Module 1: Early Assessment

This module identifies best practices for the early assessment of suspected stroke. Patients typically present at the ED, but the same practices should be followed at an outpatient clinic or when patients are directly admitted to acute care. The recommendations emphasize assessing the patient to inform clinical decision-making and determine the most appropriate pathway.

Module 1 Recommended Practices	Contributing Sources of Evidence
1.1 Initial evaluation	
1.1.1 Rapid initial evaluation should be conducted for airway, breathing, and circulation	Based on CSBPR (level B evidence); consistent with AHA/ASA (class I recommendation; level B evidence) and Australia (level C evidence)
1.2 Initial examinations	
1.2.1 All patients should undergo a neurological examination to determine focal neurological deficits and assess stroke severity on a standardized stroke scale (NIHSS or CNS for stroke)	Based on CSBPR (level B evidence)
1.2.2 Patients presenting with potentially disabling, acute neurological symptoms suggestive of an acute stroke within 6.0 hours of symptom onset, and may be considered for those in whom treatment can be initiated within a 12- hour window from stroke symptom onset, who meet clinical and imaging criteria may be considered for endovascular therapy	Modified by OSN EVT Working Group consensus Based on CSBPR
1.2.3 All patients with suspected acute stroke (presenting within acute stroke treatment time window) should undergo rapid brain imaging (non-contrast CT or MRI) and CTA (Door to CT/CTA should be less than twenty five minutes)	Based on CSBPR (level A evidence); consistent with SIGN (level A recommendation), AHA/ASA (class I, level B recommendation), NHS/NICE (level 4 evidence), and Australia (level A evidence) Modified by OSN EVT Working Group Consensus
1.2.4. For patients with acute ischemic stroke that are clinically eligible for acute stroke treatments, advanced CT imaging including CT and multiphase CTA or Perfusion CT should be considered.	Based on CSBPR (Level B evidence); Hermes Modified by OSN EVT Working Group
1.2.5 Brain imaging should be interpreted immediately by a health care provider with expertise in reading/interpreting CT/CTA and/or MRI of the brain	Based on AHA/ASA (class I, level C evidence); modified by expert advisory panel consensus Modified by OSN EVT Working Group Consensus
1.2.6 All patients should undergo ECG to detect atrial fibrillation and other acute arrhythmias but should not delay acute treatment	Based on CSBPR (level B evidence); consistent with AHA/ASA (class I recommendation, level B evidence) and Australia (level GPP evidence) Modified by OSN EVT Working Group Consensus
1.2.7 A chest x-ray should not delay assessment for thrombolysis	Taken from CSBPR (level C evidence); modified by expert advisory panel consensus
1.2.8 All patients should have the following blood work: • CBC • electrolytes • creatinine • glucose • INR • partial thromboplastin time • troponin test (if clinically indicated)	Based on CSBPR (level B evidence); modified by expert advisory panel consensus; consistent with SIGN (level C recommendation), AHA/ASA (class I recommendation, level B and C evidence), and Australia (level GPP evidence)
1.3 Assessment and early management of dysphagia	
1.3.1 All patients with stroke should be made NPO initially and have their swallowing ability screened using a simple, valid, reliable, bedside testing protocol as part of their initial assessment and before initiating	Based on CSBPR (level B evidence); consistent with AHA/ASA (class I recommendation, level B evidence) and Australia (level B evidence)

Module 1 Recommended Practices	Contributing Sources of Evidence
oral medication, fluid, or food	
1.3.2 All patients with stroke who are not alert within the first 24 hours should be monitored closely, and swallowing ability should be screened when clinically appropriate	Based on CSBPR (level C evidence); consistent with Australia (level GPP evidence)
1.3.3 Patients with stroke presenting with features indicating dysphagia or pulmonary aspiration should receive a full clinical assessment of their swallowing ability by a speech-language pathologist or appropriately trained specialist who would advise on swallowing ability and the required consistency of diet and fluids	Based on CSBPR (level B evidence)
1.4 Cross-continuum prevention assessment and therapies	
1.4.1 All patients, whether admitted to hospital or discharged from the ED, should be given appropriate cross-continuum secondary prevention assessments and therapies (Modules 5 and 10)	Based on expert advisory panel consensus
1.5 Recommendation is not applicable to ischemic or ICH stroke patients	
1.6 Initial examinations for ischemic stroke	
1.6.1 Recommendation is not applicable to ischemic stroke patients	
1.6.2 All other patients (presenting beyond 48 hours) with a TIA or ischemic stroke should undergo vascular imaging of the brain and neck arteries as soon as possible	Based on CSBPR (level B evidence)
1.7 Initial examinations for ICH	
1.7.1 Patients with ICH must be treated as a medical emergency. ICH should be promptly recognized, and patients should be evaluated immediately by physicians with expertise in stroke management	Based on CSBPR (level A evidence)
1.7.2 Evaluation of patients with acute ICH should include questions about anticoagulant therapy, measurement of platelet count, PTT, and INR	Based on CSBPR (level A evidence); consistent with NHS/NICE (level 3 evidence) and Australia (level D evidence)
1.7.3 Select patients with ICH should have CTA or MRA as soon as possible	Based on CSBPR (level B evidence); modified by expert advisory panel consensus

Abbreviations: AHA/ASA, American Heart Association/American Stroke Association; Australia, Australian Clinical Guidelines for Stroke Management; CBC, complete blood count; CSBPR, Canadian Stroke Best Practices Recommendations; CNS, Canadian Neurological Scale; CT, computerized tomography; CTA, computed tomography angiography; ECG, electrocardiogram; ED, emergency department;EVT, Endovascular Treatment ICH, intracerebral hemorrhage; INR, international normalized ratio; MRA, magnetic resonance angiography; MRI, magnetic resonance imaging; NHS/NICE, National Collaborating Centre for Chronic Conditions; NIHSS, National Institute of Health Stroke Scale; NPO, *nil per os* (nothing by mouth); PTT, partial thromboplastin time; SIGN, Scottish Intercollegiate Guidelines Network; TIA, transient ischemic attack.

The following implementation considerations were noted by members of the expert advisory panel.

Module 1 Implementation Considerations
General considerations
• Development and/or updating of ED acute stroke protocols to ensure communication with CritiCall Ontario as soon as possible to determine treatment and transport decisions for patients presenting with potentially disabling, acute neurological symptoms suggestive of an acute stroke within 6.0 hours of symptom onset and considered to be a potential candidate for intravenous thrombolysis and/or endovascular therapy (EVT)
• Regional planning for access to acute stroke EVT should consider the following: o The importance of rapid triage, assessment and brain imaging (including parallel vascular imaging) of acute stroke patients who are potential candidates for EVT. o Development of regional and provincial bypass and repatriation agreements o Sites should establish rapid communication protocols with closest EVT site(s), facilitated through CritiCall Ontario. o Development of regional protocols to support a "drip and ship" process.
• Capacity Planning is needed to develop access to EVT for patients living within regions where currently there is a greater than two (2) hour patient transfer time to an EVT Centre
• Where feasible, development of processes and protocols to facilitate EMS to divert patients to regional or district stroke and /Endovascular Treatment centres if there is suspicion of stroke
• The process for EMS prenotification of the receiving stroke hospital about a stroke patient arrival should be better

established to ensure acute stroke teams receive timely and detailed information

- Collaboration between local EMS and institutions that provide stroke services should occur in all stroke networks across the province to support quality improvement initiatives that facilitate access to stroke care
- Ongoing education should be provided to EMS crews about the recognition of stroke symptoms and regional medical redirect protocols, including time sensitive treatments such as thrombolysis,EVT, patient transport monitoring and management.
- Upon receiving EMS prenotification, the receiving hospital's acute stroke team should be contacted and called to the ED (for appropriate patients)
- Standardized stroke assessment and treatment protocols/tools should be developed and used in all Ontario hospital EDs
- Access should be increased in all hospitals to either stroke physician experts or radiologists who can interpret brain imaging urgently and allow for full assessment and treatment with tPA thrombolysis within target door to needle time of less than 60 minutes in 90% of treated patients and a median door to needle time of 30 mins. of patient arrival for appropriate patients
- Sufficient human resources capacity should be ensured so that patients can be diagnosed and treated in a timely manner
- To facilitate early assessment, hospital-level CTAS I or CTAS II access to diagnostic imaging should be established for suspected stroke patients
- Rapid turnaround times for lab work should be negotiated in hospitals that provide tPA thrombolysis for ischemic stroke patients to facilitate rapid assessment and treatment
- Efforts to raise public awareness about the symptoms of stroke and when to contact 911 should continue to be enhanced and funded
- Capacity planning to ensure access to CT/CTA should include:
    - Training for CT technologists
    - Adoption of provincial CT/CTA Protocol
    - Human resource availability
    - Communication processes with EVT Centre experts

Abbreviations: CTAS, Canadian Triage and Acuity Scale; ED, emergency department; EMS, emergency medical services; tPA, tissue plasminogen activator.