TITLE: **Vitamin D Testing in the General Population: Clinical and Cost-Effectiveness and Guidelines**

DATE: 02-December 2014

RESEARCH QUESTIONS

1. What is the clinical effectiveness of vitamin D testing in the general population?

2. What is the cost-effectiveness of vitamin D testing in the general population?

3. What are the evidence based guidelines associated with vitamin D testing in the general population?

KEY FINDINGS

One health technology assessment report, one systematic review, two non-randomized studies, and one economic evaluation were identified regarding the clinical and cost-effectiveness of vitamin D testing in the general population. Three evidence-based guidelines regarding vitamin D testing in the general population were also identified.

METHODS

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2014, Issue 11), 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 systematic reviews and guidelines. The results of a second focused search (with main concepts appearing in the title or subject heading) were also included. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2010 and November 26, 2014. Internet links were provided, where available.

SELECTION CRITERIA

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Adults (healthy or with any disease)
Intervention	Vitamin D testing
Comparator	None Supplementation with vitamin D without evidence to support this
Outcomes	Clinical effectiveness Cost-effectiveness Guidelines
Study Designs	Health technology assessment reports, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, economic evaluations, evidence-based guidelines

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, economic evaluations, and evidence-based guidelines.

One health technology assessment report, one systematic review, two non-randomized studies, and one economic evaluation were identified regarding the clinical and cost-effectiveness of vitamin D testing in the general population. No relevant randomized controlled trials were identified. Three evidence-based guidelines regarding vitamin D testing in the general population were also identified.

Additional references of potential interest are provided in the appendix.

Health Technology Assessments

1. Health Quality Ontario. Clinical utility of vitamin D testing: an evidence-based analysis. Ont Health Technol Assess Ser [Internet]. 2010 [cited 2014 Dec 01];10(2):1-93. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3377517/pdf/ohtas-10-93.pdf
PubMed: PM23074397

Systematic Reviews and Meta-analyses

2. LeBlanc ES, Zakher B, Daeges M, Pappas M, Chou R. Screening for vitamin D deficiency: a systematic review for the U.S. Preventive Services Task Force. Ann Intern Med. 2014 Nov 25.
PubMed: PM25419719

Randomized Controlled Trials

No literature identified.

Non-Randomized Studies

3. Wei M, Yu R, Deutsch SC. Insignificant medium-term vitamin D status change after 25-hydroxyvitamin D testing in a large managed care population. PLoS ONE [Internet]. 2014 [cited 2014 Dec 1];9(8):e105571. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4138213/pdf/pone.0105571.pdf
PubMed: PM25136806

4. Bilinski K, Boyages S. The Vitamin D paradox: bone density testing in females aged 45 to 74 did not increase over a ten-year period despite a marked increase in testing for vitamin D. J Endocrinol Invest. 2013 Dec;36(11):914-22.
PubMed: PM23558361

Economic Evaluations

5. Lee RH, Weber T, Colon-Emeric C. Comparison of cost-effectiveness of vitamin D screening with that of universal supplementation in preventing falls in community-dwelling older adults. J Am Geriatr Soc [Internet]. 2013 May [cited 2014 Dec 1];61(5):707-14. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3656128/pdf/nihms-443901.pdf
PubMed: PM23631393

Guidelines and Recommendations

6. National Institute for Health and Care Excellence. Vitamin D: increasing supplement use among at-risk groups [Internet]. London: NICE; 2014. [cited 2014 Dec 1]. Available from: http://www.nice.org.uk/guidance/ph56
See: Recommendation 7, page 11
UK recommendations on vitamin D supplements, page 20
Cost effectiveness, Section 4.16, page 26-27

7. Vitamin D testing: report [Internet]. Canberra: Australian Government, Department of Health; 2014. [cited 2014 Dec 1]. (MBS reviews). Available from: http://www.msac.gov.au/internet/msac/publishing.nsf/Content/932329F88F2367D3CA257D77008073B9/$File/Vitamin%20D%20testing%20Review%20Report-accessible.pdf
See: Clinical guidance on vitamin D testing, page 64
7.4 Relationship between testing for vitamin D levels and health outcomes, page 67
7.7 Cost Implications of vitamin D testing, page 69

8. Screening tests of unproven benefit [Internet]. 8th ed. In: Guidelines for preventive activities in general practice. East Melbourne, Australia: The Royal Australian College of General Practitioners; 2012. p. 85-6 [cited 2014 Dec 1]. Available from: http://www.racgp.org.au/your-practice/guidelines/redbook/screening-tests-of-unproven-benefit/
See: Screening Tests Not Recommended in Low-risk General Practice Populations
Screening Tests of Indeterminate Value

PREPARED BY:
Canadian Agency for Drugs and Technologies in Health
Tel: 1-866-898-8439
www.cadth.ca

APPENDIX – FURTHER INFORMATION:

Non-Randomized Studies – Prevalence of Testing

9. Quaggiotto P, Tran H, Bhanugopan M. Vitamin D deficiency remains prevalent despite increased laboratory testing in New South Wales, Australia. Singapore Med J. 2014 May;55(5):271-80.
PubMed: PM24862752

Clinical Practice Guidelines – Methodology Uncertain

General Population

10. LeFevre ML. Screening for Vitamin D deficiency in adults: U.S. Preventive Services Task Force Recommendation statement. Ann Intern Med. 2014 Nov 25.
PubMed: PM25419853

11. Lindblad AJ, Garrison S, McCormack J. Testing vitamin D levels. Can Fam Physician [Internet]. 2014 Apr [cited 2014 Dec 1];60(4):351. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4046558/pdf/0600351.pdf
PubMed: PM24733326

12. Vitamin D testing and supplementation [Internet]. Edmonton: Toward Optimized Practice; 2014. [cited 2014 Dec 1]. (Clinical practice guideline). http://www.topalbertadoctors.org/download/1304/Vitamin%20D%20Testing%20and%20Supplementation.pdf
See: Vitamin D Testing, page 1

13. Guidelines and Protocols Advisory Committee. Vitamin D testing protocol [Internet]. Victoria (BC): British Columbia Ministry of Health; 2013 Jun 1. [cited 2014 Dec 1]. Available from: http://www.bcguidelines.ca/pdf/vitamind.pdf

14. Holick MF, Binkley NC, Bischoff-Ferrari HA, Gordon CM, Hanley DA, Heaney RP, et al. Evaluation, treatment, and prevention of vitamin D deficiency: an Endocrine Society clinical practice guideline. J Clin Endocrinol Metab. 2011 Jul;96(7):1911-30.
PubMed: PM21646368

15. Ontario Health Technology Advisory Committee. OHTAC recommendation: clinical utility of vitamin D testing [Internet]. Revised June 2010. Toronto: Health Quality Ontario; 2010 [cited 2014 Dec 1]. Available from: http://www.hqontario.ca/english/providers/program/ohtac/tech/recommend/rec_vitamin%20d_201002.pdf
See: OHTAC Recommendations, page 5

Specific Indication

16. Aspray TJ, Bowring C, Fraser W, Gittoes N, Javaid MK, Macdonald H, et al. National osteoporosis society vitamin D guideline summary. Age Ageing. 2014 Sep;43(5):592-5.
PubMed: PM25074538

17. Eastell R, Brandi ML, Costa AG, D'Amour P, Shoback DM, Thakker RV. Diagnosis of asymptomatic primary hyperparathyroidism: proceedings of the Fourth International Workshop. J Clin Endocrinol Metab. 2014 Oct;99(10):3570-9.
PubMed: PM25162666

18. Tangpricha V, Kelly A, Stephenson A, Maguiness K, Enders J, Robinson KA, et al. An update on the screening, diagnosis, management, and treatment of vitamin D deficiency in individuals with cystic fibrosis: evidence-based recommendations from the Cystic Fibrosis Foundation. J Clin Endocrinol Metab. 2012 Apr;97(4):1082-93.
PubMed: PM22399505

19. ACOG Committee on Obstetric Practice. ACOG Committee Opinion No. 495: Vitamin D: Screening and supplementation during pregnancy. Obstet Gynecol. 2011 Jul;118(1):197-8.
PubMed: PM21691184

Consensus or Position Statements

20. Nowson, CA, McGrath JJ, Ebeling PR, Haikerwal A, Daly RM. Vitamin D and health in adults in Australia and New Zealand: a position statement. Med J Aust [Internet]. 2012 [cited 2014 Dec 1];196(11):686-7. Available from:
https://www.mja.com.au/journal/2012/196/11/vitamin-d-and-health-adults-australia-and-new-zealand-position-statement
See: Recommendations for assessment and management of vitamin D deficiency states, page 5

21. Aloia JF. Clinical Review: The 2011 report on dietary reference intake for vitamin D: where do we go from here? J Clin Endocrinol Metab. 2011 Oct;96(10):2987-96.
PubMed: PM21795456

Review Articles

22. Bolland MJ, Grey A, Davidson JS, Cundy T, Reid IR. Should measurement of vitamin D and treatment of vitamin D insufficiency be routine in New Zealand? N Z Med J. 2012 Feb 10;125(1349):83-91.
PubMed: PM22327161

23. Glendenning P, Inderjeeth CA. Screening for vitamin D deficiency: defining vitamin D deficiency, target thresholds of treatment and estimating the benefits of treatment. Pathology. 2012 Feb;44(2):160-5.
PubMed: PM22186673

24. Krasowski MD. Pathology consultation on vitamin D testing. Am J Clin Pathol. 2011 Oct;136(4):507-14.
PubMed: PM21917672

Additional References

25. Vitamin D testing for northern populations: clinical and cost-effectiveness and guidelines [Internet]. Ottawa: Canadian Agency for Drugs and Technologies in Health; 2014 Mar 11. [cited 2014 Dec 1]. (Rapid response report: summary of abstracts). Available from: http://www.cadth.ca/media/pdf/htis/mar-014/RB0657%20Vitamin%20D%20Testing%20final.pdf

26. Lindblad AJ, McCormack J. Vitamin D levels: vitamin do or vitamin don't [Internet]. Edmonton: Alberta College of Family Physicians; 2014. [cited 2014 Dec 1]. Available from: https://www.acfp.ca/wp-content/uploads/tools-for-practice/1397843445_20140203_102028.pdf