



**TITLE: Methylcobalamin Ultra (Vitamin B12) and Vitamin C Supplementation for the General Population: Clinical Evidence**

**DATE:** 28 September 2012

## **RESEARCH QUESTIONS**

1. What is the clinical evidence regarding the clinical benefit of Methylcobalamin Ultra (B12) supplementation in the general population?
2. What is the clinical evidence regarding the clinical benefit of Vitamin C supplementation in the general population?

## **KEY MESSAGE**

Ten relevant systematic reviews and meta-analyses were identified regarding the clinical evidence of vitamins B12 and C supplementation in the general population.

## **METHODS**

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2012, Issue 9), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. A methodological filter was applied to limit retrieval to health technology assessments, systematic reviews and meta-analyses. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2009 and September 25, 2012. Internet links were provided, where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.

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## RESULTS

Ten relevant systematic reviews and meta-analyses regarding the clinical evidence for the clinical benefit of vitamins B12 and C supplementation in the general population were identified. No relevant health technology assessment reports were identified. Additional references of potential interest are provided in the appendix.

### OVERALL SUMMARY OF FINDINGS

#### *Vitamin B12*

Four systematic reviews and meta-analyses<sup>1-4</sup> were identified examining the clinical benefits of vitamin B12 supplementation in the general population. Vitamin B12 supplementation was not found to:

- Slow cognitive decline<sup>4</sup> or improve cognitive function in participants with or without cognitive impairment when used either alone or in combination with vitamin B6 or folic acid.<sup>1,4</sup>
- Reduce the risk of diabetes or cardiovascular disease in patients with low levels of vitamin B12.<sup>2</sup>

In a systematic review examining the use of folic acid supplementation in combination with vitamins B6 and B12 for the prevention of stroke, authors found a small preventative effect in male patients and recommended further study.<sup>3</sup>

#### *Vitamin C*

Six systematic reviews and meta-analyses<sup>5-10</sup> were identified examining the clinical benefits and harms of vitamin C supplementation in the general population. Vitamin C supplementation in combination with other antioxidants (most frequently beta-carotene, vitamin A, vitamin E, and selenium) was not found to:

- Have a significant effect on reducing mortality when used in combination with other antioxidants for either short or long duration.<sup>5</sup>
- Decrease or increase the risk of age-related macular degeneration.<sup>6</sup>
- Reduce the risk of age-related cataracts, cataract extraction, progression of cataract, or slow the loss of visual acuity.<sup>8</sup>
- Reduce the incidence or mortality of prostate cancer.<sup>10</sup>

Short term supplementation with vitamin C was found to reduce both systolic and diastolic blood pressure, however long-term evidence was not available.<sup>7</sup> Vitamin C was also found to be beneficial for the prevention of colds and was found to have potential benefits for patients experiencing cold symptoms.<sup>9</sup> The authors concluded that the use of vitamin C could be recommended to Canadians for the prevention of colds.

Authors of one systematic review highlighted that since vitamin supplementation can be harmful for some, supplementation should not be recommended unless there is clear evidence of benefit.<sup>6</sup>

## REFERENCES SUMMARIZED

### Health Technology Assessments

No literature identified.

### Systematic Reviews and Meta-analyses

#### *Vitamin B12*

1. Ford AH, Almeida OP. Effect of homocysteine lowering treatment on cognitive function: a systematic review and meta-analysis of randomized controlled trials. *J Alzheimers Dis.* 2012;29(1):133-49.  
[PubMed: PM22232016](#)
2. Rafnsson SB, Saravanan P, Bhopal RS, Yajnik CS. Is a low blood level of vitamin B12 a cardiovascular and diabetes risk factor? A systematic review of cohort studies. *Eur J Nutr.* 2011 Mar;50(2):97-106.  
[PubMed: PM20585951](#)
3. Lee M, Hong KS, Chang SC, Saver JL. Efficacy of homocysteine-lowering therapy with folic Acid in stroke prevention: a meta-analysis. *Stroke [Internet].* 2010 Jun [cited 2012 Sep 27];41(6):1205-12. Available from:  
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2909661>  
[PubMed: PM20413740](#)
4. Vogel T, Dali-Youcef N, Kaltenbach G, Andres E. Homocysteine, vitamin B12, folate and cognitive functions: a systematic and critical review of the literature. *Int J Clin Pract.* 2009 Jul;63(7):1061-7.  
[PubMed: PM19570123](#)

#### *Vitamin C*

5. Bjelakovic G, Nikolova D, Gluud LL, Simonetti RG, Gluud C. Antioxidant supplements for prevention of mortality in healthy participants and patients with various diseases. *Cochrane Database Syst Rev.* 2012;3:CD007176.  
[PubMed: PM22419320](#)
6. Evans JR, Lawrenson JG. Antioxidant vitamin and mineral supplements for preventing age-related macular degeneration. *Cochrane Database Syst Rev.* 2012;6:CD000253.  
[PubMed: PM22696317](#)
7. Juraschek SP, Guallar E, Appel LJ, Miller ER 3rd. Effects of vitamin C supplementation on blood pressure: a meta-analysis of randomized controlled trials. *Am J Clin Nutr.* 2012 May;95(5):1079-88.  
[PubMed: PM22492364](#)
8. Mathew MC, Ervin AM, Tao J, Davis RM. Antioxidant vitamin supplementation for preventing and slowing the progression of age-related cataract. *Cochrane Database Syst Rev.* 2012;6:CD004567.

[PubMed: PM22696344](#)

9. Nahas R, Balla A. Complementary and alternative medicine for prevention and treatment of the common cold. Can Fam Physician [Internet]. 2011 Jan [cited 2012 Sep 27];57(1):31-6. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3024156>  
[PubMed: PM21322286](#)
10. Jiang L, Yang KH, Tian JH, Guan QL, Yao N, Cao N, et al. Efficacy of antioxidant vitamins and selenium supplement in prostate cancer prevention: a meta-analysis of randomized controlled trials. Nutr Cancer. 2010;62(6):719-27.  
[PubMed: PM20661819](#)

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**APPENDIX – FURTHER INFORMATION:**

**Pooled Analyses**

11. Park Y, Spiegelman D, Hunter DJ, Albanes D, Bergkvist L, Buring JE, et al. Intakes of vitamins A, C, and E and use of multiple vitamin supplements and risk of colon cancer: a pooled analysis of prospective cohort studies. *Cancer Causes Control* [Internet]. 2010 Nov [cited 2012 Sep 27];21(11):1745-57. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3091388>  
[PubMed: PM20820901](#)

**Review Articles**

12. Harrison FE. A critical review of vitamin C for the prevention of age-related cognitive decline and Alzheimer's disease. *J Alzheimers Dis*. 2012;29(4):711-26.  
[PubMed: PM22366772](#)
13. Dennehy C, Tsourounis C. A review of select vitamins and minerals used by postmenopausal women. *Maturitas*. 2010 Aug;66(4):370-80.  
[PubMed: PM20580500](#)

**Additional References**

14. Allan GM, Korownyk C. Anti-oxidant vitamin cure-alls: will good theories ever die? [Internet]. Edmonton: Alberta College of Family Physicians; 2009. [cited 2012 Sep 27]. (Tools for Practice). Available from: [http://www.acfp.ca/Portals/0/docs/TFP/20120402\\_011147.pdf](http://www.acfp.ca/Portals/0/docs/TFP/20120402_011147.pdf)
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[PubMed: PM20861067](#)
16. Selenium, vitamin E or vitamin C do not prevent prostate cancer [Internet]. Liverpool: National Prescribing Centre; 2009 Jan 14. [cited 2012 Sep 27]. (NPC Rapid Review). Available from: <http://www.npc.nhs.uk/rapidreview/?p=260>