



TITLE: Diagnostic Imaging and Laboratory Services: Clinical Evidence and Cost-Effectiveness

DATE: 10 August 2011

RESEARCH QUESTIONS

1. What is the clinical evidence regarding the impact of overutilization of diagnostic imaging services, such as magnetic resonance imaging, computed tomography scan, and ultrasound?
2. What is the cost-effectiveness of diagnostic imaging services, such as magnetic resonance imaging, computed tomography scans, and ultrasound?
3. What is the cost-effectiveness of laboratory services?

METHODS

A focused search (with main concepts appearing in title or major subject heading) was conducted on key resources including PubMed, The Cochrane Library (2011, Issue 7), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. Methodological filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses and economic studies. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2006 and August 3, 2011. Internet links were provided, where available.

KEY MESSAGE

No literature was identified on the clinical evidence regarding the impact of overutilization of diagnostic imaging services. The results of the economic evaluations on diagnostic imaging and laboratory services were inconsistent, so no definitive conclusions could be made.

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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 economic evaluations.

The literature search identified twenty-nine economic evaluations regarding the cost-effectiveness of diagnostic and laboratory services. No relevant health technology assessments, systematic reviews, and meta-analyses were identified regarding the impact of overutilization of diagnostic imaging services. Additional articles of potential interest are found in the appendix.

Health Technology Assessments

No literature Identified

Systematic Reviews and Meta-analyses

No literature identified

Economic Evaluations

Diagnostic Imaging Services

1. Ward MJ, Sodickson A, Diercks DB, Raja AS. Cost-effectiveness of lower extremity compression ultrasound in emergency department patients with a high risk of hemodynamically stable pulmonary embolism. *Acad Emerg Med*. 2011 Jan;18(1):22-31. [PubMed: PM21414059](#)
2. Lucidarme O, Cadi M, Berger G, Taieb J, Poynard T, Grenier P, et al. Cost-effectiveness modeling of colorectal cancer: Computed tomography colonography vs colonoscopy or fecal occult blood tests. *Eur J Radiol*. 2011 Mar 26. [PubMed: PM21444171](#)
3. Cerci JJ, Trindade E, Pracchia LF, Pitella FA, Linardi CC, Soares J, Jr., et al. Cost effectiveness of positron emission tomography in patients with Hodgkin's lymphoma in unconfirmed complete remission or partial remission after first-line therapy. *J Clin Oncol*. 2010 Mar 10;28(8):1415-21. [PubMed: PM20142591](#)
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[PubMed: PM20664028](#)
9. Otero HJ, Rybicki FJ, Greenberg D, Mitsouras D, Mendoza JA, Neumann PJ. Cost-effective diagnostic cardiovascular imaging: when does it provide good value for the money? *Int J Cardiovasc Imaging* [Internet]. 2010 Aug [cited 2011 Aug 3];26(6):605-12. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2927101>
[PubMed: PM20446040](#)
10. Tholen AT, de Monye C, Genders TS, Buskens E, Dippel DW, van der Lugt A, et al. Suspected carotid artery stenosis: cost-effectiveness of CT angiography in work-up of patients with recent TIA or minor ischemic stroke. *Radiology*. 2010 Aug;256(2):585-97.
[PubMed: PM20656842](#)
11. Norlin JM, Elf JL, Svensson PJ, Carlsson KS. A cost-effectiveness analysis of diagnostic algorithms of deep vein thrombosis at the emergency department. *Thromb Res*. 2010 Sep;126(3):195-9.
[PubMed: PM20580416](#)
12. Yen RF, Yen MF, Hong RL, Tzen KY, Chien CR, Chen TH. The cost-utility analysis of 18-fluoro-2-deoxyglucose positron emission tomography in the diagnosis of recurrent nasopharyngeal carcinoma. *Acad Radiol*. 2009 Jan;16(1):54-60.
[PubMed: PM19064212](#)
13. Taneja C, Edelsberg J, Weycker D, Guo A, Oster G, Weinreb J. Cost effectiveness of breast cancer screening with contrast-enhanced MRI in high-risk women. *J Am Coll Radiol*. 2009 Mar;6(3):171-9.
[PubMed: PM19248993](#)
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[PubMed: PM19397223](#)

15. Zech CJ, Grazioli L, Jonas E, Ekman M, Niebecker R, Gschwend S, et al. Health-economic evaluation of three imaging strategies in patients with suspected colorectal liver metastases: Gd-EOB-DTPA-enhanced MRI vs. extracellular contrast media-enhanced MRI and 3-phase MDCT in Germany, Italy and Sweden. *Eur Radiol.* 2009 Jun;19 Suppl 3:S753-S763.
[PubMed: PM19484243](#)
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[PubMed: PM19818321](#)
17. Parker L, Nazarian LN, Carrino JA, Morrison WB, Grimaldi G, Frangos AJ, et al. Musculoskeletal imaging: medicare use, costs, and potential for cost substitution. *J Am Coll Radiol.* 2008 Mar;5(3):182-8.
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[PubMed: PM17538525](#)
23. Hernandez R, Vale L. The value of myocardial perfusion scintigraphy in the diagnosis and management of angina and myocardial infarction: a probabilistic economic analysis. *Med Decis Making.* 2007 Nov;27(6):772-88.
[PubMed: PM17989429](#)

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[PubMed: PM16720823](#)
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Laboratory Services

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APPENDIX – FURTHER INFORMATION:

Systematic Reviews (Clinical Outcomes Not Reported)

30. Kilani RK, Paxton BE, Stinnett SS, Barnhart HX, Bindal V, Lungren MP. Self-referral in medical imaging: a meta-analysis of the literature. *J Am Coll Radiol*. 2011 Jul;8(7):469-76.
[PubMed: PM21723483](#)

Economic Studies (Cost Analysis)

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[PubMed: PM17386379](#)

Review Articles

33. Bresnahan BW. Economic evaluation in radiology: reviewing the literature and examples in oncology. *Acad Radiol*. 2010 Sep;17(9):1090-5.
[PubMed: PM20634104](#)
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[PubMed: PM20975004](#)
35. Hendel RC, Berman DS, Di Carli MF, Heidenreich PA, Henkin RE, Pellikka PA, et al. ACCF/ASNC/ACR/AHA/ASE/SCCT/SCMR/SNM 2009 appropriate use criteria for cardiac radionuclide imaging: a report of The American College Of Cardiology Foundation Appropriate Use Criteria Task Force, The American Society Of Nuclear Cardiology, The American College Of Radiology, The American Heart Association, The American Society Of Echocardiography, The Society Of Cardiovascular Computed Tomography, The Society For Cardiovascular Magnetic Resonance, and The Society Of Nuclear Medicine. *Circulation*. 2009 Jun 9;119(22):e561-e587.
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[PubMed: PM19356433](#)
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[PubMed: PM18584178](#)

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[PubMed: PM21211760](#)
39. Chou R, Qaseem A, Owens DK, Shekelle P, Clinical Guidelines Committee of the American College of Physicians. Diagnostic imaging for low back pain: advice for high-value health care from the American College of Physicians. *Ann Intern Med*. 2011 Feb 1;154(3):181-9.
[PubMed: PM21282698](#)
40. Hendee WR, Becker GJ, Borgstede JP, Bosma J, Casarella WJ, Erickson BA, et al. Addressing overutilization in medical imaging. *Radiology*. 2010 Oct;257(1):240-5.
[PubMed: PM20736333](#)
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[PubMed: PM21040866](#)
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[PubMed: PM17602271](#)

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