



TITLE: Computed Tomography Scanners for Patients in Rural or Remote Locations: Clinical and Cost-Effectiveness

DATE: 03 March 2014

RESEARCH QUESTIONS

1. What is the clinical effectiveness of computed tomography scanners for patients in rural or remote locations?
2. What is the cost-effectiveness of computed tomography scanners for patients in rural or remote locations?

KEY MESSAGE

Three non-randomized studies and one economic evaluation were identified regarding the effectiveness of computed tomography scanners for patients in rural or remote locations.

METHODS

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2014, Issue 2), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2004 and February 26, 2014. Internet links were provided, where available.

RESULTS

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, and economic evaluations.

Disclaimer: The Rapid Response Service is an information service for those involved in planning and providing health care in Canada. Rapid responses are based on a limited literature search and are not comprehensive, systematic reviews. The intent is to provide a list of sources of the best evidence on the topic that CADTH could identify using all reasonable efforts within the time allowed. Rapid responses should be considered along with other types of information and health care considerations. The information included in this response is not intended to replace professional medical advice, nor should it be construed as a recommendation for or against the use of a particular health technology. Readers are also cautioned that a lack of good quality evidence does not necessarily mean a lack of effectiveness particularly in the case of new and emerging health technologies, for which little information can be found, but which may in future prove to be effective. While CADTH has taken care in the preparation of the report to ensure that its contents are accurate, complete and up to date, CADTH does not make any guarantee to that effect. CADTH is not liable for any loss or damages resulting from use of the information in the report.

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Three non-randomized studies and one economic evaluation were identified regarding the effectiveness of computed tomography scanners for patients in rural or remote locations. No health technology assessments, systematic reviews, or randomized controlled trials were identified.

Additional references of potential interest are provided in the appendix.

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

No literature identified.

Randomized Controlled Trials

No literature identified.

Non-Randomized Studies

1. Berkseth TJ, Mathiason MA, Jafari ME, Cogbill TH, Patel NY. Consequences of increased use of computed tomography imaging for trauma patients in rural referring hospitals prior to transfer to a regional trauma centre. *Injury*. 2014 Jan 14.
[PubMed: PM24485008](#)
2. Ballantine M, Bhimani M, Milne WK. Diagnostic approach to pulmonary embolism in a rural emergency department. *Can J Rural Med*. 2012;17(1):17-20.
[PubMed: PM22188622](#)
3. Merkens BJ, Mowbray RD, Creedon L, Engels PT, Rothwell DM, Chan BT, et al. A rural CT scanner: evaluating the effect on local health care. *Can Assoc Radiol J*. 2006 Oct;57(4):224-31.
[PubMed: PM17128890](#)

Economic Evaluations

4. M Al-Shawi, T Watson, J Carlson, L Anthony, M Thomas. CT Scan Services In The Rural Setting, The Clinical Need And Cost Effectiveness: The Katherine Hospital Experience (Australia). *The Internet Journal of Surgery*. 2013 Volume 30 Number 1. Available from:
<http://ispub.com/IJS/30/1/1495#>

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APPENDIX – FURTHER INFORMATION:

Randomized Controlled Trials

Mobile CT Scanners

5. Walter S, Kostopoulos P, Haass A, Keller I, Lesmeister M, Schlechtriemen T, et al. Diagnosis and treatment of patients with stroke in a mobile stroke unit versus in hospital: a randomised controlled trial. *Lancet Neurol.* 2012 May;11(5):397-404. PM:22497929

Non-Randomized Studies

Mobile CT Scanners

6. Shuaib A, Khan K, Whittaker T, Amlani S, Crumley P. Introduction of portable computed tomography scanners, in the treatment of acute stroke patients via telemedicine in remote communities. *Int J Stroke.* 2010 Apr;5(2):62-6. [PubMed: PM20446937](https://pubmed.ncbi.nlm.nih.gov/20446937/)

Non-Randomized Studies

Analysis of the Canadian CT Head Guidelines

7. Von der Porten, Fern. Head injuries in the rural setting : what is the role of the Canadian CT head guidelines. 2006. Master of Science - MSc dissertation. Abstract available: <https://circle.ubc.ca/handle/2429/31342>

Non-Transfer for Mild Traumatic Brain Injuries

8. Levy AS, Orlando A, Salottolo K, Mains CW, Bar-Or D. Outcomes of a Non-Transfer Protocol for Mild Traumatic Brain Injury with Abnormal Head CT in a Rural Hospital Setting. *World Neurosurg.* 2013 Nov 12. [PubMed: PM24240025](https://pubmed.ncbi.nlm.nih.gov/24240025/)

Imaging and Transfers

9. Gomez D, Haas B, de MC, Sharma S, Hsiao M, Zagorski B, et al. Institutional and provider factors impeding access to trauma center care: an analysis of transfer practices in a regional trauma system. *J Trauma Acute Care Surg.* 2012 Nov;73(5):1288-93. [PubMed: PM22922969](https://pubmed.ncbi.nlm.nih.gov/22922969/)
10. Gupta R, Greer SE, Martin ED. Inefficiencies in a rural trauma system: the burden of repeat imaging in interfacility transfers. *J Trauma.* 2010 Aug;69(2):253-5. [PubMed: PM20699732](https://pubmed.ncbi.nlm.nih.gov/20699732/)
11. Svenson J. Trauma systems and timing of patient transfer: are we improving? *Am J Emerg Med.* 2008 May;26(4):465-8. [PubMed: PM18410817](https://pubmed.ncbi.nlm.nih.gov/18410817/)

Economic Evaluations – Non-Rural Patients Receiving CT Scans

12. Wardlaw JM, Seymour J, Cairns J, Keir S, Lewis S, Sandercock P. Immediate computed tomography scanning of acute stroke is cost-effective and improves quality of life. *Stroke*. 2004 Nov;35(11):2477-83.
[PubMed: PM15459431](#)

Additional References

13. Fleet R, Poitras J, Maltais-Giguere J, Villa J, Archambault P. A descriptive study of access to services in a random sample of Canadian rural emergency departments. *BMJ Open*. 2013;3(11):e003876. Available from:
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3845037>
[PubMed: PM24285633](#)
14. Fleet R, Audette LD, Marcoux J, Villa J, Archambault P, Poitras J. Comparison of access to services in rural emergency departments in Quebec and British Columbia. *CJEM*. 2013;15(0):1-12.
[PubMed: PM24064348](#)
15. Hay K. Portable head computed tomography for rural centres. *Can J Rural Med*. 2010;15(3):125-6.
[PubMed: PM20605001](#)
16. Medical imaging in Northern Canada: A snapshot in time [Internet]. 2009 April 18 [cited 2014 Mar 2]. 43p. British Columbia: Canadian Radiological Foundation. Available from:
http://www.car.ca/uploads/crf/crf_report_mi_in_northern_canada_2009.pdf
17. Todd AW, Anderson EM. CT scanning in stroke patients: meeting the challenge in the remote and rural district general hospital. *Scott Med J*. 2009 May;54(2):17-20.
[PubMed: PM19530496](#)
18. Sacco F, Zafren K, Brown K, Cohen T, Coopes BJ, Godersky J, et al. Guidelines for the management of head injuries in remote and rural Alaska. *Alaska Med*. 2004 Jul;46(3):58-62.
[PubMed: PM15839596](#)