

## ABSTRACTS

### DENTAL FLUOROSIS VS. IQ OF CHILDREN OF BAGALKOT DISTRICT, INDIA

#### RELATION BETWEEN DENTAL FLUOROSIS AND INTELLIGENCE QUOTIENT IN SCHOOL CHILDREN OF BAGALKOT DISTRICT

This study was conducted on 160 children, aged 7–11 years, in the Bagalkot district of Karnataka state, India, between August and October 2010, with the aim of determining if a relationship exists between the degree of dental fluorosis and scores on Intelligence Quotient (IQ) tests. Among 120 randomly sampled and examined children of the Bagalkot taluk (water fluoride = 0.5 ppm), 80 children without dental fluorosis were selected for the study. They were compared to a selection (based upon the presence of dental fluorosis) among 80 (of 150 randomly sampled and examined) children of the Hungund taluk (water fluoride 2.5–3.5 ppm). Intelligence testing was done using the Raven's Coloured Progressive Matrices. The following observations were derived from the data. The mean IQ score of children without dental fluorosis ( $76.36 \pm 20.84$ ) was significantly higher ( $P = 0.0019$ ) than that of children with dental fluorosis ( $66.62 \pm 18.09$ ). The mean IQ scores did not vary with the severity of dental fluorosis as classified by Dean's fluorosis index. It was also found that a higher percentage of children with dental fluorosis was in the "Extremely Low" and "Low" IQ categories, whereas a higher percentage of children without dental fluorosis was in the "Average" and "High Average" IQ categories. Table 1 of the paper reveals the largest effect among female children ( $64.36 \pm 19.94$  vs.  $78.29 \pm 17.36$ , with and without dental fluorosis, respectively;  $P = 0.0032$ ), whereas among males the effect was smaller ( $68.67 \pm 16.21$  vs.  $75.14 \pm 22.86$ ;  $P = 0.1285$ ). Previous studies have indicated decreased intelligence in children exposed to high levels of fluoride, and our study confirms such an effect.

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### TIME TO END WATER FLUORIDATION?

#### SLAYING SACRED COWS: IS IT TIME TO PULL THE PLUG ON WATER FLUORIDATION?

Water fluoridation continues to be a contentious public health policy. Recent moves to introduce schemes in England raise important questions about the use of evidence in public policy. Of particular concern is how evidence is used for public health policy-making purposes. This article reviews some of the key debates about water fluoridation and examines the way evidence has been promoted and used. The background to water fluoridation is discussed and also key ideas about how evidence influences policy. While traditionally the problem of evidence is characterised as one where policy makers either accept or reject evidence, a central concern of this article is where poor evidence is promoted by professionals and accepted by policy makers. The article then examines the evidence on the dental and biomedical effects of water fluoridation. Drawing on the idea of the 'Gold Effect' as defined below,<sup>1</sup> the article shows how deeply held beliefs by public health officials shape not only policy but

also the application of evidence by professionals and researchers to promote and implement it.

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**Editorial note:** <sup>1</sup>Named after Thomas Gold, this effect refers to the phenomenon “that a mere unqualified belief can occasionally be converted into a generally accepted scientific theory, through the screening action of refereed literature, of meetings organized by scientific organizing committees, and through the distribution of funds controlled by ‘club’ opinions.” (Kundt W. The Gold effect: odyssey of scientific research. In: Richter AK, editor. Understanding Physics. Katlenburg-Lindau, Federal Republic of Germany: Copernicus Gesellschaft e.V.; 1988. Available from: <http://arxiv.org/abs/astro-ph/9810059v1> and [http://arxiv.org/PS\\_cache/astro-ph/pdf/9810/9810059v1.pdf](http://arxiv.org/PS_cache/astro-ph/pdf/9810/9810059v1.pdf)

## UVB IRRADIANCE, VITAMIN D, AND FLUORIDE VS. DENTAL CARIES RISK

### A REVIEW OF THE ROLE OF SOLAR ULTRAVIOLET-B IRRADIANCE AND VITAMIN D IN REDUCING RISK OF DENTAL CARIES

Large geographical variations in dental health and tooth loss among US adolescents and young adults have been reported since the mid-1800s. Studies in the 1920s and 1930s noted that vitamin D and ultraviolet-B (UVB) irradiance reduced caries formation, the proposed mechanism being improved calcium absorption and metabolism. This paper reviews the history of studies of dental caries with respect to vitamin D, geographical location and available solar UVB doses. In addition, data on mean dental health rank by state for US servicemen from three periods, 1918, 1934 and 1943, were used in regression analyses with respect to summertime solar UVB doses and an index for mottled enamel, a proxy for natural fluoridation of drinking water, for 1935. There was a significant inverse correlation for dental health rank with respect to solar UVB from doses of 4.0 to 6.5 kJ/m<sup>2</sup> with little change thereafter. Adding data for mottled enamel rates for the states with UVB doses <6.6 kJ/m<sup>2</sup> improved the adjusted R<sup>2</sup> from 0.45 to 0.52. The mechanism whereby UVB reduces risk of dental caries is likely through production of vitamin D, followed by induction of cathelicidin and defensins, which have antimicrobial properties. Serum 25-hydroxyvitamin D concentrations at or above 30–40 ng/ml should significantly reduce the formation of dental caries. It is unfortunate that the UVB and vitamin D findings were not given more consideration in the 1950s as a way to reduce the risk of dental caries when water fluoridation was being promoted.

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