RISK FACTORS FOR FRACTURES IN THE ELDERLY

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Abstract from Epidemiology 9 (4) 417-423 1998

We report the results of a 5-year prospective cohort study of risk factors for fractures, including drinking fluoridated water, in a cohort of 3,216 men and women age 65 years and older. We studied risk factors for hip fracture and fractures at other locations separately. We found a higher risk of hip fractures for subjects exposed to fluorine concentrations over 0.11 mg per liter but without a dose-effect relation [odds ratio (OR) = 3.25 for a concentration of 0.11-0.25 mg per liter; OR = 2.43 for greater than or equal to 0.25 mg per liter]. For higher thresholds (0.7 and 1 mg per liter), however, the OR was less than 1. We found no association between fluorine and non-hip fractures. Non-hip fractures were associated with polymedication rather than with specific drug use, whereas fracture was associated with polymedication and use of anxiolytic and antidepressive drugs. Subjects drinking spirits every day were more likely to have hip fractures. Tobacco consumption increased the risk for non-hip fractures.

Key words: Elderly; Fluoridated water; Fracture; Hip Fracture; Osteoporosis; Psychotropic drugs.

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USE OF TOENAIL FLUORIDE LEVELS AS AN INDICATOR FOR THE RISK OF HIP AND FOREARM FRACTURES IN WOMEN

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Abstract from Epidemiology 9 (4) 412-416 1998

The relation between fluoride intake and risk of osteoporotic fractures remains unclear. The lack of individual measures of long-term fluoride intake has limited epidemiologic studies. We used toenail fluoride in this study as a measure of long-term intake to evaluate the relation between fluoride intake and subsequent risk of hip and distal forearm fractures. Between 1982 and 1984, we collected toenail clippings from 62,641 women in the Nurses' Health Study who were free from cancer, heart disease, stroke, and previous hip or forearm fracture. We identified fracture cases (53 proximal femur and 188 distal forearm) through subsequent biennial mailed questionnaires and matched controls to cases on year of birth. The odds ratio of hip fracture among women in the highest quartile of toenail fluoride (>5.50 parts per million), compared with those in the lowest quartile (<2.00 ppm) was 0.8 (95% confidence interval = 0.2-4.0), with adjustment for menopausal status, postmenopausal hormone use, caffeine intake, and alcohol consumption. The corresponding adjusted odds ratio for forearm fracture was 1.6 (95% confidence interval = 0.8-3.1). Further adjustment for body mass index, smoking status, and calcium and vitamin D intake did not alter these results.

Key words: Bone; Femur; Hip fractures; Osteoporosis; Radius fractures; Water fluoride.

Reprints: D Feskanich, Channing Laboratories, 181 Longwood Ave, Boston, MA 02115, USA.
NEW, OR BIASED, EVIDENCE ON WATER FLUORIDATION

A J Spencer, Adelaide, Australia


The recent review, 'New evidence on fluoridation', by Diesendorf, Colquhoun, Spittle, Everingham and Clutterbuck (Australian & New Zealand Journal of Public Health 1997 21 187-90) claims a consistent pattern of evidence pointing to fluoride damaging bone, a negligible benefit in dental caries reduction from ingested fluoride, and any small benefit from fluoride coming from the action of fluoride at the tooth surface. Public health authorities are allegedly reluctant to pursue such evidence. In the interest of scholarly debate, invited by Diesendorf et al, this reaction paper examines six separate areas raised in the original paper: fluoridation and hip fracture; fluoridation and osteosarcomas; pre-eruptive and post-eruptive benefits in dental caries reduction; fluoride ingestion; benefit in dental caries reduction for contemporary Australian children; and bias of health authorities and responsible science. Numerous examples of bias in the identification, selection and appraisal of the evidence on water fluoridation presented by Diesendorf et al are developed. Further, this reaction paper puts forward both studies and appraisal indicating that water fluoridation should continue to be regarded as a safe and effective public health measure.

Key words: Dental caries; Fluoridation; Fluorosis; Hip fracture; Osteosarcoma.

Reprints: A J Spencer, University of Adelaide, Department of Dentistry, Adelaide, SA 5005, Australia.

COMMENTS

The arguments advanced in Dr Spencer’s lengthy critique were mostly answered in our reply to earlier critics (see Fluoride 31 (3) pages 166-169 August 1998). In that reply we commented: “They list studies that, in their view, counterbalance the comprehensive data on which we based our conclusion that fluoridation should be discontinued. Such publications do not nullify the compelling evidence of harm represented by the comprehensive data we reviewed. In any case, even if the evidence is conflicting, so that conclusions remain in dispute, the precautionary principle is itself grounds for discontinuing the mass uncontrolled fluoride dosing of entire populations.” We then dealt in detail with the various small-scale and inadequate studies which our critics, and now Dr Spencer, claimed were adequate rebuttals of our review. In his concluding section Spencer alleges bias because of our “rejecting the findings of groups tasked with reviewing and evaluating the evidence on the safety, effectiveness and efficiency of water fluoridation” – such groups being pro-fluoridation “health authorities” whose reviews he describes as “responsible science”.

John Colquhoun

More needs to be said about the so-called “experts” who are alleged to do “responsible science”. Perhaps readers could be reminded that earlier this century such experts in the field of medicine
- treated pregnant women with stilboestrol which led to the development of vaginal cancers in their daughters;
- prescribed large oral or intravenous doses of radium salts for circulatory, nervous, endocrine and psychiatric disorders;
- encouraged the over-use of aspirin resulting in outbreaks of kidney disease and gastric ulcers;
- x-rayed pregnant women routinely, resulting in an increase in childhood cancers.

Mark Diesendorf
AGRONOMIC IMPACT OF TEPHRA FALLOUT FROM THE 1995 AND 1996 RUAPEHU VOLCANO ERUPTIONS, NEW ZEALAND
S J Cronin, M J Hedley, V E Neall and R G Smith
Palmerston North, New Zealand
Abstract from Environmental Geology 34(1) 21-30 1998

Eruptions from Ruapehu Volcano on 11 and 14 October 1995 and 17 June 1996 distributed at least 36 x 10^6 m^3 of sulphur(S)-rich tephra over the central and eastern North Island of New Zealand. The tephras added between 30-1500 kg ha^-1 S to at least 25,000 km^2 of land in primary production. Smaller but beneficial amounts of selenium (Se) and in some areas potassium and magnesium were also supplied. Addition of S to the soils in the form of sulphate and elemental S resulted in a drop in soil pH and an increase in pasture S contents within seven weeks of the eruptions. The soils affected by the tephra are naturally low in S and Se, but following the eruptions S was not required in fertilizer applications in many areas. The strongest and longest lasting effects of S and Se deposition were in high anion-retention soils particularly Hapludands (moist, moderately weathered soils, derived from volcanic ash). Soluble fluorine concentrations within the tephras were low compared to historic Icelandic and Chilean examples. However, pastoral livestock deaths were apparently caused by fluorosis in addition to starvation when tephra covered feed. The Ruapehu tephra contained very low concentrations of other soluble toxic elements.

Key words: Fluorosis; Ruapehu volcano; Selenium; Sulphur; Tephra; Volcanic hazards.
Reprints: S J Cronin, Massey University, Department of Soil Science, Palmerston North, New Zealand.

COMMENT
There have been other reports of fluorosis in animals resulting from this eruption (e.g. see abstract in Fluoride 31 (1) pages 51-52 February 1998). Strangely, the medical literature mentions no effects of fluoride on humans inhabiting the same area. There were, however, complaints of distress, as the following abstract shows.

John Colquhoun

THE EFFECTS OF A SERIES OF VOLCANIC ERUPTIONS ON EMOTIONAL AND BEHAVIOURAL FUNCTIONING IN CHILDREN WITH ASTHMA
Kevin R Ronan
Palmerston North, New Zealand
Abstract from New Zealand Medical Journal 25 April 1997

Aims: To determine whether children with asthma experienced disruptions in emotional and behavioural functioning following a series of volcanic eruptions.
Methods. Multitrait, multimethod assessment was carried out with children living in the volcanic area. Self reports, teacher reports, and parent reports were collected on 118 children and addressed issues related to psychiatric disruptions resulting from the eruptions.

Results. Asthma was reported by 30% of the sample and this figure compares favourably with previous findings with other New Zealand samples. These asthmatic children were compared with a group of nonasthmatic children on a
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range of psychiatric symptoms following the volcanic eruptions. Asthmatic children reported, and were observed by parents and teachers, to manifest greater levels of eruption related distress when compared to a group of nonasthmatic children. Children with asthma were found to have significantly higher symptom scores on several indices including those related to eruption-related general distress and context-specific problems (eg, upset at home, upset when eruptions were discussed). Additionally, these children perceived their parents to be significantly more upset than the parents themselves reported. It is important to note that asthmatic children, while clearly more distressed, did not as a group evidence clinical levels of posttraumatic stress disorder symptomology. Conclusions. Children with asthma were more psychologically vulnerable to the volcanic eruptions than children without asthma. These findings have implications for the behavioural management of asthma in children. Discussion integrates current findings with other recent data in highlighting the potential in supplementing traditional asthma management techniques.

Key words: Asthma; Behaviour; Children; Volcanic eruptions.

Reprints: K R Ronan, Psychology Department, Massey University, Palmerston North, New Zealand.

COMMENT

Although fluoride air pollution is a well-known result of volcanic eruptions, the word “fluoride” does not appear in the above study. Respiratory distress resulting from fluoride air pollution was described by Roholm in his classic work (Fluorine Intoxication. A Clinical-Hygienic Study. H K Lewis, London 1937, pp 201-202). Respiratory symptoms, including asthmatic wheezing, were reported by subsequent investigators, cited by Waldbott et al (Fluoridation: the Great Dilemma, Coronado, Lawrence KS 1978 pp 132, 299).

John Colquhoun

HAEMATOLOGICAL CHARACTERISTICS AND BONE FLUORIDE CONTENT IN BUFO MELANOSTICTUS FROM AN ALUMINIUM INDUSTRIAL SITE

P C Mishra and A K Mohapatra
Jyoti Vihar, Orissa, India

Abstract from Environmental Pollution 99 (3) 421-423 1998

Fluoride concentration in bones and differential haemotological characteristics (RBC, haemoglobin, haematocrit, mean corpuscular haemoglobin and mean corpuscular volume) were measured in amphibians, Bufo melanostictus, collected from fluoride-contaminated and uncontaminated areas. The average haemoglobin content, total RBC count and haematocrit (%) in blood samples were found to be significantly reduced, while mean corpuscular concentration and volume were significantly elevated in individuals from the contaminated area in comparison to those from the uncontaminated area. Fluoride concentration was approximately 11 times greater in the bones of toads from the contaminated area.

Key words: Aluminium industry; Bone fluoride; Haematology; Bufo melanostictus.

Reprints: P C Mishra. Sambalpur University, Department of Environmental Science, Jyoti Vihar 769019, Orissa, India.

Fluoride 31 (4) 1998
FLUORIDE INTOXICATION IN BOVINES DUE TO INDUSTRIAL POLLUTION

D Swarup, S K Dwivedi, S Dey and S K Ray
Uttar Pradesh, India

Abstract from Indian Journal of Animal Sciences 68 (7) 605-608 1998

A clinical survey conducted in the vicinity of an aluminium smelter revealed occurrence of fluoride intoxication in cattle population. Affected animals exhibited lameness, reluctance to move, thickening of metatarsal, metacarpal rib and mandibular bones with the presence of palpable bony exostoses. Moderate to severe dental lesions were also observed in the majority of animals. Overall incidence of disease was 42.31%. The highest incidence (58.27%) was within 3 km distance which declined exponentially with the distance from the smelter. Biochemical examination of serum revealed significantly higher levels of alkaline phosphatase (22.08 ± 2.12 KA unit/dl), inorganic phosphorus (5.15 ± 0.24 mg/dl) and creatinine (1.88 ± 0.26 mg/dl) and decreased level of triiodothyronine (0.59 ± 0.14 ng/ml) in the affected animals than normal animals. Fluoride level in urine of affected cattle averaged 26.45 ± 3.28 ppm in the close vicinity of the smelter. Contamination of pasture from smelter smoke was considered to be the potential source of the fluoride intoxication.

Key words: Aluminium Smelter; Bovines; Fluoride intoxication; Industrial pollution.
Reprints: D Swarup, Indian Veterinary Research Institute, Izatnagar 243122, Uttar Pradesh, India.

EXPOSURES IN THE ALUMINA AND PRIMARY ALUMINIUM INDUSTRY
AN HISTORICAL REVIEW

G Benke, M Abramson and M Sim
Prahan, Victoria, Australia


We reviewed specific chemical exposures and exposure assessment methods relating to published and unpublished epidemiological studies in the alumina and primary aluminium industry. Our focus was to review limitations in the current literature and make recommendations for future research. Although some of the exposures in the smelting of aluminium have been well characterised, particularly in potrooms, little has been published regarding the exposures in bauxite mining and alumina refining. Past epidemiological studies in the industry have concentrated on the smelting of aluminium, with many limitations in the methodology used in their exposure assessment. We found that in aluminium smelting, exposures to fluorides, coal tar pitch volatiles (CTPV) and sulfur dioxide (SO2) have tended to decrease in recent years, but insufficient information exists for the other known exposures. Although excess cancers have been found among workers in the smelting of aluminium, the exposure assessment methods in future studies need to be improved to better characterise possible causative agents. The small number of cohort studies has been a factor in the failure to identify clear exposure-response relationships for respiratory diseases. A dose-response relationship has been recently described for fluoride exposure and bronchial hyper-responsiveness, but whether fluorides are the causative agent, co-agent or simply markers for the causative agent(s) for potroom asthma, remains to be determined. Published epidemiological studies
and quantitative exposure data for bauxite mining and alumina refining are virtually non-existent. Determination of possible exposure-response relationships for this part of the industry through improved exposure assessment methods should be the focus of future studies.

Key words: Aluminium industry; Industrial fluorosis; Lung-cancer mortality; Potroom workers; Respiratory symptoms.

Reprints: G Benke, Alfred Hospital, Monash Medical School, Department of Epidemiological and Preventive Medicine, Prahran, VIC 3181, Australia.

INVESTIGATION OF FLUORIDE ELIMINATION DURING A DIALYSIS SESSION

A Nicolay, P Bertocchio, E Bargas, F Coudore, G Alchahin and J P Reynier
Marseille, France

Abstract from Clinica Chimica Acta 275 (1) 19-26 1998

We have conducted a study of the elimination kinetics of fluoride ions by a log linear regression analysis of plasma levels obtained during a bicarbonate hemodialysis session, with a dialyzer in polymercaprin for six patients with chronic renal failure. Using plasma fluoride levels of 35 patients studied for 20 months, we have validated these kinetics for hemodialysis with sodium bicarbonate, acetate-free biofiltration, hemodiafiltration with low flow rate and other dialyzers. Our results show that the decrease in plasma fluoride levels is statistically significant only after the first hour, and the fall reaches approximately 30% after a 4 h dialysis session. We propose that post-dialysis measurements of plasma fluoride are now not necessary if levels before dialysis are known.

Key words: Hemodialysis; Kinetics; Plasma fluoride level; Vichy St-Yorre water.

Reprints: A Nicolay, Hopital St Marguerite, F-13009 Marseille, France.

pH-ALTERED INTERACTION OF ALUMINIUM AND FLUORIDE ON NUTRIENT UPTAKE, PHOTOSYNTHESIS AND OTHER VARIABLES OF CHLORELLA VULGARIS

L C Rai, Y Husaini and N Mallick
Varanasi, Uttar Pradesh, India

Abstracted from Aquatic Toxicology 42 (1) 67-84 1998

This study presents information on the pH-induced toxicity of AlCl₃, AlF₃, NaF and AlCl₃ + NaF on growth, nutrient uptake, photosynthesis, photosynthetic electron transport, enzymes of nitrogen and phosphorus metabolism and ATPase activity of Chlorella vulgaris. The interaction of AlCl₃ and NaF produced additive effect at pH 6.8, and synergistic at pH 6.0 and 4.5. It is suggested that phosphate restricts the entry of Al into the cell, while fluoride promotes it. AlF toxicity could be due to its interference with phosphate binding site of ATPase thereby arresting the release of energy.

Key words: Aluminum; Chlorella vulgaris; Fluoroaluminate; Infra-red spectroscopy.

Reprints: L C Rai, Banaras Hindu University Department of Botany, Varanasi 221005, Uttar Pradesh, India.
ANOMALOUS FLUORIDE IN GROUNDWATER FROM WESTERN PART OF SIROHI DISTRICT, RAJASTHAN AND ITS CRIPPLING EFFECTS ON HUMAN HEALTH

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Hyderabad, Andhra Pradesh, India

Abstract from Current Science 74 (9) 773-777 1998

Anomalously high concentration of fluoride (up to 16 ppm) has been observed in dug/tube well water, which is being used for drinking and irrigation purposes, around Palri, Andor and Wan villages, in western part of Sirohi district, Rajasthan. Fluoride concentration in groundwater is much higher than the permissible limit of 0.6-1.5 ppm of fluoride recommended for potable purposes. Water samples with more than 5 ppm fluoride are confined to Andor and Wan villages. Mottling is commonly observed in people of this area with a few cases of crippling fluorosis. Areas with such a high fluoride content require serious attention and remedial measures like setting up of large-scale defluoridation plant, use of simple domestic defluoridation methods and public awareness for preventing harmful diseases like fluorosis.

Key words: Fluorosis; Groundwater fluoride; Rajasthan, India.
Reprints: P B Maithani, AMD Complex, Department of Atomic Energy, Hyderabad 500016, Andhra Pradesh, India.

DEFLUORIDATION OF SEPTENTRIONAL SAHARA WATER OF NORTH AFRICA BY ELECTROCOAGULATION PROCESS USING BIPOLAR ALUMINIUM ELECTRODES

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Algiers, Algeria

Abstract from Water Research 32 (5) 1604-1612 1998

The purpose of this paper is to suggest an efficient defluorination process which does not require a big investment. For this, the electrocoagulation process with aluminium bipolar electrodes was used. In the first step, the influence of parameters such as inter-electrode distance, fluoride concentration, temperature and the pH of the solution, were investigated and optimized with synthetic water in batch mode. In the second step, the optimization process was continued with Oued Souf water (South Algeria) where the influence of the current density and the area/volume ratio on the defluorination process was evaluated. The electrocoagulation process with aluminium bipolar electrodes permitted the defluorination of Sahara water without adding soluble salts to the treated water. The aluminium-fluoride weight ratio attained 17/1.

Key words: Aluminium electrodes; Defluoridation; Drinking water; Electrocoagulation.
Reprints: N Mameri, Ecole Nationale Polytech Algeria, Department of Environmental Engineering, Biotechnical Laboratory, 10 Aver Pasteur, Algiers, Algeria.
PARENTS SATISFACTION WITH CHILDREN'S TOOTH COLOR – FLUOROSIS AS A CONTRIBUTING FACTOR

J A Lalumandier and G Rozier
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Abstract from Journal Of The American Dental Association 129 (7) 1000-1006 1998

The authors surveyed parents of 708 patients in a pediatric dental practice about their satisfaction with the color of their children's teeth and factors associated with their level of satisfaction. Overall, 43 per cent of parents were dissatisfied with their children's tooth color, and 78 per cent of children had a Tooth Surface Index of Fluorosis, or TSIF, score greater than 0. The worst TSIF score was the only factor associated with parent satisfaction.

Key words: Dental fluorosis; Parent satisfaction; Tooth color; Tooth Surface Index.

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CROSS-CULTURAL COMPARISON OF ATTITUDES AND OPINIONS ON FLUORIDES AND FLUORIDATION BETWEEN AUSTRALIA AND JAPAN

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Yokohama, Japan

Abstract from Community Dentistry And Oral Epidemiology 26 (3) 182-193 1998

This paper reports on two studies exploring similarities and contrasts in knowledge, attitudes and opinions on fluorides and fluoridation of two culturally different population groups. The first study compares the attitudes and opinions of parents of primary (elementary) schoolchildren in Melbourne, Australia, and Yokohama, Japan, and the second study compares the attitudes and opinions of dentists drawn from the same geographic areas. A self-administered questionnaire collected data on 517 parents and 629 dentists. The questionnaires were of similar design and content for both parents and dentists. They included a series of knowledge and attitudinal statements on preventive dentistry and use of fluorides. Attitudinal responses were measured on a 5-point agree-disagree Likert scale. Data were analyzed using both bivariate and multivariate techniques. Australian parents appeared better informed on the benefits of water fluoridation and held more favorable opinions on fluorides and fluoridation than their Japanese counterparts. Similarly, Australian dentists held more positive attitudes toward the use of fluorides and fluoridation than their Japanese peers. Cultural norms and experiences appear to shape parental attitudes, whereas the focus of dental education and dental practice on restorative treatments in Japan appears to be a substantial influence on the attitudes and opinions held by Japanese dentists.

Key words: Australia; Dental profession; Fluoridation; Fluoride use; Japan; Parents; Preventive Dentistry.

Reprints: A Tsurumoto, Tsurumi University, Department of Preventive Dentistry, Tsurumi Ku, 2-1-3 Tsurumi, Yokohama, Kanagawa 230, Japan.
APPLYING THE NATIONAL ASSOCIATION OF ENVIRONMENTAL PROFESSIONALS CODE OF ETHICS TO THE ENVIRONMENTAL PROTECTION AGENCY AND THE FLUORIDE IN DRINKING WATER STANDARD

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Abstract of paper presented at the National Association of Environmental Professionals 23rd Annual Conference, San Diego, California, June 20-26, 1998

As stated in the NAEP (National Association of Environmental Professionals) Code of Ethics and Standards of Practice for Environmental Professionals, the "keystone of professional conduct is integrity." This means, among other things, that professionals must be responsible for the validity of their work. This work must be conducted without "dishonesty, fraud, deceit or misrepresentation or discrimination." They must not put professional judgment aside in order to twist facts and/or conclusions to give a client, or a superior, a desired outcome. Further, professional integrity does not stop when a report is signed. There is a continuing responsibility for seeing that a report is not misrepresented by others, or altered to change its data or conclusions.

The National Federation of Federal Employees, Local 2050, representing all 1200 non-management professionals at the headquarters of the US Environmental Protection Agency (EPA), has attempted to incorporate a modified version of the NAEP code of ethics into their collective bargaining agreement with EPA. This paper explains the content of this proposal and the event that galvanized this effort - the November, 14, 1985 Federal Register notice setting a health-based standard for fluoride in drinking water.

The NAEP code required some modification to better clarify the role of professionals who provide analyses of issues in a regulatory context, in an agency run by politicians. Regulations require specific scientific endpoints to be defined. Politicians often require analyses that support politically acceptable solutions. This presents a serious dilemma in that professional ethics often take a back seat to political expediency. An enforceable code of ethics is needed to permit honest analysis for decision-making to surface from the professional staff without fear of intimidation or reprisal.

The need for a code of ethics at the Agency has been emphasized time after time since its inception in 1970. This need became critical, in the opinion of the leadership of the professionals' union, when EPA published the fluoride in drinking water standard in 1985. An investigation by the union revealed that scientific support documents for the health-based standard were invalid. Political decisions were found to have influenced and altered scientific conclusions.

Key words: Code; Environmental Protection Agency; Ethics; Fluoride in drinking water standard; National Association of Environmental Professionals.
Reprints: Dr Robert J Carton, 2455 Ballenger Creek Pike, Adamstown, MD 21710, USA.

* As of April 20, 1998, EPA professionals are represented by the National Treasury Employees Union (NTEU), Chapter 280.