

Nova Scotia Health



Clinical Guidelines

IMPROVING CARDIOVASCULAR HEALTH OF NOVA SCOTIANS

Nova Scotia Guidelines for Stroke Care

May 2008



Your Health Matters

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Where guidelines are modified for local circumstances, significant departures from the provincial guidelines should be fully documented and the reasons for the differences explicitly detailed.

If you develop tools and forms within your district to support the guidelines, please share them with us and we will post them in the toolbox on our website. If you wish to obtain sample tools, forms and protocols, please visit the Cardiovascular Health Nova Scotia website at <http://www.gov.ns.ca/health/cvhns/> or contact us by telephone (902) 473-7834, fax (902) 473-8616 or e-mail: cvhns@cdha.nshealth.ca.

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INTRODUCTION

Background and History

In November 2000, the Stroke Working Group of the Heart and Stroke Foundation of Nova Scotia established the Nova Scotia Integrated Stroke Strategy Committee (NSISS 2000). This group developed a comprehensive model for organized stroke care for the province. Stakeholders from across the province, both in working groups and in extensive consultations, participated in the development of the Strategy. The work resulted in the report entitled *Re-organizing Stroke Care in Nova Scotia, Report of the Nova Scotia Integrated Stroke Strategy Committee*, released in March 2002.¹

In response, the Nova Scotia Department of Health conducted a gap analysis to determine and understand the implementation issues highlighted in the Stroke Strategy report.¹ Consultation with key stakeholders was undertaken. The analysis indicated that the principles in the strategy were sound, but that the report did not address the impact or feasibility of implementation, or issues related to critical mass and patient volumes. The gap analysis indicated that more consultation regarding service delivery and costs with key stakeholders and decision makers at the District level would be required.

The gap analysis identified acute stroke care and stroke rehabilitation as areas for further study. As a result, the Department of Health, Acute and Tertiary Care Branch established the Acute Stroke Care Working Group and the Stroke Rehabilitation Working Group to review existing models and to develop Nova Scotia guidelines and related implementation strategies.

These Stroke Care Working Groups were led by Cardiovascular Health Nova Scotia (CVHNS) and were comprised of representatives from both government and health service delivery at various levels including physicians, District Health Authority (DHA) senior leadership, emergency health, and rehabilitation services. The working groups reviewed the gap analysis and related resource requirements using the Department of Health Quality Framework.

CVHNS is a provincial program of the Nova Scotia Department of Health that aims to improve the cardiovascular health and care of Nova Scotians. The Program's scope includes cardiac disease and stroke. CVHNS is responsible for:

- developing guidelines and service delivery models,
- working with DHAs to improve cardiovascular health,
- monitoring and reporting cardiovascular health outcomes,
- facilitating professional development opportunities for health providers, and
- working with others to reduce the risk and burden of cardiovascular disease.

CVHNS is accountable to the Acute and Tertiary Care Branch of the Nova Scotia Department of Health and receives advice from a Provincial Advisory Council. The Council advises the Program and subsequently the Department of Health on pertinent health care issues and priorities related to the Program's mandate. The Advisory Council consists of physicians, senior leaders from the DHAs, researchers, health professionals, and non-governmental organizations.

Mandate of the Working Groups

The mandate of the Stroke Care Working Groups was to develop and recommend best practice guidelines for the management of stroke in Nova Scotia from prevention through acute care, rehabilitation, and community reintegration.

Process

Evidence-based best practices are produced to help health professionals, managers, patients, and caregivers make decisions about healthcare in specific clinical circumstances.

The Stroke Care Working Groups adopted and adapted best practice guidelines utilizing a comprehensive process, including a review of existing stroke management practices in Nova Scotia¹ and the *Canadian Best Practice Recommendations for Stroke Care 2006*.² Other guidelines and documents identified and reviewed throughout this process included, but were not limited to documents published in Canada,²⁻⁵ the United States,⁶⁻¹⁰ England,¹¹ Australia,^{12,13} New Zealand¹⁴ and Scotland.¹⁵⁻¹⁸ This review revealed a wealth of expertise and interest in the quality of stroke care, further supporting the need for standards and guidelines to guide clinical decisions regarding treatment and care of Nova Scotians who have suffered a stroke.

The process to identify and review key guidelines involved the following steps: Key international guidelines were identified through a literature search and a review conducted by policy staff at the Department of Health; all best-known stroke guidelines were reviewed by the Acute Stroke Working Group Committee. The committee then prioritized which guidelines would be included in the review, based on levels of evidence, comprehensiveness, readability and validation.

Topics deemed suitable for inclusion were based on the core elements of an integrated stroke strategy, as well as those with higher levels of evidence. Guidelines statements were reviewed and compared, and decisions made regarding which statements best captured the intent of the guideline. Once completed, the Canadian Stroke Strategy (CSS) Best Practice Recommendations for Stroke Care 2006² were incorporated into the draft Nova Scotia Stroke Care Guidelines – the CSS Guidelines were developed utilizing the AGREE tool.¹⁹

Once drafted, the guidelines were reviewed by the acute stroke working group and rehabilitation working group members in two drafts, and feedback incorporated as appropriate. Implementation strategies were discussed and developed throughout the process.

Aims of the Guidelines

The aims of the guidelines are to:

- Provide explicit recommendations for practicing clinicians, managers, administrators, patients and caregivers about the management of stroke and TIA, covering the continuum from the acute event to the longer-term management in the community.

- Provide recommendations based on best available evidence and contextualized to Nova Scotia.
- Provide consensus statements from the working parties or groups for important areas of clinical practice where evidence is lacking.

Principles

The principles of the guidelines are that they should:

- Address issues in stroke management that are important
- Draw upon published evidence wherever possible
- Indicate areas of uncertainty or controversy

Wherever possible, we have avoided making discipline-specific recommendations, trying instead to address problems from the patient's perspective, suggesting what interventions are needed, but not who should make them.

Scope

These provincial guidelines cover the acute and long-term management of stroke in adults (over 16 years) from onset through prevention of recurrence, rehabilitation, and community reintegration. The scope of these guidelines includes the management of all subtypes of stroke (transient ischemic attack [TIA], ischemic stroke [or cerebral infarction], intracerebral hemorrhage and subarachnoid hemorrhage). These guidelines do not cover primary (population-based) prevention and the details of surgical management.

Definitions

The word *stroke* is used to refer to a clinical syndrome, of presumed vascular origin, typified by rapidly developing signs of focal or global disturbance of cerebral function lasting more than 24 hours or leading to death.²⁰ This clinical syndrome may result from cerebral infarction, intracerebral hemorrhage, or subarachnoid hemorrhage. Detailed definitions of stroke subtypes are included in **Appendix A**.

Context and Use

The guidelines should be taken as statements to inform, not as rigid rules. Guidelines cannot cover every eventuality and new evidence is published every day. Furthermore, this guideline should not be used as a legal resource, as its general nature cannot provide individualized guidance for all patients in all circumstances.²¹

These guidelines relate particularly to the management of stroke care. It is assumed that they will be used within the context of the services available in each DHA, and clinicians and others will be operating within professionally recognized standards of practice. Feedback is most welcome, as these guidelines will be updated on a regular basis to keep abreast of new evidence.

STROKE IN NOVA SCOTIA

Prevalence and Burden of Stroke

- Approximately 1500 Nova Scotians experience a stroke each year. This statistic is an estimate only, as no epidemiologically rigorous study of stroke has been conducted in Nova Scotia, or elsewhere in Canada. Of those individuals who survive, more than half require ongoing assistance with daily activities.
- Cardiovascular diseases combined are responsible for 32% of all deaths in Nova Scotia.⁴
- Strokes account for 22% of all cardiovascular disease deaths in Nova Scotia.⁴
- Circulatory diseases, particularly heart disease, stroke, and hypertension cost the Nova Scotia healthcare system an estimated \$252 million each year in hospital, physician, and drug costs alone.²²
- Stroke in Canada costs more than \$3 billion, primarily because of the high rates of resulting disability and institutionalization.^{23,24}

Public Awareness in Nova Scotia

Public awareness of stroke in Nova Scotia is similar, or slightly better than the national average, according to survey results submitted by Environics Omnibus on behalf of the Heart and Stroke Foundation (Survey September 19, 2004 – October 24, 2005): 83% responded that they knew the medical term stroke; when asked to describe a stroke, 45% of Nova Scotians responded with an explanation including a disruption or blockage of blood to the brain (compared with 50% of the total number of Canadians surveyed).

Table 1 compares the awareness of the signs of stroke between Nova Scotians and Canadians.

Response Category	Nova Scotia (%)	Canada (%)
Sudden weakness, numbness, tingling in face/arm/leg	48	43
Dizziness or loss of balance	43	39
Loss of speech or trouble speaking	24	27
Vision problems, blurry vision	37	25
Headache	20	18
Did not know/no answer	15	18

Nova Scotians were also as likely as other Canadians to be able to identify all the following risk factors for stroke: smoking, diet, high blood pressure (BP), high cholesterol, obesity, lack of exercise, family history and stress. Forty-four percent of Nova Scotians knew to dial 911 when someone has a stroke.

Supports for Local Adaptation

The Stroke Care Working Groups acknowledge that local adaptation of these guidelines will create different and unique challenges for each of the District Health Authorities. Diversity in local stroke statistics, resources, and geographical location will inform considerations for local

adaptation of the guidelines. When implementing the Stroke Care Guidelines at the DHA level, the following issues should be considered:

- Improving access to education and training for practitioners involved in delivering stroke care.
- Developing and sharing protocols/care paths/algorithms.
- Improving access to, and linkages with, other related specialist services.
- Sharing services between neighboring District Health Authorities (re: critical mass).
- Involving local champions and leaders in stroke care to support and liaise on business and implementation planning.
- Using telemedicine and other clinical-decision support tools.

As a provincial program of the Department of Health, Cardiovascular Health Nova Scotia can play a role in guideline dissemination and uptake by:

- Providing support for implementation of these guidelines through education and training initiatives.
- Providing implementation-planning consultation.
- Providing communication and clinical-decision support tool development and dissemination.
- Monitoring and evaluating implementation.

CORE ELEMENTS OF AN INTEGRATED STROKE STRATEGY

The Canadian Stroke Strategy (CSS) was initiated in 2003 under the leadership of the Canadian Stroke Network (CSN) and the Heart and Stroke Foundation of Canada (HSFC). The vision of CSS is that *“all Canadians have optimal access to integrated, high-quality and efficient services in stroke prevention, treatment, rehabilitation, and community reintegration. The CSS serves as a model for innovation and positive health system reform in Canada and internationally.”*²

The key components required across the continuum as part of a “system” for coordinated and integrated stroke care are identified in Table 2. The development of coordinated and integrated stroke strategies at the local, regional and/or provincial levels should include as many of these components as possible to ensure comprehensiveness of the stroke strategy. However, as stated previously, it is recognized that systemic and resource restrictions may make this difficult in some jurisdictions. These core elements were reflected in the original Stroke Strategy Report developed in Nova Scotia.¹

The *Nova Scotia Integrated Stroke Strategy: Reorganizing Stroke Care in Nova Scotia* report¹ recommends a coordinated, three-level system to provide equitable access to optimal stroke care throughout the province. Prevention, pre-hospital, acute care, rehabilitation and community reintegration are considered, and services are recommended at the community, district, and provincial levels. While many of the resources required are already in place, the components most lacking are specialized services at the district level, and coordination and integration between service levels.

Table 2. Core Elements of an Integrated Stroke Strategy*

Health Promotion and Primary Prevention	Pre-hospital and Emergency Care	Acute Care and Treatment	Stroke Rehabilitation	Community Re-integration
<ul style="list-style-type: none"> • Health promotion efforts that contribute to the primary prevention of stroke in all communities (integrated with existing chronic disease prevention initiatives) • Stroke prevention offered by primary care providers • Public awareness initiatives focusing on the signs and symptoms of stroke • Enhanced public education on the warning signs of stroke and the appropriate response • Definition, dissemination, and implementation of best practices • Ongoing monitoring and evaluation 	<ul style="list-style-type: none"> • Best practices for emergency medical services, physicians and nurses implemented • Heightened emergency response with appropriate protocols • Definition, dissemination, and implementation of best practices • Ongoing monitoring and evaluation 	<ul style="list-style-type: none"> • Organized stroke care (stroke units with critical mass of trained staff functioning in an interdisciplinary team) • Initial assessment performed by clinicians experienced in stroke • Timely access to diagnostic services (neuro-imaging) • Timely access to thrombolytic therapy (tissue-plasminogen activator [TPA]) and other reperfusion strategies • Definition, dissemination, and implementation of best practices • Ongoing monitoring and evaluation 	<ul style="list-style-type: none"> • Organized stroke care (post-acute stroke rehabilitation units) • Initial assessment performed by clinicians experienced in stroke • Timely access to specialized, interdisciplinary stroke rehabilitation • Timely access to appropriate levels of rehabilitation intensity for stroke survivors • Stroke rehabilitation support provided to caregivers • Long-term rehabilitation services widely available in nursing and continuing care facilities, and in outpatient and community programs • Optimization of strategies to prevent the recurrence of stroke • Outcome data for stroke rehabilitation required • Definition, dissemination, and implementation of best practices • Ongoing monitoring and evaluation 	<ul style="list-style-type: none"> • Assistance received by stroke survivors and their families with an evolving care plan and regular follow-up assessments • Health care professionals and caregivers in community and long-term care settings have stroke care expertise • Ongoing support in the form of community programs, respite care and educational opportunities available to support caregivers in balancing personal needs with caregiving responsibilities • Strategies to assist stroke survivors to maintain, enhance, and develop appropriate social support • Definition, dissemination, and implementation of best practices • Ongoing monitoring and evaluation
<p>*Adapted with permission from Reference #25</p>		<p>Stroke Secondary Prevention</p> <ul style="list-style-type: none"> • Secondary stroke prevention strategies are implemented in the acute care, rehabilitation and community re-engagement phases of the stroke care continuum. • Stroke prevention clinics in place to improve secondary stroke prevention through effective, consistent prevention with early recognition of risk factors, and timely, targeted intervention • Stroke prevention offered by primary care providers, • Optimization of strategies to prevent the recurrence of stroke • Definition, dissemination, and implementation of best practices • Ongoing monitoring and evaluation 		

LEVELS OF EVIDENCE

The following table summarizes the definitions for each level of evidence reported in this document. More detailed information about the evidence rating systems is available in each of the referenced primary guidelines documents.

Level of Evidence		Definition
A	I	<ul style="list-style-type: none"> – At least one randomized controlled trial (RCT); or – A meta-analysis of several RCTs
B	II	<ul style="list-style-type: none"> – Well-designed, controlled trial without randomization; or – Well-designed cohort or case-control analytic study; or – Multiple time series – Dramatic results of uncontrolled experiment.
C	III	<ul style="list-style-type: none"> – At least one well-designed, nonexperimental descriptive study (e.g. comparative studies, correlation studies, case studies); or – Expert committee reports, opinions; and/or – Experience of respected authorities
	III-1	<ul style="list-style-type: none"> – Evidence obtained from well-designed pseudo-RCTs (alternate allocation or some other method)
	III-2	<ul style="list-style-type: none"> – Evidence obtained from comparative studies with concurrent controls and allocation not randomized (cohort studies); or – Case-control studies; or – Interrupted time-series with a control group
	III-3	<ul style="list-style-type: none"> – Evidence obtained from comparative studies with historical control; or – Two or more single-arm studies; or – Interrupted time series without a parallel control group
D	IV	<ul style="list-style-type: none"> – Expert committee reports, opinions and/or experience of respected authorities. <p>This grading indicates that directly applicable clinical studies of good quality are absent.</p>
R	R	<ul style="list-style-type: none"> – Recommended good practice based on the clinical experience of the relevant guideline development group.

Public Awareness and Responsiveness

Improving stroke outcomes by increasing the number of individuals eligible to receive time-dependent stroke therapy requires recognition by the public and healthcare professionals of the possibility of stroke in an individual case and on taking immediate action.

1. Recognition of Stroke and Responsiveness

- All people (members of the public) should be able to recognize and identify at least two signs and symptoms of stroke,²⁶ and know how to take appropriate action (i.e. seek immediate medical attention). [*Level III*³]
 - **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
 -
- Heart and Stroke Foundation of Canada: The Warning Signs of Stroke 2006

Pre-hospital Care

Effective and rapid pre-hospital care is a critical part of the continuum of care for stroke patients. Paramedics can play a major role in improving overall stroke care by minimizing scene times, providing optimal pre-hospital assessment and treatment, and rapidly transporting the patient to the most appropriate hospital. Implementing pre-hospital protocols for early identification and notification of the receiving hospital can also substantially reduce the time to definitive treatment.

2. Assessment and Transport

- Conduct a rapid assessment that includes use of an acute stroke protocol to determine appropriate destination for the patient. *[Level III²⁶]*
- Develop formal bypass or diversion protocols and transfer agreements, so that individuals meeting inclusion criteria for time-dependent therapy have the opportunity to receive them. *[Level II²⁶]*
- Maintain NPO until swallowing status is determined. *[Level II²]*

Hospital Care: Management in the Emergency Department

Rapid diagnosis of stroke and immediate consideration of treatment options are important for hyperacute therapy. It is therefore vital that emergency department protocols reflect this, and that stroke be triaged and responded to in an appropriate manner.

3.	<p><u>Triage</u></p> <ul style="list-style-type: none">• Stroke should be treated as a medical emergency and prioritized as such by emergency department staff, with rapid referral to the stroke team. [Level III¹²]
4.	<p><u>Diagnostic Evaluation</u></p> <p>Brain Imaging</p> <p>4a</p> <ul style="list-style-type: none">• Patients should be assessed by a clinician experienced in the evaluation of stroke. All patients with suspected acute stroke should undergo brain imaging immediately. In most instances, the modality of choice is a non-contrast computer-assisted tomographic (CT) scan. If magnetic resonance imaging (MRI) is performed, the scan should include diffusion-weighted imaging (DWI) sequences to detect ischemia, and gradient echo (T2*-weighted) and fluid attenuated inversion recovery (FLAIR) pulse sequences for hemorrhage. [Level B^{3,11,14}] <p>Investigations</p> <p>4b</p> <ul style="list-style-type: none">• The following investigations should be routinely obtained in all patients: [Level III¹²]<ul style="list-style-type: none">– complete blood count– electrocardiogram– electrolytes– creatinine– International Normalized Ratio (INR); and– blood glucose (BG) <p>4c</p> <ul style="list-style-type: none">• Selected patients may require the following additional investigations. These tests should be performed as soon as possible after stroke onset, and in selected patients, some of these tests may need to be performed as an emergency procedure. [Level III¹²]<ul style="list-style-type: none">– carotid duplex ultrasound– echocardiography– angiography

<p>4d</p>	<ul style="list-style-type: none"> – MRI – fasting lipids – erythrocyte sedimentation rate – chest X-ray – vasculitis screen – syphilis serology – prothrombotic screen – etc. <ul style="list-style-type: none"> • All patients with suspected acute stroke should have their blood glucose concentration checked immediately. Blood glucose measurement should be repeated if the first value is abnormal or if the patient is known to have diabetes. Hypoglycemia should be corrected immediately. Markedly elevated blood glucose concentrations should be treated with glucose-lowering agents. <i>[Level B-C^{3,12}]</i> <p>Dysphagia Assessment</p> <ul style="list-style-type: none"> • Prior to initiating oral intake of fluids or food, all patients with stroke should have their swallow screened, using a simple, valid, reliable bedside-testing protocol. <i>[Level B-C^{2,3,12,14,18,27}]</i> • Patients on nil by mouth or modified diet should continue to receive clinically essential medication by an appropriate route. <i>[Level IV²]</i>
<p>5.</p> <p>5a</p> <p>5b</p>	<p><u>Thrombolytic Therapy for Acute Ischemic Stroke</u></p> <ul style="list-style-type: none"> • All acute ischemic stroke patients should be evaluated for treatment with intravenous alteplase (recombinant tissue-plasminogen activator [TPA]) using the eligibility criteria and protocol from the National Institute of Neurological Disorders and Stroke rt-PA Stroke Study.²⁸ Administration of TPA should follow the American Stroke Association Guidelines. <i>[Level A-B^{3,6,11}]</i> • All eligible patients should receive TPA within one hour of hospital arrival and within three hours of symptom onset. "Eligible patients" refers to those who arrive at hospital within three hours of the onset of stroke symptoms and in whom TPA is not contraindicated. <i>[Level B-C^{3,11}]</i>
<p>6.</p> <p>6a</p>	<p><u>Management of Subarachnoid and Intracerebral Hemorrhage</u></p> <ul style="list-style-type: none"> • Patients with suspected subarachnoid hemorrhage should have an urgent neurosurgical consultation for diagnosis and treatment. <i>[Level B²]</i>

6b	<ul style="list-style-type: none"> Patients with cerebellar hemorrhage should have an urgent neurosurgical consultation for consideration of craniotomy and evacuation of the hemorrhage. <i>[Level C²]</i>
6c	<ul style="list-style-type: none"> Patients with supratentorial intracerebral hemorrhage should be cared for on a stroke unit. <i>[Level B-C²]</i>
7.	<p><u>Carotid Artery Imaging</u></p> <ul style="list-style-type: none"> Carotid imaging should be performed within 24 hours of a carotid territory TIA or nondisabling ischemic stroke, unless the patient is clearly not a candidate for carotid endarterectomy. <i>[Level B^{2,3,16}]</i>

General Stroke Treatment

There is overwhelming evidence that the most effective care for stroke patients is provided on a geographically defined ward area, where coordinated care is provided by a specialized, experienced stroke team. The structure of stroke unit care varies between facilities, but all provide care according to protocols, and have regular team meetings and access to ongoing education.

8. Stroke Units

- 8a • Patients admitted to hospital because of an acute stroke should be treated in an interdisciplinary stroke unit. *[Level A/T^{3,17,27}]*
- 8b • A stroke unit is a specialized, geographically defined hospital unit dedicated to the management of stroke patients. *[Level A/T^{11,12}]*
- 8c • The core interdisciplinary team should consist of appropriate levels of medical, nursing, nutrition, occupational therapy, physiotherapy, social work, and speech-language pathology staff. Additional disciplines may include pharmacy, (neuro)psychology, and recreation therapy. *[Level B^{12,17,27}]*
- 8d • Staff specializing in the management of stroke should have access to ongoing professional education. *[Level III¹²]*

9. Assessment of the Stroke Patient

- 9a • All people admitted to hospital with acute stroke should be assessed by the interdisciplinary team as soon as possible after admission *[Level A¹¹]*, preferably within the first 24 to 48 hours. *[Level C¹⁴]*
- 9b • All people with acute stroke not admitted to hospital should undergo comprehensive outpatient assessment(s) that includes a medical evaluation and functional assessments. *[Level A¹¹]*, preferably within two weeks. *[Level C/D²]*
- 9c • Stroke unit teams should conduct at least one formal interdisciplinary meeting per week at which patient problems are identified, rehabilitation goals set, progress monitored, and support after discharge planned. *[Level B¹⁷]*
- 9d • Clinicians should use standardized, valid assessments to evaluate the patient's stroke-related impairments and functional status, and encourage patient participation in community and social activities. *[Level III⁶]*

10.	<u>Medical Management and General Supportive Care</u>
10a	<ul style="list-style-type: none"> • After brain imaging has excluded hemorrhage, all acute stroke patients should be given at least 160 mg of acetylsalicylic acid (ASA) immediately as a one-time loading dose. [Level A^{11,14}]
10b	<ul style="list-style-type: none"> • In patients treated with TPA, administration of ASA should be delayed until after the post-thrombolysis scan has excluded intracranial hemorrhage. [Level A^{11,14,15}]
10c	<ul style="list-style-type: none"> • ASA (81–325 mg daily) should then be continued indefinitely or until an alternative antithrombotic regimen is started. [Level A¹¹]
10d	<ul style="list-style-type: none"> • In dysphagic patients, ASA may be given by enteral tube or by rectal suppository. [Level A¹¹]
10e	<ul style="list-style-type: none"> • The routine acute use of anticoagulation (e.g. intravenous unfractionated heparin) in unselected patients following ischemic stroke/TIA is not recommended. [Level I¹²]
10f	<ul style="list-style-type: none"> • Drugs that have been used historically or traditionally, but for which there is no evidence of benefit from randomized controlled trials (e.g. steroids, hemodilution, glycerol, etc.), should be avoided. [Level I¹²]
10g	<ul style="list-style-type: none"> • The use of alternative therapies or complementary medicines without evidence of benefit from randomized controlled trials is discouraged. Of particular importance is avoidance of therapies that may interact with those prescribed by the treating physician (e.g. the use of <i>Ginkgo biloba</i> in patients on antiplatelet therapy). [Level I¹²]
10h	<ul style="list-style-type: none"> • Early physiological changes including hypertension, hypotension, hyperglycemia, fever, and hypoxia have all been shown to have an effect on outcome and should be routinely monitored in stroke patients. [Level III¹²]
10i	<ul style="list-style-type: none"> • Patients who are hypoxic should be given oxygen supplementation. [Level III¹²]
10j	<ul style="list-style-type: none"> • If severe hypertension (e.g. BP > 200/110 mm Hg) exists, instituting or intensifying antihypertensive therapy may be considered, but BP should be cautiously reduced (i.e. by no more than 10-20%) and the patient observed for signs of neurological deterioration. [Level III¹²]
10k	<ul style="list-style-type: none"> • Pre-existing antihypertensive therapy may be continued (orally or via nasogastric tube) provided there is no hypotension or other reason to withhold treatment. [Level III¹²]

10l	<ul style="list-style-type: none"> All patients with suspected acute stroke should have their blood glucose concentration checked immediately. Blood glucose measurement should be repeated if the first value is abnormal or if the patient is known to have diabetes. Hypoglycemia should be corrected immediately. Markedly elevated blood glucose concentrations should be treated with glucose-lowering agents. <i>[Level B-C^{3,12}]</i>
11.	<p><u>Principles of Inpatient Stroke Rehabilitation</u></p> <p>11a</p> <ul style="list-style-type: none"> All patients with stroke who are admitted to hospital and who require rehabilitation should be treated in a comprehensive or rehabilitation stroke unit by an interdisciplinary team. <i>[Level A¹³]</i> <p>11b</p> <ul style="list-style-type: none"> Where admission to a stroke rehabilitation unit is not possible, longer-term inpatient rehabilitation should be provided on a mixed rehabilitation unit (i.e. where interdisciplinary care is provided to patients disabled by a range of disorders including stroke). <i>[Level B¹⁷]</i> <p>11c</p> <ul style="list-style-type: none"> All patients with stroke should begin rehabilitation therapy as early as possible once medical stability has been reached. <i>[Level I⁶]</i> <p>11d</p> <ul style="list-style-type: none"> Patients should undergo as much therapy appropriate to their needs as they are willing and able to tolerate. <i>[Level A¹¹]</i> <p>11e</p> <ul style="list-style-type: none"> The team should promote the practice of skills gained in therapy into the patient's daily routine in a consistent manner. <i>[Level A¹¹]</i> <p>11f</p> <ul style="list-style-type: none"> Therapy should include repetitive and intense use of novel tasks that challenge the patient to acquire motor skills needed to use the involved limb during functional tasks and activities. <i>[Level A²⁷]</i>

Components of Stroke Management That Cross the Continuum of Care

Stroke care is multifaceted and requires a coordinated interdisciplinary team approach and long-term management. The following aspects of stroke care should be assessed and managed across the continuum of stroke care, from acute care to community re-integration.

12.	<u>Dysphagia Assessment</u>
12a	<ul style="list-style-type: none"> • All patients with stroke should have their swallow screened prior to initiating oral intake of fluids or food utilizing a simple, valid reliable bedside testing protocol. <i>[Level B^{3,14,18,27}]</i>
12b	<ul style="list-style-type: none"> • Patients with stroke presenting with features indicating dysphagia or pulmonary aspiration should receive a full clinical assessment of swallowing by a speech-language pathologist or appropriately trained specialist who should advise on safe swallow and consistency of diet and fluids. <i>[Level A^{3,11,14,27}]</i>
13.	<u>Nutrition</u>
13a	<ul style="list-style-type: none"> • Patients with suspected nutritional problems should be referred to a dietitian and provided with nutritional support. <i>[Level I¹²]</i>
13b	<ul style="list-style-type: none"> • Alternative means of feeding or hydration (e.g. nasogastric tube, intravenous, percutaneous endoscopic gastrostomy) should be considered as soon as possible for patients unable to maintain adequate oral nutrition/hydration. <i>[Level I¹²]</i>
14.	<u>Communication</u>
14a	<ul style="list-style-type: none"> • Patients with suspected communication difficulties should be assessed by a speech-language pathologist. <i>[Level III-2¹²]</i>
14b	<ul style="list-style-type: none"> • Patients with communication difficulties should be treated as early and as frequently as possible. <i>[Level III¹²]</i>
14c	<ul style="list-style-type: none"> • The speech-language pathologist should advise staff and caregivers of appropriate supportive communication techniques. <i>[Level III-2¹²]</i>
15.	<u>Mobility</u>
15a	<ul style="list-style-type: none"> • Patients with suspected mobility difficulties should be assessed by a physiotherapist. <i>[Level III¹²]</i>

15b	<ul style="list-style-type: none"> • Patients should be mobilized as early and as frequently as possible. <i>[Level III-3¹²]</i>
15c	<ul style="list-style-type: none"> • The physiotherapist should advise staff and caregivers of appropriate mobilizing and transfer techniques and prescribe aids as required. <i>[Level III¹²]</i>
16	<p><u>Activities of Daily Living</u></p>
16a	<ul style="list-style-type: none"> • Patients with suspected difficulties with activities of daily living should be assessed by an occupational therapist. <i>[Level II¹²]</i>
16b	<ul style="list-style-type: none"> • Patients with suspected sensory and motor control difficulties impacting on upper limb function and activities of daily living should be assessed by an occupational therapist and/or physiotherapist. <i>[Level III¹²]</i>
16c	<ul style="list-style-type: none"> • Patients with suspected cognition and/or perceptual difficulties should be assessed by one or more of the following: occupational therapist, neuropsychologist, psychologist, speech-language pathologist. <i>[Level III¹²]</i>
16d	<ul style="list-style-type: none"> • The occupational therapist should advise staff and caregivers on techniques and equipment to maximize outcomes relating to activities of daily living, sensorimotor function, perception and cognition. <i>[Level III¹²]</i>
16e	<ul style="list-style-type: none"> • Patients with confirmed activities of daily living problems should have an ADL management plan formulated and documented. <i>[Level III¹²]</i>
17.	<p><u>Continence</u></p>
17a	<ul style="list-style-type: none"> • Patients with suspected continence difficulties should be assessed by trained personnel. <i>[Level III¹²]</i>
17b	<ul style="list-style-type: none"> • Patients with confirmed continence difficulties should have a continence management plan formulated and documented. <i>[Level III-3¹²]</i>
17c	<ul style="list-style-type: none"> • The use of indwelling catheters should be avoided, unless used as part of a continence management plan. <i>[Level III-3¹²]</i>
17d	<ul style="list-style-type: none"> • A continence management plan should be communicated in a way that is easily understood to the patient and caregiver prior to discharge and should include information on how to access continence resources. <i>[Level III¹²]</i>
18.	<p><u>Patient and Caregiver Education</u></p>
18a	<ul style="list-style-type: none"> • Information and education should be provided for all patients with stroke and their families and caregivers, at all stages of care across the continuum (prevention, acute care, rehabilitation, community reintegration). It should address

18b	<p>the nature of stroke and its manifestations, signs and symptoms, impairments and their impacts and management, risk factors, post-stroke depression, planning and decision-making, resources and community support. <i>[Level A^{3,11,12,14}]</i></p> <ul style="list-style-type: none">• Information and education should be interactive, timely, up to date, provided in a variety of languages and formats (written, oral, counseling approach), and specific to patient, family and caregiver needs and impairments. <i>[Level A/B^{3,11,12,14}]</i>
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Identification and Management of Post-stroke Depression

All stroke survivors should be considered at risk of depression. At the time of the first assessment, the clinical team should determine whether the patient has a history of depression or risk factors for depression. The presence of depression should be reconsidered at three-month intervals or at key stages of the recovery process, particularly after rehabilitation services have been discontinued. [Level A²]

19. **Post-stroke Depression**

- 19a • Patients diagnosed with a depressive disorder should be given a trial of antidepressant medication, if no contraindication exists. The CSS Best Practice Working Group makes no recommendation for the use of one class of antidepressants over another; however, side effect profiles suggest that serotonin-specific reuptake inhibitors (SSRIs) may be favored in this patient population. [Level I^{2,6}]
- 19b • In patients with severe, persistent, or troublesome tearfulness, SSRIs are recommended as the antidepressant of choice. [Level I⁶]
- 19c • Routine use of prophylactic antidepressants is not recommended in post-stroke patients. [Level I⁶]
- 19d • Patients and their caregivers should have their individual psychosocial and support needs reviewed on a regular basis as part of the longer-term management of stroke. [Level A¹¹]
- 19e • Patients should be given information and advice on and the opportunity to talk about the impact of illness upon their lives. [Level B¹¹]
- 19f • Patients with marked anxiety should be offered psychological therapy, given by an appropriately trained and supervised practitioner. [Level B¹¹]

Prevention and Treatment of Complications of Stroke

Medical complications are common after stroke. Clinicians across the continuum of care must be vigilant in order to prevent, identify and appropriately manage the complications that may arise.

20. Venous Thromboembolism

- 20a • Early mobilization of the patient is recommended. [Level III^{1,2}]
- 20b • Antithrombotic stockings should be used in all patients with reduced mobility. [Level II^{1,2}]
- 20c • If the patient is significantly immobilized, has a history of venous thromboembolism, or a known prothrombotic tendency, subcutaneous heparin 5000 units BID, or low-molecular weight heparin in prophylactic doses should be given. [Level II^{1,2}]

21. Fever

- 21a • Patients with fever should be investigated to identify the source (e.g. infection of urinary tract, respiratory tract, skin, intravenous site). [Level I^{1,2}]
- 21b • Antipyretic therapy, comprising regular acetaminophen and/or physical cooling measures should be instituted in all patients with fever. [Level III-2^{1,2}]

22. Pressure Sores

- 22a • Patients at risk of pressure sores should be assessed by trained personnel. [Level IV^{1,2}]
- 22b • In patients at risk of or with pressure sores, a management plan should be formulated and documented (e.g. patient repositioned as needed based on examination of skin integrity and/or use of pressure-relief aids such as an alternating air flow mattress). [Level III^{1,2}]

23. Shoulder Pain

- Factors that contribute to, or exacerbate, shoulder pain should be identified and managed appropriately.

23a	<ul style="list-style-type: none"> Educate staff and caregivers about correct handling of the hemiplegic arm [Level B^{11,27}]
23b	<ul style="list-style-type: none"> Joint protection strategies should be instituted to minimize joint trauma. Consider use of supports for the arm [Level A¹¹]
23c	<ul style="list-style-type: none"> The shoulder should not be passively moved beyond 90 degrees of flexion and abduction unless the scapula is upwardly rotated and the humerus is laterally rotated. [Level A²⁷]
23d	<ul style="list-style-type: none"> Overhead pulleys should not be used. [Level A⁵]
23e	<ul style="list-style-type: none"> The upper limb must be handled carefully during functional activities. [Level B²⁷]
23f	<ul style="list-style-type: none"> Staff should position patients, whether lying or sitting, to minimize the risk of complications such as shoulder pain. [Level B¹¹]
23g	<ul style="list-style-type: none"> Shoulder pain and limitations in range of motion should be treated with gentle stretching and mobilization techniques focusing especially on external rotation and abduction. [Level B²⁷]
24.	<u>Falls</u>
24a	<ul style="list-style-type: none"> All patients should be assessed for fall risk. [Level III-2¹²]
24b	<ul style="list-style-type: none"> Patients at risk of falls should have a management plan formulated and documented (in collaboration with the patient and caregiver[s]). [Level III¹²]
24c	<ul style="list-style-type: none"> Restraints are not routinely recommended unless a specific management plan recommends their use. [Level III¹²]
25.	<u>Pain</u>
25a	<ul style="list-style-type: none"> All patients should be assessed for pain regularly and pain should be actively treated. [Level III¹²]
25b	<ul style="list-style-type: none"> Tricyclic antidepressants may be useful in reducing chronic pain. [Level III-I¹²]

Secondary Prevention

The probability of stroke recurrence is about 10% at one year and 15% at five years. A second stroke is more likely to be fatal or disabling. Therefore, after a first stroke or TIA it is important to determine the cause, identify the patient's modifiable risk factors, and implement appropriate evidence-based secondary prevention measures.

26.	<p><u>Anticoagulation</u></p> <ul style="list-style-type: none"> Warfarin therapy should be considered in all patients with ischemic stroke or TIA who have documented atrial fibrillation, cardioembolic stroke from valvular heart disease or recent myocardial infarction, unless a contraindication to warfarin exists. <i>[Level I¹²]</i>
27.	<p><u>Carotid Endarterectomy</u></p> <ul style="list-style-type: none"> Patients with carotid artery territory TIA or nondisabling ischemic stroke should be considered for carotid endarterectomy when stenosis in the carotid artery ipsilateral to their stroke or TIA is measured at greater than 70% (using North American Symptomatic Carotid Endarterectomy Trial [NASCET] method),²⁹ and when surgery can be performed within two weeks by a specialist surgeon with rates of less than 5% perioperative mortality/morbidity. Men with symptomatic moderate (50-69%) carotid stenosis may also be surgical candidates. <i>[Level II¹²]</i>
28.	<p><u>Antiplatelet Therapy</u></p> <ul style="list-style-type: none"> Antiplatelet therapy in the form of acetylsalicylic acid (ASA) 81-325 mg OD or Aggrenox one capsule (ASA 25 mg and modified-release dipyridamole 200 mg) BID, or clopidogrel 75 mg once daily, should be prescribed to all patients with ischemic stroke who are not prescribed warfarin. <i>[Level I¹²]</i>
29.	<p><u>Blood Pressure Management</u></p> <p>29a</p> <ul style="list-style-type: none"> Patients with stroke or TIA who are beyond the hyperacute period should be prescribed antihypertensive treatment to target normal BP. <i>[Level A^{3,6,11,30}]</i> <p>29b</p> <ul style="list-style-type: none"> Treat BP in accordance with current Canadian Hypertension Education Program (CHEP) guidelines (available at www.hypertension.ca). <i>[R]</i> <p>29c</p> <ul style="list-style-type: none"> The combination of an angiotensin-converting enzyme inhibitor and a diuretic is preferred, with or without other antihypertensive medication(s). <i>[Level A³⁰]</i>

29d	<ul style="list-style-type: none"> Recommended BP treatment targets are systolic BP <130 mm Hg [<i>Level C³⁰</i>] and diastolic BP <80 mm Hg [<i>Level A³⁰</i>] for patients with diabetes or nondiabetic chronic kidney disease, and systolic BP <140 mm Hg [<i>Level C³⁰</i>] and <90 mm Hg [<i>Level A³⁰</i>] for other patients.
30.	<p><u>Lipid-lowering Therapy</u></p>
30a	<ul style="list-style-type: none"> After the hyperacute phase of stroke, ischemic stroke patients with low-density lipoprotein-cholesterol (LDL-C) of >2.0 mmol/L should be managed with lifestyle modification, dietary guidelines and medication recommendations. [<i>Level A^{3,12,31}</i>]
30b	<ul style="list-style-type: none"> After the hyperacute phase of stroke, a statin should be prescribed for most patients who have an ischemic stroke or TIA in order to achieve a target goal of LDL-C of <2.0 mmol/L and total cholesterol / high-density lipoprotein-cholesterol (TC/HDL-C) ratio of <4.0. [<i>Level A^{3,32}</i>]
31.	<p><u>Diabetes Management</u></p>
31a	<ul style="list-style-type: none"> After the hyperacute phase of stroke, glycemic targets must be individualized [<i>Level III^{33,34}</i>]; however, in most patients with type 1 or type 2 diabetes, therapy should be targeted to achieve an A1C ≤ 7.0% in order to reduce the risk of microvascular [<i>Level A/I³³</i>] and macrovascular complications. [<i>Level C³³</i>]
31b	<ul style="list-style-type: none"> To achieve an A1C ≤ 7.0%, patients with type 1 or type 2 diabetes should aim for fasting plasma glucose or preprandial plasma glucose targets of 4.0 to 7.0 mmol/L and 2-hour postprandial plasma glucose targets of 5.0 to 10.0 mmol/L. [<i>Level B2³³</i>]
31c	<ul style="list-style-type: none"> If it can be safely achieved, lowering plasma glucose targets toward the normal range should be considered [<i>Level C³³</i>]: A1C ≤ 6.0% [<i>Level D³³</i>]; fasting/preprandial plasma glucose: 4.0 to 6.0 mmol/L [<i>Level D³³</i>]; and 2-hour postprandial plasma glucose: 5.0 to 8.0 mmol/L. [<i>Level D³³</i>]
32.	<p><u>Lifestyle Management</u></p>
32a	<ul style="list-style-type: none"> Stroke survivors should be assessed for and given information about risk factors, lifestyle management issues (exercise, smoking, diet, weight, alcohol, stress management), and be counseled about possible strategies to modify their lifestyle and risk factors. [<i>Level III/C/R^{11,12,14,26,31}</i>] The lifestyle and risk factors and interventions include:
32b	<ul style="list-style-type: none"> Exercise: moderate exercise (an accumulation of 30 to 60 minutes) of brisk walking, jogging, cycling or other dynamic exercise 4 to 7 days each week. Medically supervised exercise programs for high-risk patients (e.g. those with cardiac disease). [<i>Level A-B/I-II^{6,14,30}</i>]

32c	<ul style="list-style-type: none"> Smoking: smoking cessation; nicotine-replacement therapy and behavioural therapy. [<i>Level II/B-C^{3,6,11}</i>]
32d	<ul style="list-style-type: none"> Diet: diet that is low in fat (especially saturated fat) and sodium, and high in fruit and vegetables. [<i>Level II/B^{6,11}</i>]
32e	<ul style="list-style-type: none"> Weight: achieve and maintain goal of a body mass index of 18.5 to 24.9 kg/m² and a waist circumference of <88 cm for women and <102 cm for men. [<i>Level II/B-C^{6,30}</i>]
32f	<ul style="list-style-type: none"> Alcohol consumption: no alcohol to moderate consumption (fewer than two standard drinks per day, or fewer than 14 drinks per week for men; fewer than nine drinks per week for women. [<i>Level C/III^{6,12}</i>]
32g	<ul style="list-style-type: none"> Stress management: individualized cognitive-behaviour interventions are more likely to be effective when relaxation techniques are employed. [<i>Level C/III³⁰</i>]

Discharge Planning

Good discharge planning is crucial not only for reducing the duration of hospitalization and number of re-admissions, but also for ensuring the successful reintegration of stroke survivors and their families into the community. Discharge planning should start as soon as the patient is admitted. Successful discharge planning should be the culmination of a best practice inpatient program that minimizes social isolation and depression and maximizes independence. Discharge planning is a complex process that relies on effective communication between team members and the patient and family. It should consider the need for equipment, social supports, and liaison with community providers.

33. Discharge Planning

- 33a • Patient and caregiver postdischarge needs (physical, emotional, communication and social) should be assessed prior to discharge. [Level II¹²]
- 33b • Patients, caregivers and the family physician should be involved with the multidisciplinary team in the development of a care plan that outlines care in the community after discharge (including provision of equipment, support services, and outpatient appointments). [Level II¹²]
- 33c • Patients and caregivers should be provided with a contact person (in the hospital or community) for any postdischarge queries. [Level III¹²]

34. Equipment and Adaptations

- 34a • Patients and caregivers should receive and be trained in the use of the equipment they require for safe patient transfer prior to discharge. [Level II¹²]
- 34b • If required, an occupational therapist should conduct a home assessment to ensure safe handling and transfer of patients, and provide education regarding the use of required equipment prior to discharge. [Level III¹²]

35. Liaising with Community Providers

- The patient's family physician, primary health care providers and community services should be informed about the patient's discharge prior to the day of discharge. [Level III¹²]

Community Rehabilitation and Reintegration

Recovery from stroke continues after the patient returns home. It is therefore important to consider the supports that are available to stroke survivors and caregivers following discharge from hospital.

36. **Community-based Rehabilitation**

- 36a • Stroke survivors should continue to have access to specialized stroke care and rehabilitation after leaving hospital. [*Level A¹¹*]
- 36b • Early supported discharge services provided by a well-resourced, coordinated specialist interdisciplinary team are an acceptable alternative to more prolonged hospital unit stroke care and can reduce the length of hospital stay for selected patients [*Level A¹⁷*]. In addition, early supported discharge services to generic (nonspecific) community services should not be undertaken [*Level A¹¹*].
- 36c • People who have difficulties in activities of daily living should receive occupational therapy or multi-disciplinary interventions targeting activities of daily living. [*Level I²*]
- 36d • Multifactorial interventions provided in the community including an individually prescribed exercise program, may be provided for people who are at risk of falling, in order to prevent or reduce the number and severity of falls. [*Level I²*]

37. **Follow-up and Evaluation in the Community**

- 37a • Stroke survivors and their caregivers should have their individual psychosocial and support needs reviewed on a regular basis. [*Level A¹¹*]
- 37b • Any stroke survivor with reduced activity at six months or later after stroke should be assessed for appropriate targeted rehabilitation. [*Level A¹¹*]
- 37c • Stroke survivors should be screened for depression at three-month intervals. [*R*]

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ABBREVIATIONS

OD = once a day
A1C = glycosylated hemoglobin
ADL = activities of daily living
ASA = acetylsalicylic acid
BG = blood glucose
BID = twice a day
BP = blood pressure
CHEP = Canadian Hypertension Education Program
CSN = Canadian Stroke Network
CSS = Canadian Stroke Strategy
CT = computer-assisted tomographic scan
DHA = District Health Authority
DWI = diffusion-weighted imaging
FLAIR = fluid attenuated inversion recovery
HSFC = Heart and Stroke Foundation of Canada
HDL-C = high-density lipoprotein-cholesterol
INR = International Normalized Ratio
LDL-C = low-density lipoprotein-cholesterol
MG = milligrams
MMOL/L = millimoles per litre
MRI = magnetic resonance imaging
NASCET = North American Symptomatic Carotid Endarterectomy Trial
NPO = nothing by mouth
NSISS = Nova Scotia Integrated Stroke Strategy
RCT = randomized controlled trial
rt-PA = recombinant tissue-plasminogen activator
SSRI = serotonin-specific reuptake inhibitors
T2*W = T2-weighted (gradient echo sequences)
TC = total cholesterol
TIA = transient ischemic attack
TPA = tissue-plasminogen activator

Appendix A

Stroke Definitions

Cerebral infarction or ischemic stroke is the acute loss of focal cerebral function with symptoms lasting 24 hours or more, corroborated by findings on a computed tomographic X-ray (CT) brain scan, magnetic resonance imaging (MRI) brain scan, or at autopsy. It is caused by inadequate cerebral blood supply as a result of low blood flow, thrombosis, or embolism associated with diseases of the blood vessels, heart, or blood.

A ***transient ischemic attack*** is “a brief episode of neurologic dysfunction caused by focal brain or retinal ischemia, with clinical symptoms typically lasting less than one hour, and without evidence of acute infarction.”³⁵

Intracerebral hemorrhage is the acute loss of focal cerebral function with symptoms lasting 24 hours or more corroborated by findings indicative of bleeding within the brain on CT or MRI scan, or at autopsy. It results from rupture of a blood vessel in the brain, which may be due to various causes including diseases of the blood vessels and the blood.

Subarachnoid hemorrhage is a hemorrhage from a cerebral blood vessel, aneurysm or vascular malformation into the subarachnoid space, (i.e. the space surrounding the brain where blood vessels lie between the arachnoid and pial layers). It is characterized by sudden onset of headache, and vomiting, with or without loss of consciousness and other neurological signs.

Stroke of uncertain type is diagnosed when the WHO definition²⁰ is satisfied but there is no brain scan (CT or MRI) or autopsy.

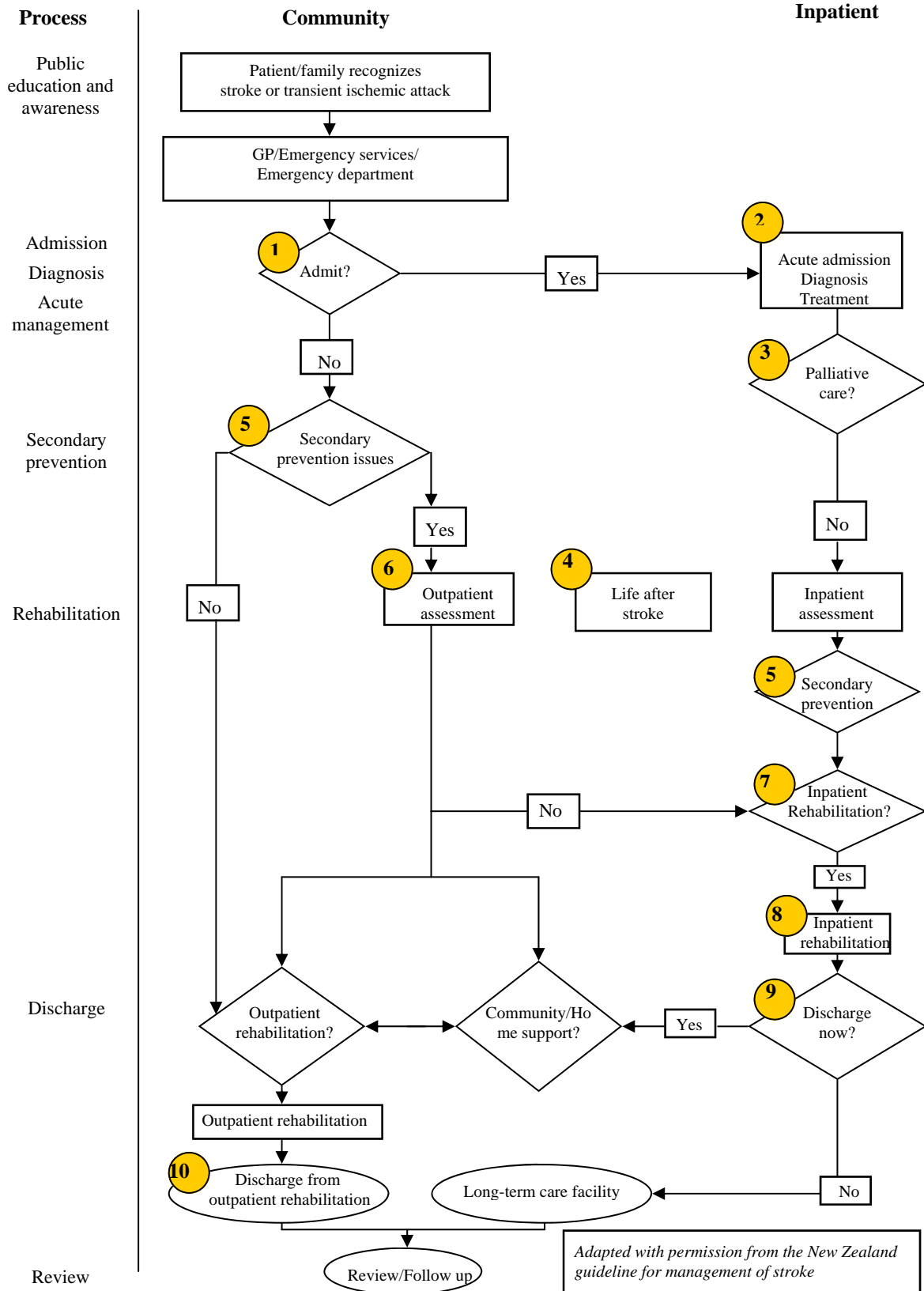
Appendix B

Nova Scotia Integrated Stroke Strategy Recommendations Heart and Stroke Foundation of Nova Scotia

The following priorities from the Report of the *Nova Scotia Integrated Stroke Strategy Committee* have been adopted and adapted by the Stroke Working Group:

- In each DHA, designate one CT-equipped hospital as the district acute stroke hospital, and make CT scanning continuously available at each of these hospitals. This will facilitate prompt, comprehensive diagnostic assessments and consolidation of resources.
- Change Emergency Health Services Nova Scotia policy so that ambulances transporting people suspected of having had a stroke may be directed to the nearest district acute stroke hospital. This will help bring caseloads towards critical mass.
- In each district or combination of districts, establish a stroke unit and interdisciplinary stroke team. The stroke team should comprise the following disciplines: food and nutrition services (dietitian), medicine, nursing, occupational therapy, physiotherapy, social work, and speech-language pathology.
- In each district or combination of districts, establish an adequately staffed and resourced rehabilitation system, which includes rehabilitation stroke units with dedicated beds with an interdisciplinary stroke team comprised of an appropriate number of dedicated rehabilitation professionals. The core team should include the following disciplines: food and nutrition (dietitian), medicine, nursing, occupational therapy, physiotherapy, social work and speech-language pathology. Specialized rehabilitation services such as neuropsychology may be based at the tertiary centre.
- Develop a provincial triage and referral system for stroke rehabilitation that is evidence-based, relatively simple and transparent.
- Ensure appropriate numbers of dedicated rehabilitation professionals for effective stroke rehabilitation are available along the continuum of care (i.e. inpatients, outpatients, in-home treatment). The goal is to enable clear, accessible entry points for rehabilitation, timely service, and improved transitions to community living.
- Develop a long-term global budget dedicated to rehabilitation programs and services. This will enable Nova Scotia to respond effectively and efficiently to the projected growth in stroke rehabilitation needs.
- Create electronic and video communication links between stroke teams. This will enable distance consultations and sharing of evidence-based treatment protocols, algorithms, standing orders, and other clinical management tools.
- Develop navigation criteria for transfer of patients within the system.

Appendix C. Management of Stroke, Part 1

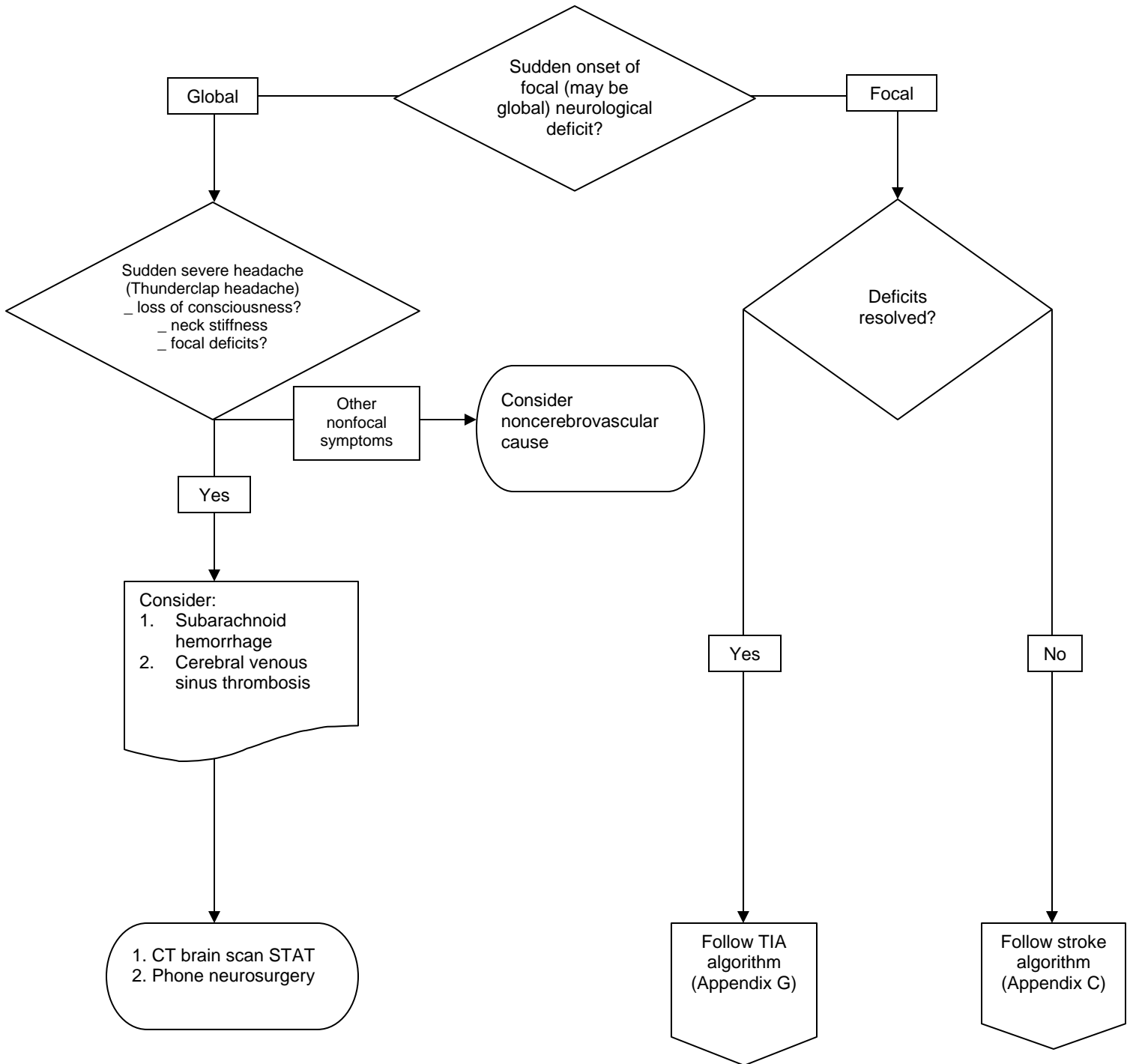


Appendix C. Management of Stroke, Part 2

<p>1 Is admission required for this person? All people with stroke should expect to be admitted, unless:</p> <ul style="list-style-type: none"> • No significant disability affecting functioning; <u>and</u> • Urgent outpatient assessment by specialist stroke service available; <u>or</u> • Already in appropriate institutional care; <u>or</u> • Person/family prefer home care despite explanation of benefits of hospital care <p>If not admitted, must consider diagnosis, secondary prevention, home support and rehabilitation needs</p>	<p>6 Outpatient clinic/review To confirm diagnosis, assess vascular risk factors and address secondary prevention:</p> <ul style="list-style-type: none"> • Urgent outpatient assessment by clinicians knowledgeable about stroke • ECG and bloods at GP or emergency department presentation • Access within 1–2 weeks • Review by physician with special interest or expertise in stroke management
<p>2 Acute admission</p> <ul style="list-style-type: none"> • Admission to stroke unit or care of stroke team • CT brain scan immediately • Swallowing assessment within 24 h • Interdisciplinary team (IDT) assessment within 72 h • ASA initiation (if appropriate) after CT brain scan 	<p>7 Is inpatient rehabilitation required? All people with stroke should expect inpatient rehabilitation by an IDT with expertise in stroke unless:</p> <ul style="list-style-type: none"> • No significant residual disability interfering with function on IDT assessment; <u>or</u> • Moderate disability (e.g. transfer with 1 person) <u>and</u> early supported discharge service available; <u>or</u> • Already in institutional care <u>and</u> community rehabilitation service available
<p>3 Is palliative care appropriate?</p> <ul style="list-style-type: none"> • Devastating stroke; <u>or</u> • Other terminal illness; <u>and</u> • After discussion with next-of-kin 	<p>8 Inpatient rehabilitation</p> <ul style="list-style-type: none"> • Admission to stroke unit or care by stroke team within a rehabilitation unit • Stroke-expert IDT responsible for care • Person-orientated goal setting • Daily therapy input (Mon-Fri) • Family and caregivers involved in rehabilitation • Appropriate information and support available to person and family
<p>4 Life after stroke</p> <ul style="list-style-type: none"> • Person has contact information for Heart and Stroke Foundation, Stroke Club or other support • Caregiver support • Cultural issues • Ongoing education about stroke • Appropriate advice and information on sexuality, mood, employment, driving 	<p>9 Is person ready for discharge to the community? Typically appropriate if:</p> <ul style="list-style-type: none"> • Medically stable; <u>and</u> • IDT has completed assessments of home situation and post-discharge requirements; <u>and</u> • An appropriate place for discharge has been identified; <u>and</u> • An appropriate plan has been agreed between IDT, person, caregivers and other agencies; <u>and</u> • All necessary equipment has been provided; <u>and</u> • All follow-up arrangements are in place (rehabilitation, social and GP/primary care)
<p>5 Is secondary prevention an issue for this person? Typically appropriate if:</p> <ul style="list-style-type: none"> • Further stroke would have important clinical consequences; <u>and</u> • Person can cooperate and comply with investigations and medications; <u>and</u> • If carotid ultrasound, has significant functional recovery from an anterior circulation stroke and fit for surgery <p>Typically not appropriate if:</p> <ul style="list-style-type: none"> – terminal illness – severe dementia – disability 	<p>10 Is person ready for discharge from rehabilitation? Typically appropriate if:</p> <ul style="list-style-type: none"> • Person has achieved agreed-upon therapy goals; <u>and</u> • No new goals are identified and agreed upon; <u>and</u> • Appropriate supports are in place

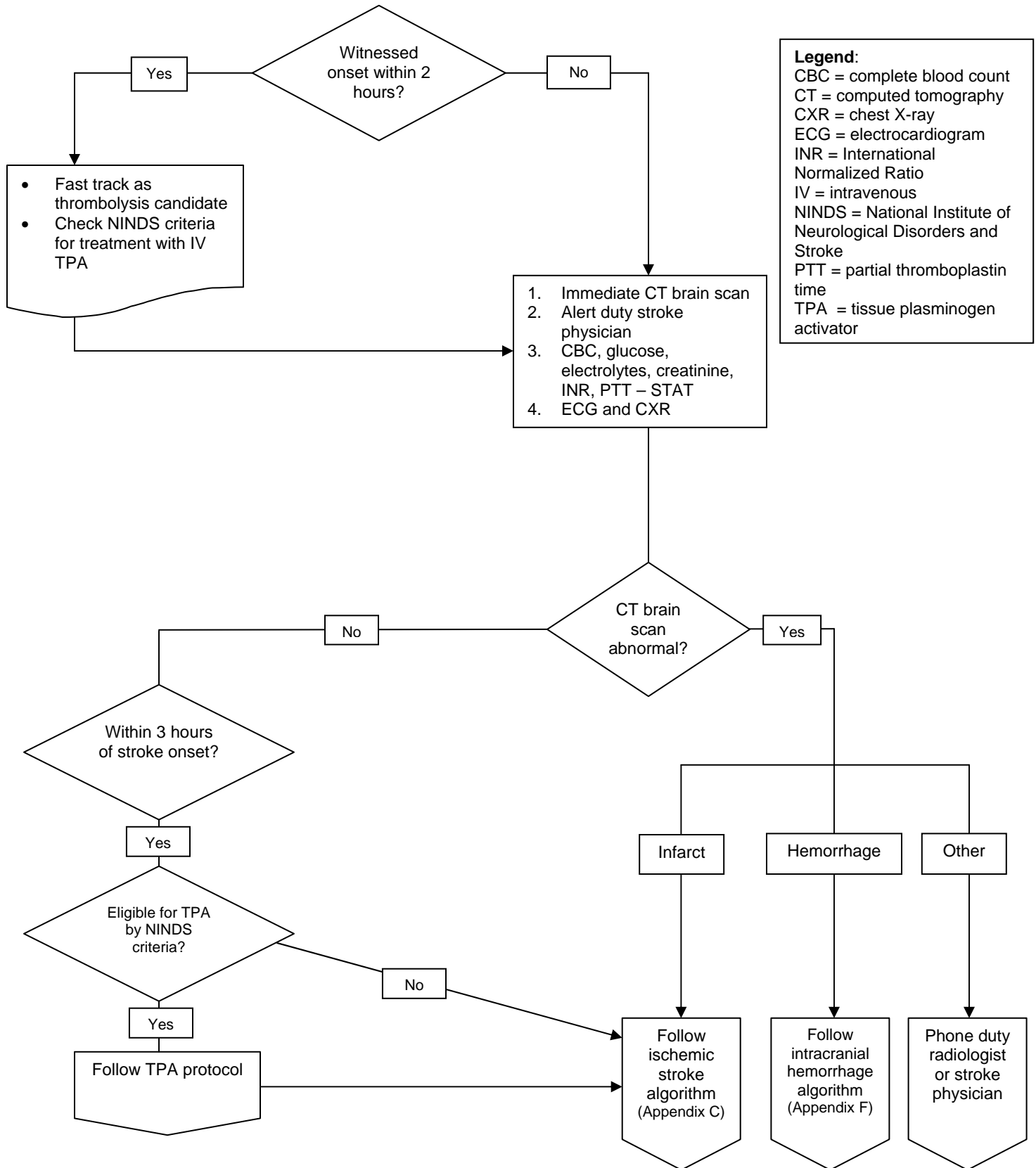
Legend:
 ASA = acetylsalicylic acid
 CT = computed tomography
 ECG = electrocardiogram
 GP = general practitioner
 MDT = multidisciplinary team
 TIA = transient ischemic attack

Appendix D. Emergency Department Management of Patient with Neurological Symptoms



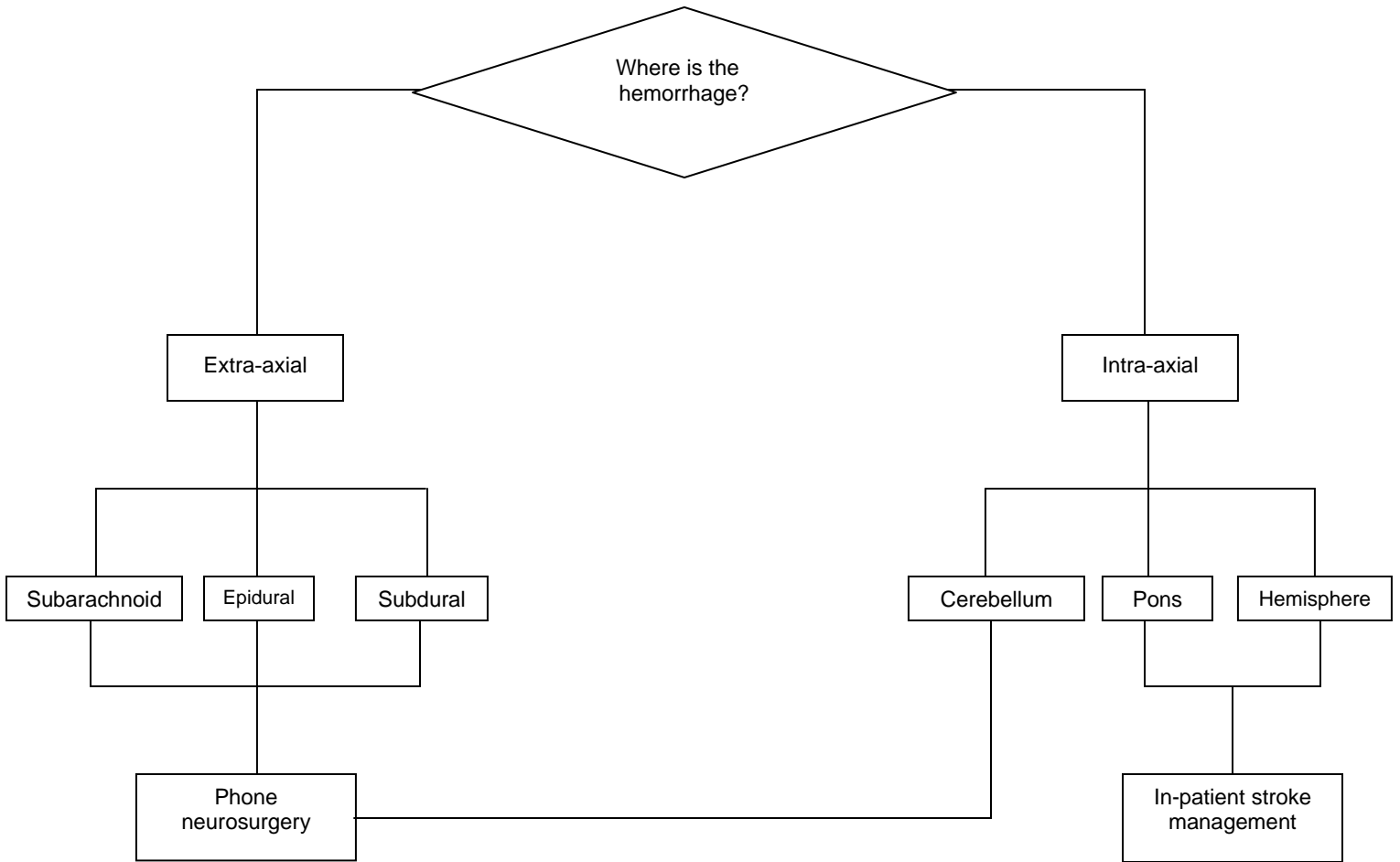
Legend:
 CT = computed tomography
 TIA = transient ischemic attack

Appendix E. Emergency Department Management of Patient With Suspected Stroke



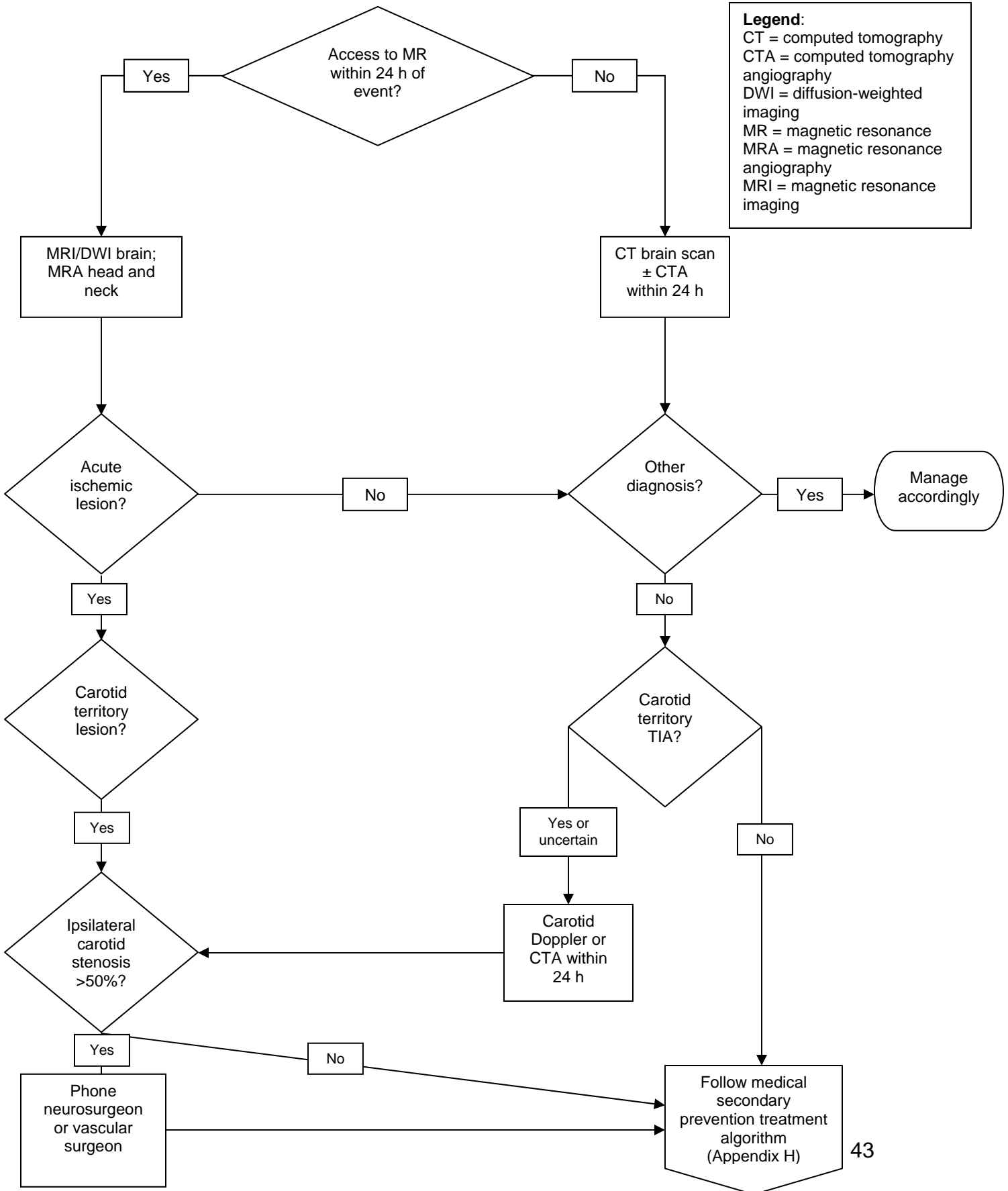
Legend:
 CBC = complete blood count
 CT = computed tomography
 CXR = chest X-ray
 ECG = electrocardiogram
 INR = International Normalized Ratio
 IV = intravenous
 NINDS = National Institute of Neurological Disorders and Stroke
 PTT = partial thromboplastin time
 TPA = tissue plasminogen activator

Appendix F. Intracranial Hemorrhage on CT Brain Scan



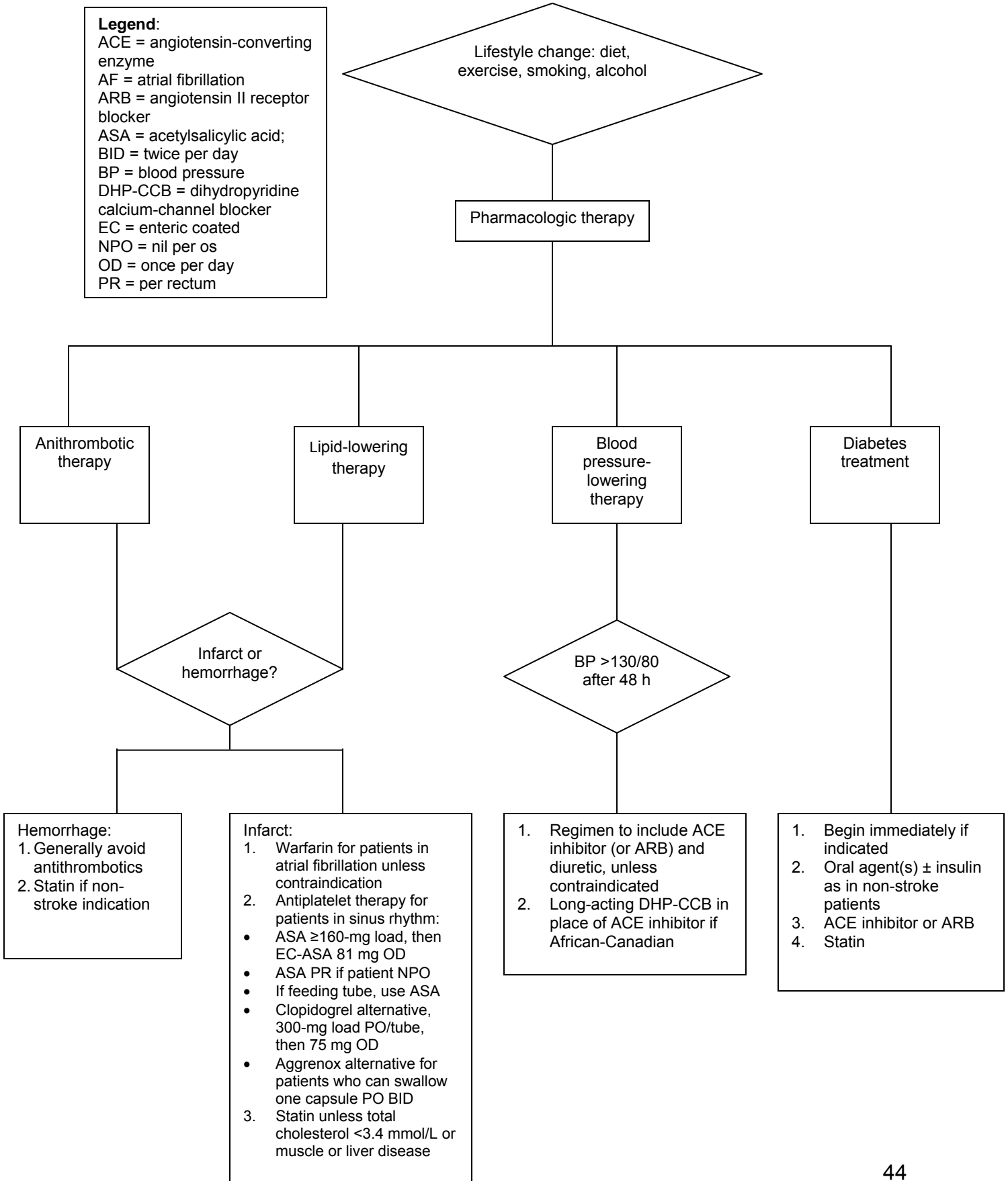
Legend:
CT = computed tomography

Appendix G. Management of Patient With Suspected Transient Ischemic Attack (TIA)



Legend:
 CT = computed tomography
 CTA = computed tomography angiography
 DWI = diffusion-weighted imaging
 MR = magnetic resonance
 MRA = magnetic resonance angiography
 MRI = magnetic resonance imaging

Appendix H. Medical Secondary Prevention Treatment



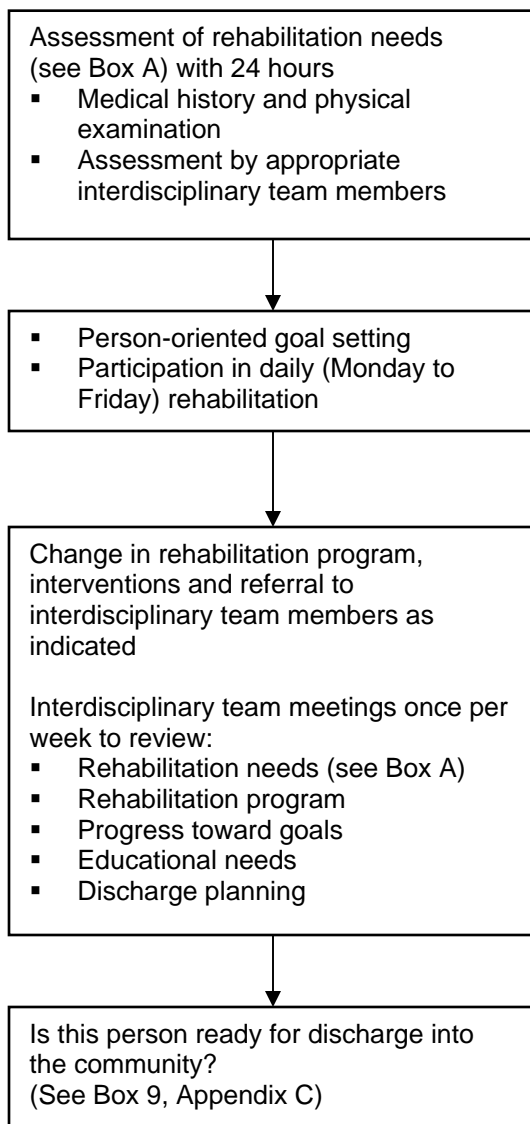
Appendix I. Overview of Stroke Inpatient Management

1. Admit to stroke unit
2. Delineate limits of care*
3. Screen for dysphagia before prescribing oral intake (See Appendix K)
4. Interdisciplinary team assessment
5. Venous thromboembolism prophylaxis for patients with impaired mobility
6. Investigate cause of stroke as appropriate
7. Initiate/modify medical secondary prevention treatment as appropriate (See Appendix H)
8. Initiate rehabilitation treatment as soon as patient is medically stable (see Appendix J)
9. Provide information for patient and family
10. Discharge planning

*If life-threatening stroke, discuss care issues and limitations (e.g. CPR, comfort care, etc.)

CPR = cardiopulmonary resuscitation

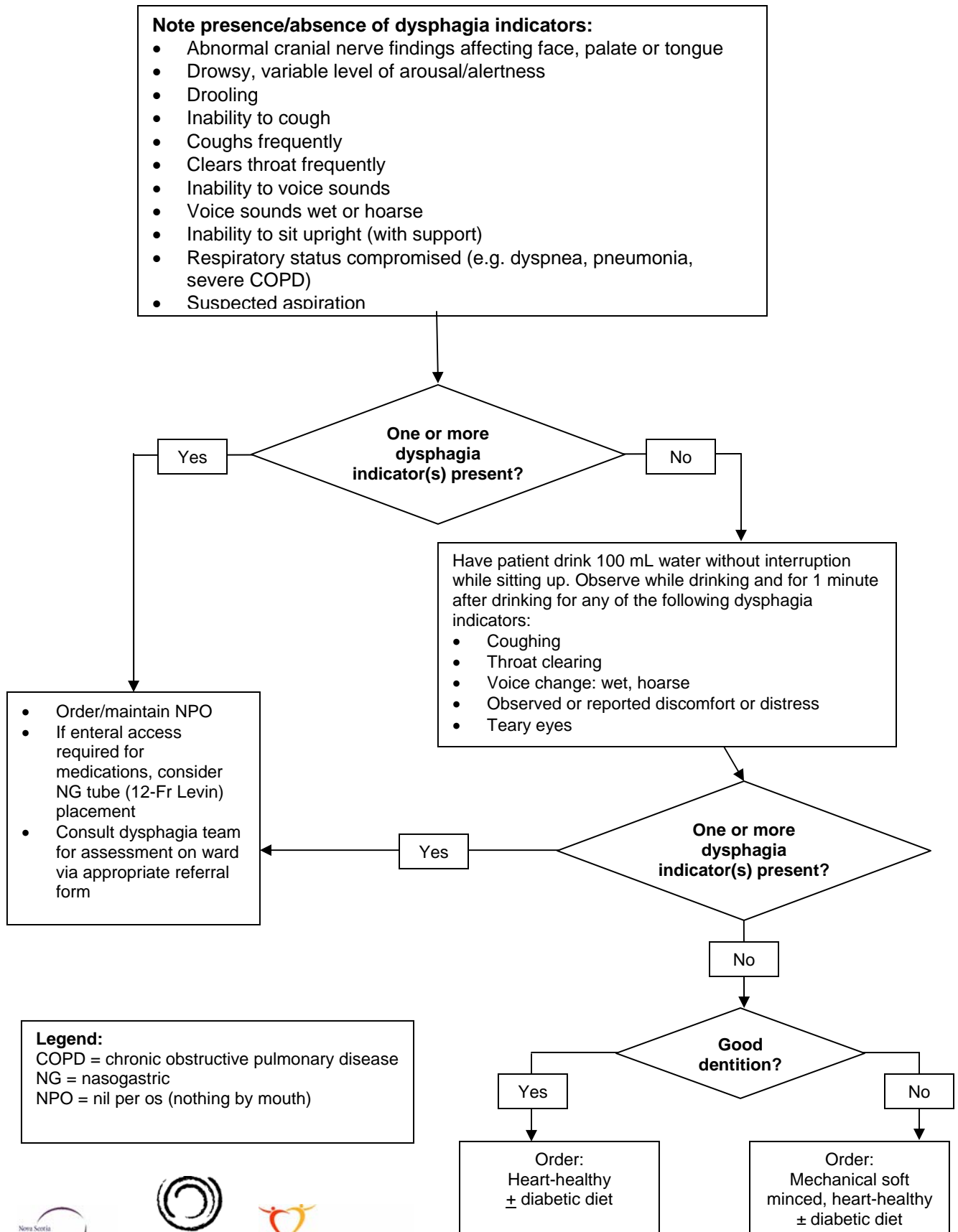
Appendix J. Inpatient Stroke Rehabilitation



Box A. Assessment of Rehabilitation Needs

1. *Prevention and management of medical complications*
 - Urinary tract infection
 - Venous embolism
 - Pneumonia
 - Malnutrition
 - Depression
 - Seizures
 - Pain
 - Complex regional pain syndrome
 - Osteoporosis
 - Secondary stroke prevention
2. *Assessment of impairments*
 - Upper extremity (including hemiplegic shoulder pain)
 - Lower extremity
 - Cognitive
 - Aphasia
 - Dysphagia
 - Apraxia
 - Agnosia
 - Neglect
 - Bladder dysfunction
 - Bowel dysfunction
 - Spasticity
 - Psychosocial adjustment
3. *Assessment of activity limitations*
 - Activities of daily living
 - Instrumental activities of daily living
 - Functional mobility
 - Driving
4. *Assessment of social functioning*
 - Home environment
 - Patient, caregiver and family ability, education and support
 - Work roles
 - Family roles
 - Leisure roles

Appendix K. Stroke Swallow Screen



Appendix L. Nursing Dysphagia Assessment Protocol QEII Health Sciences Centre

Diet advancement/regression will be recommended by the Dysphagia Team. Once a recommendation is made, the Dysphagia Team will reassess at appropriate intervals.

Introduction of PO Feeding

Nursing staff may assess patient swallow safety and recommend an introductory PO diet (gelled diet or puréed food diet– no thin or thick liquids) in instances when all of the following conditions are met:

- the Dysphagia Team is unavailable for the next 24 hours, and
- the Dysphagia Team has not previously assessed the patient (the patient is new to the unit or was not able to participate in evaluation), and
- the patient is NPO and is not otherwise being nourished (PO, enteral or parenteral), and
- the patient demonstrates all of the following:
 - is able to sit upright and remain alert for at least 20 minutes
 - is able to manage his/her own secretions through swallow
 - is medically stable
 - has a clear voice and can voice on command
 - has an effective cough
 - does not have a tracheostomy

Before Testing

- have patient sit as upright as possible
- use only a teaspoon for testing and do not use a straw for drinking
- have a clock or watch with second hand available for swallow timing
- have the patient say “AHHHH”. Listen to the patient’s voice before feeding to:
 - establish what voice sounds like before feeding (to compare)
 - ensure voice is clear (if not, patient must be able to clear voice through cough or throat clearing)

Test Procedure

Day 1

Test only purée consistency (preferably applesauce; pudding can also be used).

Begin with:

- 3 trials of ½ teaspoon

Then

- 3 trials of 1 teaspoon

Then

- 3 trials of self-loaded and administered

For each swallow:

- feel larynx for elevation to ensure swallow has occurred and in order to time delay
- have patient talk or say “AHHHH” and listen for any change in vocal quality
- check the oral cavity for residue
- note any change in breathing

Discontinue testing and do not initiate a gelled diet or puréed food diet (no thin or thick liquids) if any of the following occur:

- purée swallow time is >6 seconds
- voice changes are noted post-swallow (e.g. voice becomes “wet,” “tight,” or hoarse)
- patient coughs or clears throat post-swallow
- oral residue (>¼ of bolus) and patient is unaware of or unable to clear residue
- respiration changes noted during feeding trials
- patient complains of swallow difficulty or sensation of incomplete clearing

- Document assessment on recording sticker and paste in progress notes
- Keep NPO
- Provide medications via an alternate route
- Consider nasogastric tube for medication and nutrition (if appropriate, considering limits of care/goals of treatment)
- Consult Dysphagia Team

Swallow is considered safe for a gelled diet or puréed food diet (no thin or thick liquids) if all of the following conditions are met during testing:

- purée swallow time is ≤6 seconds
- voice remains clear post-swallow
- no cough or throat clearing post-swallow
- no significant food residue in mouth post-swallow
- no respiration changes noted during feeding trials
- patient does not complain of swallow difficulty or sensation of incomplete clearing

- Document assessment on recording sticker and paste in progress notes
- Obtain diet order for gelled diet or puréed food diet (no thin or thick liquids)
- Notify food services of diet change
- Give medications crushed in purée (if appropriate to crush)
- Consult Dysphagia Team

Day 2

Test only thick liquid honey consistency if the patient is doing well on the gelled diet or puréed food diet (no thin or thick liquids) and the dysphagia team remains absent for another 24 hours.

Begin with:

- 3 trials of ½ teaspoon thickened, liquid-honey consistency

Then:

- 3 trials of 1 teaspoon

Then

- 3 trials of self-administered sip (cue patient to take a small sip)

For each swallow:

- feel larynx for elevation to ensure swallow has occurred and in order to time delay
- have patient say “AHHHH” and listen for any change in vocal quality
- check the oral cavity for residue
- note any change in breathing

Discontinue testing and do not advance diet to pureed thick liquids if any of the following occur:

- swallow time is >6 seconds
- voice changes noted post-swallow (voice becomes “wet”, “tight”, or hoarse)
- patient coughs or clears throat post-swallow
- oral residue (>¼ of bolus) and patient is unaware or unable to clear residue
- respiration changes noted during feeding trials
- patient complains of swallow difficulty or sensation of incomplete clearing

- | |
|---|
| <ul style="list-style-type: none">➤ Document assessment on recording sticker and paste in progress notes➤ Maintain gelled or puréed food diet (no thin or thick liquids) |
|---|

Swallow is considered safe for a puréed thick liquid diet if all of the following conditions are met during testing:

- Swallow time is ≤6 seconds
- Voice remains clearing post-swallow
- No cough or throat clearing post-swallow
- No significant food residue in mouth post swallow
- No respiration changes noted during feeding trials
- Patient does not complain of swallow difficulty or sensation of incomplete clearing

- | |
|---|
| <ul style="list-style-type: none">➤ Document assessment on recording sticker and paste in progress notes➤ Obtain diet order for a puréed thick liquid diet➤ Notify food services of diet change➤ Continue giving meds crushed in purée if appropriate to crush |
|---|

Diet Regression

If the Dysphagia Team is unavailable before the next meal and there are indications that the patient's safety is at risk on the ordered diet, e.g.:

- frequent coughing/throat clearing during meals or ingestion of a specific food item
- voice changes during meal (e.g. becomes "wet" or unusually tight/hoarse)
- patient complains of difficulty or discomfort with one or more menu items
- respiratory status changes during or after meals
- medical status has deteriorated
- patient level of arousal/alertness has declined
- patient is suspected of or diagnosed with aspiration pneumonia

The staff nurse may:

- withdraw food items that appear to pose risk or difficulty, or
- regress diet to a safer consistency than that which was ordered (see Table 1), or
- keep patient NPO until reassessed by the Dysphagia Team, and
- notify the Dysphagia Team directly for reassessment

Table 1. Texture-modified diet regression chart

	Diet name	Solids	Liquids/Fluids
1.	General (i.e. heart healthy or diabetic diet)	<ul style="list-style-type: none"> All solids 	<ul style="list-style-type: none"> Thin liquids
2.	Mechanical soft, diced	<ul style="list-style-type: none"> Meat cut into bite-sized pieces for patients who can't cut 	<ul style="list-style-type: none"> Thin liquids
3.	Mechanical soft, minced	<ul style="list-style-type: none"> Minced meat Regular cooked vegetables All bread products No salad No apples 	<ul style="list-style-type: none"> Thin liquids
4.	Mechanical soft, minced, thick liquid diet	<ul style="list-style-type: none"> Minced meat Regular cooked vegetables All bread products No salad No apples 	<ul style="list-style-type: none"> Thick liquids, honey consistency No regular liquids No ice No ice cream No Jell-O
5.	Modified mechanical soft, thick liquid diet	<ul style="list-style-type: none"> Minced meat Minced cooked vegetables Soft moist casseroles No bread products 	<ul style="list-style-type: none"> Thick liquids, honey consistency No regular liquids No ice No ice cream No Jell-O No fresh fruit, except bananas
6.	Puréed thick liquid diet	<ul style="list-style-type: none"> Smooth puréed food 	<ul style="list-style-type: none"> Thick liquids, honey consistency No regular liquids No ice No ice cream No Jell-O
7.	Gelled diet or puréed food – no thin or thick liquids	<ul style="list-style-type: none"> Smooth puréed food as thick as pudding 	<ul style="list-style-type: none"> IV hydration required, unless palliative No thick or thin liquids No regular liquids No ice No ice cream No Jell-O
8.	NPO	<ul style="list-style-type: none"> None Medications given via alternate route 	<ul style="list-style-type: none"> IV hydration required, unless palliative No sips No ice

Legend:

IV = intravenous

PO = per os (by mouth)

NPO = nil per os (nothing passed orally, nothing by mouth)

	Duality of Interest Declaration						
Name	Employment	Stock Shareholder	Honoraria/ Consulting Fee	Grant/ Research support	Member of Advisory panel/standing committee	Member Board of Directors	Nothing to Disclose
Andrews - Cunningham, Dana							x
Currie, Tom							x
Gorman, Mary			<ul style="list-style-type: none"> • Pfizer • Merck Frost • Jansen Ortho 				
Hallman, Shelley							x
Green, Peggy							x
Joyce, Brenda							x
MacEachern, Sue							x
Maharaj, Mandat			<ul style="list-style-type: none"> • Pfizer • Astra Zeneca 				
Mason-Browne, Anne							x
McDonald, Alison							x

	Duality of Interest Declaration						
Name	Employment	Stock Shareholder	Honoraria/ Consulting Fee	Grant/ Research support	Member of Advisory panel/standing committee	Member Board of Directors	Nothing to Disclose
Nearing, Shannon							x
Phillips, Stephen							x
Sheppard, Sharon							x
Silver, Laurie							x
Travers, Andrew			<ul style="list-style-type: none"> Roche Pharmaceuticals 				
Wozniak, Susan							x