Northwest Territories Health and Social Services

NWT Clinical Practice Information Notice

UPON RECEIPT: (1) PLEASE FOLLOW THE DIRECTIONS BELOW
(2) FILE THIS NOTICE IN SECTION C, CLINICAL PRACTICE INFORMATION BINDER FOR FUTURE REFERENCE

The following clinical practice has been approved for use in the Northwest Territories Health and Social Services system, and has been distributed to:

☐ Hospitals ☒ Community Health Centers ☒ Public Health Units ☒ Doctors' Offices ☒ Social Services Offices ☐ Other: _____

The information contained in this document is a Departmental:

☐ Policy ☒ Standard ☒ Protocol ☐ Procedure ☐ Guidelines

Title: Vitamin D Supplementation for Infants and Children < 2 Years

Effective Date: March 23rd, 2007

Statement of approved clinical practice:

Based on the recommendation of the NWT Maternal Perinatal Committee, the Office of the Chief Medical Health Officer endorses the Canadian Pediatric Society's Position Statement on Vitamin D Supplementation in Northern Native Communities.

Recommended supplement doses are:

Infants and Children	May-Sept	Oct-April
Breastfeeding infants and breastfed children < 2 years of age	400 IU/Day	800 IU/Day
Artificially fed (formula fed) infants and children < 2 years of age	0	400 IU/Day
Children <2 who do not drink Vitamin D enriched milk (such as non-dairy milk)	0	400 IU/Day

Please replace the current page 7-7, 7-8 from the Pediatrics section of the NWT Clinical Practice Guidelines for Primary Community Care Nursing manual with the page attached.
All others should retain the attached information for reference in their own filing system.

Attachments:

- Revised Page 7-7, 7-8 of Pediatrics section of the NWT Clinical Practice Guidelines for Primary Community Care Nursing manual.
- Vitamin D Supplementation for Infants and Children < 2 Years: Frequently Asked Questions.

Access Canadian Pediatric Society Position Statement at:
http://www.cps.ca/English/statements/II/ii02-02.htm

This clinical practice is approved. 19/04/07
(signature & date)

Assistant Deputy Minister ☐ Chief Medical Officer of Health ☒ Director, Child & Family Services ☐ Director, Adoptions ☐

correctly. They lack an adequate supply of iron and may interfere with absorption of iron from other sources. The composition of whole cow's milk is inappropriate for infants and promotes blood loss from the gut. It should not be used in the first 9 or 10 months of life. Partly skimmed and skimmed milk should never be used in the first year of life, because the lack of fat can be difficult for the kidneys to handle. See Table 7-2 for volume and frequency of formula feeding.

Table 7-2: Approximate volume and frequency of feedings

Age	No of bottles per 24 hours	Intake (mL/bottle)
1st week	6 – 10	30 – 80
1 – 4 weeks	7 or 8	60 – 120
1 – 4 months	4 or 5	210 – 240
5 – 9 months	3 or 4	210 – 240

When refrigeration is lacking, it is suggested that bottles be boiled before formula is prepared.

Where mothers are forced by circumstances to use evaporated milk formula, appropriate mixing is essential (see below), and daily ferrous sulfate supplements (2 mg elemental iron per kilogram body weight) are recommended. For the at-risk infant (e.g. low birth weight and premature infants, extremes of poverty or a history of iron deficiency in siblings), provision from birth of daily supplemental iron through formula or Fer-In-Sol® is especially important.

Recipes For Formula

Commercial Infant Formulas

- Ready to feed: give as is, without dilution
- Concentrate: mix 1:1 with water
- Powdered: follow instructions; over- or under-dilution of powdered formula can be dangerous

Evaporated Milk

3 oz milk + 5 oz water + 1 tbsp sugar = one 8-oz bottle (30 mL = 1 oz)

After 6 months, use 4 oz milk + 4 oz water (no added sugar)

Vitamin And Mineral Supplements

Children in some First Nations and Inuit communities may require fluoride supplementation, except if the community has high levels of natural fluoride in the water supply. The regional dental officer can provide information on the situation in your community.

Recommended dose of fluoride is as follows (Canadian Paediatric Society 1996):

- 6 months to 2 years: 0.25 mg/day
- 3-4 years: 0.50 mg/day
- >5 years: 1 mg/day

Multiple vitamins are generally not recommended, but Tri-Vi-Sol® with fluoride is an adequate preparation for children 0-2 years of age.

It is preferable to give vitamin D (e.g. D-Vi-Sol®) separately from fluoride (e.g. Pedi-Dent® or Karidium®).

In general, in the NWT we use surface water (from rivers and lakes) without natural fluoride as the water supply is largely produced by natural precipitation. Only a few large communities add fluoride as part of water treatment due to potential hazard of overfluoridation in small communities. Yellowknife, Inuvik, and Tuktoyaktuk have fluoride added to their water. Nahanni Butte, Wha Ti, Wrigley, and Fort Liard are on wells and would have some natural fluoride. (source EHO 25/7/2003)

Table 7-3 indicates requirement for vitamin D in relation to type of feeding and the recommended doses for infants and children under the age of 2 years old.

Table 7-3-Vitamin D requirements and recommended doses

Infants and Children	May-Sept	Oct-April
Breastfeeding infants and breastfed children < 2 years of age	400 IU/Day	800 IU/Day
Artificially fed (formula fed) infants and children < 2 years of age	0	400 IU/Day
Children <2 who do not drink Vitamin D enriched milk (such as non-dairy milk)	0	400 IU/Day

Solid Foods

Iron-fortified infant cereal should be added to the diet as a first supplement at age 4-6 months (one grain type at a time). Prepared baby foods, if used, should be added initially in small quantities, one at a time, after cereals have been started. Vegetables or meats should be started before fruits.

Northwest Territories

Vitamin D supplementation for Infants and Children
Frequently Asked Questions

1. What is Vitamin D?

Vitamin D is actually a preprohormone called Vitamin D_3 made in the skin in response to ultraviolet –B light exposure.[1] Nutritional Vitamin D status is measured in humans by circulating levels of 25(OH)D (or hydroxyvitamin D).[2]

2. What medical conditions may be related to deficiencies?

Reported deficiencies can result in poor fetal and bone development in infancy and childhood. Recent studies indicate that deficiency also affects other areas of health, for example, sub-optimal intakes or low skin exposure to sunlight may be associated with the development of type 1 diabetes, colorectal cancer, allergies, decreased birth weights, and autoimmune diseases.[3] [4] [5] Severe deficiencies lead to Vitamin D deficiency rickets.[6]

3. Why is vitamin D supplementation a Public Health concern?

Vitamin D deficiency rickets has not been eradicated in Canada though precise rates are unknown.[7] It is likely that actual reported cases, estimated to be 69 cases among infants and toddlers in the first 18 month of one study, are likely to underestimate actual cases.[8] Frequent signs and symptoms at diagnosis included; skeletal deformity, seizures, failure to thrive, fractures and delayed milestones. This debilitating features, if not prevented, can have a lasting negative effect on children and adults.

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[1] Hollis, B. W., & Wagner, C. L. (2006, April). Nutritional vitamin D status during pregnancy: reasons for concern. Commentary. Canadian Medical Association Journal. 174(9), 1287-1290.

[2] ibid

[3] Health Canada (2004) Vitamin D Supplementation for Breastfed Infants, www.healthcanada.ca/nutrition

[4] Hollis, B. W., & Wagner, C. L. (2006, April). Nutritional vitamin D status during pregnancy: reasons for concern. Commentary. Canadian Medical Association Journal. 174(9), 1287-1290.

[5] Mannion, C. A., Gray-Donald, K., & Koski, K, G. (2006). Association of low intake of mil and vitamin D during pregnancy with decreased birth weight. *Canadian Medical Association Journal, 174*(9), 1273-1277.

[6] Gartner, L. M. & Greer, F. R. (2003, April). Prevention of rickets and Vitamin D deficiency: New guidelines for vitamin D intake. Clinical report. *Pediatrics 111*(4), 908-910. Available on-line: http://pediatrics.aappublications/org.cgi/content/full/111/4/908

[7] Health Canada (2004) Vitamin D Supplementation for Breastfed Infants, www.healthcanada.ca/nutrition

[8] ibid

4. What are the major sources of Vitamin D for infants and children?

Sunlight

Skin exposure to sunlight is the main source of Vitamin D.[9]

Dietary Sources

Traditional Sources:
Vitamin D is naturally present in traditional foods, especially in traditional Inuit diets (seal liver, muktuk and char).[10]

Store and other foods:
Few foods contain naturally occurring Vitamin D. See the table below for the most common sources in of Vitamin D dietary sources in Canada.

Canadian Dietary Sources of Vitamin D[11]

Most Common Canadian Dietary Sources of Vitamin D	
Food	**International Units of Vitamin D***
Egg yolk, one	25 IU
** All cow's milk (fortified) - 250 mL	88 IU
Artificial Infant formula (fortified) - 250 mL	100 IU
Margarine (fortified), 1 tsp	25 IU
Salmon, cooked, 1 oz	103 IU
***Fortified plant based beverage - 250 mL	80 IU

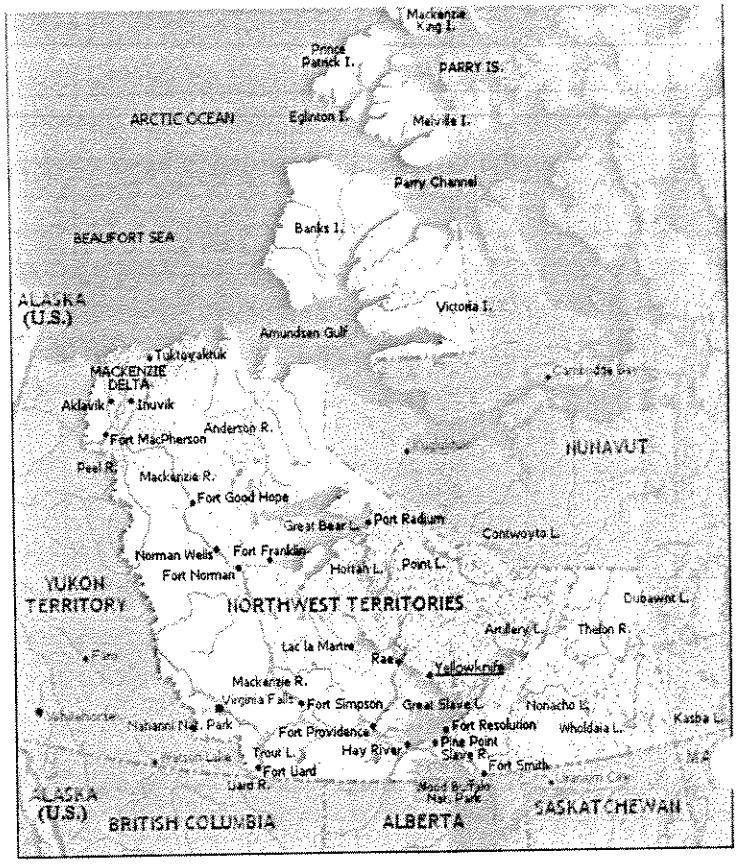
Notes:

1 µg = 40 IU of vitamin D
** Cow's milk is not recommended before 9 to 12 months of age [1].
*** Vegetarian beverages are inappropriate alternatives to breast milk, infant formula or cow's milk in the first two years of life
Single vitamin D3 supplement drops are recommended and available without a prescription in pharmacies and some grocery stores. Breastfeeding mothers should maintain a healthy, well-balanced diet according to *Canada's Food Guide to Healthy Eating* even when a vitamin D supplement is provided to the infant.

[9] Health Canada (2004) Vitamin D Supplementation for Breastfed Infants, www.healthcanada.ca/nutrition
[10] CBC News. (2006, June). Northern strategy to prevent rickets in Nunavut. Available from: http://www.cbc.ca/health/story/2006/06/14/rickets-nunavut.html?ref=rss
[11] Adapted from: Most Common Canadian Sources of Vitamin D. Health Canada (2004) Vitamin D Supplementation for Breastfed Infants, www.healthcanada.ca/nutrition

5. What factors influence how much Vitamin D is absorbed from the sun?

Geographic latitude, the seasons, increased use of sunscreen, amount of skin exposure, skin pigmentation, air pollution, maternal deficiency, and breastfeeding have been reported to affect Vitamin D production in the skin.[12]



Geographic latitude

Geographic latitudes, particularly those above 60^0N in the Northwest Territories, Nuanvut and Yukon territories can result in inadequate exposure for much of the year; it is also estimated that in Edmonton, Alberta, there is no Vitamin D synthesis in the skin from October to March.[13]

Seasons, sunscreen and skin exposure and skin pigmentation

Seasonal changes and variations in sunlight affect sun exposure.[14] In northern latitudes, vitamin-D production in the skin may be absent for 4-6 months of the year. Winter clothing, use of sunscreen, cultural use of protective clothing and dark skin pigmentation all reduce skin exposure to the sun.[15] Infants with increased skin pigmentation require increased exposure to sunlight.[16]

Maternal Deficiency

Vitamin D deficiency in infants is exacerbated by maternal sub-clinical deficiency.[17] Maternal stores may result in reduced foetal stores that are normally adequate for the first two months of an infant's life.[18]

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[12] Health Canada (2004) Vitamin D Supplementation for Breastfed Infants, www.healthcanada.ca/nutrition
[13] ibid
[14] Canadian Paediatric Society. (2002, September). Position Statement (II 2002-02). Vitamin D supplementation in northern Native Communities. Paediatr Child Health 7(7), 459-463.
[15] Canadian Paediatric Society. (2002, September). Position Statement (II 2002-02). Vitamin D supplementation in northern Native communities. Paediatr Child Health 7(7), 459-463.
[16] ibid
[17] Health Canada (2004) Vitamin D Supplementation for Breastfed Infants, www.healthcanada.ca/nutrition
[18] ibid

Breastfeeding

Infants who are breastfed but not exposed to sunlight may have difficulty obtaining adequate Vitamin D due to low Vitamin D content in human breast milk. Additionally, vitamin D that is available to infants from breastmilk during the first six months is initially dependent on material stores, diet and sun exposure.[19]

6. What is the current recommendation for Vitamin D supplementation for infants and children?

As of January 1, 2006, approved Clinical Practice Guidelines[20] for Vitamin D supplementation for infants and children are:

Infants and Children	**Time of Year**	
	May - September	*October - April*
Breastfed infants and children < 2 years of age	400 IU/day	800 IU/day
Artificially fed infants and children < 2 years of age	0	400 IU/day
Children who do not drink Vitamin D enriched milk	0	400 IU/day

Notes: these guidelines are adapted from the Canadian Pediatric Society's Position Statement: Vitamin D supplementation in northern native communities (Paedric Child Health, 2002) and the Government of Nunavut Public Health Vitamin D Protocol, Summer 2005.

[19] ibid
[20] NWT Clinical Practice Information Notice, January, 2006: Public Health Vitamin D Protocol