

Imaging-Related Point-of-Care Tests: CADTH Evidence

Reports With Critical Appraisal and Key Messages

[Portable Stroke Diagnostic Devices for Adults with Stroke Symptoms: A Review of Diagnostic Accuracy and Cost-Effectiveness \(July 2019\)](#)

Summary With Critical Appraisal

Background and Context

Although advanced imaging techniques such as CT and MRI are considered the gold standard for stroke identification, they may not always be readily available in resource-constrained health care settings. A number of novel stroke diagnostic devices have been developed in order to decrease the amount of time required to establish a stroke diagnosis, which is important given that the early identification and treatment of stroke are critical for improving clinical outcomes and ensuring patients receive necessary medical attention. These portable diagnostic devices utilize various imaging techniques, such as Doppler ultrasound, volumetric impedance phase-shift spectroscopy, or microwave tomography to visualize the blood flow characteristics of the brain, providing information on the likelihood a patient has experienced a stroke. The objective of this report is to evaluate the evidence regarding the diagnostic accuracy and cost-effectiveness of several portable stroke diagnostic devices for adults with symptoms of stroke.

Evidence Identified

- One non-randomized study on the diagnostic accuracy of bioimpedance spectroscopy visors
- No evidence on the diagnostic accuracy of the combination device (i.e., combination of transcranial Doppler ultrasound, robotic headset blood flow monitor, and machine learning) or of the microwave tomography system
- No cost-effectiveness evidence

Key Messages and Findings

- The one study regarding the diagnostic accuracy of bioimpedance spectroscopy visors suggested that the device accurately differentiated patients requiring severe stroke triage from those who were healthy or who experienced a minor stroke, with a sensitivity of 93% and specificity of 87%.
- The limitations of this study (e.g., its open-label nature, unclear recruitment methods, industry-funded status, and potentially limited generalizability) should be considered when interpreting the results.

Reports Summarizing Available Literature Without Critical Appraisal

[Point-of-Care Ultrasound for Adults in Rural and Remote Health Care Settings \(September 2021\)](#)

Reference List

Evidence Identified

- One non-randomized study on clinical utility
- No evidence on cost-effectiveness
- No evidence-based guidelines

[Point of Care Ultrasound for Assessment of Patients with Physical Trauma in Emergency Departments: Clinical Utility and Cost-Effectiveness \(September 2019\)](#)

Summary of Abstracts

Evidence Identified

- One randomized controlled trial and 1 non-randomized study on clinical utility
- No evidence on cost-effectiveness

[Point of Care Ultrasound for Assessment of Patients with Obstetrical Issues in Emergency Departments: Clinical Utility and Cost-Effectiveness \(September 2019\)](#)

Summary of Abstracts

Evidence Identified

- Two systematic reviews, 1 randomized controlled trial, and 1 non-randomized study on clinical utility
- No evidence on cost-effectiveness

[Point of Care Ultrasound for Assessment of Patients with Deep Vein Thrombosis in Emergency Departments: Clinical Utility and Cost-Effectiveness \(August 2019\)](#)

Summary of Abstracts

Evidence Identified

- One non-randomized study on clinical utility
- No evidence on cost-effectiveness

[Point of Care Ultrasound for Assessment of Patients with Suspected or Known Chronic Heart Failure in Emergency Departments: Clinical Utility and Cost-Effectiveness \(August 2019\)](#)

Summary of Abstracts

Evidence Identified

- Three non-randomized studies on clinical utility
- No evidence on cost-effectiveness

Reports Summarizing the Evidence on Emerging Technologies

[Smartphone-Connected Ultrasound Devices \(April 2020\)](#)

CADTH Issues in Emerging Health Technologies

Background and Context

Smartphone- or tablet-connected ultrasound devices are an evolution of point-of-care ultrasound devices that result in smaller, more compact, less expensive devices compared with conventional ultrasound devices.

Evidence Identified

- Six studies using the Lumify system
- One study examining the Sonon system
- One systematic review examining several systems

Key Messages and Findings

- Currently, 3 smartphone- or tablet-connected ultrasound devices are available in Canada.
- Smartphone- or tablet-connected ultrasound devices likely have a place in care similar to existing point-of-care ultrasound devices.
- No cost-effectiveness studies regarding the use of smartphone- or tablet-based ultrasound systems were identified.

[Mobile Stroke Units for Prehospital Care of Ischemic Stroke \(June 2017\)](#)

CADTH Issues in Emerging Health Technologies

Background and Context

The standard of care for the treatment of stroke includes paramedics to transport people with suspected stroke to hospital. Once in the emergency department, neuroimaging with non-contrast CT must be done for any patient with suspected stroke.

Mobile stroke units are similar to those found in ambulances but are equipped with a portable CT scanner and specially trained staff for the rapid diagnosis and treatment of ischemic stroke. Other features of mobile stroke units vary from region to region and may include telestroke equipment, POC laboratories, the availability of thrombolytic drugs, and standard emergency response equipment.

Evidence Identified

- Two randomized controlled trials of mobile stroke unit models in Germany
- Additional observational studies, case studies, and cost studies from Europe and the US

Key Messages and Findings

- Currently, there is no published evidence on the use of mobile stroke units in Canada, but research from other countries indicates that these units may allow earlier treatment with thrombolytic medications for people with acute ischemic stroke.
- Mobile stroke units do not pose additional safety risks to patients.
- There is limited evidence that mobile stroke units can improve functional outcomes, and further research is underway.
- There is also limited evidence about how staffing models and the distances that mobile stroke units must travel to provide care impact patient outcomes.
- Additional research is needed to determine if mobile stroke units will be cost-effective in Canadian health care settings and how they might impact care in locations where patients are separated by large distances from centres that provide specialty stroke care.



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