NFIS

National Fluoridation Information Service

Community Water Fluoridation and Osteosarcoma – Evidence from Cancer Registries

Regional Public Health
Better Health For The Wellington Region

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National Fluoridation Information Service

The National Fluoridation Information Service (NFIS) is a consortium funded by the Ministry of Health, led by Regional Public Health working in partnership with:

- Hutt Valley DHB Community Dental Services,
- Environmental Science and Research,
- Centre for Public Health Research at Massey University and
- National Poisons Centre.

Our work includes:

- Following public debate and choices on water fluoridation
- Monitoring international research on the usefulness of water fluoridation
- Critically reviewing emerging research
- Working with District Health Boards and Councils to provide accurate and up-to-date information to their communities
- Providing clinical advice to the Ministry of Health
- Monitoring water fluoridation policy
- Providing access to New Zealand oral health data and research
- Sharing information via quarterly e-newsletters and e-briefings and the NFIS website

BACKGROUND

A proposed link between fluoride intakes from community water fluoridation programmes and cancer has been cited in the media and in submissions on local body decision making processes as a reason to discontinue CWF. While references are often made to cancer generically in communications such as letters to the editor the scientific content of these claims relates principally to one study by EB Bassin et al., (Age-specific fluoride exposures in drinking water and osteosarcoma. Cancer Causes Control, 2006).

A connection of any substance with any form of cancer (valid or not) can be frightening and alarming for all people and is of particular concern for local body politicians charged with making decisions on behalf of their community about the appropriateness of CWF for their community. It is important that clearly referenced coherent information is available on this topic to enable councillors and rate payers alike to make informed decisions for their communities.

SCIENTIFIC QUESTION

Is there any evidence of an increased risk of the bone cancer osteosarcoma with community water fluoridation?

Evidence from Cancer Registries

Many countries have established cancer registries which help in planning and monitoring their cancer control strategies[i]. These registries play an important role in research into the causes of cancers, both by providing data on patterns and trends, and in different types of epidemiological study (in particular, in their ability to follow up groups of persons exposed to potential hazard). To ensure that cases are properly recorded and that the statistical data gathered are complete and can be used to make valid comparisons cancer registries must conform to accepted working practices and standards,.

Two international studies described here have used data from cancer registries to explore the relationship between Community Water Fluoridation (CWF) and osteosarcoma by comparing the incidence of this cancer in areas with CWF to the incidence in areas without CWF.

1. Comber et al[ii] examined the incidence of osteosarcoma in Northern Ireland and the Republic of Ireland in relation to different drinking water fluoridation policies. While an estimated 70% of the population in the Republic of Ireland region has access to CWF, CWF is not implemented in Northern Ireland. Data on osteosarcoma was extracted from the Northern Ireland Cancer Registry and the National Cancer Registry of Ireland and used to calculate age standardized and age-specific incidence rates for areas with and without CWF. No statistically significant differences were observed in the incidence rates of osteosarcoma between areas with or without CWF. The authors concluded that their study provided no

evidence to support the hypothesis that osteosarcoma incidence in the island of Ireland is related to public community water fluoridation programmes.

2. Levy M et al[iii] conducted an ecological analysis using the cumulative osteosarcoma incidence rate data from the Centers for Disease Control, U.S. (CDC) Wonder database for 1999–2006, categorized by age group, sex, and states. States were categorized as low (30%) or high (85%) according to the percentage of the population receiving CWF between 1992 and 2006. There was no statistically significant difference in the incidence rates of osteosarcoma between low and high fluoridation states. The authors concluded that the CWF status in the continental U.S.A has no influence on osteosarcoma incidence rates during childhood and adolescence.

It is useful to note that both studies do not show evidence of "peaking" in male incidence rates between ages 5 and 8 years found by a, often quoted, study using a matched case–control study design to explored age-specific and gender-specific effects of fluoride levels in drinking water and the incidence of osteosarcoma[iv].

New Zealand first established its Cancer Registry in 1948 and from 1993 it has been compulsory for all pathology laboratories to report on cancers other than non-melanoma skin cancer. All new osteosarcoma cases require laboratory diagnosis and therefore all cases are reported to the Registry. This means that since 1993 the Registry contains a complete set of osteosarcoma cases for all New Zealand. The Registry not only collects data on site and morphology of malignant tumours but also records the age and sex of the case, and the census area unit (CAU) of where the case lives at time of diagnosis. It is therefore possible to use Registry data to explore the relationship between CWF and osteosarcoma.

In a preliminary analysis of Registry data for nine years 2000 to 2008 (see Table), osteosarcoma cases were selected based on the two three digit ICD-O3 morphology code's 918 and 919 and CAUs were categorized into those that are served by CWF ("+") and those not served by CWF ("-"). Using 2006 census estimates obtained from the Department of Statistics table builder website[v] national rates were calculated for each sex and age group comparing fluoridated with non-fluoridated areas.

NZ Cancer Registry - Osteosarcoma Registrations 2000-2008						
Age (years)	**0 - 9**	**10 - 19**	**20 - 39**	**40 - 64**	**65+**	**All ages**
CWF Status						
Male						
Cases for 2000 to 2008						
+	2	17	8	7	4	38
-	5	16	7	5	7	40
Total	7	33	15	12	11	78
Average cases per year						
+	0.2	1.9	0.9	0.8	0.4	4.2
-	0.6	1.8	0.8	0.6	0.8	4.4
Total	0.8	3.7	1.7	1.3	1.2	8.7
Rate (,000,000/yr)						
+	1.3	10.6	2.6	2.3	4.0	
-	4.3	12.7	3.6	1.8	6.6	
Total	2.6	11.5	3.0	2.1	5.3	
Female						

Cases for 2000 to 2008						
+	3	16	3	9	0	31
-	1	11	2	0	4	18
Total	4	27	5	9	4	49
Average cases per year						
+	0.3	1.8	0.3	1.0	0.0	3.4
-	0.1	1.2	0.2	0.0	0.4	2.0
Total	0.4	3.0	0.6	1.0	0.4	5.4
Rate (,000,000/yr)						
+	2.1	10.2	0.9	2.8	0.0	
-	0.9	9.3	1.0	0.0	3.2	
Total	1.6	9.8	0.9	1.5	1.6	
Both sexes						
Cases for 2000 to 2008						
+	5	33	11	16	4	69
-	6	27	9	5	11	58
Total	11	60	20	21	15	127
Average cases per year						
+	0.6	3.7	1.2	1.8	0.4	7.7
-	0.7	3.0	1.0	0.6	1.2	6.4
Total	1.2	6.7	2.2	2.3	1.7	14.1
Rate (,000,000/yr)						
+	1.7	10.4	1.7	2.5	1.7	
-	2.7	11.1	2.3	0.9	4.8	
Total	2.1	10.7	1.9	1.8	3.3	

CONCLUSION FROM CANCER REGISTRY EVIDENCE

The analysis confirms that osteosarcoma is extremely rare in New Zealand with only 127 new cases registered during this period averaging 14.1 per year. The peak age is 10 to 19 years for both sexes. These rates indicate that there is no difference in the rates of osteosarcoma cases between areas with CWF and areas without CWF for both sexes, findings which are consistent with the two international studies.

IMPLICATIONS FOR NEW ZEALAND

A more robust study analysis is to be undertaken of the possible relationship between osteosarcoma cases and CWF data in NZ.

REFERENCES

[i] International Association of Cancer Registries (IACR) - http://www.iacr.com.fr

[ii] Comber H, Deady S, Montgomery E, Gavin A. Drinking water fluoridation and osteosarcoma incidence on the Island of Ireland. Cancer Causes Control. 2011;22:919–24

[iii] Levy M, Leclerc BS. Fluoride in drinking water and osteosarcoma incidence rates in the continental United States among children and adolescents. Cancer Epidemiol. 2012;36(2):e83-8

[iv] Bassin EB, Wypij D, Davis RB, Mittleman MA. Age-specific fluoride exposure in drinking water and osteosarcoma (United States). Cancer Causes Control. 2006; 17:421–8

[v] http://nzdotstat.stats.govt.nz/wbos/Index.aspx