

## Nau mai haere mai,

Welcome to the ninth issue of our e-newsletter 'On Tap'. We have been very busy at the NFIS office over the past few months and have produced a bumper issue for you. Our next issue will be in September. This issue has some very interesting articles for you to read:

- a summary of the recommendations on oral health from the Child Health Committee and the government's response
- a look at Dr Jonathan Broadbent's (et al.) study published in the Journal of Dental Research on enamel defects
- key findings from the most recent NFIS review of the literature July – December 2013
- a further article discussing the cost effectiveness of community water fluoridation
- interesting reading from Sciblogs on the misrepresentation of science

This is my last issue of On Tap as I am moving on to a new nutrition role. I would like to take this opportunity to thank all our readers for the positive feedback we have received for each issue of On Tap. These e-newsletters take a lot of work to put together so it is very gratifying to know that they are being read and are useful for the sector. Thank you all for reading and if you have anything you would like to contribute to On Tap or a topic you would particularly like us to cover please contact the NFIS team at [NFIS@huttvalleydhsb.org.nz](mailto:NFIS@huttvalleydhsb.org.nz) or 04 587 2815.

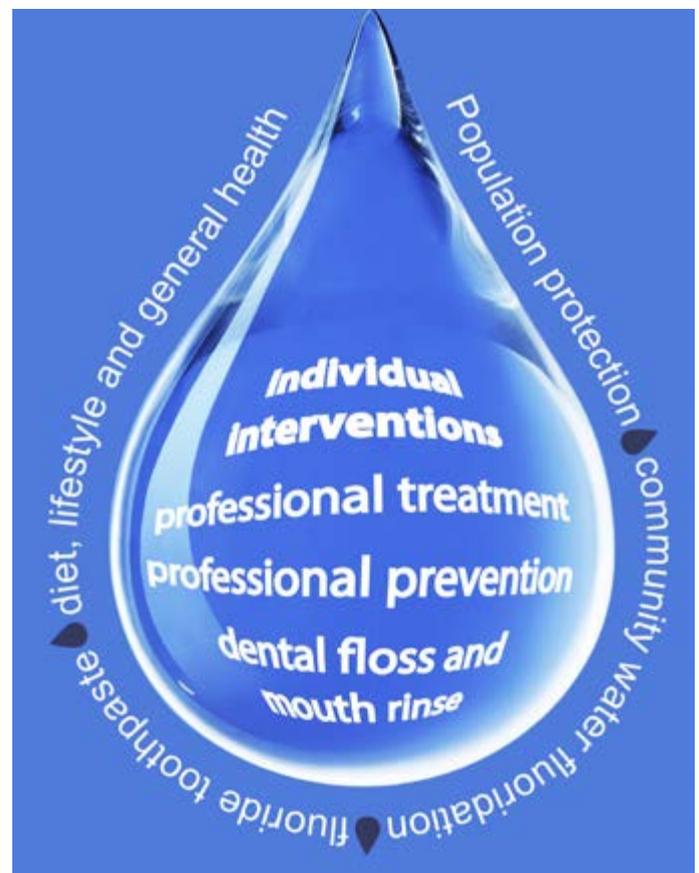
Nga mihi, Emmeline

## THE COST-EFFECTIVENESS OF FLUORIDE PREVENTION AND INTERVENTION PROGRAMMES IN NEW ZEALAND

An argument that is often brought up in media discussions as a reason to stop community water fluoridation (CWF) programmes is the assertion that they are no longer cost-effective, and that using other more individually targeted fluoride interventions would be better value for money. So does the available evidence support these statements? In this article we take a closer look at the research on the cost-effectiveness of fluoride related prevention and intervention programmes, especially those that have been used in New Zealand. In addition, we discuss the experience of some District Health Boards that have trialled individually targeted fluoride interventions.

In 2013 NFIS published an advisory reviewing the evidence on the cost-effectiveness of CWF as a dental public health prevention programme (NFIS 2013, see [here](#)). All nine studies included in this advisory reported that CWF is cost-effective in populations over 1000. In addition, studies also indicated that the cost-effectiveness of CWF increases in areas with populations at higher risk of tooth decay, such as minority ethnic groups, low income groups and young people (aged one to 20 years) (NFIS 2013).

As well as providing evidence that CWF programmes are cost-effective, the advisory also included a study by



CONTINUES ON NEXT PAGE

CONTINUED FROM PREVIOUS PAGE

Marino et al. (2012) who compared the cost effectiveness of various dental public health prevention and interventions programmes. These included fluoridated milk, fluoridated mouthrinses, fluoride gels, dental sealants and supervised tooth brushing programmes. It found that CWF was the second most cost-effective after fluoridated salt (not currently in use in NZ)<sup>1</sup> (Marino et al., 2012).

Depending on the size of the population, CWF has been estimated to cost between USD\$2.70 per person per year in areas with 5,000 people or less, and USD\$0.40 in areas with 20,000 or more people (Kumar and Moss, 2008). Due to the increased availability of fluoride from other sources, the estimated cost-effectiveness of CWF programmes has reduced, but recent studies estimate that CWF programmes are still associated with annual savings of from AUD\$12.80 (Campaign et al., 2010) and USD\$14.89 (Marino et al., 2012), to as much as USD\$61 (Brunson et al., 2005) per person in dental treatment costs.

### **TOOTH BRUSHING PROGRAMMES IN SCHOOLS**

In addition to CWF, other fluoride related interventions that have been implemented in NZ include supervised tooth brushing programmes in schools and fluoride varnish programmes mainly provided through school dental clinics.

Northland is one of the DHBs that have trialled the effectiveness of supervised tooth brushing programmes in schools. The DHB decided to trial this intervention as there are high rates of tooth decay among children in the region, and no CWF programmes. The first tooth brushing trial was held at a low decile school over a three year period starting in May 2008. The programme involved all children in the school (Yr 1 – Yr 8). Toothbrushes and toothpaste were provided to the school (sponsored by the NZ Dental Association and Colgate) and oral health education sessions were provided by dental therapists/assistants at the launch, and at 6, 18 and 30 months into the programme. Daily brushing sessions were facilitated by teachers after the school lunch breaks.

The evaluation of the trial found the programme had helped improve the children's tooth cleanliness and the health of their gums. Findings also indicated that teachers and dental therapists were positive about implementing the programme; however their enthusiasm was reliant on continued support from DHB oral health promotion staff (Gowda, 2011).

A second trial of a tooth brushing programme in Northland involved four decile four schools over one year starting in April 2012. This trial did not include an evaluation of whether the children's oral health had improved, but looked at how well the programme was running. Similar issues to the previous trial were found. Enthusiasm for the programme decreased with time in all but one of the schools, and was reliant on continued support from DHB oral health promotion staff. The trial report concluded that teachers' ability to support tooth brushing programmes is a key factor for the long term sustainability of this intervention (which can be difficult due to teachers' busy schedules). The report suggested that although tooth brushing programmes would be beneficial, selection criteria may be needed to identify schools that can ensure long term sustainability of the programmes (Ali and Dones, 2013).

These trials would suggest that tooth brushing programmes by themselves do not replace the benefits of having CWF programmes, which are available to all and do not rely on busy teachers to implement. There are also considerable costs related to tooth brushing programmes, in regards to teacher and DHB staff time and resources needed to run the programme. This reflects the findings of Marino et al. (2012), who found that supervised tooth brushing was the third most costly of the oral health interventions reviewed. However, as the first Northland trial and other research (see Kumar and Moss, 2008) have shown that these programmes can improve oral health, they may be a useful complementary oral health intervention, particularly for schools with populations less likely to be brushing regularly and where the teachers are able to commit to the programme long term.

### **FLUORIDE VARNISH PROGRAMMES**

Another fluoride intervention that has been used in New Zealand is fluoride varnish application to teeth. These programmes are mainly performed by school dental services to prevent development of tooth decay in those over 12 months of age with a high risk of dental caries both in areas with and without CWF programmes (New Zealand Guidelines Group, 2009). Benefits of this intervention are that the varnish can be applied when someone visits the dental clinic/dentist for their regular check-up and it only needs to be applied every 6 months to be effective (Kumar and Moss, 2008).

A potential issue is that those most at risk of dental caries may be less likely to regularly

access dental services. For example findings from the 2009 NZ Oral Health Survey (MoH, 2010) showed that only 59.7% of 2-4 year olds had visited a dental provider in the last year, and Maori and Pacific children (2-17 years) were significantly less likely to have visited than non-Maori and non-Pacific children.

To improve access to fluoride varnish programmes in the US, medical providers have been trained to provide the applications (Kumar and Moss, 2008). This has also been considered in New Zealand. In Canterbury, the Community Dental Service looked into involving the local Pacific health provider public health nurse to provide fluoride varnish applications to Pacific children. However, it was found to be too costly and the Pacific population too small to justify the expense and it was decided that capturing the children through the School Dental Service would be more cost-effective (Dr T. Misa – Canterbury Community Dental Service, personal communication, 19.02.14). Providing this service through medical providers targeting populations at risk of dental caries (such as Maori and Pacific health providers) may, however, be an effective approach if a substantial number of children can be captured. It should also be noted that the School Dental Service have recently gone through a nationwide reorientation of their model of care to improve access to their services, and ensure a more targeted prevention and early intervention focussed service.

The cost of varnish application has been estimated to between USD\$16 and \$19 per application (two applications per year recommended), which is considerably more than the USD\$0.40-\$2.70 per person per year estimated for CWF programmes (Kumar and Moss, 2008). As with tooth brushing programmes, this suggests that fluoride varnish programmes themselves do not replace the benefits of having CWF programmes in place, but may be a useful complimentary intervention to improve oral health amongst those at most risk of dental decay.

This article has considered the scientific evidence and the experience and comments from DHBs about the cost-effectiveness of CWF programmes and the use of other more individually targeted fluoride related interventions in New Zealand. In conclusion the evidence suggests that CWF programmes continue to be one of the more cost-effective dental public health programmes available and play a key role in oral health prevention.

CONTINUES ON NEXT PAGE

CONTINUED FROM PREVIOUS PAGE

1. Marino et al. (2012) found prevention programmes involving salt fluoridation, community water fluoridation, milk fluoridation and fluoride mouthrinses most cost effective, and programmes involving supervised tooth brushing, dental sealants and fluoride gel application least cost effective.

**References**

Ali, S. and Dones, J. (2013). Health Promoting Schools and oral health promotion collaborative school toothbrushing programme in Northland. In A. Zander and H. Came (Eds.) *Proceedings of the 2013 Public Health Association Conference* (pp. 57-61). Auckland: Public Health Association.

Brunson, D. et al. (2005). Costs and Savings Associated with Community Water Fluoridation Programmes in Colorado. *Preventing Chronic Disease*. Published online October 2005.

Campaign, A. et al. (2010). The impact of changing dental needs on cost savings from fluoridation. *Australian Dental Journal*. 55(1), pp. 37-44.

Gowda, S. (2011). *School-based toothbrushing programme in a high-risk rural community in New Zealand – an evaluation*. Whangarei: Northland District Health Board.

Kumar, J.V. and Moss, M.E. (2008). Fluorides in dental Public Health Programmes. *The Dental Clinics of North America*. 52, pp. 387-401.

Marino, R. et al. (2012). Cost-effectiveness models for dental caries prevention programmes among Chilean schoolchildren. *Community Dental Health*, 29(4), pp. 302-308.

Ministry of Health. (2010). *Our Oral Health: Key findings of the 2009 New Zealand Oral Health Survey*. Wellington: Ministry of Health.

National Fluoridation Information Service. (2013). *NFIS Advisory: A review of the current cost benefit of community water fluoridation interventions*. Wellington: National Fluoridation Information Service.

New Zealand Guidelines Group. (2009). *Guidelines for the use of fluorides*. Wellington: Ministry of Health.

# KEY FINDINGS

## Review of scientific literature: July-December 2013

NFIS reviewed 53 papers for this review; here are some of the key findings.

### SUPPORT FOR COMMUNITY WATER FLUORIDATION (CWF)

- In an online survey in 2010, 1174 general dental practitioners on the New Zealand Dental Register (who were contactable) were invited to complete an online survey. The response rate was 39.6% (465 dentists). The results showed 93.5% of respondents supported CWF. The remaining 6.5% of respondents were either unsure or did not support CWF. The survey also found 85.6% of respondents believed that drinking fluoridated water was a harmless way to prevent dental caries. A further 7.6% of respondents were neutral as to the harmful effects of CWF, and the remaining 5.9% believed CWF could cause harm such as: bone cancer, hip fractures or other systemic health problems (Grant, Dawson, & Thomson, 2013).
- A study of voting patterns on CWF in Oregon and Kansas, USA found that those most likely to vote in favour of CWF had a higher level of education and were at the centre of the political spectrum (Hersch & Pelkowski, 2014).

### CWF AND ORAL HEALTH

- A longitudinal study in Iowa, USA found that CWF resulted in a smaller increase in the number of caries in permanent (molar and incisor) teeth. The effect was strongest in adolescents from low-income families (Broffitt, Levy, Warren, & Cavanaugh, 2013).
- A cross-sectional study in New South Wales Australia, found that in small, rural communities, socio-economic status and tooth-brushing frequency were statistically significant predictors of dental caries, whilst access to fluoridated water at school was not (Zander, Sivanewaran, Skinner, Byun, & Jalaludin, 2013).
- A cross-sectional study of 14-15 year olds in New South Wales Australia, found that those living in fluoridated communities had fewer dental caries than those living in non-fluoridated communities (Skinner, Johnson, Phelan, & Blinkhorn, 2013).

### CWF AND OSTEOPOROSIS

- A Swedish retrospective cohort study found no association between long term exposure to water at naturally occurring fluoride levels of 0.5-2.7mg/l and occurrence of hip fracture (Nasman, Ekstrand, Granath, Ekborn, & Fored, 2013).
- A cross sectional study from the USA found no association between low bone mineral density (BMD) and dental fluorosis in adults aged 20-49 years (Wiener & Sambamoobi, 2013).

**References**

Broffitt, B., Levy, S. M., Warren, J., & Cavanaugh, J. E. (2013). Factors Associated with surface level caries incidence in children aged 9-13: the Iowa Fluoride Study. *Journal of Public Health Dentistry*, DOI: 10.1111/phd.12028.

Grant, S. M., Dawson, S. K., & Thomson, W. M. (2013). New Zealand dentists' views on community water fluoridation. *New Zealand Dental Journal*, 69-73.

Hersch, P., & Pelkowski, J. E. (2014). Voter demand for fluoridated water: a tale of two (av)ities. *Applied Economi Letters*, 51-54. \*Published online 2013

Nasman, P., Ekstrand, J., Granath, F., Ekborn, A., & Fored, C. M. (2013). Estimated Drinking Water Fluoride Exposure and Risk of Hip Fracture: A Cohort Study. *Journal of Dental Research*, DOI: 10.1177/002203451356443.

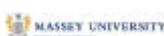
Skinner, J., Johnson, G., Phelan, C., & Blinkhorn, A. (2013). Dental Caries in 14 and 15 year olds in New South Wales, Australia. *BioMed Central Public Health*, DOI: 1471-2458/13/1060.

Wiener, R. C., & Sambamoobi, U. (2013). Dental Fluorosis and Lumbar Spine Bone Mineral Density in Adults, ages 20 to 49 years: Results from the 2003 to 2004 National Health and Nutrition Examination Survey. *Journal of Dental Hygiene*, 370-377.

Zander, A., Sivanewaran, S., Skinner, J., Byun, R., & Jalaludin, B. (2013). Risk factors for dental caries in small rural and regional Australian communities. *Rural and Remote Health*, 2492-2498.



NFIS CONSORTIUM PARTNERS:



**PARLIAMENTARY HEALTH COMMITTEE INQUIRY REPORT**

# Improving children’s health outcomes and preventing child abuse with a focus from preconception until three years of age

In 2013, the New Zealand Parliamentary Health Committee carried out an inquiry into practical health and social interventions from preconception until three years of age to prevent child abuse and promote child well-being. The Health Committee was composed of MPs from the following four political parties (National, Labour, Greens and New Zealand First) with Dr Paul Hutchison (National) as chairperson.

The Committee initiated the enquiry "...in an attempt to find what practical health and social interventions can be made to promote children’s wellbeing in New Zealand ..." (New Zealand House of Representatives, 2013, p. 6). The recommendations are particularly significant because the Committee’s members came from each of the four political parties providing a degree of cross party support.

In October 2013, the Committee released its report which addressed a wide range of health issues including oral health (*New Zealand House of Representatives, 2013*). The Government response to the report was tabled in Parliament on 6 March 2014 (*New Zealand Government, 2014*).

**ORAL HEALTH RECOMMENDATIONS**

The oral health section of the report noted that early childhood dental caries are one of the most common and expensive diseases of childhood. If not treated promptly, dental caries cause pain, infection, and abscesses which may require antibiotics, and/or hospital admission for treatment under general anaesthesia.

As well as recommending a nationwide dental public health campaign and improved access to childhood dental treatment, the Committee made two recommendations specifically relating to community water fluoridation (CWF) and one recommendation about fluoride varnish application.

People working in DHBs on CWF/oral health could find these recommendations useful when preparing information for Councils. The recommendations are listed to the right with the summary of the Government response (*New Zealand Government, 2014*) in italics.

**CONCLUSION**

It is good to see the need for on-going monitoring of the evidence on CWF recognised. We note also the Committee recommendation on shifting the decision making responsibilities for CWF from Territorial Authorities (TLAs) to DHBs.

The NFIS environmental scans (2010–2013) show the difficulties many TLAs have with current decision making on CWF. Since the publication of the Health Committee report, the Kapiti Coast District Council have been instrumental in organising for the Local Authorities in the Wellington region to put a remit to the Local Government New Zealand (LGNZ) national conference "...proposing to make health authorities, rather than local councils, responsible for deciding whether fluoride is put into local water supplies"(Kapiti Coast District Council, 2014). Read about the remit [here](#).

Also contributing to the discussion since the publication of the Committee’s recommendations, the New Zealand Dental Association has stated that decisions about CWF should be the responsibility of Central Government and that New Zealand should adopt a consistent policy of fluoridating all water supplies in New Zealand (Radio New Zealand, 2014).

**References**

Kapiti Coast District Council. (5 March 2014). *Council gains support to make health authorities responsible for fluoride*. Retrieved from <http://www.kapiticoast.govt.nz/Your-Council/News/2014/Council-gains-support-to-make-health-authorities-responsible-for-fluoride/>

New Zealand Government. (2014). *Government Response to Report of the Health Committee on Inquiry into improving child health outcomes and preventing child abuse with a focus from preconception until three years of age*. Retrieved from <http://www.parliament.nz/resource/0002200372>.

New Zealand House of Representatives. (November 2013). *Inquiry into improving children’s health outcomes and preventing child abuse with a focus from preconception until three years of age Volume 1*. Retrieved from <http://www.parliament.nz/resource/0002018580>.

Radio New Zealand. (28 March 2014). *Dentists want Govt to step in over fluoride*. Retrieved from <http://www.radionz.co.nz/news/national/240144/dentists-want-govt-to-step-in-over-fluoride>

**RECOMMENDATION 102 Accepted**

That the Ministry of Health ensure that the addition of fluoride to the drinking water supply is backed by strong scientific evidence and that on-going monitoring of the scientific evidence is undertaken by, or for, the Ministry of Health, and that the Director-General of Health is required to report periodically to the Minister of Health on the status of the evidence and coverage of community water fluoridation.

- ◆ *The Minister of Health is kept up to date with CWF issues*
- ◆ *CWF is based on strong scientific evidence which is regularly reviewed.*

Please note: NFIS is contracted by the Ministry to monitor the international scientific evidence on CWF and provides detailed critical reviews of the emerging research every six months. These reports are published on [www.NFIS.org.nz](http://www.NFIS.org.nz)

**RECOMMENDATION 103 Not accepted**

That Central Government work with Local Government New Zealand and the Ministry of Health to make district health boards responsible for setting standards around water-quality monitoring and adjustments to meet World Health Organization standards.

- ◆ *The Ministry of Health provides Drinking Water Standards based on WHO Guidelines*
- ◆ *Currently Territorial Authorities and private/community providers supply drinking water conforming to the Drinking Water Standards*
- ◆ *The Standards cannot be used to require the fluoridation of drinking water, but fluoridation is provided where it is supported by local communities*
- ◆ *Legislative change would be required if DHBs were to make decisions on fluoridation of drinking-water.*

**RECOMMENDATION 106 Accepted in part**

That the Government closely monitor children who miss scheduled oral health appointments and take corrective action when a pattern emerges. This might include topical fluoride applications and a delegated health worker to encourage their developing a healthy diet and a healthy home care regime.

- ◆ *Some DHBs are investigating the option of providing applications of fluoride varnish in community settings (eg, in homes or at early childhood centres) for children who have significant dental decay.*

# Articles of interest



## DOES CARIES IN PRIMARY TEETH PREDICT ENAMEL DEFECTS IN PERMANENT TEETH?

J.M. BROADBENT, W.M. THOMSON, S.M. WILLIAMS (2005)  
 JOURNAL OF DENTAL RESEARCH 84(3), PP. 260-264.

This New Zealand research project investigated the hypothesis that dental caries in baby teeth is a risk factor for enamel defects in the adult teeth that follow.

Data from the Dunedin Multidisciplinary Health and Development Study, a prospective cohort study of 1037 children born in Dunedin between 1 April 1972 and 31 March 1973, was used for the study. Dental examination data from the study was used to investigate the incidence of dental caries in the upper front baby teeth of participants at age five and any development defects in their upper front adult teeth at age nine.

The study found that children who had dental caries in a front baby tooth were over two times more likely to have a demarcated enamel defect (see picture 1 to the right) in the following front adult tooth than children who did not have any decay in their front baby teeth. This was after adjusting for differences by gender, socioeconomic status, number of years of exposure to community water fluoridation programmes, primary tooth loss, and primary tooth trauma.

The risk of having a demarcated defect in a upper front adult tooth was even higher (five times more likely) for children who had lost an upper front baby tooth for reasons other than trauma e.g. due to decay or early shedding of teeth.<sup>1</sup>

The study also found that the risk of getting adult front teeth with diffuse enamel defects (see picture 2 to the right) increased by 10% for every year a child with baby teeth lived in an area with CWF (until four years of age).

### NFIS CONCLUSION

This is a reasonably robust study as it has a large study sample (n=663), and uses longitudinal data (where the same participants are followed up over time) and data from dental examinations

(not only participant's recall of events), which helps to reduce bias. In addition, having a large amount of data available through the Dunedin Multidisciplinary Study provided the authors with the ability to adjust for important confounding factors. A weakness of the study was lack of available data on differences in enamel defects between various ethnic groups, e.g. Maori and non-Maori (as the majority of the Dunedin Multidisciplinary Study participants are NZ European).

The findings from this study emphasize the importance of preventing tooth decay in baby teeth as decay is associated with an increased risk of demarcated enamel defects in the following adult teeth. This finding is in agreement with other research demonstrating the importance of preventing tooth decay in baby teeth. For example see the [National Health Committee \(2003\) report \*Improving Child Oral Health and Reducing Child Oral Health Inequalities\*](#), which discusses the impacts oral health problems in childhood can have on oral and general health throughout life.

The reviewed study also indicated that living in an area with CWF was associated with an increase in diffuse enamel defects. These defects are generally less visible than demarcated defects (see picture 2 to the right). As cited by Thomson (2013), recent longitudinal research has found that diffuse defects fade over time and are less apparent by the end of adolescence.

1. The majority of teeth lost for reasons other than trauma, were due to decay or abscesses (Dr J. Broadbent, personal communication, 25.03.2014).

### References

Cutress, T.W. and Suckling, G.W. (1990). Differential Diagnosis of Dental Fluorosis. *Journal of Dental Research*. 69(Spec Iss), pp. 714-720.

Thomson, W.M. (2013). New Zealand drinking water should be fluoridated – the 'yes' case. *Journal of Primary Health Care*. 5(4), pp. 330-332.

National Health Committee. (2003). *Improving Child Oral Health and Reducing Child Oral Health Inequalities*. Wellington: National Health Committee.

Images supplied by University of Otago Dental Department.

### PLAIN ENGLISH DEFINITIONS OF DEMARCATED AND DIFFUSE ENAMEL DEFECTS



picture 1

#### Demarcated defects

A hypomineralisation defect of dental enamel (lack of minerals in the developing teeth) with a clearly defined border, and white, yellow or brown 'marks' on the teeth (usually due to a local cause such as previous decay). These are generally more visible than diffuse enamel defects. The above image shows an example of a demarcated enamel defect.



picture 2

#### Diffuse defects

Enamel defects that do not have a clearly defined border. They occur as opaque white areas in the enamel. Diffuse enamel defects are sometimes due to fluoride exposure (i.e. fluorosis), but can also be due to other factors such as early childhood fevers or malnutrition. The fluoride intake and medical history of a child with diffuse enamel defects need to be assessed to determine whether they are due to fluorosis or other factors (Cutress and Suckling, 1990). The above image is an example of a diffuse enamel defect.

# MISREPRESENTATION OF SCIENCE

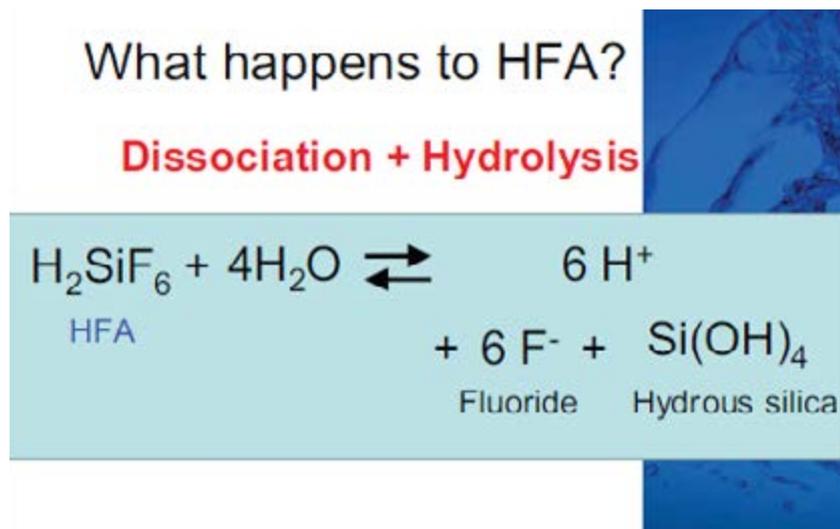
Critically assessing evidence is an important part of science, but criticisms need to be backed by robust scientific evidence and reasoning. This does not always happen and NFIS regularly comes across misrepresentations of the scientific evidence on community water fluoridation (CWF). Untangling misrepresentation of science can be very time consuming, as it requires investigating the source of published claims, tracking them back through the scientific literature to the original study(ies) and assessing the validity of the original study(ies) cited in the misrepresentation.

The most noteworthy example of scientific misrepresentation since our last issue of On Tap was found in the 'Back to Back' section of the December 2013 issue of the *Journal of Primary Health Care*. The purpose of the 'Back to Back' section of this journal is for professionals to discuss a clinical, ethical or political issue they have opposing views on. In the December issue an article 'for' and 'against' CWF was presented, and since this was published there have been several responses to the arguments made in the 'against' CWF article as being misrepresentations of the science on CWF.

One of these responses to the 'against' CWF article was published in a blog called *Open Parachute*. *Open Parachute* is part of the science blogger syndicate, SciBlogs (<http://sciblogs.co.nz/>), an initiative run by the Science Media Centre. The Science Media Centre is a government funded media group whose role is to provide easily accessible source of relevant scientific information for use by the New Zealand media.

The *Open Parachute* entry mainly addressed the 'against CWF' article's statement about fluorosilicates (some of which are used for fluoridating water) that they: "... do not fully dissociate to form free fluoride ions in aqueous solution and revert to the silicofluoride<sup>1</sup> ion in acid stomach conditions". *Open Parachute* demonstrated that this statement is not supported by the scientific evidence, which has found that:

- Although fluorosilicates do not completely decompose at low pH values (3 and below), they do show complete decomposition at neutral pH values. Using the argument that fluorosilicates do not completely decompose when used for CWF is therefore invalid, as water has a neutral pH.



- As fluorosilicates completely decompose into fluoride and silica at neutral pH values they cannot revert back into fluorosilicate even in acidic stomach conditions, arguments about the risks of fluorosilicates entering the body (and causing harm) from drinking fluoridated water are therefore a misrepresentation of the science.

To read the full blog entry, click [here](#).

The use of fluorosilicates in CWF is not a new issue. At the Hamilton City Council CWF tribunal last May (2013), one of the NFIS consortium members (who is a water scientist working for Environmental Science and Research (ESR)), presented on the same issue. The presentation included the figure above showing the final result of adding hexafluorosilicic acid to drinking water, which is the disappearance of the hexafluorosilicic acid and formation of fluoride and silica, i.e. the same process that was discussed in *Open Parachute*.

## LANCET ARTICLE

While writing this article for *On Tap*, another example of misrepresentation in a scientific journal came to our attention. The article was published in the neurology edition of the *Lancet* and identifies fluoride as one of several newly 'proven' developmental toxicants. However, this 'proof' of the neurotoxicity of fluoride was based on only one previous review of fluoride neurotoxicity in Chinese villages with naturally occurring high levels of fluoride in drinking water (Choi et al., 2012), which was co-authored by one of the authors of the *Lancet* article. NFIS Consortium Partners have previously discussed the limitations of the methodology of this article and its limited usefulness in drawing any scientific conclusions on the topic (please see their response to that article [here](#)).

Following the publication of the *Lancet* article it was recently referenced by the Fluoride Action Network New Zealand (FANNZ) for their 'Statement against fluoridation' for the Kapiti Coast District Council Draft Annual Plan 2014-15 ([www.kapiticoast.govt.nz](http://www.kapiticoast.govt.nz)). In their statement FANNZ claim that CWF is neurotoxic, and that fluoride can also cause other neurological diseases such as ADHD and Alzheimer's disease, neither of which were mentioned in the *Lancet* article. This is an example of where poor science has been picked up and re-referenced distorting and misrepresenting the original study outcomes.

In conclusion, these examples show the importance of keeping an open yet wary mind when reading science, to assess whether claims made are backed by robust scientific evidence and reasoning. For further thoughts on this topic a very useful article outlining tools for policy makers to help with critically assessing science was recently published in the journal *Nature* and can be found [here](#).

- Note: Silicofluorides and fluorosilicates are the same chemical.

## References

- Atkin, G.M. (2013). New Zealand drinking water should be fluoridated – No. *Journal of Primary Health Care*. 5(4), pp. 332-334.
- Choi AL, Sun G, Zhang Y, Grandjean P. Developmental fluoride neurotoxicity: a systematic review and meta-analysis. *Environmental Health Perspectives*. 120, pp. 1362–1368.
- Grandjean, P., Landrigan, P. (2014). Neurobehavioural effects of developmental toxicity. *Lancet Neural*. 13, pp. 330-338.
- Sutherland WJ., Speigelhalter D., Burgman MA. (2013). Twenty tips for interpreting scientific claims. *Nature*. 503, pp 335-337.

**CONSORTIUM PARTNER**

Introducing

**DR ROBIN WHYMAN**

Robin is a general dentist and a specialist in public health dentistry. He is clinical director of oral health services at Hawke’s Bay DHB and principal dental officer at Whanganui DHB.

Robin’s clinical practice involves hospital-based paediatric dentistry, special needs dentistry and general dentistry for high need patients. He is also engaged in a number of public health dentistry projects involving equity of access to oral health services, improving child oral health outcomes, community water fluoridation, clinical leadership and quality improvement for dental services. Robin is currently the New Zealand Councillor and Treasurer for the Royal Australasian College of



Dental Surgeons and a member of the New Zealand Dental Association Research Foundation Board.

Previous roles Robin has held include regional director for dental services at Capital and Coast and Hutt Valley DHBs and chief dental officer for the New Zealand Ministry of Health.

Robin’s work for NFIS has included an advisory on the suggested relationship between delayed tooth

eruption and community water fluoridation, peer reviewing the NFIS 6-monthly reviews of the literature and advisory documents, presenting to a number of territorial local authority council meetings and regular assistance with DHB enquiries.

**Waimarama**

Kia ora e hoa ma,

In November 2013 New Health New Zealand (Inc.) (a private citizens group) took the South Taranaki District Council to judicial review over its decision to extend its community water fluoridation programme to include the towns of Patea and Waverly. The case was heard in the New Plymouth High Court.

New Health NZ initiated the judicial review on the grounds that they believed the council had:

- no power to fluoridate the water supply;
- if they did have the power (to fluoridate), it was a breach of the right to refuse medical treatment, as per the New Zealand Bill of Rights Act; and
- the council had failed to take relevant consideration in making its decision.

On 7 March the decision of Judge Rodney Hansen in the case of New Health v Taranaki was released. Judge Hansen rejected all grounds of challenge. He concluded that:

- there is implied power to fluoridate in the Local Government Act 2002 and the Health Act confirms that fluoride may be added to drinking water in accordance with drinking water standards issued under that Act;
- fluoridation of water is not medical treatment for the purpose of s11 of the New Zealand Bill of Rights Act; and
- the Council carefully considered the detailed submissions presented and reached its decision after anxious consideration of the evidence and careful deliberation.

This [link](#) provides a very good summary of the case from the lawyers working on behalf of South Taranaki District Council.

You can find a link to the full decision on our [CWF Activities page](#) under the Statements icon. **Sections 79 through to 111** are very interesting in relation to all public health actions and interventions and I recommend carefully reading the whole document for everyone working in the oral health sector. The judge has been very thorough in his research of the case history around CWF. It is interesting to understand how public health interventions are viewed from a legal perspective and the importance of the history of past legal action to the case.

Nga mihi, Emmeline

**WHAT’S NEW @  
nfis.org.nz**

This quarter we have added a number of interesting things to our website.

On the NFIS documents page you will find:

- [Review of Scientific Papers Relating to Water Fluoridation](#) published between January and July 2013
- [Reference lists](#) September – December 2013



On the CWF Activities page you will find:

- International | A link to the [Centers for Disease Control grand round on CWF](#)
- International | A link to the [Public Health England CWF report](#)
- International | A link to the [WHO public consultation on draft sugars guideline](#)
- Statements | A link to the [decision of Judge Rodney Hansen in New Health v Taranaki](#)



NFIS CONSORTIUM PARTNERS:

