

THE FLUORIDE CONNECTION

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Fluoride and the Placental Barrier

Kaj Roholm, in his extensive investigation of fluoride intoxication in Danish cryolite workers published in 1937,¹ stated that he did not think that fluoride crossed the placental barrier. This opinion was based, primarily, on his failure to see fluorosis in the deciduous teeth of offspring. However, he was convinced that sufficient fluoride was passed through the milk of contaminated female workers to cause fluorosis of the anterior permanent teeth in their children.

W R Cox, in 1953, published his personal account of multiple problems in a commercially valuable, fur-producing chinchilla ranch that were traced to the high fluoride content of commercial animal feed.² In 1951, when the probable cause was first identified, the research physician and the chemist consulted from the University of Oregon Medical School did not hesitate to state that fluoride penetrated the placental barrier in these animals.

Fluoride and Fertility

One of the major problems encountered in the chinchillas concerned fertility. After changing to a diet low in fluoride there were increases in the number of offspring born, the number of litters, and the numbers born alive. The adult mortality rate decreased from 14.6% in 1951 to 3.3% in 1952. However, a number of abnormalities associated with the fluoride-contaminated feed were passed on through multiple generations.

It is of more than passing interest that although Cox found more than 1400 studies that demonstrated adverse effects of fluoride in animals, both wild and domestic, there was a profound lack of knowledge and interest in these findings and their implications for humans. This was especially true for possible soft tissue damage. Cox, a layman, was shocked by the fact that those professionals exhibiting this lack of knowledge and disinterest were, at that time, spearheading the campaign to fluoridate public water supplies.

Freni, in a 1994 review,³ noted decreased fertility in most animals studied. High doses (*i.e.* 430 ppm dietary fluoride in rats) showed anestrus with cumulative generational effects. This phenomenon, according to Freni's research, was first noted in 1933 and confirmed in 1984.

His paper presents multiple examples that led him to state, without equivocation, that fluoride "easily crosses the placenta."

Freni participated in the 1991 US Public Health Service review of the toxicity of fluoride⁴ and in the National Toxicology Program study that emphasised the "cancer paradigm" discussed in *Our Stolen Future*^{5*}. He was concerned about the implications of reproductive problems that were encountered. As a result, in 1991 he searched for reproductive studies that involved humans, but he found none.

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* Reviewed on pages 227-229.

It may come as a surprise that, after 46 years of fluoridation of drinking water, *no appropriate study had taken place on the effect of fluoride on the developing fetus or on the possible effect on human fertility.*

Freni, in a complicated study, compared the total fertility rate (TFR) in US counties having at least one water system with 3 ppm or more fluoride. He found a negative TFR/fluoride association that fitted the toxicity data on animals. He presented several theories to account for the lowered TFR: one, that fluoride lowers protein synthesis in osteoblasts; the other, that fluoride inhibits the adenylyl cyclase system in human spermatozoa.

Narayana and Chinoy referred in a 1994 paper⁶ to "the wide prevalence of infertility in the fluorosis-afflicted human population in India and other parts of the globe." In their study, mature rats were treated with sodium fluoride (10 mg/kg daily for 50 days). They found that fluoride interferes with androgenesis and adversely impaired the target organ structures. They suggested that the effect of fluoride may be on receptor sites, *i.e.* that fluoride may alter the concentration or configuration of the receptor, thereby inhibiting the action of testosterone. The similarity of this action to that of the hormone-disrupting chemicals, described in *Our Stolen Future*, is obvious.

Fluoride and the Brain

The 1991 review *Fluoride Benefits and Risks*, published by the USPHS,⁴ states that there is "relative impermeability of the blood-brain barrier to fluoride." No reference was made to studies concerning fluoride effects on the brain.

In their 1978 book *Fluoridation, the Great Dilemma*, Waldbott, Burgstahler and McKinney⁷ describe the findings of Soviet physicians that 79% of patients with occupational fluorosis demonstrate "dysfunction of subcortical axial non-specific structures of the brain."

Recent studies from China^{8,9} on the relationship between residence in endemic fluorosis areas in that country and IQ contain references and discussions dating to the 1980s. These Chinese studies indicate that the influence of a high fluoride environment on intelligence may occur early in development such as during the stages of embryonic life or infancy when differentiation and growth are more rapid. Ultramicroscopic study of embryonic brain tissue obtained from termination of pregnancy operations in endemic fluorosis areas showed "differentiation of brain nerve cells was poor, and brain development was delayed."⁹

The studies of Li *et al*⁸ (coal soot fluorosis) and Zhao *et al*⁹ (water supply fluorosis) compare the IQ status of children living in high-fluoride areas with that of children in low-fluoride areas whose mothers also resided in the same areas during gestation. A graph constructed from Li's data shows, in the high fluoride population, a flattening of the normal "Bell Curve" distribution of the IQ and a shift of the curve toward the low IQ (< 70 IQ) end compared to those in the low fluoride population (Figure 1). Data from Zhao's study shows the same IQ shift (Figure 3). Both studies demonstrate that IQ is lower in *all* age groups in the high-fluoride population compared to the low-fluoride population (Figures 2 and 4). This finding suggests neurological damage in early development, *i.e. in utero*.

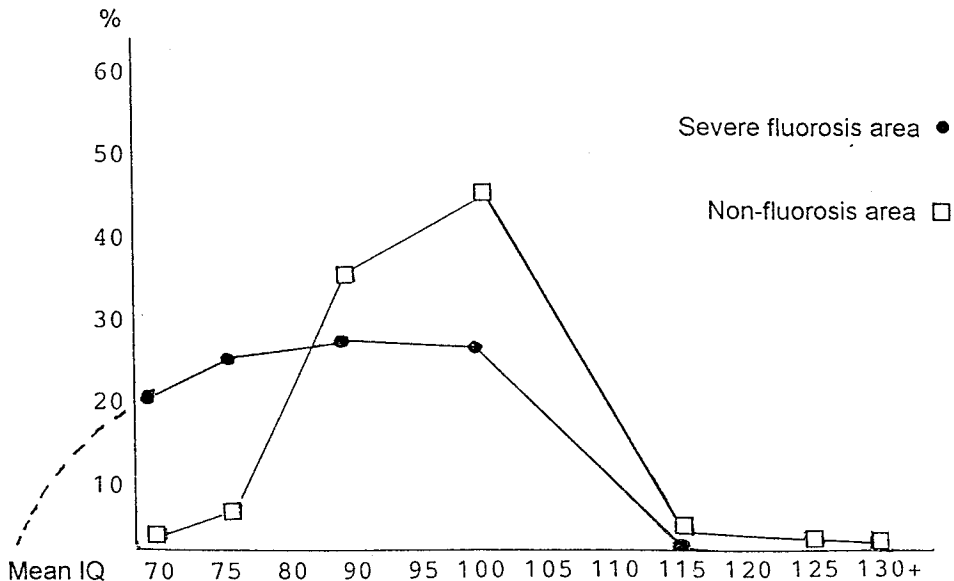


FIGURE 1. Distribution of child IQ scores [Li XS *et al. Fluoride 28* (4) 189-192 1995 Table 3] Note: In the "severe and medium" fluorosis areas high-fluoride coal is used as a domestic fuel for cooking, heating and drying grain. In the "slight or no" fluorosis areas there is no such custom. Dean DF Index was 3.2 in the "severe" area and <0.4 in the non-fluorosis area. From 230 to 224 children were studied in each area.

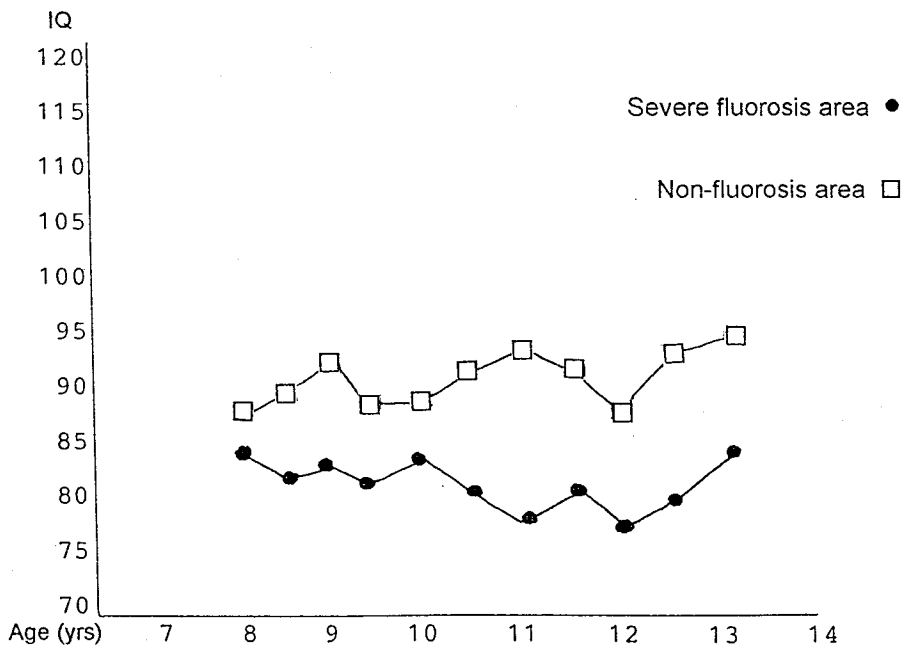


FIGURE 2. IQ of children of different ages in areas with high and low fluoride exposure [Li XS *et al. Fluoride 28* (4) 189-192 1995 Table 4]

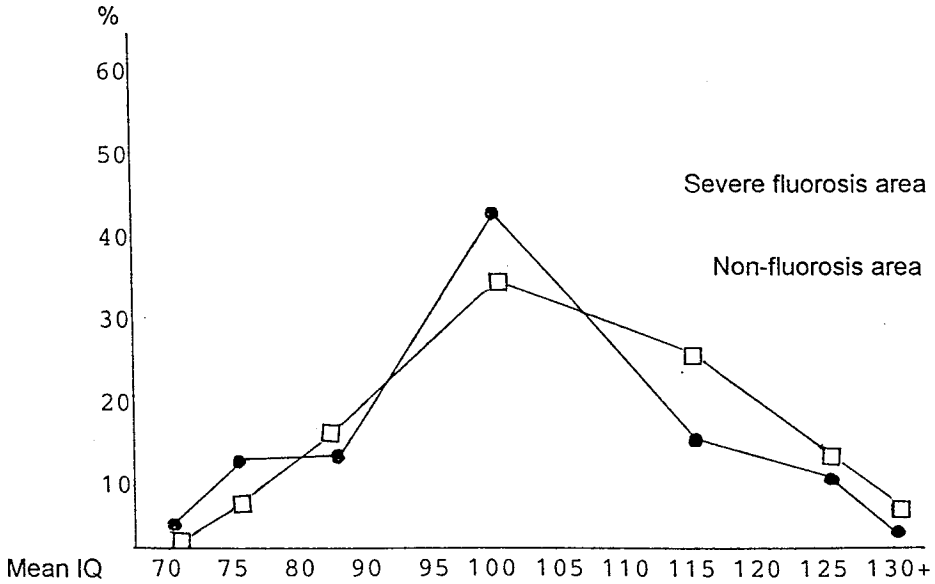


FIGURE 3. Distribution of child IQ scores [Zhao *et al. Fluoride* 29 (4) 190-192 1996 Table 2] Note: Study compares two villages: Sima with 4.12 mgF/L and Xinghua with 0.91 mgF/L in their water supplies.

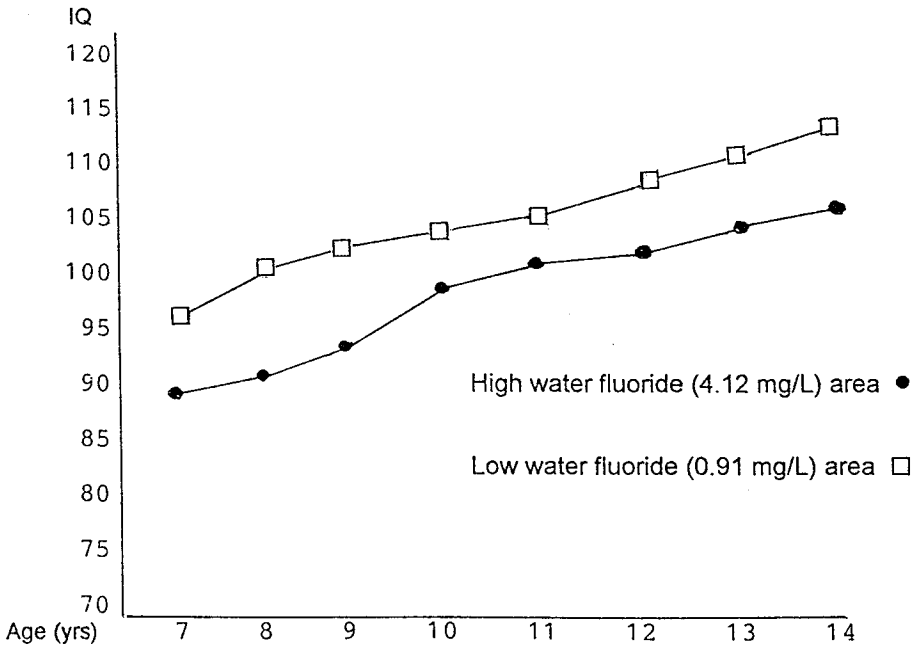


FIGURE 4. IQ of children of different ages in areas with high and low fluoride exposure [Zhao *et al. Fluoride* 29 (4) 190-192 1996 Table 3]

Other causes of lowered IQ appear to have been ruled out. These include: iodine deficiency; other congenital and acquired diseases; and cultural and ethnic differences. Dietary differences, which are known to play an important role in dental and skeletal fluorosis, were not specifically accounted for, although the authors mention "similar circumstances of material life."

These studies present evidence that, as with infertility, brain dysfunction is prevalent in endemic fluorosis areas in countries outside those that practise deliberate fluoridation of drinking water. But when the rising prevalence of dental fluorosis and the high dietary intakes of fluoride in fluoridated areas are considered, it may be said that large areas of endemic fluorosis have now been created in Canada, the US, and other fluoridated countries pursuant to the policies of their respective governments. How much responsibility can be attributed to fluoride for the infertility and behavioral problems addressed by the authors of *Our Stolen Future*?

Are fluoridated countries seriously looking for possible associations? It has already been noted that appropriate research into the association between fluoride and human reproductive problems was not undertaken until 1991, 46 years after the start of fluoridation. What is the status with regard to possible links with the signs and symptoms of brain dysfunction?

In 1995, the 50th anniversary of fluoridation in the US and Canada, Mullenix *et al* published a study of the neurotoxicity of sodium fluoride in rats.¹⁰ They state "This is the first laboratory study to demonstrate that CNS functional output is vulnerable to fluoride, that the effects on behavior depend on the age at exposure and that fluoride accumulates in brain tissue." The authors state further the "Experience with other developmental neurotoxins prompts expectations that changes in behavioral function will be comparable across species, especially humans and rats."

This study demonstrated generic behavioral pattern disruption that the authors point to as indicative of a potential for motor dysfunction, IQ deficits, and learning disabilities in humans. They also note that the plasma fluoride levels (0.059 to 0.640 ppm) in their rat model are similar to those reported in humans exposed to high levels of fluoride. In addition, they cite early Chinese studies and point out that high levels of fluoride in drinking water (*i.e.* 3 to 11 ppm) affect the nervous system directly without first causing physical deformities from skeletal fluorosis, currently used as the ultimate indicator of fluoride intoxication in discussions by proponents of fluoridation.

"Still unexplained," Mullenix *et al* continue, "is the possibility that fluoride exposure is linked to subtle brain dysfunction."

The characteristics of the latter and the implications for society are well described in *Our Stolen Future*, even though the causative agents named there are the hormone-disrupting chemicals.

Fluoride and “the Paradoxical Effect”

As already noted, *Our Stolen Future* emphasises the importance of the “paradoxical effect” in establishing the biological effects of toxins and, more particularly, the hormone-disrupting artificial chemicals. The authors credit Frederick vom Saal’s investigations, which began in 1976, with the demonstration of a “U-shaped” response curve for DES. This illustrates the “paradoxical response”; that is, the response *increases* for a time and then *diminishes* with even higher doses.

This phenomenon, in which a high dose may paradoxically cause *less* damage than a lower dose, was described in a 1964 article by Schatz, Schalscha and Schatz.¹¹ These authors showed that paradoxical effects are not isolated phenomena but are broadly operative and of widespread importance in the biochemistry and physiology of many living systems under many different conditions.

Schatz *et al* mention the different terms that investigators have used when they encountered this phenomenon. They describe the way in which conditioning leads investigators to think only in linear dose relationships, thereby leading them to attribute deviations to experimental error or experimental variability. Their paper illustrates that paradoxical effects are real, not artifacts. In their words, “Paradoxical effects have been produced by radiation, temperature, mutagenic and carcinogenic chemicals, fluoride, steroid hormones, dextran, detergents, trace metals, herbicides, fungicides, insecticides, germicides, antibiotics, drugs, and a host of other agents.”

It is noteworthy that fluoride is included in their list of chemicals that may produce a paradoxical effect. They show, as an example, the curve of inhibition of human prostatic acid phosphatase. “As the fluoride concentration is increased over a thousand-fold range, the extent of inhibition rises, attains a maximum that may approach 100%, and subsequently falls.” In a recent paper,¹² Schatz compared low-level fluoridation with low-level radiation: “The occurrence of paradoxical effects with low-level fluoridation and low-level radiation shows that there is no threshold level below which fluoride and radiation are harmless.”

Recognition of the importance of the paradoxical effect and the way in which research may be blinded by continued pursuit of the “linear dose relationship” and the “cancer paradigm” is essential if we are to determine the nature of *all* the elements that conspire to steal our future.

Conclusion

The similarities between the DES story, so well told in *Our Stolen Future*, and the story of the fluoridation of drinking water is striking. In both, numerous animal studies have been declared to be irrelevant. Both DES and fluoridation of water supplies have been shown to be without effect for the purposes claimed - the

prevention of miscarriage in the case of DES and of tooth decay in the case of fluoridation. DES continued to be prescribed for several decades after it had been discredited; fluoridation is being pushed now as hard as ever with the full support of governments, their public health services and professional organisations representing dentistry and medicine, especially pediatrics. The failure of the US Food and Drug Administration to act on DES is described in *Our Stolen Future*. This failure to act is repeated in the case of the human consumption of fluoride.

Is our future being stolen? Yes. There are many medical problems that can be attributed to the hormone-disrupting chemicals and other substances, including fluoride. Lowered fertility and increased brain dysfunction are two of these for which there is mounting evidence.

The message is clear. Action is required immediately. However, such action must be *inclusive*, not *selective*, as suggested in *Our Stolen Future*.

References

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