Stroke Education:
Self- Learning Package

This learning module was adapted from the
Prairie Mountain Health (PMH) Emergency Medical System (EMS)
and PMH Stroke Education for Non-Stroke Centres self-learning packages,
with permission from Prairie Mountain Health Authority.

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STROKES

Every nine (9) minutes a Canadian has a stroke. Stroke is the third leading cause of death and the leading cause of adult disability in Canada (Boulanger et al., 2018). Approximately 315,000 Canadians live with the effects from a stroke. Furthermore, strokes account for 65,000 hospital visits a year at an estimated annual cost of $3.6 billion in health care expenses and lost productivity (Heart & Stroke Foundation [HSF], 2014). Population projections demonstrated that the Canadian population is aging (Statistics Canada, 2010). Since the risk of ischemic stroke increases with age, a higher incidence of stroke is expected. During the last decade, there has been a 24% increase of strokes among fifty year olds and a 13% rise among sixty year olds (HSF, 2014), and the rate is expected to double in the next 15 years (Lindsay & Hill, 2014).

Over the last 20 years, there have been several advancements in both stroke prevention and acute stroke care (Haselman, 2014; Watkins 2014). Today, a major stroke is treatable if persons experiencing a stroke arrive within the recommended treatment time window at a hospital equipped to provide hyperacute stroke care. Current reperfusion therapies for acute ischemic stroke (AIS) include thrombolytic therapy and mechanical clot retrieval. "Intravenous recombinant tissue plasminogen activator (rt-PA) is a treatment of proven benefit for select patients with AIS as long as it is within 4.5 hours after onset" (Saver et al., 2013, p. 2480). The earlier the patient receives rt-PA within the 4.5 hours, the greater the benefit because with each minute that passes 1.9 billion brain cells are lost - "**time is brain**" in acute stroke. The benefit of rt-PA in patients with AIS is strongly time dependent (Fonarow, et al., 2014), making this time-driven therapy a challenge for health regions, hospitals, and practitioners.

Endovascular therapy (EVT) in acute stroke involves mechanical clot retrieval for proximal intracranial arterial occlusion. The 2018 Canadian Stroke Best Practice Recommendations (CSBPR) support the use of EVT in the treatment of patients with AIS where the proximal intracranial artery is occluded and clients present to a stroke centre within six hours of symptom onset. Based on recently published DAWN and DEFUSE3 clinical trials, the window for a highly selected group of patients with large ischemic strokes to receive EVT has been increased to 24 hours after last seen normal (Boulanger et al., 2018). Stroke systems within Canada are attempting to incorporate EVT into their organized stroke care models. The capacity to perform EVT in Manitoba is increasing.

Pre-hospital providers (such as Emergency Medical Services [EMS] and staff at non-stroke centres) must respond to stroke as a serious, time-sensitive medical emergency and a potentially life-threatening condition that warrants rapid recognition, pre-notification and prompt transport to a hospital that provides hyperacute stroke care. Out-of-hospital care impacts patient outcomes.

PROGRAM OBJECTIVES

To standardize evidence-informed best practices related to stroke care across the continuum in Southern Health-Santé Sud through:

- Access to stroke prevention clinics.
- Early recognition of stroke irrespective of where in the continuum of services the patient accesses care.
- Timely access to a stroke centre for key assessments and interventions.
- Effective post-stroke care aimed at rehabilitation to maximize recovery and potential.
- Facilitated reintegration into the community.

GENERAL HYPERACUTE STROKE TREATMENT GUIDELINES

Southern Health- Santé Sud's EMS and all providers of care play a critical role in early recognition, assessment and management of a patient who shows signs of acute stroke. Thus, all patients presenting with stroke symptoms within 6 hours of onset (or last seen normal) are evaluated for eligibility for reperfusion therapy, consisting of Alteplase (rt-PA) and/or endovascular therapy (EVT). Interventions in the first few hours after stroke symptom onset impact recovery.

Time is brain… The benefits of Alteplase (tPA) are strongly time dependent (NINDS, 1995), meaning the earlier the drug is given to eligible patients the greater the benefit. Thus, eligible patients can only **receive thrombolytic therapy within 4.5 hours of symptom onset**.

The EVT window for treatment in Manitoba is six hours. All patients presenting with disabling stroke within **6 hours** of symptom onset are evaluated for possible endovascular therapy and transferred without delay to the appropriate hyperacute stroke centre.

LEARNING OBJECTIVES

- To understand stroke pathophysiology.
- To understand the risk factors associated with strokes.
- To recognize the signs and symptoms of a stroke.
- To understand how to assess a patient using the Cincinnati Stroke Scale (CSS).
- To understand how to assess a patient using the Los Angeles Motor Scale (LAMS).
- To identify the elements of the initial patient assessment.
- To understand how to determine time of onset for patient with positive stroke signs and symptoms.
- To understand the response pathways in community, non-stroke centres, and at stroke centres.
- To identify care required by the patient with a stroke during the hyperacute phase.
- To increase knowledge about Alteplase (tPA) use in the treatment of strokes.
- To identify potential post stroke complications.
- To identify important points to consider when providing care to patients post strokes.
- To become familiar with screening tools that can be used with patients who have experienced a stroke.

DESIGNATED STROKE CENTRES IN MANITOBA

The goal of hyperacute stroke care is reperfusion of eligible ischemic strokes. Patients presenting with an acute stroke at a stroke centre are either assessed by in-house Neurology or via TeleHealth by a TeleStroke Neurologist to determine if they are eligible for reperfusion therapy. The following facilities are designated as "Stroke Centres" within the province of Manitoba:

- St. Boniface General Hospital (Winnipeg).
- Health Sciences Centre (Winnipeg).
- Brandon Regional Health Centre (some in-house neurology services and TeleStroke Site).
- St. Anthony's General Hospital (The Pas) – TeleStroke Site.
- Thompson General Hospital – TeleStroke Site.
- Dauphin Regional Health Centre – TeleStroke Site.
- Boundary Trails Health Centre (Winkler) - TeleStroke Site.
- Bethesda Regional Health Centre (Steinbach) - TeleStroke Site.
- Portage District General Hospital (Portage La Prairie) - TeleStroke Site.

TeleStroke

TeleStroke is a novel patient care delivery modality through which videoconferencing and rapid transmission of imaging enables stroke patients to be assessed, diagnosed, and managed by a team of stroke experts at a distant site. TeleStroke is primarily used for thrombolytic therapy assessment, where a stroke neurologist provides consultative services to a hyperacute stroke team in a distant hospital in caring for patients presenting with an acute stroke. This is referred to as 'TeleStroke – Hyperacute'. As a result, TeleStroke increases access to quality care and decreases the geographic gap between patient and expertise.

STROKE PATHOPHYSIOLOGY

Stroke is defined as a "sudden, rapidly evolving syndrome, with a non-epileptic neurological deficit associated with a well-circumscribed volume of infarcted brain tissue within a discrete vascular territory, caused by an insufficient supply of blood to a portion of the brain" (Williams, Perry, & Watkins, 2010, p. 34). Hemorrhagic strokes, which occur due to a ruptured blood vessel, account for only 15% of all strokes. The remaining 85% are ischemic, caused by a blockage within a cerebral artery.

When a cerebral blood vessel is occluded, the lack of blood flow distal to the obstruction results in a core of dead tissue, which is surrounded by a viable ischemic penumbra. The penumbra is an area of hypo-perfusion that can survive for a short while. The ischemic penumbra can be salvaged and recovers its function by rapidly dissolving the clot that is causing the obstruction, restoring blood flow (Haselman, 2014). The amount of impairment from strokes is minimized when blood flow to the brain is restored quickly. Hence acute stroke is a time sensitive medical emergency.

TYPES OF STROKES

Strokes can be divided into two main categories - ischemic and hemorrhagic.

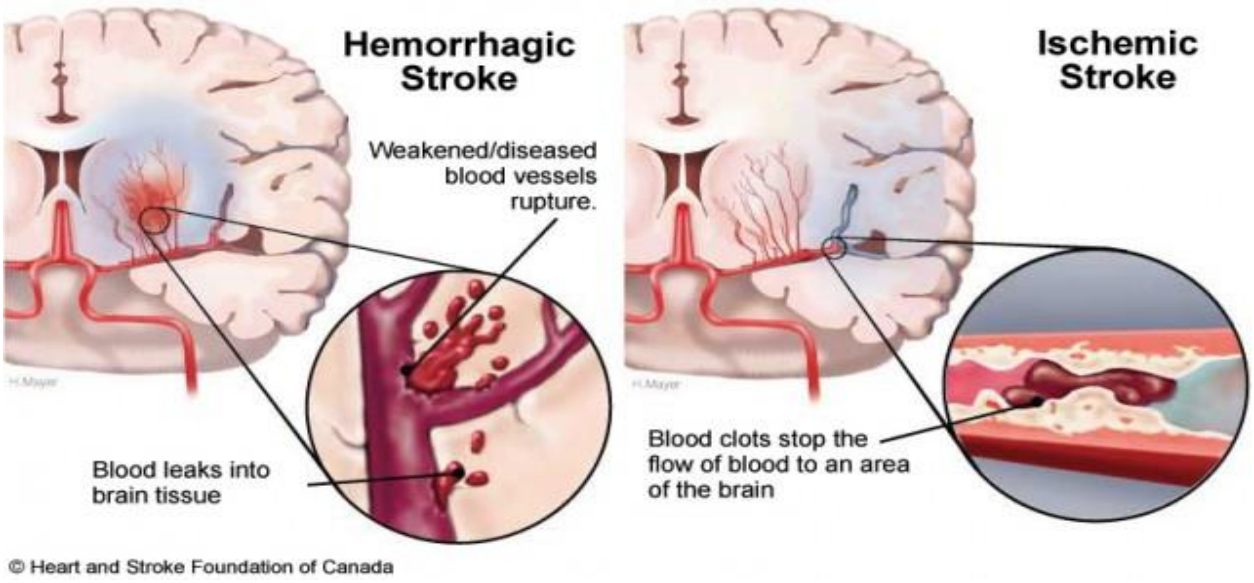
1. **Ischemic Strokes** – also known as occlusive strokes, occur when a cerebral artery is blocked by a clot or other foreign matter. The occluded blood vessel prevents perfusion of the surrounding brain tissue. **Only ischemic strokes can be treated with Alteplase (tPA) –** that is, can be thrombolized.

   Occlusive strokes are classified as either embolic or thrombotic, depending on the cause.

   - **Embolic Strokes** – an embolus is a solid, liquid, or gaseous mass carried to a blood vessel from a remote site. The most common emboli are clots which usually arise from diseased blood vessels in the neck or from abnormally contracting chambers in the heart. Other types of emboli that may cause occlusion in cerebral blood vessels are air, tumor tissue, and fat. Embolic strokes often occur rapidly and without any warning signs.
   - **Thrombotic Strokes** – a cerebral thrombus is a blood clot that gradually develops in and obstructs a cerebral artery. As a person ages, atheromatous plaque deposits can form on the inner walls of arteries. The buildup causes a narrowing of the arteries and reduces the amount of blood that can flow through them. This process is known as atherosclerosis. Once the arteries are narrowed, platelets adhere to the roughened surface and can create a blood clot that blocks the blood flow through the cerebral artery. This ultimately results in brain tissue death. Unlike the embolic stroke, the signs and symptoms of thrombotic stroke develop gradually. A thrombotic stroke often occurs at night and is characterized by a patient awakening with symptoms, such as altered mental status and/or loss of speech, sensory, or motor function. **This is the most common type of stroke, identified as the primary cause in about 85% of cases.**

2. **Hemorrhagic Strokes** – are usually categorized as being within the brain (intracranial hemorrhage) or in the space around the outer surface of the brain (subarachnoid hemorrhage). Onset is often sudden and marked by a severe headache. Hemorrhage inside the brain often tears and separates normal brain tissue. The release of blood into the cavities within the brain that contain cerebrospinal fluid may paralyze vital centres. If blood in the subarachnoid space impairs drainage of cerebrospinal fluid, it may cause a rise in the intracranial pressure. Only 15% of strokes are hemorrhagic, caused by uncontrolled bleeding in the brain.

Diagram of the Brain in Hemorrhagic and Ischemic Strokes



TRANSIENT ISCHEMIC ATTACKS (TIA's)

Some patients may experience stroke-like symptoms, known as transient ischemic attacks (TIAs). Often a TIA is referred to as a "mini-stroke." A TIA is a brief episode of neurological dysfunction caused by focal brain or retinal ischemia with complete resolution of symptoms in less than one hour and without evidence of infarction on CT. The onset of a TIA is usually abrupt. The specific signs and symptoms depend upon the area of the brain affected. Any one or a combination of stroke symptoms may be present. Thus, determining whether such a neurological event is due to a stroke or to a TIA in the pre-hospital setting is very challenging.

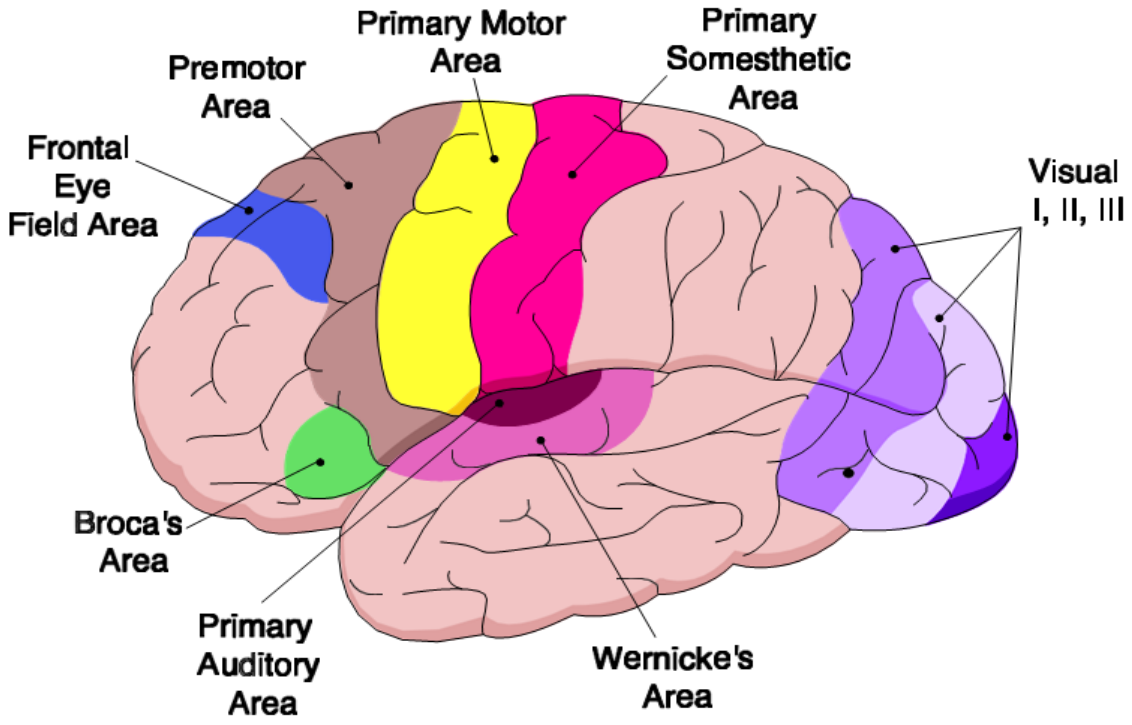
After the attack, the patient will show no evidence of residual brain or neurological damage. The patient who experiences a TIA may, however, be at risk for an eventual stroke. The most common cause of a TIA is carotid artery disease. Other common causes include a small embolus, decreased cardiac output, and hypotension.

A TIA is a warning sign of an impending stroke. The risk of stroke progression or recurrence is highest in the first hours to days from initial symptom onset, with a 6.7% risk at 48 hours and a 10% risk by 7 days after a TIA (Kamal et. al., 2015, p. 2). Hence, patients experiencing a TIA need to have immediate medical attention to be risk stratified and obtain a treatment plan to prevent a disabling stroke.

EFFECTS OF STROKE

The effect of a stroke differs depending on the area in the brain where the occlusion or bleed occurs. Some areas will affect fewer functions but, the nearer the affected area lies to the brain stem and medulla, the worse the impact will be.

Diagram of the Brain Identifying Areas of Sensory and Motor Controls



Left Hemisphere Stroke

The impact of a stroke in the left hemisphere will depend on the size of the area affected by the occlusion or bleed. The associated neurological signs and symptoms that form a common pattern of stroke presentation involving the left or dominant sphere are:

- Weakness or paralysis on the right side of the body;
- Sensory loss on the right side of the body;
- Deficits to right visual field;
- Left gaze preference;
- Trouble reading, talking, thinking or doing math;
- Behavior may become slower and more cautious than usual;
- Trouble learning or remembering new information; and/or
- Frequent instructions and feedback to finish tasks may be needed.

Right Hemisphere Stroke

The associated neurological signs and symptoms that form a common pattern of stroke presentation involving the right hemisphere are:

- Weakness or paralysis on the left side of the body;
- Sensory loss on the left side of the body;
- Deficit and/or neglect of the left visual field;
- Right gaze preference;
- Neglect: forgetting or ignoring objects or people on the left side; may even ignore their own left arm or leg;
- Difficulty distinguishing distance, depth, between up and down, or between front and back;
- Problems understanding maps;
- Short-term memory loss; and or
- Difficulties with judgment; impulsive behavior.

Cerebellar Stroke

The associated signs and symptoms that form a common pattern of stroke presentation involving the cerebellum are:

- Headache, nausea/vomiting;
- Vertigo, imbalance;
- Normal tone, power, reflexes;
- Inability to sit or stand;
- Ataxia or loss of normal coordination; and/or
- Late signs: decreasing level of consciousness, diplopia, and/or gaze palsy.

Brain Stem Stroke

Patients who experience a brain stem stroke may also present with any of these symptoms:

- Headache, nausea/vomiting;
- Ipsilateral lower motor neuron facial weakness or sensory loss;
- Contralateral hemiparesis;
- Pupillary changes;
- Dysarthria (difficulty with the motor control of speech);
- Ataxia;
- Changes in level of consciousness (LOC);
- Hiccoughs, vertigo;
- Bilateral motor findings;
- Diplopia, gaze palsies; and/or
- Dysphagia (difficulty swallowing).

COMMON SIGNS AND SYMPTOMS OF STROKE SYNDROMES

Anterior Cerebral Stroke	Middle Cerebral Stroke	Posterior Cerebral Stroke	Vertebro Basilar Stroke	Thalamic Stroke	Lacunar Stroke Four Types
• Contralateral sensorimotor deficit: foot and leg • Arm paresis • Gait ataxia • Bladder incontinence • Personality and behaviour changes • Flat affect, distractible • Perservation and amnesia	• Contralateral sensorimotor deficit: face, arm, leg • Contralateral homonymous hemianopsia • Contralateral hemi-spatial neglect or inattention (usually in Right Hemispheric Strokes) • Aphasia, alexia, agraphia (usually in Left Hemispheric Stroke or dominant hemisphere) • Gaze deviation towards affected hemisphere • Dysarthria	• Pure homonymous hemianopsia • Nausea • Vomiting • Ataxia • Vertigo • Weakness • Sensory loss • Dysarthria	• Vertigo • Limb and gait ataxia • Cranial nerve dysfunction • Coma at onset • Diplopia • Cross sensory loss • Bilateral motor deficits • Isolated field defect • Pure motor/ sensory loss • Dysarthria • Dysphagia	• Alteration in senses (except smell) • Alteration in pain, crude touch (loss) • Alteration in temperature • Contralateral hemiplegia • Hyper-sensitivity to stimulus • Vertical and lateral gaze deficits • Short-term memory loss	*Pure motor hemiparesis* • Contralateral hemiparesis of face, arm and leg *Ataxic Hemiparesis* • Ipsilateral paresis of leg • Arm and leg ataxia *Dysarthria and Clumsy Hand Syndrome* • Dysarthia • Weakness of hand • Impaired manual dexterity *Pure Sensory Stroke* • Impairments in pain, temperature, touch, position and vibration

Visual depiction of the Common Signs and Symptoms of Stroke Syndromes. Adapted from "Stroke Assessment and Prevention Pocket Cards "by the Heart and Stroke Foundation. Retrieved from http://www.strokebestpractices.ca/wp-content/uploads/2016/03/HSF_StrokeAssessGuide_NEW_7.5x4.25_EN_v3.pdf

IDENTIFYING A POTENTIAL STROKE and SCREENING for SEVERITY

The Cincinnati Stroke Scale (CSS) is the first tool used to identify a potential stroke. The Los Angeles Motor Scales (LAMS) complements CSS and provides more information about the severity of the stroke.

Cincinnati Stroke Scale (CSS):

There are <u>three</u> areas of assessment:

1. **<u>Facial Droop</u>:** Have the patient show their teeth or smile.

- Normal: Both sides of face move equally.
- Abnormal: One side of face doesn't move as well as the other side, or the one side does not move at all.

2. **<u>Arm Drift</u>** – Have the patient close their eyes and hold their arms straight out in front of them and observe for arm drift for 10 seconds.

- Normal: Movement of both arms is equal or both arms do not move at all.
- Abnormal: One arm does not move, or drifts down compared to the other.

3. **<u>Speech</u> –** have the patient say **"you cannot teach an old dog new tricks."**
   - Normal: Patient uses correct words with no slurring.
   - Abnormal: Slurred or inappropriate words or patient is mute.

NOTE: If any one of these signs is abnormal, the probability of a stroke is 72%.

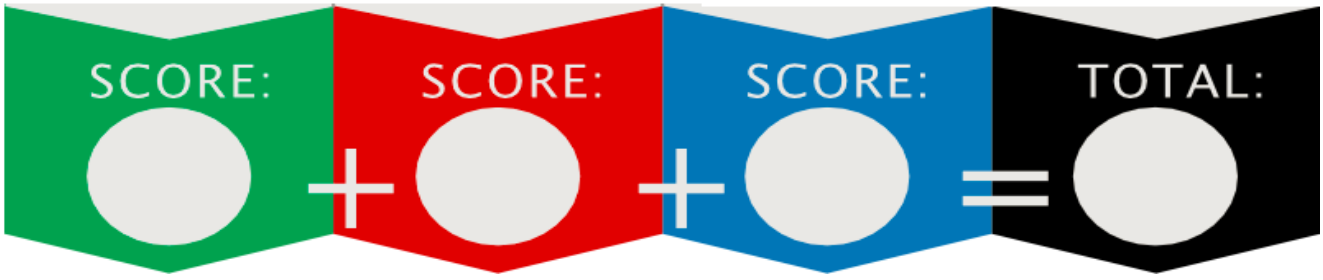
Los Angeles Motor Scale (LAMS):

LAMS is validated tool for assessment of stroke severity. It requires generating a LAMS score. A LAMS score of 4 or greater is indicative of a more severe stroke.

HOW TO CALCULATE A LAMS SCORE?

1. Assess patient for facial droop, arm drift, and grip strength.
2. Generate a score for each sign.
3. Add the scores.

ABSENT = O PRESENT = 1	ABSENT = O DRIFTS DOWN = 1 FALLS RAPIDLY = 2	NORMAL = O WEAK GRIP = 1 NO GRIP = 2	ADD SCORES



4. Interpret the results: the LAMS score generated is one criterion that will be used to determine whether the patient is a candidate for Alteplase (tPA) intervention and/or Endovascular Therapy (EVT).

NB:

If a person shows the above stroke symptoms and is in a community clinic, Personal Care Home, Transitional Care Centre, follow the *Stroke/Transient Ischemic Attack (TIA): Algorithm for Responses in Community* (CLI.4110.PL.013.SD.01) on page 14.

For a Hospital with an emergency department that is not a stroke centre, follow *Acute Stroke Care Map for Emergency Departments at Non-Stroke Centres* (CLI.4110.PL.013.FORM.01).

If a person presents to a stroke centre with the above symptoms, follow *Hyperacute Stroke Algorithm for Stroke Centres* (CLI.4110.PL.013.SD.02) on page 15.

REDUCING THE RISK

A stroke affects the quality of life for the person who has had a stroke. Furthermore, it also impacts the lives of the family and caregivers. Depending on the seriousness of the stroke, health costs can quickly escalate. Following a stroke, some people regain functional capacity that enables independent living. In contrast, the person who has had a stroke and is dependent for their activities of daily living may only be able to be supported with institutionalized care.

Modifiable Risk Factors

The most significant reduction in stroke morbidity and mortality can be addressed by prevention. Education is key to prevention. People need to be aware of the risk factors, and realize they do have some control in reducing their chances of having a stroke. What can be controlled?

- Healthy lifestyle choices:
  - Maintaining a healthy body weight;
  - Smoking cessation.
- Controlling hypertension.
- Regular testing for lipid abnormalities:
  - Controlling hyperlipidemia through medication and diet.
- Diabetes.
- Dysrhythmias:
  - Atrial fibrillation increases the risk of having an embolic stroke. In atrial fibrillation, the atria do not contract properly, resulting in clots forming in the atrial appendage. Some of these clots may break off and travel to the brain causing a stroke. Atrial fibrillation can be treated with medications.

Uncontrollable Risk Factors

What cannot be controlled?

- Age – as our age increases, so does the risk.
- Gender – males have a higher risk of stroke until women become menopausal, at which time the risk for stroke is equal.
- Family history.
- Ethnicity – Aboriginal People with diabetes, East Indians and African Americans are at greater risk of having a stroke.
- Prior stroke or TIA – “The risk of stroke progression or recurrence is highest in the first hours to days from initial symptom onset, with a 6.7% risk at 48 hours and a 10% risk by 7 days after a TIA” (Kamal et al., 2015, p. 2).

STROKE/TRANSIENT ISCHEMIC ATTACK (TIA) ALGORITHM for RESPONSES in COMMUNITY

In compliance with known Health Care Directive or Advanced Care Plan, and based on the Cincinnati Stroke Scale (CSS; see below), for a person who exhibits acute stroke or TIA symptoms in a Community Clinic, Personal Care Home, or Transitional Care Centre

Based on the descriptions provided below, assess and take action

ACUTE STROKE PROTOCOL

Less than 6 hours from onset of persistent motor or speech symptoms

Call EMS

Based on screening criteria, transport **STAT** to closest **ED** that provides appropriate hyperacute stroke therapy

HIGHEST RISK

Person presents **within 48 hours** from symptom onset or **more than 48 hours with new persistent or fluctuating motor or speech** symptoms

Call EMS

Transport to closest **ED** providing stroke care for immediate investigation and management

INCREASED RISK

Person presents between 48 hours and 2 weeks from symptom onset without persistent or fluctuating motor or speech symptoms

Complete key investigations within **24 hours** of person's first contact with health care system.

- ☐ Consult Neurologist
- ☐ Transfer to a regional Stroke Centre if recommended by neurologist
- ☐ Refer to Stroke Prevention Clinic (SPC)

LESS URGENT

Person presents after 2 weeks and those who present with isolated sensory symptoms/tingling

- ■ Complete key investigations.
- ■ Arrange for a SPC visit within 2 weeks of event
- ☐ Consult Neurologist if indicated

Key Investigations:

- ■ 12 Lead ECG
- ■ Non-contrast CT scan
- ■ CTA (arch to vertex) or Carotid Ultrasound
- ☐ MRI, Holter monitor, and echocardiogram
- ■ CBC, electrolytes, creatinine, fasting glucose, urea, PTT, INR, Troponin, HgbA1C, TSH, liver function tests, fasting lipid profile

Cincinnati Stroke Scale (CSS)

Facial Droop: Have the client show their teeth or smile
- ❑ Normal: Both sides of face move easily
- ❑ Abnormal: One side of face does not move at all

Arm Drift: Have the client close their eyes and hold their arms straight out in front of them for 10 seconds
- ❑ Normal: Both arms move equally or not at all
- ❑ Abnormal: One arm drifts compared to the other

Speech: Have the client say **"You cannot teach an old dog new tricks"**
- ❑ Normal: Client uses correct words with no slurring
- ❑ Abnormal: Slurred or inappropriate words or mute

Stroke Prevention Clinics (SPC) in Manitoba:

Health Sciences Centre
Fax: 204-787-3808

St. Boniface General Hospital
Fax: 204-233-3285

Brandon General Hospital
Fax: 204-578-4956

HYPERACUTE STROKE ALGORITHM FOR STROKE CENTRES

ED Registration Clerk:
- Page overhead "Code 25 Stroke"
- If known, include "ETA ____ hour"
- Pre-notify Stroke Team (telestroke neurology, CT tech, Lab tech, and Radiologist)

EMS Pre Notifies Stroke Centre
OR
Patient presents to Emergency Department.
Triage CTAS Level 1.

Key Point:
Door to CT – ASAP
Upper limit within 15 min of arrival
TIME IS BRAIN

On Arrival
Initiate ***Stroke Centres Emergency Standard Orders*** (CLI.4110.PL.013.FORM.07).
Confirm time of onset of disabling stroke symptom to be less than **6 hours.**

Patient for Diagnostic Imaging ** accompanied by nurse (follow Shared Health/Soins Communs protocols)
Based on CT/CTA Results

If brain imaging indicates bleed or subarachnoid hemorrhage, Consult neurology and provide recommended care.

Brain imaging shows ischemic infarct per ASPECTS and Radiologist

If no evidence of an infarct on CT and no persistent disabling deficits, go to ***Minor Stroke/Transient Ischemic Attack (TIA): Risk Assessment and Standard Orders*** (CLI.4110.PL.013.FORM.03)

Decision to treat:
Alteplase (tPA) criteria met

YES

NO

Key Point:
Door-to- needle target within 30 min of arrival
Upper limit within 60 min of arrival
TIME IS BRAIN

Initiate ***Stroke Centres: Alteplase (tPA) Standard Orders*** (CLI.4110.PL.013.FORM.10)
- Bolus + Infusion.
- Neuro vitals and monitoring.
- NO antithrombotic x 24 hours.
- Provide ***Role of Alteplase (tPA) in Stroke Care: Information for Patients and Family (Bilingual)*** (CLI.4110.PL.013.SD.03).
- Manage any complications.

Go to ***Stroke Centre Standard Orders: No Alteplase (tPA) / Post Alteplase (tPA)*** (CLI.4110.PL.013.FORM.02)

Refer to ***Stroke: Suspected Intracranial Hemorrhage (ICH) During and Post Alteplase (tPA) Infusion Algorithm*** (CLI.4110.PL.013.SD.04)

- Monitor in special care unit or emergency department for a minimum of 24 hours.
- Repeat non-contrast CT at 24 hours.
- Transfer to In-Patient Unit.

Refer to ***Management of Angioedema Caused by Alteplase (tPA) use in Acute Ischemic Stroke*** (CLI.4110.PL.013.SD.05)

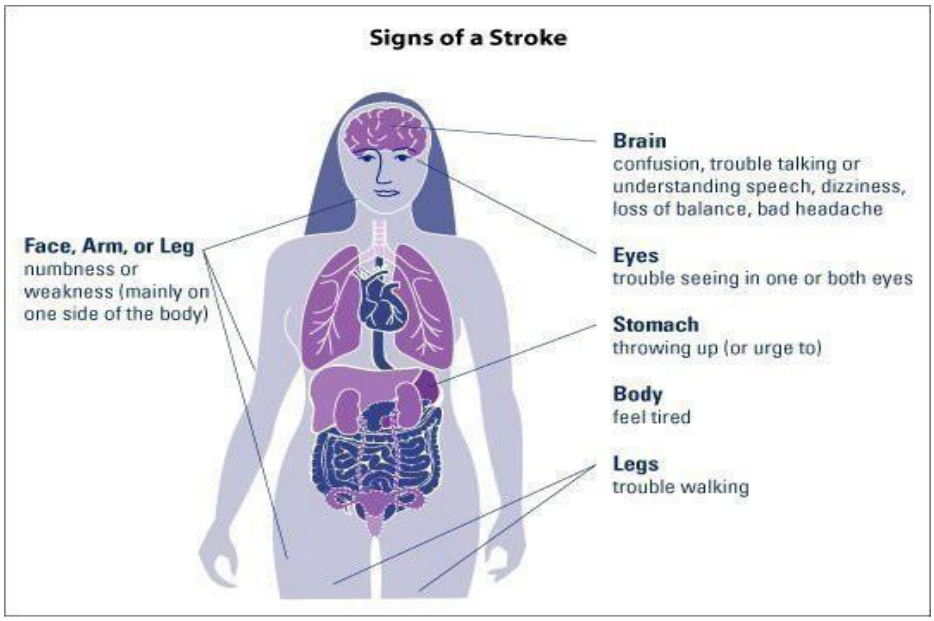
Go to
Stroke Centre Standard Orders: No Alteplase (tPA) /Post Alteplase (tPA)

ASSESSMENT AND MANAGEMENT OF A PATIENT WITH A STROKE

COMMON SYMPTOMS

Depending upon the area of the brain that is affected during the stroke or TIA, the patient may experience any of the following:

- Loss of balance or loss of coordination;
- Dizziness that starts suddenly;
- Aphasia (inability to speak), which can be further described as:
  - Expressive Aphasia: the loss of the ability to express one's thoughts in speech or writing;
  - Receptive Aphasia: the inability to comprehend spoken or written language;
  - Global Aphasia: the inability to comprehend and express language skills;
- Dysarthria, or impaired articulation, which may result in slurred speech due to a motor deficit of the tongue or speech muscles;
- Paralysis or numbness on one side of the body;
- Blurred, blackened or double vision;
- A headache that starts suddenly and is either unusual or very intense – it may also be accompanied by a stiff neck, facial pain, or pain between the eyes;
- Nausea/vomiting;
- Altered consciousness;
- Decreased reflexes – difficulty swallowing;
- Unequal pupils or pupils that respond sluggishly to light; and/or
- Incontinence.



OBTAIN A HISTORY OF THE EVENT

Health care professionals ensure that there are no unnecessary delays in assessment, transport, and treatment of patients with impaired cerebral function. The sooner that an eligible person having a stroke receives reperfusion therapy, either Alteplase (tPA) or endovascular therapy (EVT), the better their outcomes. Hence - time is brain. With every minute that passes, 1.9 billion brain cells die! Thus, the sooner normal blood flow can be restored, the greater the likelihood of a good outcome.

NB: The goal of care in non-stroke centres is to "recognize and mobilize". Within stroke centres, the goal is early diagnosis and treatment.

Time of Onset

Establishing the time of stroke onset has critical implications for treatment. The exact time of onset or last seen normal (LSN) needs to be determined (i.e., known symptom onset or last known stroke symptom-free time). Other questions that can help determine symptom onset or LSN are:

- Was it witnessed or un-witnessed?
- Did the patient experience a stroke on wakening?
    - When did patient go to sleep relative to time of call to EMS or arrival to hospital?

Other Questions

- What part of the body is affected?
- What was the duration of symptoms (if symptoms have resolved)?
- Did the patient experience a headache?
- Did the patient have any seizure-like activity?
- Was there any incontinence?

Patients with impaired cerebral blood flow benefit from:
Early recognition
Rapid, timely treatment

BASELINE ASSESSMENT

- Airway – Breathing – Circulation;
- Cincinnati Stroke Scale (Face – Arm - Speech);
- Los Angeles Motor Scale (LAMS);
- Time of onset or Last Seen Normal;
- Baseline vital signs (BP, HR, RR, Temp, & O2 Sat);
- Blood Glucose level (BGL) – if hypoglycemia is present, it can mimic the signs of a stroke but is very treatable;
- Medical history:
    - Patient risk factors for stroke;
    - Significant illnesses and co-morbidities;
    - Advanced directives.

STROKE PROTOCOL (at Non-Stroke Centres)

Follow the complete the ***Acute Stroke Care Map for Emergency Departments as Non-Stroke Centres*** (CLI.4110.PL.013.FORM.01). The following are only some key points related to the process.

Indications for Stroke Protocol Initiation:

- Greater than 18 years of age;
- One or more abnormal indicators from Cincinnati Pre-Hospital Stroke Scale;
- Onset of symptoms (or when the patient was last seen neurologically normal) less than 6 hours;
- Normal blood glucose level (BGL);
- No advanced health care directive for comfort care only.

Contraindications for Stroke Protocol Initiation:

- Immediate life threat is identified in the ABCs;
- Initial BGL less than 4.0 mmol/L, subsequently treated with total resolution of stroke symptoms;
- Known/suspected sepsis;
- Suspected TIA with complete resolution of symptoms prior to scene departure;
- Advanced Care Plan (ACP)/Health Care Directive (HCD) indicating "comfort care" only;
- Onset of symptoms (or when patient was last seen to be neurologically normal) greater than 6 hours and on-call stroke neurologist does not recommend hyperacute stroke interventions.

Call MTCC:

- For patients who meet the 6-hour window, request an immediate transfer to nearest stroke centre as per EMS stroke protocol.
- If stroke neurologist has identified which stroke centre to transfer patient to, relay this information to MTCC.

Notify the Designated Stroke Centre:

- Contact stroke centre and provide verbal report including:
  - LSN or symptom onset time;
  - Symptoms;
  - Vital signs and blood glucose;
  - Changes in symptoms since arrival;
  - Informant or family member present or available; and
  - Treatments and pending diagnostic results.

SUSPECTED ACUTE STROKE PROTOCOL:
CARE OF PATIENTS WHILE AWAITING EMS TRANSPORT at Non-Stroke Centres

- Start supplemental oxygen therapy to keep O_2 saturations between 94% and 98%.
- Establish and maintain continuous cardiac monitoring.
- Monitor vital signs and neurological assessment every 15 minutes.
- If time permits, establish an IV and draw samples for routine stroke blood work (do not delay transport for lab draw or results), and do a 12 lead EKG.
    - NB: information related to the of types of tubes and labelling for blood samples.
- Be prepared to support respiratory and circulatory systems.
- Obtain a blood sugar reading and treat accordingly.
- Monitor the patient closely for evidence of vomiting.
- Keep patient NPO.
- Reassure the patient.
- Keep patient on bedrest.
- Protect affected limbs from injury.
- Assess for incontinence.
- **If the patient is conscious** - if no contraindications, place in a supine position, with head and shoulders elevated 30 degrees).
- **If the patient is unconscious** – if no contraindications, position in lateral recumbent position towards paralyzed side with head and shoulders slightly elevated (see diagrams on page 28 and 29.

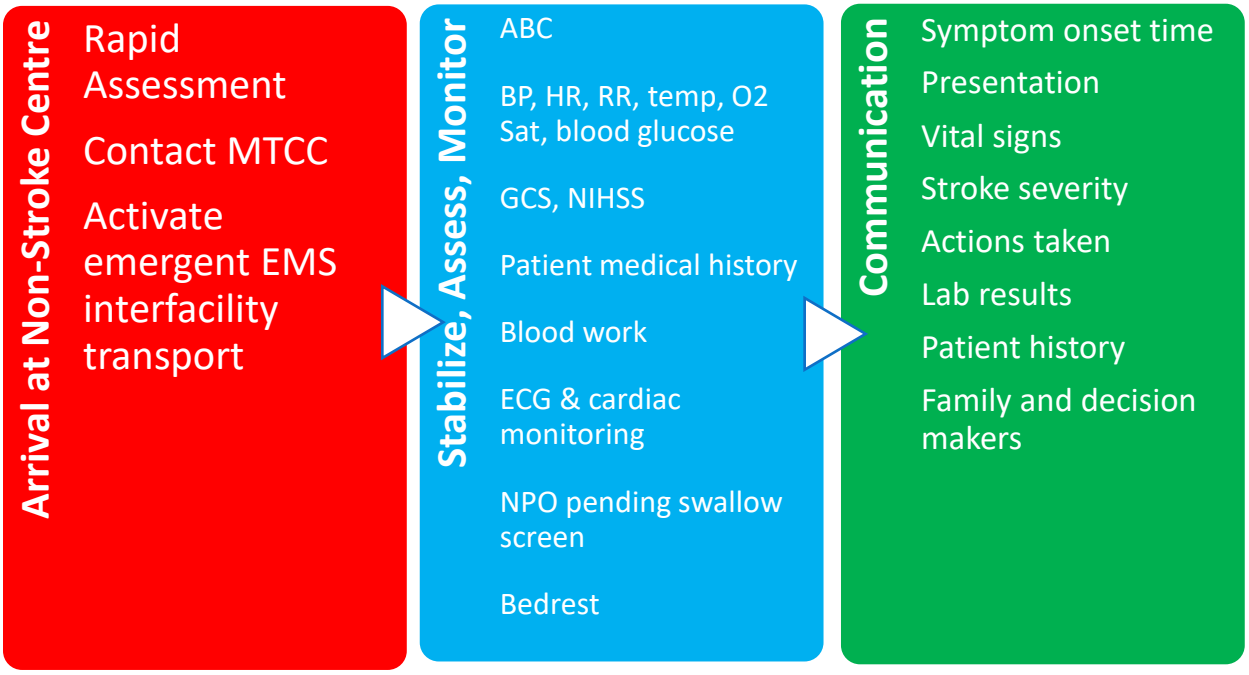
Note:

- Patients with impaired cerebral blood flow may also have sustained injuries and may not be aware of them due to paralysis.
    - Assess all patients completely and thoroughly for traumatic injury.
- Talk to the patient and keep them informed. Even though they may be unable to speak, they are often aware of their surroundings. Make sure you explain procedures to them and reassure them.

<u>Inform Patient and Family of the Following:</u>

- That the patient will be taken to the nearest stroke centre that can provide the appropriate treatment. This may involve bypassing the nearest facility.
- Encourage family/caregiver to escort the patient to the stroke centre to provide collateral history and support the patient with treatment consent. A substitute decision maker is needed if patient is unable to give consent.
    - If family/caregiver or witness is unable to accompany the patient in the ambulance, ensure a proper history is completed and obtain a phone number where the family/caregiver or witness may be reached at for collateral history. The stroke neurologist always requires collateral history as part of their assessment.

SUMMARY OF ACTIONS AT NON-STROKE CENTRES



ALTEPLASE (tPA): QUICK FACTS FOR NURSES

Alteplase (tPA) is the only drug approved for ischemic stroke.

- Alteplase (tPA) completely opens the vessel in only 13% - 38% of cases.
  - Usually works by partially opening the vessel.
- Benefit of Alteplase (tPA) is strongly time dependent.
  - The earlier Alteplase (tPA) is given in the thrombolytic window the better the outcome.
  - Benefit of Alteplase (tPA) has been shown to occur for up to 4.5 hours after symptom onset.
  - Goal: Door-to-Needle (DTN) within 30 minutes of arrival to stroke centre.
- Dosage:
  - Use an accurate weight. Alteplase (tPA) is a weight based drug.
  - Total dosage = 0.9 mg/kg, to a maximum of 90 mg.
  - Independent double check is required by 2 Nurses.
- Administration:
  - Use Alteplase (tPA) within 8 hours of mixing.
  - Alteplase (tPA) starts with a bolus = 10% of total dose over one minute – given by physician.
  - Remainder of the dosage is the infusion, delivered by IV pump over one hour.
- Watch and treat high blood pressure:
  - Treat Systolic Blood Pressure greater than 180 or
  - Diastolic blood pressure greater than 105;
    - Aim for systolic and diastolic pressures just below these parameters.
- Intracranial Hemorrhage (ICH) risk increases over time.
  - Within 0 to 90 min. of administration = 3.1%;
  - Within 270 to 360 min. = 6.9% (Dr. Tamayo – September 2011).
- Potential complications:
  - Watch for angioedema (tongue and lip swelling).
  - Watch for superficial and internal bleeding.
  - Watch for allergic reaction, unexplained hypotension, skin eruptions, and/or airway tightening.
- Alteplase (tPA) is cleared rapidly from circulating plasma by the liver (assess LFTs).
- Precautions:
  - No foley catheter for 5 - 7 hours post Alteplase (tPA).
  - No line insertions, NG tubes or IV starts for 24 hours post Alteplase (tPA) (Adams et al., 2007).

Role of Alteplase (tPA) in Stroke Care: Information for Patients and Families

What is Alteplase (tPA)?

- Alteplase *(tPA) is a "clot-busting" drug,* used to break-up the clot that blocks blood flow to the brain. Once the clot is dissolved, blood supply returns to that area of the brain.
- It is given by intravenous (IV), not as a pill.

Who can get Alteplase (tPA)?

- Alteplase (tPA) is not given to everyone who has had a stroke.
- If bleeding in the brain has caused the stroke, you will not be offered Alteplase (tPA*).*
- Sometimes a person's medical history or present condition makes it unsafe for Alteplase (tPA) use.
- The doctor and nurse will discuss this with you.

What Tests Need To Be Done Before Alteplase (tPA) will be offered?

- A CT Scan of the brain must be done as soon as possible.
- Blood tests will also be done to check if you have a bleeding condition, as well as check other aspects of your health.

There Are Benefits and Risks to Receiving Ateplase (tPA).

If you choose not to have Alteplase (tPA), your care will not be affected. You will receive all other treatments for a persons who have had a stroke.

What Are the Benefits of Ateplase (tPA)?

- 1 out of every 8 patients who receive Alteplase (tPA) may have a complete recovery and return back to the way they were before the stroke.
- For those patients who do not have a complete recovery, there may be an improvement in their symptoms following Alteplase (tPA).
- To have these benefits, Alteplase (tPA) must be given within 4.5 hours of when the signs and symptoms of stoke first appeared.

What Are The Risks Of Ateplase (tPA) Treatment?

- 1 out of 16 patients who receive Alteplase (tPA) have a 6.4% chance of bleeding in the brain after receiving Alteplase (tPA)
- If bleeding in the brain happens after Alteplase (tPA), your stroke symptoms may get worse, and you may die.
- Alteplase (tPA) may also cause bleeding in other areas of your body.

After Your Stroke…What Happens Next?

- If you are receiving Alteplase (tPA), you will spend at least 24-hours being closely monitored.
- If you are not receiving Alteplase (tPA), you will be admitted for further assessment.

www.southernhealth.ca

Rôle de l'altéplase (tPA) dans les soins d'accident vasculaire cérébral (AVC): Renseignements à l'intention des patients et de leurs familles

Qu'est-ce que l'altéplase (tPA)?

- L'altéplase (tPA) est un médicament qui élimine les caillots et qui sert à décomposer le caillot qui bloque le flux sanguin vers le cerveau. Une fois le caillot dissout, l'apport sanguin revient à cette zone du cerveau.
- Il est administré par voie intraveineuse (IV) et non sous forme de pilule.

Qui peut recevoir de l'altéplase (tPA)?

- L'altéplase (tPA) n'est pas administrée à toutes les personnes ayant subi un AVC.
- Si un saignement dans le cerveau a provoqué l'AVC, l'altéplase (tPA) ne vous sera pas offerte.
- Parfois, les antécédents médicaux d'une personne ou son état actuel rendent l'utilisation d'altéplase (tPA) dangereuse.
- Le médecin et l'infirmière en discuteront avec vous.

Quels essais doivent être effectués avant que l'altéplase (tPA) ne soit proposée?

- Un tomodensitogramme du cerveau doit être effectué le plus tôt possible.
- Des analyses sanguines seront également effectuées pour vérifier si vous avez des problèmes de saignement, ainsi que pour vérifier d'autres aspects de votre santé.

Il y a des avantages et des risques associés à l'altéplase (tPA).

Si vous décidez de ne pas recevoir d'altéplase (tPA), vos soins ne seront pas touchés. Vous recevrez tous les autres traitements destinés aux personnes ayant subi un AVC.

Quels sont les avantages du traitement par l'altéplase (tPA)?

- 1 patient sur 8 recevant de l'altéplase (tPA) peut obtenir une guérison complète et revenir à l'état antérieur à l'AVC.
- Chez les patients qui ne se rétablissent pas complètement, il pourrait y avoir une amélioration de leurs symptômes après avoir reçu de l'altéplase (tPA)
- Pour obtenir ces avantages, l'altéplase (tPA) doit être administrée dans les quatre heures et demie suivant l'apparition des premiers symptômes.

Quels sont les risques associés au traitement par l'altéplase (tPA)?

- Un patient sur 16 qui a reçu de l'altéplase (tPA) a 6,4 % de risque de saignement dans le cerveau après avoir reçu de l'altéplase (tPA).
- Si des saignements dans le cerveau surviennent après l'altéplase (tPA), les symptômes de l'AVC pourront s'aggraver et vous pourrez mourir.
- L'altéplase (tPA) peut également causer des saignements dans d'autres parties de votre corps.

Après avoir subi un AVC…que se passe-t-il?

- Si vous recevez de l'altéplase (tPA), vous serez surveillé de près pendant au moins 24 heures.
- Si vous ne recevez pas de l'altéplase (tPA), vous serez hospitalisé pour une évaluation plus approfondie.

POTENTIAL COMPLICATIONS POST STROKE

1. **New Stroke**
   - Highest risk is immediately after the initial event, and it decreases over time.
   - Higher risk is with atherosclerotic strokes.
     - Also called “stroke in evolution”.
   - Symptoms may fluctuate.
   - Monitor for changes in neurological status (use Glasgow Coma Scale [GCS], National Institute of Health Stroke Scale [NIHSS]).

2. Cerebral Edema and Increased Intracranial Pressure (ICP)

- Highest incidence within the first 2 to 5 days.
- More common with multilobar infarcts and hemorrhagic strokes.
- Edema is not usually a problem in the first 24 hours unless the patient is young (i.e. less than 55 years). This risk in young patients is due to having less brain atrophy and therefore less room in the skull to accommodate any swelling.
  - Greater risk with large cerebellar infarct or brainstem infarct.
- Ischemia leads to dysfunction of the cerebral vasculature. A breakdown occurs in the blood brain barrier in the first 4 to 6 hours post stroke, and protein and water can flood into the extravascular space, leading to cerebral edema and ICP.
  - The peak effect is usually during the first 3 to 5 days. Then it resolves and gets reabsorbed over the next several weeks.
- It is the most common cause of early death in patients with hemispheric strokes.
  - Monitor for a change in level of consciousness, worsening neurological signs.
  - Late signs would be bradycardia, respiratory changes and a widening pulse pressure.
- Management of cerebral edema and ICP: CT scan, elevate the head of the bed (HOB) and administer Mannitol.

3. Seizures

- Incidence: occur in about 10% of persons with strokes.
  - 85% of seizures occur in the first 72 hours.
- Investigate and rule out a metabolic cause (e.g., hyponatremia, hypoglycemia, toxins).
- Treat cause and start anticonvulsant therapy.

4. Hemorrhagic Transformation

- Occurs in the first 1 to 2 weeks post ischemic stroke.
- Occurs in about 3% of ischemic strokes; 4% to 6% with those that received Alteplase (tPA)
- Most serious complication post stroke.
- Ischemia of distal blood vessels and brain tissue makes blood vessels fragile.
- When the vessel is recannulized or the clot migrates distally, blood flow is restored to the injured vessel. Because it is fragile, it results in hemorrhage into the bloodless field.
- Can range from a petechial hemorrhage to a large hematoma with a shift that may require evacuation.
- Risks: increased possibility of a hemorrhage related to: a large infarct; the richness of collateral circulation; use of anticoagulants; and the use of interventional agents such as Alteplase (tPA)
- Monitor for: worsening neurological signs, headache, nausea, vomiting, changes in level of consciousness (LOC) and a spike in blood pressure.
- Management: CT scan, blood pressure control, possible neurosurgery consult.

ASSESSMENT TOOLS

SWALLOWING SCREEN: TOR-BSST

"Dysphagia occurs in 55% of all acute stroke patients. Early identification of dysphagia from screening can lead to earlier treatments and thereby reduce complications" (Martino et al., 2009, p. 555). The Toronto Bedside Swallowing Screening Test (TOR-BSST) is a tool specifically designed and validated as a bedside dysphagia screening tool for stroke survivors in acute and rehabilitative settings. The use of TOR-BSST as a screening tool is limited to certified professionals only. Initial training is approximately 4 hours in length. Screeners must maintain and demonstrate competency over time.

LANGUAGE SCREENING TEST (LAST)

Language Screening Test (LAST) is a formalized quantitative scale for screening language functions, including comprehension and expression, through the assessment of: naming, repetition, automatic speech, picture recognition, and verbal instructions. LAST is indicated for screening patients with acute stroke. This can be administered at the bedside in approximately two (2) minutes by trained professionals.

FUNCTIONAL STATUS ASSESSMENT

A functional status assessment to determine physical impairment and disability of patients with a stroke is completed using Functional Status Independence Measure (FIM) or Chedoke-McMaster Stroke Assessment. Functional status is reassessed at regular interval to measure progress of ameliorating impairments and to inform discharge planning.

ASSESSING DEFICITS FROM A STROKE using the National Institute Health Stroke Scale (NIHSS)

NIHSS is the preferred stroke deficit assessment tool and Southern Health-Santé Sud supports its use. However, its use is limited to trained providers. To become competent in its use, please refer to the following website for training and certification http://nihss-english.trainingcampus.net

NB:
The NIHSS tool is provided for use for staff who have completed the training and received certification. However, the initial baseline NIHSS score can be completed by the Telestroke Neurologist. When completed, in stroke centres only, record the baseline score on the *Stroke Centres: Transcribed Emergency Standard Orders* (CLI.4110.PL.013.FORM.08).

SCREEENING FOR DEPRESSION

The Geriatric Depression Scale: Short Form provides the basis for screening for depression in patients who have had a stroke. The tool is provided below.

Geriatric Depression Scale: Short Form

Client Name _____ Date of Assessment _____

Question:	Choose the best answer for how you have felt over the past week.	Circle Answer		Score
1	Are you basically satisfied with your life?	Yes	**No**	
2	Have you dropped many of your activities and interests?	**Yes**	No	
3	Do you feel that your life is empty?	**Yes**	No	
4	Do you often get bored?	**Yes**	No	
5	Are you in good spirits most of the time?	Yes	**No**	
6	Are you afraid that something bad is going to happen to you?	**Yes**	No	
7	Do you feel happy most of the time?	Yes	**No**	
8	Do you often feel helpless?	**Yes**	No	
9	Do you prefer to stay at home, rather than going out and doing new things?	**Yes**	No	
10	Do you feel you have more problems with memory than most?	**Yes**	No	
11	Do you think it is wonderful to be alive now?	Yes	**No**	
12	Do you feel pretty worthless the way you are now?	**Yes**	No	
13	Do you feel full of energy?	Yes	**No**	
14	Do you feel that your situation is hopeless?	**Yes**	No	
15	Do you feel that most people are better off than you are?	**Yes**	No	

** Score 1 Point for each answer in **bold**. **Total Score:** _____

A score greater than 5 is suggestive of depression, should be monitored.

A score greater than or equal to 10 is almost always indicative of depression.

NATIONAL INSTITUTES OF HEALTH STROKE SCALE (NIHSS)

NB: Use only Glasgow Coma Scale when patient is unresponsive or by staff who is NOT trained in NIHSS.
Record baseline on the *Neurological Assessment Record Acute Care* (CLI.4510.PR.002.FORM.04).

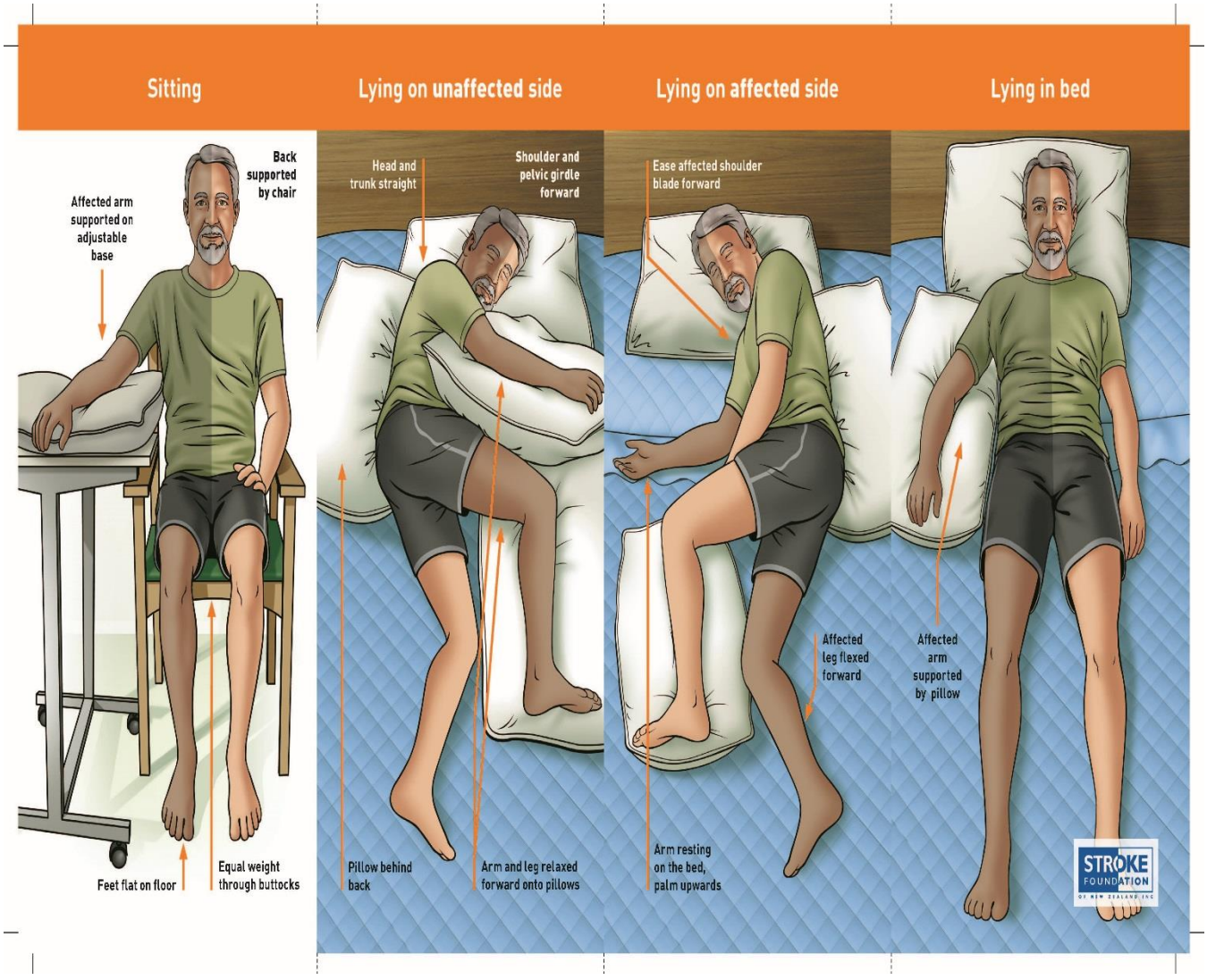
☐ **NIHSS Monitoring for Patients Receiving Alteplase (tPA)**	☐ **NIHSS Monitoring for Patients with Acute Stroke Not Receiving Alteplase (tPA)**
☐ On admission/prior to start of Alteplase (tPA) ☐ At completion of Alteplase (tPA) infusion ☐ Q4h until 24 hours post – Alteplase (tPA) infusion ☐ Daily X 2 more days	☐ On admission to Emergency Department ☐ On transfer to Inpatient Unit ☐ Once daily X 2 more days

		Date				
		Time				
Item	Name	Response	Baseline in ED			
1A	Level of Consciousness	0 = Alert. 1 = Not Alert – arouses with minor stimulation. 2 = Not Alert – requires repeated or strong stimulation. 3 = Unresponsive/reflex posturing.				
1B	Level of Questions	0 = Answers both questions correctly. 1 = Answers one question correctly. 2 = Answers neither correctly.				
1C	Level of Consciousness Commands	0 = Performs both tasks correctly. 1 = Performs one task correctly. 2 = Performs neither task correctly.				
2	Best Gaze ❒ Pre-existing blindness or other disorders of visual acuity	0 = Normal. 1 = Partial gaze palsy – abnormal in one or both eyes. 2 = Total gaze paralysis.				
3	Visual Fields	0 = No visual loss. 1 = Partial blindness/disturbance in one field. 2 = Complete blindness/disturbance in one field. 3 = Complete blindness/disturbance in both visual fields.				

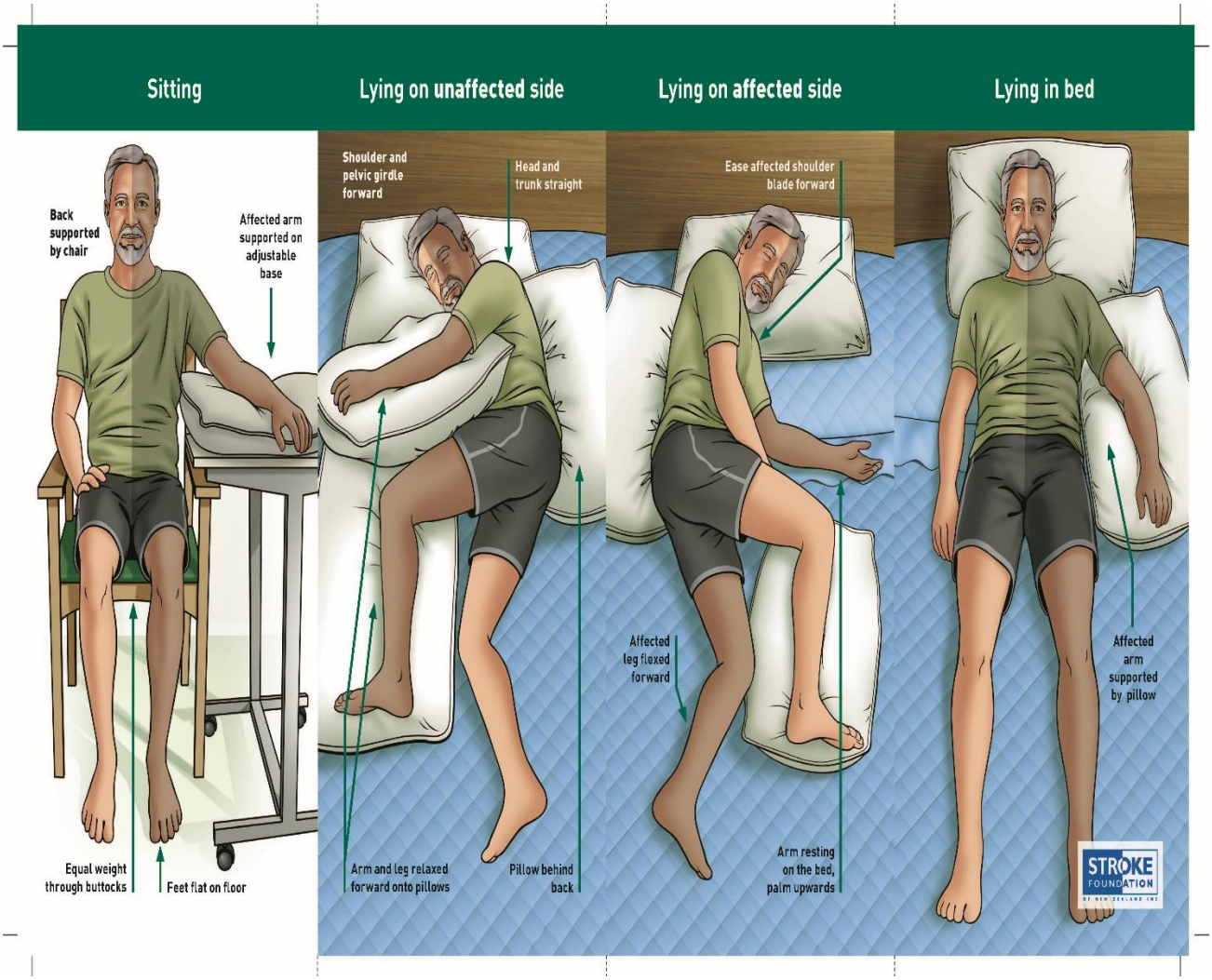
		Date				
		Time				
Item	Name	Response	Baseline in ED			
4	Facial Palsy	0 = Normal; symmetrical. 1 = Minor paralysis; asymmetry on smiling. 2 = Partial paralysis – of lower face. 3 = Complete paralysis of one or both sides of face.				
5	Arm Motor a. Left b. Right	0 = No drift for 10 sec. 1 = Drift under 10 sec. 2 = Some effort against gravity. 3 = No effort against gravity. 4 = No movement. UN = Amputation or joint fusion.	a b	a b	a b	a b
6	Leg Motor a. Left b. Right	0 = No drift for 5 sec. 1 = Drift under 5 sec. 2 = Some effort against gravity. 3 = No effort against gravity. 4 = No movement. UN = Amputation or joint fusion.	a b	a b	a b	a b
7	Limb Ataxia: with eyes open, intact visual field; finger-nose-finger and heel-shin test.	0 = Absent. 1 = Present in one limb. 2 = Present in two or more limbs. UN = Amputation or joint fusion.				
8	Sensory	0 = Normal; no loss. 1 = Mild to moderate loss. 2 = Severe to total loss.				
9	Best Language	0 = No aphasia. 1 = Mild to moderate aphasia. 2 = Severe aphasia. 3 = Mute or global aphasia.				
10	Dysarthria	0 = Normal articulation. 1 = Mild to moderate dysarthria. 2 = Severe dysarthria. UN = Intubated or other physical barrier.				
11	Extinction/ Inattention	0 = Normal 1 = Visual, tactile, auditory, spatial or personal inattention. 2 = Profound hemi-inattention to more than one modality				
		Total Score:				
		Assessment Completed By:				

IMPORTANT POINTS TO CONSIDER

POSITIONING FOR RIGHT HEMIPLEGIA



POSITIONING FOR LEFT HEMIPLEGIA



ORAL HYGIENE

Patients who have had a stroke require dental/oral assessment and oral hygiene. This includes determining the frequency, level of assistance required, and appropriate supplies (Perry, Potter, & Ostendorf, 2018). Patients with dysphagia are at greater risk for aspiration pneumonia. Effective oral hygiene is key to preventing this type of complication that can be detrimental to the patient's outcome. Complete the *Oral Health Assessment and Care Plan Guide* (CLI.4110.PL.018.FORM.01)

Work Book

1. A_____is a brief episode of neurological dysfunction caused by focal brain or retinal ischemia with complete resolution of symptoms in less than _____ hour(s) without evidence of infarction on CT.

2. Pick the correct statement:
   - **a.** Load and go doesn't always need to be completed for stroke patients. It is usually best to take your time and go slow
   - **b.** Strokes are the third leading cause of death in Canada
   - **c.** The onset of a TIA is usually gradual
   - **d.** Most often, stroke patients benefit when treated with dextrose or oral glucose

3. A 59 year old female with symptoms suggestive of a stroke presents at your facility. Following the Cincinnati Pre-Hospital Stroke test you note the patient has abnormal arm drift and abnormal speech. 2 hr 45 min's has elapsed since onset of symptoms. In this situation, your next course of action would be:
   - **a.** Do not check blood glucose as it will delay meeting the timeline
   - **b.** Contact MTCC to arrange a transfer to the nearest Stroke centre.
   - **c.** Transport to nearest open emergency department

4. Stroke patients who may be candidates for thrombolytic therapy can only receive treatment once a CT scan identifies:
   - **a.** Atherosclerosis
   - **b.** Cerebral thrombus or blood clot
   - **c.** Hemorrhagic bleed
   - **d.** Significant cerebrospinal fluid is detected in the cranial cavity

5. Time of onset must be_____hours or less. If the time is greater than _____, next steps are _____.

6. Early recognition and rapid transport to a hospital of a potential stroke patient is of critical importance.
   ☐ True ☐ False

7. The following must be present before initiating a Stroke Protocol.
   - **a.** Unequal pupils, decreased respirations and low blood sugar
   - **b.** Altered LOC, history of stroke or heart disease
   - **c.** Symptoms suggestive of a stroke and one or more abnormal results from the Cincinnati Stroke Test
   - **d.** Less than 6 hours has passed since onset of patients symptoms began or last seen normal.

8. In the event the patient becomes unstable while awaiting transport to the Stroke Centre, the following action should take place:

- **a.** Request for a quicker transfer, transport emergent if not already doing so.
- **b.** Notify your MD and have the patient assessed to address life threatening issues.
- **c.** There is no procedure in place to deal with this type of event.

9. List the three tests that compromise the Cincinnati Stroke Test.

_____

_____

_____

10. List the two main categories that stroke can be divided into.

_____

_____

11. Prior to transport, the following should NOT take place:

- **a.** Begin an IV – NS TKO.
- **b.** Allow the patient to drink some water.
- **c.** Monitor vitals.
- **d.** Continue to reassess patient for any change in status.

12. List the six contraindications for a Stroke Protocol.

_____

_____

_____

_____

_____

_____

Work Book Answer Key

1. TIA; one
2. b
3. b
4. b
5. 6; arrange for CT scan within 24 hours of symptom onset.
6. True
7. c and d
8. b
9. Facial droop, Arm drift, Speech
10. Ischemic & Hemorrhagic
11. b
12.
    - Immediate life threats identified in the ABC's.
    - Initial BGL less than 4.0 mmol/l, subsequently treated, with total resolution of stroke symptoms.
    - Known/suspected sepsis.
    - Suspected TIA with complete resolution of symptoms.
    - ACP/HCD indicating "comfort care" only.
    - Onset of symptoms (or when patient was last seen neurologically normal) is greater than 6 hours.

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