

## MODULE 8: SECONDARY STROKE PREVENTION



### Learning Objectives

Upon completion of this module, nurses will be able to:

- Explain modifiable and non-modifiable risk factors
- Identify key aspects of secondary stroke prevention
- Identify best practices for carotid stenosis interventions
- Identify commonly prescribed medications for stroke and stroke prevention
- Understand TIA
- Explain the role of the secondary prevention clinic
- Learn key points for teaching stroke patients about their medications



## 8.1 Stroke Prevention and Risk Factor Management

Primary stroke prevention is an individually based clinical approach to disease prevention. It targets otherwise healthy individuals with modifiable risk factors to prevent the initial occurrence of a disease. It is typically implemented in the primary care setting.

Secondary stroke prevention is an individually based clinical approach to reduce the risk of further vascular events in:

- An individual who has experienced a stroke or transient ischemic attack (TIA)
- An individual who is at high risk of stroke due to underlying medical conditions or risk factors

(Heart and Stroke Foundation of Canada, 2008 and 2012 Canadian Best Practice Recommendations for Stroke Care)

### Stroke Risk Factors

**Non-modifiable** stroke risk factors are those over which an individual has no control:

- Age – stroke can occur at any age, but after age 55 the risk of stroke doubles in each successive decade
- Gender – after menopause, stroke is more prevalent in women; otherwise, stroke is more prevalent in men
- Race/ethnicity – stroke is more prevalent in Aboriginal People and Canadians of African, Hispanic, Japanese and Chinese descent
- Family history – you are more likely to have a stroke if you have a first degree relative with a history of stroke or heart disease prior to the age of 55
- Previous TIA or stroke

A stroke risk profile that includes non-modifiable risk factors can be balanced out or offset by effective management of risk factors that are modifiable.

**Modifiable** risk factors are those over which an individual has some control, or those factors s/he can modify in order to reduce the risk of stroke.

With medical supervision/management:

- Hypertension
- Diabetes
- Hyperlipidemia
- Atrial Fibrillation
- Cardiac Disease
- Obstructive Sleep Apnea
- Oral Contraceptives and Hormone Replacement Therapy

Through self-management (and with medical support, if needed):

- Healthy diet
- Sodium intake
- Physical inactivity
- Obesity
- Excessive alcohol consumption
- Smoking

Preventative measures aimed at reducing risk factors will not only prevent strokes but will also prevent other chronic diseases which share similar risk factors.

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*8 out of 10 individuals have at least one of the following risk factors while 1 out of 10 has three or more:*

- *smoking*
- *physical inactivity*
- *obesity*
- *hypertension*
- *diabetes*

# Lifestyle and Risk Factor Management

(Adapted from the *2012 Canadian Best Practice Recommendations for Stroke Care: Stroke Prevention*)



Persons at risk of stroke and patients who have had a stroke should be assessed for vascular disease risk factors and lifestyle management issues. They should receive information and counselling about possible strategies to modify their lifestyle and risk factors. Referrals to appropriate specialists should be made where required to provide more comprehensive assessment and structured programs to manage risk factors.

- Healthy Balanced Diet
- Sodium
- Exercise
- Weight
- Alcohol Consumption
- Oral Contraceptives and Hormone Replacement Therapy

## Healthy Balanced Diet

- Should be in accordance with *Canada's Food Guide to Healthy Eating*
- High in fruits, vegetables, low fat dairy products, dietary and soluble fibre, whole grains and protein from plant sources
- Low in saturated fat, cholesterol (less than 200 mg/day) and sodium

## Sodium

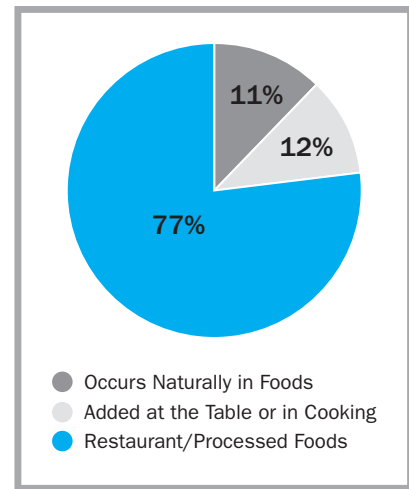
- Limit sodium intake from all sources, according to the amount considered adequate by age.
- The adequate sodium intake for most adults is 2000 mg per day and daily intake shouldn't exceed 2300 mg (this is only 1 teaspoon!)
- The average daily sodium intake is well beyond the upper limit.
- Most of our sodium intake is hidden in processed foods.
- Simply getting rid of the salt shaker is not enough!

Research suggests that reducing sodium intake to the recommended levels could lower the incidence of stroke and cardiac disease by as much as 30% as well as have a significant impact on reducing blood pressure. Becoming familiar with reading nutrition labels will help to make healthy food choices and reduce sodium intake.

### Recommended Sodium Intake

Average Daily Sodium Intake	Recommended daily sodium limit by age range	Upper limit for sodium intake by age range
Approximately 3,500 mg	19-50: 2,000 mg	19-50: 2,300 mg
	51-70: 2,000 mg	51-70: 2,300 mg
	71+: 2,000 mg	71+: 2,300 mg

Adapted from Canadian Hypertension Education Program Recommendations, Hypertension Canada, 2014



Adapted from Mattes and Donnelly, 1991

### Exercise

- Daily moderate exercise (brisk walking, jogging, cycling, swimming)
- A weekly accumulation of 150 minutes of moderate-vigorous activity in a minimum of 10 minute segments
- Most stroke patients should be encouraged to start a regular exercise program
  - Exercise programs supervised by health and/or medical professionals are recommended for high risk patients (e.g. those at risk of falls or with co-morbid conditions such as cardiac disease)

The benefits of physical activity include better lipid values, especially HDL and TG, better blood glucose control, a lower BP, more energy, lower stress level, weight control, and an improved immune system.

## Weight

- Maintain goal of a body mass index (BMI) of 18.5 to 24.9 kg/m<sup>2</sup> (BMI is weight divided by height squared)
  - Overweight defined as a BMI between 25-30
  - Obesity BMI greater than 30
  - BMI greater than 40 defines severe or extreme obesity
- Maintain goal of a waist circumference as outlined in the table below

Country or Ethnic Group	Target Waist Circumference	
	Men	Women
European	Equal to or less than 94 cm	Equal to or less than 80 cm
South Asian, Chinese	Equal to or less than 90 cm	Equal to or less than 80 cm
Japanese	Equal to or less than 85 cm	Equal to or less than 90 cm
South and Central American	Use South Asian cut-off points until more specific data are available	
Sub-Saharan African	Use European cut-off points until more specific data are available	
Eastern Mediterranean and Middle East (Arab)	Use European cut-off points until more specific data are available	

Table adapted from Lau et al., 2007

Research cautions the use of waist circumference parameters, indicating that waist circumference may not be applicable for those of African descent and that more research should be done for this population (2012 Canadian Best Practice Recommendations for Stroke Care, p. 11).

Waist circumference is an index of the absolute amount of abdominal fat.

Abdominal obesity should be measured, as it plays a critical role in the etiology of metabolic syndrome (increased waist circumference, raised triglycerides, decreased HDL, increased BP and raised fasting glucose).

Clear evidence exists that obese individuals are at increased risk of health problems, including stroke, heart disease, type 2 diabetes, osteoarthritis and certain cancers (2006 Canadian Clinical Practice Guidelines on the Management and Prevention of Obesity in Adults and Children).

## **Alcohol Consumption**

Recommendations include two or fewer standard drinks per day

- Fewer than 15 drinks per week for men
- Fewer than 10 drinks per week for women who are not pregnant

*\*A standard drink is 5 oz of wine, 12 oz of beer or 1.5 oz of spirits.*

Heavy and/or binge drinking (more than 4 drinks per day for men and 3 drinks per day for women) have been associated with an increased risk of stroke. (*Canadian Centre on Substance Abuse, 2013*).

## **Oral Contraceptives and Hormone Replacement Therapy**

The risks and the benefits of using estrogen-containing oral contraceptives or hormone replacement therapy in the presence of stroke should be discussed with patients. Alternative medical management should be considered in patients taking estrogen-containing oral contraceptives or hormone replacement therapy in the presence of stroke/TIA.

Evidence shows that hormone replacement therapy and high or low dose estrogen-containing oral contraceptives increases the risk of ischemic stroke. Research suggests that transdermal contraceptive therapy has not been shown to increase the risk of stroke but does increase the risk of venous thromboembolism.

## 8.2 Blood Pressure Management

(Adapted from the *2012 Canadian Best Practice Recommendations for Stroke Care: Stroke Prevention*)

- Hypertension is the single most important, modifiable risk factor for stroke.
- Blood pressure should be monitored in all persons at risk for stroke.

Approximately 20-30% of adults have high blood pressure as do 60% of those over age 65, and 70% in those who have experienced a stroke (Du et al., 2000). Each 2mmHg reduction of systolic blood pressure is linked to a 25% reduction in stroke events (Girerd and Giral, 2004).

Canadian Hypertension Education Program (CHEP) states that:

- About 25% of adult Canadians are hypertensive and with current lifestyles over 90% will develop hypertension.
- Blood pressure increases with age.
- Blood pressure should be checked with each encounter with the healthcare system.
- CHEP guidelines should be followed for a comprehensive treatment plan that includes identification of other risk factors, lifestyle modification, pharmacotherapy and ongoing monitoring.



## CHEP 2014 Recommendations for the Management of Blood Pressure

Population	Recommended Treatment Target
General Population under age 80 (primary prevention of first stroke)	Less than 140/90mmHg
Individuals under age 80 who have had a stroke/TIA	Less than 140/90mmHg
Individuals under age 80 with diabetes	Less than 130/80mmHg
Individuals under age 80 with non-diabetic chronic kidney disease	Less than 140/90mmHg
Individuals over age 80	Less than 150*/NA *Individualized according to each person's unique risk factor profile

Table adapted from the Canadian Hypertension Education Program 2014 Recommendations (Hypertension Canada, 2014)

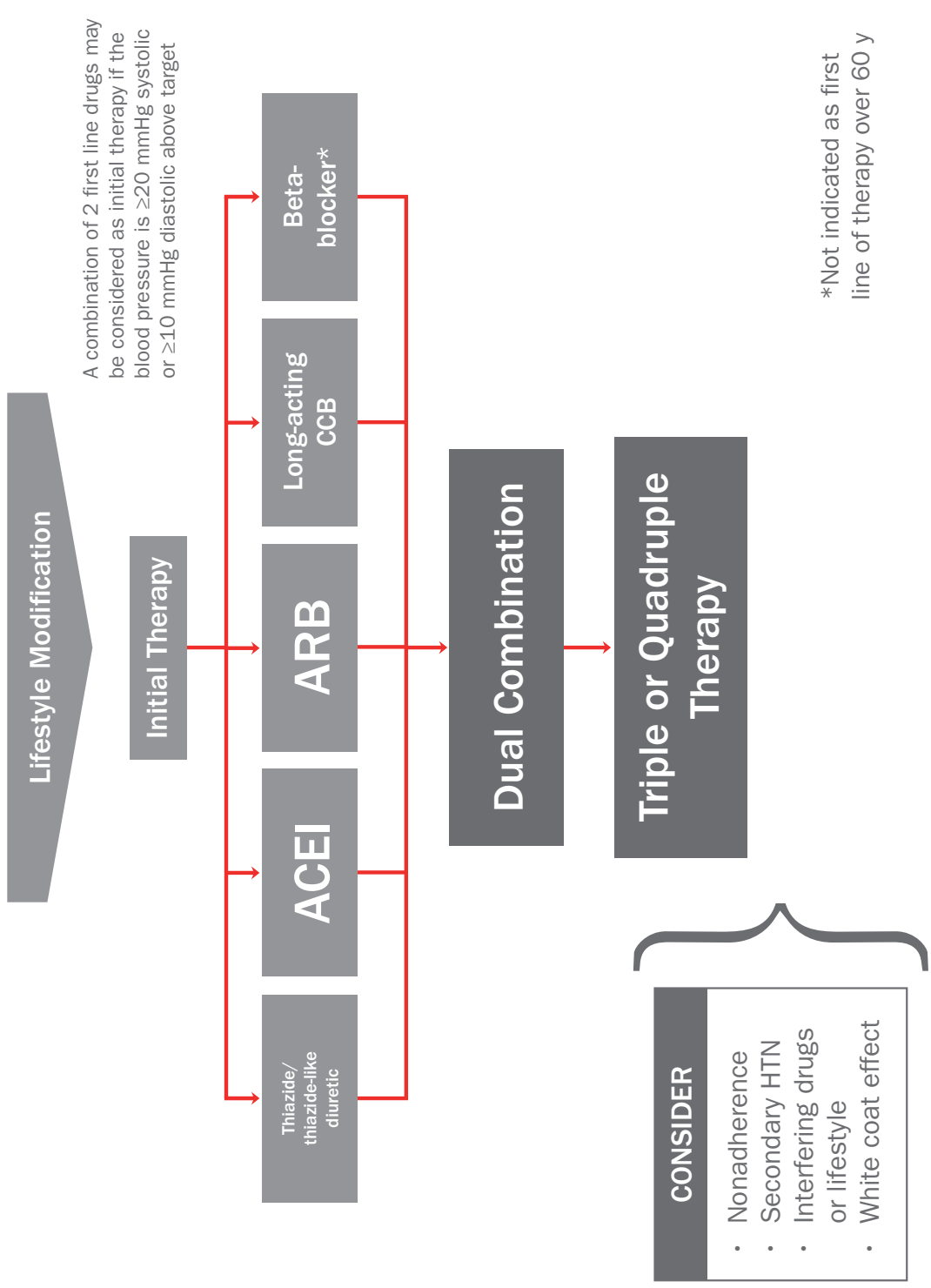
Ideally, the targets should be even lower than shown in the table. Studies are underway to better define the appropriate lower target rate for stroke patients.

Patients found to have elevated blood pressure (systolic greater than 130mmHg and/or diastolic greater than 85mmHg) should undergo a thorough assessment for the diagnosis of hypertension.

According to the CHEP 2014 Guidelines, lifestyle management is a critical component of hypertension management.

# Pharmacological Treatment of Hypertension

**TARGET <140/90 mmHg**



**ACEI, ARB and direct renin inhibitors are contraindicated in pregnancy and caution is required in prescribing to women of child bearing potential**

Adapted from Hypertension Canada 2014 Canadian Hypertension Education Program Recommendations

Common medication categories for hypertension include:

- Thiazide-like **diuretic** such as Hydrochlorothiazide and Indapamide
- **ACEI** (Angiotensin Converting Enzyme Inhibitor) such as Ramipril and Perindopril
- **ARB** (Angiotensin II Receptor Blocker) such as Diovan or Avapro
- **Long-acting CCB** (Calcium Channel Blocker) such as Cardizem and Norvasc
- **Beta-Blocker** such as Metoprolol or Atenolol

These have all been shown to reduce recurrent stroke and other vascular events. Most patients with stroke or TIA will benefit from treatment with a blood pressure lowering agent, regardless of the presence of hypertension.

There is less evidence on the role of beta blockers and calcium channel blockers in the secondary prevention of stroke, but there may be some benefit. For secondary prevention, aggressive treatment of blood pressure is of greater benefit than more modest reductions.

For patients with non-disabling stroke or TIA not requiring hospitalization, it is recommended that blood pressure lowering treatment be initiated or modified at the time of the first medical assessment.

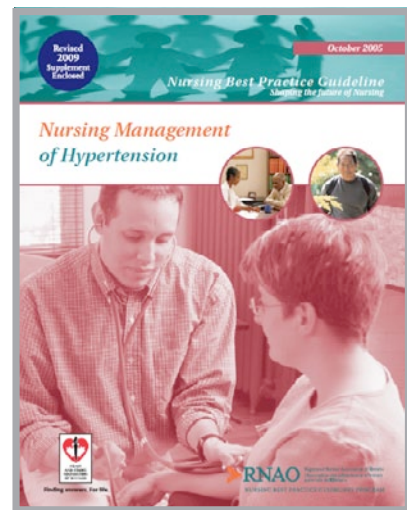
There is lack of randomized controlled trials that define the optimal time to initiate blood pressure lowering therapy after acute stroke or TIA – **each case must be assessed individually.**

**Another recommended resource:**

**RNAO Nursing Management of Hypertension (revised 2009)**

Manual includes:

- The detection and diagnosis of hypertension
- Using correct cuff size
- Education for patients about home BP monitoring
- Education for patients on their target BP and importance of achieving this target
- Assessment and Development of a Treatment Plan:
  - Lifestyle interventions: help to identify lifestyle factors which may influence hypertension management
  - Diet: instruct DASH diet (Dietary Approaches to Stop Hypertension)
  - Healthy weight: weighing patients, calculating BMI and measuring waist circumference
  - Exercise guidelines
  - Alcohol consumption
  - Smoking cessation
  - Stress reduction



<http://rnao.ca/bpg/guidelines/nursing-management-hypertension>

## 8.3 Lipid Management

(Adapted from the 2012 Canadian Best Practice Recommendations for Stroke Care: Stroke Prevention)

Best practice indicates that lipid levels should be monitored in all persons at risk for stroke.



Dyslipidemia is a modifiable risk factor for atherosclerosis in which screening is imperative in order to identify risk and institute appropriate therapy for both primary and secondary prevention of coronary artery disease (CAD), peripheral artery disease (PAD), and stroke. (Adams et al., 2009)

### Lipid Assessment

- Fasting lipid levels (total cholesterol, total triglycerides (TG), low-density lipoprotein (LDL) cholesterol, high-density lipoprotein (HDL) cholesterol) should be measured on all patients presenting with stroke or TIA.
- Adults at any age should have their blood lipid levels measured if they have a history of diabetes, smoking, hypertension, obesity, history of myocardial infarction or coronary revascularization, stroke, TIA, peripheral vascular disease, chronic kidney disease, family history of premature cardiovascular disease (men less than 55, women less than 65), family history of hyperlipidemia, erectile dysfunction, inflammatory disease, HIV infection, chronic obstructive pulmonary disease (COPD), atherosclerosis, abdominal aneurysm, or clinical manifestation of hyperlipidemia.
- Aboriginal people and those of South Asian descent are at an increased risk, and consideration should be given to screening at an earlier age.
- Considered in the high risk category is any patient with a diagnosis of CAD, peripheral vascular disease, aortic aneurysm, cerebrovascular disease (including TIA), and most adult patients with type 1 or type 2 diabetes mellitus.

- It is very important to implement the healthy lifestyle modifications outlined earlier to lower overall risk of stroke.
- Ischemic stroke patients should be treated to achieve a target of LDL less than 2.0 mmol/L or a 50% reduction from their baseline LDL cholesterol level; treatment includes pharmacotherapy and aggressive lifestyle modification, including dietary guidelines.
- Statin therapy is not routinely indicated for stroke prevention in the instance of intracerebral hemorrhage, but may be considered on an individualized basis when the overall risk-factor profile includes co-existing pro-thrombotic factors.

## Pharmacological Treatment of Dyslipidemia

### Statins

- Atorvastatin (Lipitor)
- Rosuvastatin (Crestor)
- Simvastatin (Zocor)

Statin agents should be prescribed for most patients who have had an ischemic stroke or transient ischemic attack to achieve current recommended lipid levels.

Possible effects include the following:

- anti-inflammatory properties may help stabilize the lining of blood vessels
- may help relax blood vessels thus contributing to lower blood pressure
- may have a blood thinning effect thus reducing the risk of blood clots

## 8.4 Diabetes Management

(Adapted from the 2012 *Canadian Best Practice Recommendations for Stroke Care: Stroke Prevention*)

Best practice indicates that:

- All individuals in the general population should be evaluated annually for type 2 diabetes risk on the basis of demographic and clinical criteria.
- A fasting plasma glucose (FPG) should be performed every three years in individuals greater than 40 years of age to screen for diabetes. More frequent and/or earlier testing with FPG and/or A1C or 2hPG in a 75 g Oral Glucose Tolerance Test (OGTT) should be considered for those at very high risk.

(Canadian Journal of Diabetes, 2013, Canadian Diabetes Association Clinical Best Practice Guidelines)

Diabetes is a major, independent risk factor for stroke and most adults with type 1 or 2 diabetes should be considered at high risk for vascular disease. It is a particularly strong risk factor in younger patients, and as much as tenfold in some subgroups.

Diabetes increases the risk of ischemic stroke more than hemorrhagic stroke.

Many patients may exhibit metabolic syndrome and additional risk factors such as hypertension, hyperdyslipidemia which further increase the risk of TIA/stroke.

Reducing risk factors to target levels is essential and involves a multi-issue approach, including lifestyle modifications, tight glycemic control, antiplatelet drugs (aspirin), control of lipid levels and blood pressure control.



According to the Canadian Diabetes Association 2013, *Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada*, the

recommended target for Glycemic Control is:

- A1C (Glycated Hemoglobin) equal to or less than 7.0 %
- FPG (Fasting Plasma Glucose) = 4.0-7.0 mmol/L
- 2 hour PG (Plasma Glucose) = 5.0-10.0 mmol/L OR 5.0-8.0 mmol/L if A1C targets are not being achieved

### **Diagnosis of Diabetes**

- FPG greater than or equal to 7.0 mmol/L
- 2 hour PG in a 75 g OGTT equal to or greater than 11.1 mmol/L
- Random PG equal to or greater than 11.1 mmol/L
- A1C equal to or greater than 6.5% (for use in adults with the absence of factors that affect the accuracy of A1C and not for use in suspected Type 1 Diabetes)

### **Diabetes Assessment and Stroke**

- Glycated hemoglobin should be measured in patients with either an ischemic stroke or TIA as part of a comprehensive stroke assessment.
- In all patients with a stroke or TIA, fasting lipid levels (TC, HDL, TG, LDL) should be measured at the time of discharge and at appropriate intervals if therapy initiated.
- Blood pressure should be measured at every diabetes visit in patients with stroke or at risk of stroke.

### **Diabetes Management in Secondary Stroke Prevention**

- Adults at high risk of a vascular event should be treated with a statin to achieve an LDL equal to or less than 2.0 mmol/L.
- Unless contraindicated, ASA therapy (80-325mg/day) is recommended in all patients with diabetes with evidence of cardiovascular disease such as stroke.
- Treat to the diabetes targets identified earlier.



## 8.5 Antiplatelet Therapy

(Adapted from the 2012 Canadian Best Practice Recommendations for Stroke Care: Stroke Prevention)

All patients with ischemic stroke or transient ischemic attack should be prescribed antiplatelet therapy for secondary prevention of recurrent stroke unless there is an indication for anticoagulation.

- Antiplatelet agents are considered a fundamental component of secondary stroke prevention.
- There is a 25% relative risk reduction in recurrent stroke for patients treated with ASA (Saxena and Koudstaal, 2004).
- For adult patients on ASA, the usual maintenance dosage is 81 mg/day, unless other indications are present which may suggest a higher dose is required.
- There is also some evidence to support the use of alternative antiplatelet agents including extended-release dipyridamole plus ASA or clopidogrel.
- Long-term use of combinations of aspirin and clopidogrel are not recommended (greater than 90 days), unless there is an alternate indication.
- Aspirin (ASA) (81-325 mg), combined ASA (25 mg) and extended release dipyridamole (200 mg) [Aggrenox], or clopidogrel (75 mg) [Plavix] may be used depending on the clinical circumstances. (ie. cardiac stent, etc.)

## 8.6 Antithrombotic Therapy for Atrial Fibrillation

(Adapted from the 2012 Canadian Best Practice Recommendations for Stroke Care: Stroke Prevention)

**Atrial Fibrillation is a significant risk factor for stroke and should be aggressively managed to reduce the risk of cerebrovascular events.**

- Patients with atrial fibrillation or atrial flutter (paroxysmal, persistent or permanent) should be screened using a predictive tool (i.e., the CHADS<sub>2</sub> or CHADS<sub>2</sub>-Vasc) and for the risk of bleeding (i.e., the HAS-BLED).
  - Note: for more information on these predictive tools, please refer to the guidelines section at [www.ccs.ca](http://www.ccs.ca)
- Patients with atrial fibrillation at low risk (CHADS<sub>2</sub> = 0) should receive aspirin (ASA) (80-325 mg/day).
- Patients with atrial fibrillation at intermediate risk of stroke (CHADS<sub>2</sub> = 1) or a high risk (CHADS<sub>2</sub> equal to or greater than 2) of stroke should receive oral anticoagulation therapy (OAC).

The choice of OAC is based on patient factors including age, renal function, additional health factors, likelihood of compliance, patient preferences, and costs.

### **Oral Anti-Coagulation (OAC):**

- Most patients should receive a novel OAC (dabigatran, rivaroxaban, or apixaban).
- Patients with atrial fibrillation who also have a mechanical heart valve must be placed on warfarin according to the best practice guidelines.
- Patients with atrial fibrillation who are already well controlled on warfarin with a stable INR (70% of the time as per documented INR) may continue on warfarin.

## Management of OAC:

### Dabigatran:

- Dose of 150 mg twice daily is appropriate for most individuals
- Dose of 110 mg is recommended for patients aged 80 and over or those at risk of bleeding

### Rivaroxaban:

- 20 mg OD
- 15 mg OD if Creatinine Clearance 30-49

### Apixaban:

- 5 mg BID
- 2.5 mg BID in the presence of two or more of the following:
  - Age 80 years and over
  - Weight 60 kg or less
  - Serum Creatinine equal to or greater than 133

### Warfarin:

- Initial dosage is 2.5 mg – 10 mg daily
- Maintenance dose dependent on INR
  - Target INR for non-valvular atrial fibrillation is 2.5 (range of 2 – 3)
  - Target INR for atrial fibrillation in presence of heart valve disease, including the presence of a mechanical heart valve, is 3 (range of 2.5 – 3.5)

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*Notes: For more information on CHADS<sub>2</sub> risk stratification tool, visit*

*<http://www.mdcalc.com/chads2-score-for-atrial-fibrillation-stroke-risk> OR [http://www.ccsguidelineprograms.ca/index.php?option=com\\_content&view=article&id=53&Itemid=65](http://www.ccsguidelineprograms.ca/index.php?option=com_content&view=article&id=53&Itemid=65)*

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*For more information on CHADS<sub>2</sub> Vasc risk stratification tool, visit*

*<http://www.mdcalc.com/cha2ds2-vasc-score-for-atrial-fibrillation-stroke-risk/> or [http://www.ccsguidelineprograms.ca/index.php?option=com\\_content&view=article&id=53&Itemid=65](http://www.ccsguidelineprograms.ca/index.php?option=com_content&view=article&id=53&Itemid=65)*

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*For more information on the HAS-BLED Risk Stratification Tool (to determine bleeding risk), visit*

*<http://www.mdcalc.com/has-bleed-score-for-major-bleeding-risk/>*

## 8.7 Carotid Intervention

(Adapted from the 2012 Canadian Best Practice Recommendations for Stroke Care: Stroke Prevention)

Carotid endarterectomy is beneficial for stroke prevention in appropriate patients. It is a surgical procedure that removes atherosclerotic plaque from the proximal internal carotid artery.

Carotid Stenosis may be classified as symptomatic or asymptomatic. Symptomatic carotid disease may result in symptoms of either a TIA and/or stroke. In asymptomatic carotid artery disease, although there may be a significant amount of atherosclerotic build-up, it is not enough to obstruct blood flow that would result in symptoms. (University of Chicago Medical Center, 2014)

### Symptomatic Carotid Stenosis

- Patients with transient ischemic attack or nondisabling stroke and ipsilateral 50 to 99% internal carotid artery stenosis (measured by two concordant non-invasive imaging modalities such as dopplers, CTA, or MRA) should be evaluated by an individual with stroke expertise (neurosurgeon/vascular surgeon). Selected patients should be offered carotid endarterectomy within two weeks of the incident transient ischemic attack or stroke unless contraindicated.
- Carotid endarterectomy is contraindicated for patients with mild (less than 50%) stenosis.
- Carotid endarterectomy may be recommended for selected patients with moderate (50 to 69%) symptomatic stenosis and should be evaluated by a *Physician* with expertise in stroke management.

- Patients with severe stenosis (70-99%) benefit most from surgery performed within 2 weeks of the event.
- The benefit of endarterectomy depends on the degree of stenosis and the timing of the surgery after the event.
- Carotid stenting may be considered for patients who are not candidates for surgery due to technical, anatomic or medical reasons.
- One death or severe stroke is prevented in every nine individuals presenting with symptomatic severe (70-99%) carotid stenosis treated with carotid endarterectomy.

## Asymptomatic Carotid Stenosis

- Carotid endarterectomy may be considered for selected patients who are asymptomatic or remotely symptomatic (over 3 months) with 60-99% carotid stenosis. These patients should be evaluated by a *Physician* with expertise in stroke management.
- Carotid stenting may be considered for patients who are not candidates for surgery due to technical, anatomic or medical reasons.

## Intracranial Stenosis

- Intracranial stenting is not recommended for the treatment of recently symptomatic intracranial stenosis 70-99%.
- Dual antiplatelet therapy is suggested using ASA 325mg and clopidogrel (for up to 90 days) as well as aggressive management of all vascular risk factors.
- Medical management decisions should be based upon a person's individual vascular risk factor profile.

## 8.8 Sleep Apnea Screening and Management

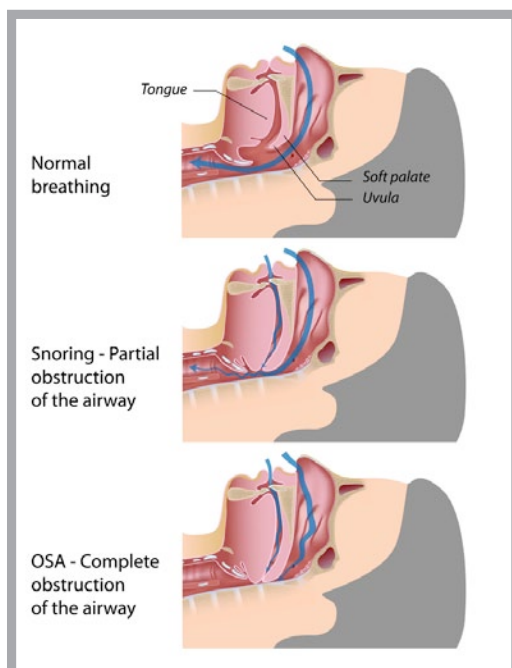
(Adapted from the 2012 Canadian Best Practice Recommendations for Stroke Care: Stroke Prevention)

Sleep disorders are an under-recognized problem that can increase risk of initial or recurrent stroke.

Sleep apnea is an ongoing condition that disrupts a person's sleep with persistent pauses in breathing or shallow breathing. Patients with this condition will move in and out of deep sleep into either light sleep or waking (due to gasping for air). It results in decreased oxygen levels, disrupts restful sleep, and is associated with high blood pressure, atrial fibrillation, stroke, and heart failure.

The most common type of sleep apnea is obstructive sleep apnea (OSA), a condition where the airway is completely or partially obstructed due to relaxation of the muscles around the back of the tongue and soft palate.

OSA is emerging as an independent stroke risk factor, and as a condition that arises as a result of a stroke. It is a modifiable stroke risk factor. OSA is more common in individuals who have experienced a stroke or TIA as compared to the general population.



## Screening and Assessment



Patients with post-stroke sleep apnea often demonstrate atypical signs of sleep apnea.

Monitor for potential symptoms that indicate OSA, which include both typical and atypical signs.

### Typical signs:

- Excessive daytime sleepiness
- Choking/gasping during sleep
- Very loud snoring
- Recurrent awakening from sleep (fragmented sleep or difficulty sleeping)
- Waking with dry mouth/sore throat
- Un-refreshing sleep
- Waking with a headache
- Difficulty concentrating/poor memory
- Irritability/depression
- Erectile dysfunction in men

(Fleetham J. et al, 2006; The Lung Association, 2012)

### Atypical signs:

- Recurrent stroke
- Increased frequency of nocturia or snoring
- Treatment resistant hypertension
- Presence of atrial fibrillation



It is recommended that nurses monitor for symptoms of sleep disturbance and, if present, screen for obstructive sleep apnea using a standardized tool (e.g., questionnaire). Patients who have a positive result on a standardized screening questionnaire should be referred to a specialist for a more detailed assessment and diagnosis.

## Management

Stroke prevention and medical management of confirmed sleep apnea can include the following:

- Vascular risk factor treatment and management (as outlined in this module)
- First line therapies, as determined by the patient's need and risk factor profile, such as:
  - Avoidance of hypnotic or sedative medications or alcohol
  - Positional therapy (i.e., position the patient to sleep on the side instead of on the back)
  - Weight loss
  - Continuous positive airway pressure (C-PAP) machine
  - Dental appliances in consultation with dental specialists
- Treatment should be considered for asymptomatic patients with an Apnea-Hypopnea Index (AHI) greater than 20/hour or SaO<sub>2</sub> less than 90 for greater than 20% of the recording time



Engaging the patient and family in ongoing education, counseling and support regarding the signs and symptoms of sleep apnea, associated stroke risks, and importance of treatment compliance



## 8.9 Smoking Cessation

(Adapted from the 2012 Canadian Best Practice Recommendations for Stroke Care: Stroke Prevention)

Cigarette smoking causes more deaths in Canada from heart disease and stroke than cancer (HSFO, 2000). Smoking doubles the risk of ischemic stroke and is associated with a 2-4 fold increase in hemorrhagic stroke (Goldstein et al., 2011).

A large proportion of Canadian current smokers have been shown to be willing to make a quit attempt. Healthcare providers have an important role in assisting individuals to quit smoking with even brief interventions proving effective in prompting quit attempts.

Female patients who smoke and take oral contraceptives or estrogen-based hormone replacement therapy are at an increased risk of initial or recurrent stroke.

### Management of Smoking Cessation

- Follow the 5 A's Model for Treating Tobacco Use and Dependence (see below)
- Smoking status should be identified, assessed and documented
- Provide clear, non-judgemental, and patient-specific advice regarding the importance of smoking cessation
- A combination of pharmacotherapy and behavioural therapy is recommended (see below)
- For inpatients who are current smokers: follow protocols for the management of withdrawal symptoms during hospitalization
- Smoking cessation in teens and young adults should be considered a priority

## Integrating Smoking Cessation into Daily Nursing Practice

(Nursing Best Practice Guidelines, visit [www.tobaccofreerna0.ca](http://www.tobaccofreerna0.ca))

- Window of opportunity in the hospital setting to intervene or at least introduce the notion of not resuming tobacco on discharge
- Nurses could implement minimal tobacco use intervention using the “Ask, Advise, Assist, Arrange” protocol with all clients

### “5 A’s” Model for Treating Tobacco Use and Dependence

<b>ASK</b> about tobacco use	Identify and document tobacco use status for every patient at every visit.
<b>ADVISE</b> to quit	In a clear strong, and personalized manner, urge every tobacco user to quit.
<b>ASSESS</b> willingness to make a quit attempt	Is the tobacco user willing to make quit attempt at this time?
<b>ASSIST</b> in quit attempt	For the patient willing to make a quit attempt, offer medication and provide or refer for counselling or additional treatment to help the patient quit.  For patients unwilling to quit at the time, provide interventions designed to increase future quit attempt.
<b>ARRANGE</b> follow-up	For the patient willing to make a quit attempt, arrange for follow-up contacts, beginning within the first week after the quit date  For patients unwilling to make a quit attempt at the time, address tobacco dependence and willingness to quit at the next visit.

Adapted from RNAO, 2007

### Smoking Cessation Interventions:

- Pharmacotherapy
  - Nicotine Replacement Therapy (NRT) (patch, gum, inhaler, lozenges, nasal spray)
  - Nicotine Receptor Partial Agonists (Varenicline - Champix)
  - Bupropion SR
- Counselling
- Smoker’s helpline (visit [www.smokershelpline.ca](http://www.smokershelpline.ca))

Withdrawal symptoms include: initially anger, impatience, restlessness, difficulty concentrating, insomnia, increased appetite and anxiety and depressed mood. Symptoms can begin a few hours after last cigarette and peak 2-3 days later and continue over a period 2-3 weeks (American Psychiatric Association, 2013).

The goal of NRT is to assist in the transition from smoking to abstinence by decreasing withdrawal symptoms and motivation to smoke (Stead et al, 2009-Cochrane Review).

## 8.10 Transient Ischemic Attack (TIA)

Transient ischemic attack (TIA) is defined as a “*transient episode of neurologic dysfunction caused by focal brain, spinal cord, or retinal ischemia, without acute infarction*” (Easton et al., 2009).

TIA was originally defined as a sudden onset of a focal neurologic symptom and/or sign lasting less than 24 hours, presumably brought on by a transient decrease in blood supply, which rendered the brain ischemic in the area producing the symptom (Easton et al., 2009). However, the classic definition of TIA, regarding 24 hrs was inadequate for several reasons. Most notably, there is risk of permanent tissue injury (i.e., infarction) even when focal transient neurologic symptoms last less than one hour. Thus, the benign connotation of “TIA” has been replaced by an understanding that even relatively brief ischemia can cause permanent brain injury.

### **Symptoms of a TIA may include:**

- Unilateral motor weakness affecting the face, arm or leg
- Speech (dysarthria) or language (aphasia) difficulties
- Visual disturbance (amaurosis fugax, hemianopsia or diplopia)
- Unilateral sensory disturbance (paresthesias) affecting the face, arm or leg
- Vertigo and/or ataxia

Symptoms depend on which arterial supply is compromised.

**Some facts:**

- Recovery is complete
- Is called a serious stroke warning event
- TIA precedes 15% of strokes (Gladstone et al., 2004)
- The 90 day risk of stroke after TIA is 10.5%
- Half of the 90 day risk occurs within the first 2 days  
(*Johnson et al, 2000*)

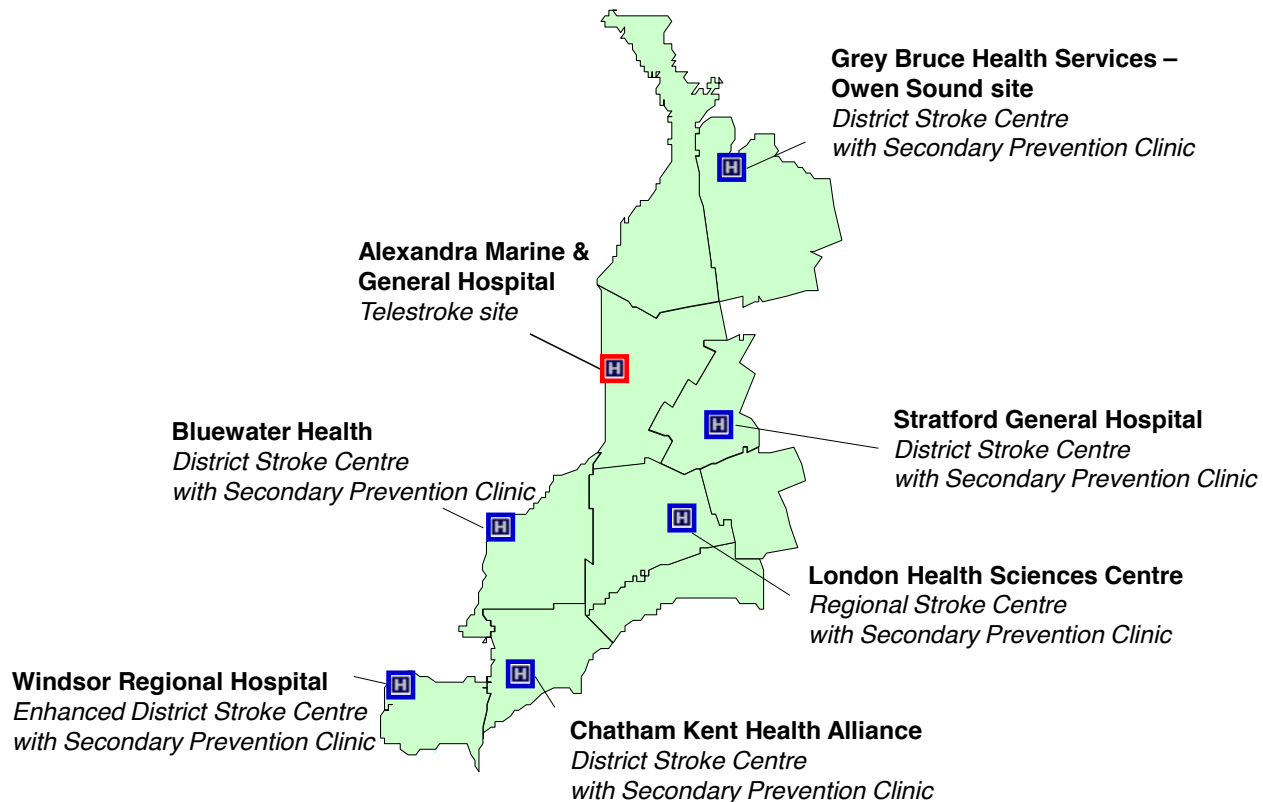
## TIA Management

- **Anticoagulant therapy:** to prevent the formation of blood clots in patients with heart disease atrial fibrillation (Coumadin, ECASA if Coumadin contraindicated)
- **Antiplatelet therapy:** to decrease further development of thrombi (ECASA, Plavix, Aggrenox)
- **Antihypertensive therapy:** to control systolic blood pressure to reduce the risk of cerebrovascular events
- **Lipid management:** to prevent the formation of atherosclerotic plaque
- **Obstructive sleep apnea management:** C-PAP or dental appliance, positioning therapy, lifestyle management
- **Lifestyle modification:** includes management of hypertension, hyperlipidemia, and diabetes, low fat/low salt diet, increased physical activity, smoking cessation, medication compliance, etc.

## 8.11 Role of Secondary Prevention Clinics

- Evaluate and triage all TIA and minor stroke patients treated surgically and medically
- Avoid an inpatient admission to hospital
- Facilitate timely investigations to determine etiology
- Initiate appropriate medications
- Provide access to timely carotid intervention when indicated
- Counsel on risk reduction, lifestyle modification, and potential referral to other members of the interprofessional team
- Refer to specialists

### Southwestern Ontario Stroke Centres



Updated September 2010

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