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:

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

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

<table>
<thead>
<tr>
<th>Secondary Prevention</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>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)</td>
<td>✓</td>
</tr>
</tbody>
</table>

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:

**Discussion of Evidence**

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).

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.

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:
<table>
<thead>
<tr>
<th>Modifiable</th>
<th>Non-Modifiable</th>
<th>Probable</th>
</tr>
</thead>
</table>
| • 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:  
  - Oral contraceptive use  
  - Post menopause hormone replacement therapy  
• Obesity:  
  - Healthy waist circumference:  
    Men - *Europid*: < 102 cm (40")  
    MEN - *Chinese or South Asian*: < 90 cm (35")  
    Women - *Europid*: < 88 cm (35")  
    Women - *Chinese or South Asian*: 80 cm (32")  
  - BMI: Body weight greater than ideal range (which is 18.5 to 24.9 kg/m²)  
• Obstructive Sleep Apnea (OBS)  
• Physical inactivity  
• Sedentary lifestyle  
• Smoking  
• Stress  
• Vascular Disease, Carotid Stenosis  
*This is number one risk factor for Stroke* |  |
|  |  |  
|  |  | • Age  
• Ethnicity: Canadians of First Nations, African or South Asian descent  
• Family History  
• Gender  
• Heredity  
• Previous Stroke  
• Previous TIA  
|  |  
|  |  | • Congenital cardiac anomalies  
• Elevated homocysteine levels  
• Inflammation & Infection  
• Metabolic Syndrome  
• Migraine headache  
• Sympathomimetic agents  
|
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.

### Additional Literature Support

- Miller et al. (2010)
- NSF (2010)
- SIGN (2010)

### Websites

  - Atrial Fibrillation – The Heart of the Matter (2010). Available at: [http://www.heartandstroke.on.ca/site/c.pvl13eNWJwE/b.5052981/k.2CA6/Heart_Disease__Atrial_fibrillation.htm](http://www.heartandstroke.on.ca/site/c.pvl13eNWJwE/b.5052981/k.2CA6/Heart_Disease__Atrial_fibrillation.htm)
  - Excessive Alcohol Consumption. Available at: [http://www.heartandstroke.com/site/c.ikIQLcMWtJE/b.3484033/k.380A/Excessive_alcohol_consumption.htm](http://www.heartandstroke.com/site/c.ikIQLcMWtJE/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.pvl13eNWJwE/b.3581685/k.CE49/Stroke.htm?src=home](http://www.heartandstroke.on.ca/site/c.pvl13eNWJwE/b.3581685/k.CE49/Stroke.htm?src=home)

### Stroke Recognition

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 “time is brain”.

(Level of Evidence = IV)

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:

### Discussion of Evidence

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 publics’ 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.).
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:

- **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.

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; Koening 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.

Additional Literature Support
Morgenstern et al. (2010)
NSF (2010)
Miller et al. (2010)

**Neurological Assessment**

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:

- 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)
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).
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).

Hypoxia

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, & Comiero, 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.

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).

Additional Literature Support
ESO (2008)

Websites
Stroke Engine. Available at: http://strokengine.ca/?page=about

Cognition/Perception/Language

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:

- 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.

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

(Level of Evidence = IV)
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 (Jiaillard, Naegle, 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, Dammekens, Leemans, & Michiels, 2010; Moreland et al., 2009; Okada, 2007; Ostir, Smith, Smith, & Ottenbaker, 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.
Additional Literature Support
Chen et al. (2006)
ICSI (2010)
Miller et al. (2010)
Summers et al. (2009)

Websites
The USN Assessment Summary Guide. Available at: http://thomasland.metapress.com/content/kqwl3hql4km5f4u/

Neurological Assessment

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)

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:

Discussion of Evidence

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 >38°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).

On page 35 of the original document, second paragraph starting Hemorrhagic transformation... has been changed as follows:

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.
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).
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).

Morgenstern et al. (2010) identified the following key components in the nursing care of clients with ICH in critical care:
- 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.

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.

Additional Literature Support
Seo & Oh, (2009)

Websites
American Heart Association. Stroke Clinical Tools Library. Available at:  
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

Complications
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:
- fall risk:  
  - 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.

(Level of Evidence = IV)
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 interpro-
fessional 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).
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.).

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).

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).

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)

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

Advanced Care Planning

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)
### Discussion of Evidence

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).

### Pain

**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). *(Level of Evidence = IV)*

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:

**Discussion of Evidence**

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:

- 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.

RNAO, (rev. 2007a) guideline, *Assessment and Management of Pain* 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.
### Additional Literature Support

**Miller et al. (2010)**

**NSF (2010)**

**SIGN (2010)**

**Summers et al. (2009)**

### Websites

- **Stroke Engine. Topics and Tools.** Available at: [http://strokengine.ca/?page=about](http://strokengine.ca/?page=about)

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### Dysphagia

**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)

**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.**

(Level of Evidence = IIa)

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**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:**

#### Discussion of Evidence

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).

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.
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](http://swallowinglab.uhnres.utoronto.ca/order.html).

**Additional Literature Support**
- Bravata, et al. (2009)
- Miller et al. (2010, pg.1689, Recommendation 4)
- NSF (2010)
- Summers et al. (2009)

**Website**
- Stroke Engine. Topics and Tools. Available at: [http://strokengine.ca/?page=about](http://strokengine.ca/?page=about)

### Nutrition

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)

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:

#### Discussion of Evidence

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.

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.
### Activities of Daily Living

**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.

(Level of Evidence = IV)

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:

#### Discussion of Evidence

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, & Lindeman, 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.

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.
### Bowel and Bladder

| 9.0 Nurses in all practice settings should assess clients for fecal incontinence and constipation. | ✓ |

*(Level of Evidence = IV)*

**Discussion of Evidence**

Fecal incontinence continues to occur in a small percentage of clients post stroke. NSF (2010) identifies the need for:

- 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.

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).

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

*(Level of Evidence = IV)*

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**Websites**

- **Internet Stroke Centre at Washington University:**
  - Modified Rankin Scale. Available at: [http://www.strokecenter.org/trials/scales/rankin.html](http://www.strokecenter.org/trials/scales/rankin.html)
  - Scales & Assessment Tools. Available at: [http://www.strokecenter.org/trials/scales/index.htm](http://www.strokecenter.org/trials/scales/index.htm)


- **Stroke Engine. Topics and Tools.** Available at: [http://strokengine.ca/?page=about](http://strokengine.ca/?page=about)

- **UDS-Uniform Data System. Alpha FIM®.** Available at: [http://www.udsmr.org/WebModules/Alpha/Alp_About.aspx](http://www.udsmr.org/WebModules/Alpha/Alp_About.aspx)

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**Additional Literature Support**

- Bracci et al. (2007)
- Lindsay et al. (Update, 2010)
- Miller et al. (2010)
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, & McNeill, 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) |  

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22
Depression

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.

(Level of Evidence = IV)

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:

Discussion of Evidence

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:

- **Gender** - female (Carod-Artal, Ferreira, Trizotto, & Menezes, 2009; Cassidy, O’Connor, & O’Keane, 2004; Masskulpan, Riewthong, Daijpratham, & 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.).

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.
Additional Literature Support
Berg, Lonnqvist, Palomaki, & Kaste (2009)
RNAO, (rev. 2010)

Websites
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://strokengine.ca/?page=about

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)

Additional Literature Support
RNAO (2009)

Caregiver Strain
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)

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:

Discussion of Evidence
Multiple studies have identified factors that contribute to caregiver burden when supporting stroke survivors such as:

- 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, & Qin, 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).
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).

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).

### Additional Literature Support

- NSF 2010
- SIGN 2010

### Websites


### Sexuality

**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.

(Level of Evidence = IV)

### Additional Literature Support

- ESO (2008)
- Miller et al. (2010)
- NSF (2010)
- SIGN (2010)

### Client and Caregiver – Readiness to Learn

**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.

(Level of Evidence = IV)
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:

### Discussion of Evidence

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:

- event/diagnosis, and
- stabilization (acute),
- preparation (discharge),
- implementation (first months at home), and
- adaptation (adjustment period at home).

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).

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<td>Choi-Kwon et al. (2005)</td>
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### Documentation

**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.

*(Level of Evidence = IV)*

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<tr>
<td>ESO (2008)</td>
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<td>Landgraff, Passek, &amp; Kerns (2009)</td>
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<td>Lindsay et al. (Update 2010)</td>
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<td>Miller et al. (2010)</td>
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<td>NSF (2010)</td>
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<td>SIGN (2010)</td>
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### Education Recommendations

**15.0 Basic education for entry to practice should include:**

- 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.

(Level of Evidence = IV)

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

(Level of Evidence = IV)

**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:**

**Discussion of Evidence**

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.

Education should include but not be limited to:

- 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).

**Additional Literature Support**

Richardson, Murray, House, & Lowenkopf (2006)

Sibon, Rouanet, Meissner, & Orgogozo (2009)

Stroke Foundation of New Zealand. (2008)
### Organization & Policy Recommendations

#### 16.0 Organizations should develop a plan for implementation that includes:

- 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.

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)

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:

**Discussion of Evidence**

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).

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.

**Additional Literature Supports**

- Hinchey et al. (2005)
- Nakagawa et al. (2008)

#### 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.  

(Level of Evidence = IV)

**Additional Literature Supports**

- Lindsay et al. (Update 2010)
- NSF (2010)
- O’Farrell & Zou (2008)
- SIGN (2010)
The Review Panel has identified updates in bold to the following content areas:

- Page 23 & 24: Overview of the Ontario Stroke System - Revised
  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 K: Professional Education Resources. Added websites for:
  - Internet Stroke Centre at Washington University.
  - Stroke Engine. Topics and Tools.

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<th>Item/Page Number</th>
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<tr>
<td>Overview of the Ontario Stroke System Page 23 &amp; 24</td>
<td>REVISED: 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. 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. 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.</td>
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| Appendix B Glossary of Terms: Page 86 | ADDED
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).

Client: Inclusive of individuals (patient, resident, client), families/significant others, groups, communities, and populations (RNAO, rev., 2006, pg. 12).

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).

Mentation: Any mental activity, including conscious and unconscious processes (Mosby, 2009).

Mnestic: Meaning “memory” (Mosby, 2009).

Neglect: The failure to attend or respond to or make movements toward one side of the environment. (Lindsay et al., Update 2010)

- 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 E: Pain Assessment Scales

**ADDED**

### Appendix F: Screening for Cognition/Perception/Language

**ADDED**

### Appendix G: Assessing Activities of Daily Living

Alpha FIM® is an abbreviated version of FIM. UDS-Uniform Data System.

**ADDED**
Alpha FIM®. Available at: [http://www.udsmr.org/WebModules/Alpha/Alp_About.aspx](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](http://www.strokecenter.org/trials/scales/index.htm)

Stroke Engine. Topics and Tools. Available at: [http://strokengine.ca/?page=about](http://strokengine.ca/?page=about)

References


Registered Nurses’ Association of Ontario (RNAO). (rev. 2010). Screening for Delirium, Dementia and Depression in Older Adults. Toronto, ON: Registered Nurses’ Association of Ontario.


