Canada's experience with Vitamin D fortification

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Outline

• A brief history of vitamin D fortification in Canada
• Current situation of fortification
• Vitamin D intakes of Canadians
  – Predominant food sources
• Vitamin D status of Canadians
  – Impact of supplement use
  – Nonwhite Canadians
• Future directions
History of Fortification

• By 1942, vitamin D had to be added as 400 IU
  – Food drinks, biscuits, cocoa mix, RTE cereals
• By mid-1960s, D status of children ranged from deficiency to excess: prompted restriction of fortification to voluntary fortification of fluid milk only
• Poor uptake of fortification by dairies [= rise in rickets] prompted mandatory fortification in 1975
• Mid-2000s, voluntary fortification of other foods

M. Cheney Publ Hlth Rev 2000; 28:171-177
Current Situation of Fortification

• **Mandatory**

  Fluid milk: **100 IU/250 mL**
  - Evaporated milk
  - Infant formula
  Plant-based “milk” if Ca-fortified **100 IU/250 mL**
  Margarine: 60 IU/10g

• **Voluntary/Discretionary**

  Meal replacements 100IU/serv
  Juice + Ca: 100 IU/250 mL
  Yogurt made with fortif. milk
  Mushroom soup: 50 IU/serv#
  D Eggs: 100 IU per egg#

Note: 1 µg = 40 IU

#Since 2012
Vitamin D intakes of Canadians

• National nutrition survey 2004 called Canadian Community Health Survey (CCHS)
  – 24-hr recall of 35,000 residents
  – Adjusted for usual intakes
  – Updated database of food composition included meat sources of vitamin D
    • ~ 40 IU per 75 g serving in many meat types
Canada: Intakes From Food

Mean 232 IU/d
EAR = 400 IU
RDA = 600 IU

Canada: Food Sources of Vitamin D

Arctic Diets and Vitamin D show that 1000 IU is possible from traditional foods

Traditional Inuit Foods
- Seal Blubber  —  400 IU/oz
- Seal Liver
- Arctic Char
- Whale and Walrus blubber

Vitamin D in Farmed Fish => a drop in vitamin D intake of Canadians?

Farmed Atlantic Salmon 245 IU/30 g

Wild Atlantic Salmon 980 IU/30 g

Vitamin D status of Canadians

• National survey of physical, clinical and biomedical parameters called Canadian Health Measures Survey
  – 2007-2009 (= cycle 1)
  – Plasma collected in 5,500 residents age 6 to 79 y
  – Frequency questions on food intake including milk use; social questions; disease diagnosis; supplement use in past month

• Vitamin D status measured as plasma levels of 25-hydroxyvitamin D [25(OH)D]
Vitamin D status of Canadians by sex
Averages 67 nmol/L

% of Canadian Population with 25(OH)D <50 nmol/L, CHMS survey 2007-2009

Fortified milk consumption significantly improves vitamin D status of Canadians

Fortified milk use increases 25(OH)D levels

Canadian population without supplement users

- These are the Winter levels of 25(OH)D
- Effect is ~ 6 nmol/L for each serv. (100 IU) which is better than 1 ug = 1 nmol/L

(S. Whiting, unpublished)
37-84 % of Canadians were below minimum servings of dairy in 2004

Conclusions

• Canadians benefit from fortification of milk
  – Long winters (6 months)
  – Milk consumption is reasonably good
  – Has reduced severe deficiency to < 10% and prevented childhood rickets

• Canada however needs more vitamin D and in more food sources
  – Mean intake is 200-300 IU compared to EAR of 400 IU, RDA of 600-800 IU
  – Growing nonwhite population
Extra Slides
“Bio-additive” sources now in marketplace

e.g., irradiated yeast, irradiated mushrooms [as in this soup], vitamin D-added to animal feeds
In each egg, 100 IU Vitamin D