelinesHFStroke/GetWithTheGuidelinesStrokeHomePage/Stroke-Clinical-Tools-Library_UCM_303743_Article.jsp</p> <p>Dysphagia Screening Tools: A Review. The Dysphagia Working Group, (2008). Available at: http://www.heartandstroke.on.ca/site/c.pvl3leNWjwE/b.5385167/k.E9C7/HCP__Management_of_Dysphagia_in_Acute_Stroke.htm..this</p> <p>Stroke Engine. Topics and Tools. Available at: http://strokenet.ca/?page=about</p>	+
<p>Nutrition</p> <p>7.0 Nurses in all practice settings should complete a nutrition and hydration screen within 48 hours of admission, after a positive dysphagia screen and with changes in neurological or medical status, in order to prevent the complications of dehydration and malnutrition. In situations where impairments are identified, clients should be referred to a trained healthcare professional for further assessment and management.</p> <p style="text-align: right;">(Level of Evidence = IV)</p>	✓
<p><i>The discussion of evidence for this recommendation found on page 42-43 of the original guideline has been revised to reflect the following additional literature support:</i></p> <p>Discussion of Evidence</p> <p>Poor nutritional status, undernourishment and dehydration are identified as factors that increase the risk of death, client's length of hospital stay and poor client outcomes six months post stroke (Lindsay et al., Update 2010; NSF, 2010; SIGN, 2010). Clients with hemorrhagic stroke may be at an even greater risk for malnutrition (NSF). Lindsay et al. identifies that research has demonstrated better outcomes with an early comprehensive assessment of nutrition, hydration and dysphagia with a validated tool within 48 hours of admission (Lindsay et al.; SIGN). Clients who are found to be undernourished or at risk of becoming undernourished should be referred to a dietitian and SLP for the development of an overall nutritional care plan which includes any alterations in food texture and consistency of fluid.</p> <p>The nurse should conduct ongoing bedside assessments for any client factors that would influence nutrition and hydration status (Lindsay et al., Update 2010; NSF, 2010; Oh & Seo, 2007; SIGN, 2010). Clients who are unable to meet their nutrient and fluid requirements should have an assessment by the interprofessional team for possible enteral nutrition support (tube feeding) within seven days of admission (Lindsay et al.). Oh and Seo identified that clients with acute brain infarction experienced significant alternations in fluid balance after initiation of tube feedings.</p>	+

<p>Additional Literature Support</p> <p>Crary, Caraby Mann, & Groher (2005)</p> <p>Miller et al. (2010)</p> <p>Tsai & Shih, (2009)</p> <p>Summer et al. (2009)</p> <p>Website</p> <p>Stroke Engine. Topics and Tools. Available at: http://strokengine.ca/?page=about</p>	+
<p>Activities of Daily Living</p> <p>8.0 Nurses in all practice settings should assess stroke clients' ability to perform the activities of daily living (ADL). This assessment, using a validated tool (such as, the Barthel Index, Functional Independence Measure™ or Alpha FIM®) may be conducted collaboratively with other therapists, or independently with training when therapists are not available. In situations where impairments are identified, clients should be referred to a trained healthcare professional for further assessment and management.</p> <p style="text-align: right;">(Level of Evidence = IV)</p>	
<p><i>The discussion of evidence for this recommendation found on page 48-50 of the original guideline has been revised to reflect the following additional literature support:</i></p> <p>Discussion of Evidence</p> <p>Quality of life post stroke is impacted by level of dependency for ADLs with a higher incidence of stroke survivors living in special/assistive or long term care facilities than the general population due to age, stroke severity, bladder dysfunction, dysphasia, cognitive decline, functional status (including assistance in transfers), single living, fatigue and depression (Appelros, Nydevik, & Terent, 2006; Lo, et al., 2008; Massucci et al., 2006; Myint, Vowler, Redmayne, & Fulcher, 2008; Nakao et al., 2010; van de Port, Kwakkel, Schepers, Heinemans, & Linderman, 2007). Various tools such as the NIHSS, Barthel Index (BI), Frenchay Activities Index (FAI), Modified Rankin Scale and the Functional Independence Measure [FIM] have been studied and used in studies (Appelros et al., 2006; Eriksson, Appelros, Norrving, & Trent, 2007; Lo et al., 2008; Massucci et al., 2006; Moreland et al., 2009; Olsson & Sunnerhagen, 2006; Ostir et al., 2005; Ostir et al., 2008; Rameezan & Zaliha, 2005; Sangha et al., 2005; van de Port et al.) to measure various cognitive and functional domains and constructs pertaining to ADLs. These tools and others are available from StrokEngine-Assess. Studies by Hinkle, McClaran, Davies, & Ng (2010) and Stillman, Granger, & Niewczyk (2009) on Alpha FIM® showed the instrument was reliable and valid in assessing the functional ability which assisted nurses in planning for client discharge. However, further refinement of the scales and study is needed to see if the instrument is sensitive enough to pick up changes over time.</p> <p>In planning, several studies (Bernhardt, Dewey, Thrift, Collier, & Donnan, 2008; Cumming, et al., 2011; Sackley et al., 2008) have demonstrated that very early rehabilitation with an emphasis on more intensive mobilization within 24 hours of an acute stroke event is safe and feasible and may speed up the client's return to unassisted walking and improve functional recovery. Nurses along with the interprofessional team, should assess on admission the client's level of functional independence including the presence of leg paresis. Based on client's assessed deficits, augmented exercise intensity interventions should be initiated to facilitate optimum function and a more rapid recovery of independence in ADLs.</p>	+

<p>Additional Literature Support Lindsay et al. (Update 2010) NSF (2010)</p> <p>Websites Internet Stroke Centre at Washington University: <ul style="list-style-type: none"> • Modified Rankin Scale. Available at: http://www.strokecenter.org/trials/scales/rankin.html • Scales & Assessment Tools. Available at: http://www.strokecenter.org/trials/scales/index.htm StrokEngine-Assess. Available at: http://www.medicine.mcgill.ca/strokengine-assess/index-en.html Stroke Engine. Topics and Tools. Available at: http://strokengine.ca/?page=about UDS-Uniform Data System. Alpha FIM®. Available at: http://www.udsmr.org/WebModules/Alpha/Alp_About.aspx</p>	+
<p>Bowel and Bladder</p> <p>9.0 Nurses in all practice settings should assess clients for fecal incontinence and constipation. (Level of Evidence = IV)</p>	✓
<p><i>The discussion of evidence for this recommendation found on page 50 of the original guideline has been revised to reflect the following additional literature support:</i></p> <p>Discussion of Evidence</p> <p>Fecal incontinence continues to occur in a small percentage of clients post stroke. NSF (2010) identifies the need for:</p> <ul style="list-style-type: none"> • Structured functional assessment including rectal exam by trained personnel, • Management and education targeted for the condition (constipation, fecal overflow, incontinence), • Bowel habit retraining to include type and timing of diet, • Exploration of continence aids, • Discharge planning. <p>The cognitive and emotional impacts of fecal incontinence should be considered by the nurse and interprofessional team to ensure implementation of strategies to support the client's dignity and client/family/caregiver adaptation and education in regards to fecal incontinence and discharge preparedness (NSF, SIGN, 2010).</p>	+
<p>Additional Literature Support Bracci et al. (2007) Lindsay et al. (Update, 2010) Miller et al. (2010)</p>	+
<p>9.1 Nurses in all practice settings should assess clients for urinary incontinence and retention (with or without overflow). (Level of Evidence = IV)</p>	✓

The discussion of evidence for this recommendation found on page 51-52 of the original guideline has been revised to reflect the following additional literature support:

Discussion of Evidence

Summers et al. (2009) identifies that the most common urinary complication is incontinence, occurring in 30-60% of clients early in the recovery period due to frontal lobe or pons infarct, neurogenic bladder, hyperreflexia with urge incontinence, urgency, frequency and/or urinary retention with or without outflow. NSF (2010) outlines that 43% of stroke clients are incontinent within the first 72 hours and 26% are catheterized within one week of admission to hospital however best practices should include:

- assessment of function by trained personnel using a structured functional assessment,
- use of a portable bladder ultrasound for diagnosis and management of urinary incontinence,
- all clients assessed as having urinary continence difficulties should have a formulated continence management plan, and
- use of indwelling catheters are to be avoided as an initial intervention except in acute retention.

Literature continues to identify urinary incontinence as having significant impact on outcomes in stroke survivors. Prevalence is identified between 40-60% (ESO, 2008; Fisher, Miller, Draper, Knowlton-Leblond, & McNeil, 2008; Lindsay et al., Update 2010; SIGN, 2010). The nurse and interprofessional team should ensure all stroke clients are screened for urinary incontinence and retention (with or without overflow). Assessment should also consider factors that impact continence management such as cognitive disabilities that impact on the ability to independently mobilize and communicate; diet and nutrition; environment; and medication (Lindsay et al.; NSF, 2010; SIGN). The Clinical Practice Guidelines for Urinary Continence Care of Stroke Survivors in Acute and Rehabilitation Settings by Fisher et al. provides examples of an assessment tool and a 3-Day voiding record (Appendix G and Appendix H, pg. 41-47) which can assist the nurse and interprofessional team in assessment and monitoring of urinary continence.

A common reason for pyrexia post stroke is the presence of urinary tract infections, so ongoing assessment is required to ensure client is not experiencing retention and infection (NSF, 2010). Use of portable bladder scanners is best practice to determine retention and post void bladder volumes (Fisher et al., 2008; Lindsay et al., Update 2010). Use of indwelling catheters is not supported for retention (Fisher et al.; Lindsay et al., NSF; SIGN, 2010).

Lindsay et al. (Update 2010) and Fisher et al. (2008) identify that all clients post stroke with urinary/bladder conditions should have:

- Structured functional assessment by trained personnel,
- Management program and education plan targeted for condition (incontinence or retention) and includes bladder training strategies that incorporate a timed and prompted toileting schedule,
- Skin care and infection prevention strategies for clients experiencing incontinence,
- Exploration of aids and discharge planning.

Tibaek, Gard, Klarskow, Iversen, Dehlendorff, & Jensen (2009) identified a strong link between activity limitations and lower urinary tract symptoms and recommended targeted interventions to treat lower urinary tract symptoms be considered during rehabilitation.



Additional Literature Support
Natsume (2008)



<p>Depression</p> <p>10.0 Nurses in all practice settings should screen clients for evidence of depression, using a validated tool (such as, the Stroke Aphasia Depression Questionnaire, Geriatric Depression Scale, Hospital Anxiety and Depression Scale or the Cornell Scale for Depression in Dementia) throughout the continuum of care. In situations where evidence of depression is identified, clients should be referred to a trained healthcare professional for further assessment and management.</p> <p style="text-align: right;">(Level of Evidence = IV)</p>	✓
<p><i>The discussion of evidence for this recommendation found on page 52-54 of the original guideline has been revised to reflect the following additional literature support:</i></p> <p>Discussion of Evidence</p> <p>Studies (Barker-Collo, 2007; De et al., 2008; Linden, Blomstrand, & Skoog, 2007) continue to identify depression and anxiety in higher percentages in post stroke versus the general populations. Presence of depression and anxiety are associated with higher disability and deterioration in physical function, ADL, discharge destination and QOL (Aprile et al., 2006; Glamcevski & Pierson, 2005; Lee et al., 2009; Nannetti, Paci, Pasquini, Lombardi, & Taiti, 2005; Nuyen, Spreeuwenberg, Groenewegen, Van den Bos, & Schellevis, 2008; Shyu, Maa, Chen & Chen, 2009; Snaphaan, van der Werf, Kanselaar, & de Leeuw, 2009; Teoh, Sims, & Milgrom, 2009). Factors implicated with increased risk for depression and impacts on client outcomes through the continuum of care include:</p> <ul style="list-style-type: none"> • Gender - female (Carod-Artal, Ferreira, Trizotto, & Menezes, 2009; Cassidy, O'Connor, & O'Keane, 2004; Masskulpan, Riewthong, Dajpratham, & Kuptniratsaikul, 2008; Zhang, et al., 2010), • Advancing age (Glamcevski & Pierson; Jonsson, Lindgren, Hallstrom, Norrving, & Lindgren, 2005; Kong et al., 2004; Lo et al., 2008; Nichols-Larsen, Clark, Zeringue, Greenspan, & Blanton, 2005; Paul et al., 2005; Roger & Johnson-Greene, 2008; Saxena et al., 2008), • Type and location of stroke (Nicols-Larsen et al.; Roding, Glader, Malm, & Lindstrom, 2010; Snaphaan et al.), • Degree of functional disability and self care deficits (Carod-Artal et al; Franzen-Dahlin et al., 2008; Giaquinto, Spiridigliozzi, & Caracciolo, 2007; Jonsson et al.; Lee et al., 2009; Masskulpan et al.; Nichols-Larsen et al.; Ostir et al., 2008; Sackley et al., 2008; Saxena et al., 2008; Snaphaan et al.; Teoh et al.; Zhang et al.), • Fatigue (Skaner, Nilsson, Sundquist, Hassler, & Krakau, 2007; van de Port et al., 2007; Zhang et al.). <p>The nurse, in collaboration with the interprofessional team needs to be vigilant in the screening or assessment of depression or altered mood using a validated screening tool throughout the continuum of care. If depression or altered mood is identified, the team should initiate appropriate interventions to support the client/family/caregivers to prevent and diminish the negative impact on client outcomes in functional status, mood and quality of life (Lindsay et al., Update 2010; NSF, 2010; SIGN, 2010). Many assessment tools are available for use in stroke clients such as: the Hamilton Rating Scale for Depression or the Aphasic Depression Rating Scale (ADRS), Beck Depression Inventory (BDI, BDI-II), Hospital Anxiety Depression Scale (HADS) and Stroke Aphasic Depression Questionnaire (SADQ). Roger & Johnson-Greene (2009) identified that assessment tools may not be optimally sensitive for detection of depression in stroke populations and recommend clinicians consider the use of the Geriatric Depression Scale-Short Form.</p>	+

<p>Additional Literature Support Berg, Lonnqvist, Palomaki, & Kaste (2009) RNAO, (rev. 2010)</p> <p>Websites Scales & Assessment Tools (Hamilton Rating Scale for Depression). Internet Stroke Centre at Washington University. Available at: http://www.strokecenter.org/trials/scales/index.htm Stroke Engine. Tools: Aphasic Depression Rating Scale (ADRS), Beck Depression Inventory (BDI, BDI-II), Hospital Anxiety Depression Scale (HADS) and Stroke Aphasic Depression Questionnaire (SADQ). Stroke Engine. Available at: http://strokenine.ca/?page=about</p>	+
<p>10.1 Nurses in all practice settings should screen stroke clients for suicidal ideation and intent when a high index of suspicion for depression is present, and seek urgent medical referral. (Level of Evidence = IV)</p>	✓
<p>Additional Literature Support RNAO (2009)</p>	+
<p>Caregiver Strain</p> <p>11.0 Nurses in all practice settings should assess/screen caregiver burden, using a validated tool (such as, the Caregiver Strain Index or the Self Related Burden Index). In situations where concerns are identified, clients should be referred to a trained healthcare professional for further assessment and management. (Level of Evidence = III)</p>	✓
<p><i>The discussion of evidence for this recommendation found on page 56-57 of the original guideline has been revised to reflect the following additional literature support:</i></p> <p>Discussion of Evidence</p> <p>Multiple studies have identified factors that contribute to caregiver burden when supporting stroke survivors such as:</p> <ul style="list-style-type: none"> • Education and preparation including problem solving and coping abilities for discharge planning (Hinojosa & Rittman, 2009; Ostwald, Bernal, Cron, & Godwin, 2009; Shanmugham, Cano, Elliot, & Davis, 2009; Ski & O'Connell, 2007; Visser-Meily, Post, van de Port, van Heugten, & van den Bos, 2008), • Degree of burden and perception of burden for completion of ADLs and living with clients with greater cognitive (including behavioural and psychological symptoms) and physical deficits (such as aphasia, dysarthria, dysphasia or use of special equipment) with the presence of comorbidities (such as diabetes mellitus) (Draper & Brocklehurst, 2007; Franzen-Dahlin et al., 2008; Hayes, Chapman, Young, & Rittman, 2009; Jonsson et al., 2005; Rigby et al., 2009; Tooth, McKenna, Barnett, Prescott, & Murphy, 2005; Visser-Meily, Post, Schepers, & Lindeman, 2005), • Impact on caregiver QOL (Gunduz & Erhan, 2008; Jonsson et al.; Khalid & Kausar, 2008; Schlote, Richter, Frank, & Wallesch, 2006), • Psychological (depression/emotional distress) and physical impacts (injury/fatigue/sleep difficulties) on caregiver (Appelros et al., 2006; Cameron, Cheung, Streiner, Coyte, & Stewart, 2006; Chumbler, Rittman, Van, Vogel, & Qnin, 2004; Haley, Roth, Howard, & Safford, 2010; Hayes et al.; Larson et al., 2005; Larson et al., 2008; Louie, Liu, & Man, 2009; Rittman, Hinojosa, & Findley, 2009), • Specific characteristics of the caregiver such as culture, gender (female), a relative that is an in-law, anxiety level, level of education, age, hours of care needed for stroke survivor, social isolation and financial issues such as unemployment (Appelros et al.; Choi-Kwon, Kim, Kwon, & Kim, 2005; Strudwick & Morris, 2010; Vincent, Desrosiers, Landreville, Demers, & Brad Group, 2009; Wilz & Kalytta, 2008). 	+

<p>Nurses, along with the interprofessional team should be aware of the potential and real impacts on the caregiver and ensure education and resources are available on discharge that promote survivor's function while supporting and empowering the caregiver's and family autonomy (Greenwood, Mackenzie, Cloud, & Wilson, 2010; Jennifer et al., 2009; King & Semik, 2006; Nir, Greenberger, & Bachner, 2009; Van Heugten, Visser-Meily, Post, & Lindeman, 2006). Studies continue to demonstrate that the caregiver role impacts the stroke survivor's function and has the potential to improve outcome and QOL. The absence of a committed caregiver increases the risk of placement in a long term care facility on discharge (Appelros et al., 2006; Lindsay et al., Update 2010).</p> <p>The literature (Gunduz & Erhan, 2008; Jonsson et al., 2005) outlines the use of various caregiver screening tools such as the Short Form-36 (SF-36) which assesses the caregiver and stroke survivor subjective views on different aspects of their life. SF-36 is available from StrokEngine-Assess and can be used by clinicians as a routine assessment in follow up clinics to identify spouses and stroke survivors in need of additional education and support. Miller et al., (2010, pg. 2342) outlines a comprehensive chart of tests that are used to screen caregivers by domains such as needs and concerns, tasks, life changes, strain and family conflict. Clinicians should use tools validated to identify aspects of caregiver strain to facilitate the implementation of targeted strategies in education and counselling to help reduce the distress of survivor dependency and facilitate the adaptation to changes in life situations (Franzen-Dahlin et al., 2008; Gunduz & Erhan; King & Semik; Hinojosa & Rittman, 2009; Jonsson et al., 2005; Larson et al., 2008; Schlote et al., 2006; Simon, Kumar, & Kendrick, 2009).</p>	
<p>Additional Literature Support NSF 2010 SIGN 2010</p> <p>Websites StrokEngine-Assess. Available at: http://www.medicine.mcgill.ca/strokengine-assess/</p>	+
<p>Sexuality</p> <p>12.0 Nurses in all practice settings should screen stroke clients/their partners for sexual concerns to determine if further assessment and intervention is necessary. In situations where concerns are identified, clients should be referred to a trained healthcare professional for further assessment and management.</p> <p style="text-align: right;">(Level of Evidence = IV)</p>	✓
<p>Additional Literature Support ESO (2008) Miller et al. (2010) NSF (2010) SIGN (2010)</p>	+
<p>Client and Caregiver – Readiness to Learn</p> <p>13.0 Nurses in all practice settings should assess the stroke client and their caregivers learning needs, abilities, learning preferences and readiness to learn. This assessment should be ongoing as the client moves through the continuum of care and as education is provided.</p> <p style="text-align: right;">(Level of Evidence = IV)</p>	✓

<p><i>The discussion of evidence for this recommendation found on page 58-59 of the original guideline has been revised to reflect the following additional literature support:</i></p> <p>Discussion of Evidence</p> <p>Nursing care must focus on client education post stroke to ensure that the stroke survivor and their families know their strengths and needs and are linked to the available education and resources to ensure optimum outcomes (Miller et al., 2010; Summers et al., 2009). Cameron & Gignac (2008, pg. 308-309) conducted a systematic review on learning needs of stroke survivors and caregivers in the literature and developed a conceptual framework to assist clinicians in understanding the right time to address the various associated education and intervention strategies needed to support client and caregiver needs during each of the following identified phases:</p> <ul style="list-style-type: none"> • event/diagnosis, and • stabilization (acute), • preparation (discharge), • implementation (first months at home), and • adaptation (adjustment period at home). <p>Nurses in all practice settings should assess the needs of the stroke survivor and their caregiver to facilitate safe transition to the next level of care. Many techniques such as motivational interviewing and ask, advise, assist and arrange protocols are available to assist nurses to be client centred and help address client and caregiver’s learning needs (RNAO, 2007b, pg. 66-71, Appendix G & H). Involvement of the client in planning meetings and giving them a voice in planning care strategies is a very important advocacy role for nursing (Hedberg, Johanson, & Cederborg, 2008).</p>	+
<p>Additional Literature Support Choi-Kwon et al. (2005)</p>	+
<p>Documentation</p> <p>14.0 Nurses in all practice settings should document comprehensive information regarding assessment and/or screening of stroke clients. All data should be documented at the time of assessment and reassessment.</p> <p style="text-align: right;">(Level of Evidence = IV)</p>	✓
<p>Additional Literature Support ESO (2008) Landgraff, Passek, & Kerns (2009) Lindsay et al. (Update 2010) Miller et al. (2010) NSF (2010) SIGN (2010)</p>	+

Education Recommendations

<p>15.0 Basic education for entry to practice should include:</p> <ul style="list-style-type: none"> • Basic anatomy and physiology of the cerebrovascular system; • Types of stroke and associated pathophysiology; • Risk factors of a stroke; • Warning signs, symptoms and common presentations of stroke syndromes; • Components of a client history and assessment specific to stroke; • Common investigations (tests); and • Validated screening/assessment tools. <p style="text-align: right;">(Level of Evidence = IV)</p>	
<p>15.1 Nurses working in areas with a focus on stroke should have enhanced stroke assessment skills.</p> <p style="text-align: right;">(Level of Evidence = IV)</p>	
<p><i>The discussion of evidence for this recommendation found on page 61-63 of the original guideline has been revised to reflect the following additional literature support:</i></p> <p>Discussion of Evidence</p> <p>Nurses need to be able to incorporate their knowledge of stroke symptoms and focal neurological deficits as they relate to brain anatomy in order to understand the significance of post stroke client symptoms and presentations and initiate appropriate care strategies (Lindsay et al., Update 2010). Recognition of the area of brain affected is especially important for clients with symptoms of new onset stroke or transient ischemic attack as time is brain. Nurses require the knowledge, skills and confidence in their ability to deliver effective therapeutic care throughout the continuum of care of a stroke survivor. The literature (O'Farrell & Zou, 2008; SIGN, 2010) highlights the importance of nurse education and training on ongoing best practices and developments in stroke care.</p> <p>Education should include but not be limited to:</p> <ul style="list-style-type: none"> • risk factors for stroke – assessment for modifiable and non modifiable risk in individuals; • prevention strategies such as effective lifestyle modification for diverse populations; • types of stroke and associated pathophysiology; • warning signs, including characteristics and urgency for management based on presenting symptoms; • criteria for thrombolytic therapy; and • screening to assess for complications from stroke and where appropriate training on tools used for screening of neurological status, swallowing (dysphagia), cognitive deficits (Lindsay et al., Update 2010; Miller et al., 2010). 	
<p>Additional Literature Support</p> <p>Richardson, Murray, House, & Lowenkopf (2006)</p> <p>Sibon, Rouanet, Meissner, & Orgogozo (2009)</p> <p>Stroke Foundation of New Zealand. (2008)</p>	

Organization & Policy Recommendations

<p>16.0 Organizations should develop a plan for implementation that includes:</p> <ul style="list-style-type: none"> • An assessment of organizational readiness to change and barriers to education. • Involvement of all members (whether in a direct or indirect supportive function) who will contribute to the implementation process. • Ongoing opportunities for discussion and education to reinforce the importance of best practices. • Dedication of a qualified individual to provide the support needed for the education and implementation process. • Opportunities for reflection on personal and organizational experience in implementing guidelines. <p>Nursing best practice guidelines can be successfully implemented only where there are adequate planning, resources, organizational and administrative support, as well as appropriate facilitation. In this regard, RNAO (through a panel of nurses, researchers and administrators) has developed the <i>Toolkit: Implementation of Clinical Practice Guidelines</i> based on available evidence, theoretical perspectives and consensus. The Toolkit is recommended for guiding the implementation of the HSFO-RNAO best practice guideline <i>Stroke Assessment Across the Continuum of Care</i>.</p> <p style="text-align: right;">(Level of Evidence = IV)</p>	
<p><i>The discussion of evidence for this recommendation found on page 64 of the original guideline has been revised to reflect the following additional literature support:</i></p> <p>Discussion of Evidence</p> <p>Asplund et al. (2009) examined factors affecting dissatisfaction amongst stroke survivors in acute stroke care and found that dissatisfaction overall was associated with the level of rehabilitation and community service support. There was also an association with stroke survivor characteristics such as degree of dependency for ADL, depressed mood and perception of poor health. Readmission is also associated with dependency for ADLs, wound care and readiness for discharge home (Chuang, Wu, Ma, Chen, & Wu, 2005; Olsson & Sunnerhagen, 2006).</p> <p>Several studies (Asplund et al.; Ellis, Rodger, McAlpine, & Langhorne, 2005; Nir, Zolotogorsky, & Sugarman, 2004; Nir & Weisel-Eichler, 2006; Panella, Marchisio, Barbieri, & Di, 2008; Read & Levy, 2006) identify that being treated in a stroke unit, being able to participate in the planning of care (including discharge planning), use of care pathways structured to the client's functional, psychological and emotional needs, and having a clinician to talk to as needed resulted in fewer reports of dissatisfaction in stroke survivors when surveyed.</p>	<p>+</p>
<p>Additional Literature Supports</p> <p>Hinchey et al. (2005)</p> <p>Nakagawa et al. (2008)</p>	<p>+</p>
<p>17.0 Organizational policy should clearly support and promote the nurses' role in stroke assessment, either independently or in collaboration with other members of the interprofessional team.</p> <p style="text-align: right;">(Level of Evidence = IV)</p>	<p>✓</p>
<p>Additional Literature Supports</p> <p>Lindsay et al. (Update 2010)</p> <p>NSF (2010)</p> <p>O'Farrell & Zou (2008)</p> <p>SIGN (2010)</p>	<p>+</p>

The Review Panel has identified updates **in bold** to the following content areas:

- Page 23 & 24: **Overview of the Ontario Stroke System - Revised**
- Appendix B: Glossary of Terms. **Definitions for Anosognosia, Client, Interprofessional, Mentation, Mnestic and Neglect.**
- Appendix E: Pain Assessment Scales. **Added website to access Wong-Baker Faces Pain Rating Scale.**
- Appendix F: Screening for Cognition/Perception/Language. **Added website to access: MoCA®.**
- Appendix G: Assessing Activities of Daily Living. **Added website to access: Alpha FIM®.**
- Appendix K: Professional Education Resources. **Added websites for:**
 - **Internet Stroke Centre at Washington University.**
 - **Stroke Engine. Topics and Tools.**

Item/Page Number	Revised Content
<p>Overview of the Ontario Stroke System Page 23 & 24</p>	<p>REVISED:</p> <p>The Ontario Stroke Network (OSN) was incorporated in 2008 to provide provincial leadership and coordination for the Ontario Stroke System (OSS). As of 2011 there are now ten Regional Stroke Centres, one enhanced District and 19 District Stroke Centres.</p> <p>The OSN recommends, implements and evaluates province-wide goals and standards for the continuum of stroke care, including health promotion and stroke prevention, acute care, recovery and reintegration processes. OSN supports the evaluation and reporting of the OSS progress. The OSN and OSS share a common vision: Fewer Strokes and Better Outcomes.</p> <p>Since the inception of the OSS (a collaborative system of provider organizations and partners who deliver stroke care across the province) in 2000, significant improvements have occurred in stroke prevention, diagnosis and treatment. There have been positive impacts in the integration and coordination of stroke care resulting in improved access to stroke treatment and related services and improved provider and client satisfaction across the continuum.</p>
<p>Appendix B Glossary of Terms: Page 86</p>	<p>ADDED</p> <p>Anosognosia: Is a self awareness disorder which prevents brain damaged patients from recognizing presence or appreciate the severity of deficits in sensory, perceptual, motor, behavioural or cognitive functioning (Orifei et al., 2009, pg. 280).</p> <p>Client: Inclusive of individuals (patient, resident, client), families/significant others, groups, communities, and populations (RNAO, rev., 2006, pg. 12).</p> <p>Interprofessional: Refers to the provision of comprehensive health services to clients by multiple health caregivers who work collaboratively to deliver quality care within and across settings (Interprofessional Care Steering Committee, 2007).</p> <p>Mentation: Any mental activity, including conscious and unconscious processes (Mosby, 2009).</p> <p>Mnestic: Meaning “memory” (Mosby, 2009).</p> <p>Neglect: The failure to attend or respond to or make movements toward one side of the environment. (Lindsay et al., Update 2010)</p> <ul style="list-style-type: none"> • Unilateral Spatial Neglect or Hemi-Attention: The failure to attend to sensory or visual stimuli on or to make movements toward one side of the environment (typically the left side due to lesions in the right hemisphere) (NSF, 2010, pg. 95).

Appendix:

Changes noted in **BOLD**

Appendix E: Pain Assessment Scales	ADDED Wong-Baker Faces Pain Rating Scale. Available at: http://www.partnersagainstpain.com/printouts/A7012AS6.pdf
Appendix F: Screening for Cognition/ Perception/Language	ADDED Montreal Cognitive Assessment. MoCA®. Available at: http://www.mocatest.org/
Appendix G: Assessing Activities of Daily Living	Alpha FIM® is an abbreviated version of FIM. UDS-Uniform Data System. Alpha FIM®. Available at: http://www.udsmr.org/WebModules/Alpha/Alp_About.aspx
Appendix K: Professional Education Resources	ADDED Internet Stroke Centre at Washington University. Scales & Assessment Tools. Available at: http://www.strokecenter.org/trials/scales/index.htm Stroke Engine. Topics and Tools. Available at: http://strokengine.ca/?page=about



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