

Fluorosis and fraud in America: hiding the epidemic of dental fluorosis.

Doug Cross¹

24th November 2010

The Internet is buzzing with gossip over a new study on the prevalence of dental fluorosis in the USA, released by the US National Center for Health Statistics ². But if one were to believe what the authors of this paper report, one would gain a strong impression that dental fluorosis (DF) is not nearly as serious a problem as opponents of fluoridation claim.

But in fact, the data do not support the authors' claims. Far from DF being a minor side-effect of the practice of water fluoridation, the evidence reveals that DF has now reached epidemic proportions, and may eventually affect virtually every American drinking this deliberately contaminated water.

Impartial science, or political spin?

The first hint that the authors of this document are not exactly impartial comes from the bold text statement -

'Less than one-quarter of persons aged 6–49 had dental fluorosis.'

The authors then go on to explain that

Among persons aged 6–49, 16.0% had very mild fluorosis, 4.8% had mild fluorosis, 2.0% had moderate fluorosis, and less than 1% had severe fluorosis. For the remaining three-quarters of persons in this age group, 60.6% were unaffected by dental fluorosis and 16.5% were classified as having questionable dental fluorosis.

The immediate impression from the wording and narrative approach in the text is that the data show that there is no cause for concern - 'less than a quarter' is far less threatening than a clear and dispassionate 'up to 23%'.

But notice the curious difficulty that the authors have with basic arithmetic here. They say that 'For the remaining three quarters of persons in this age group, 66.6% were unaffected by dental fluorosis'. So in fact, only 45% of people were entirely 'unaffected', which leaves 55% who did have DF - now that is hardly compatible with the claim that 'Less than a quarter had dental fluorosis'!

Then there is the implicit, but utterly improper, assumption that all people in each age group were equally at risk of exposure to fluoridated water. They were not, as I shall show below, and the authors' attempts to compare the prevalence of DF in the entire population of American citizens in each relevant age group grossly inflates the sizes of the target groups. Including those who do have fluorosis in artificially enlarged groups that contain many members who were not at risk dilutes the evidence from those who were, and decreases the apparent prevalence of DF in groups that were actually exposed to fluoridated water.

This is a common method of obscuring alarming and inconvenient medical data, and if done deliberately constitutes scientific fraud. It is significant that in this publication the bad news is presented in a much smaller type-face after the initial upbeat statement has been splashed across the page.

Robust data, or misdirection?

Let's be quite clear about how the authors seem to be attempting to get us to react to their study. This improper claim that 'less than one-quarter of persons aged 6-49' had DF provides an easy option for lazy copywriters and journalists looking for a quick headline for tomorrow's news. It is deliberately designed to suggest that things aren't really too bad, because only a few people have this condition (even though the authors know that more than half actually do have it). Instead they imply that most of the people have only a trivial and non-threatening 'very mild' form of the condition. The message to the media is perfectly plain - there's nothing to worry about, so you guys can forget about looking into the story in depth - it's really not very interesting at all, so why not just go away and write about something else!

¹ Address for communication - maverick65@tiscali.co.uk

² Beltrán-Aguilar ED, Barker L and Dye BA. Nov 2010, Prevalence and Severity of Dental Fluorosis in the United States, 1999–2004 National Center for Health Statistics (<http://www.cdc.gov/nchs/data/databriefs/db53.pdf>)

Asking the right questions.

Well, in fact, there really is a story here, and it's a big one. But it's not the story that these authors really want to tell. The devil is, of course, in the detail, and the detail screams a very different story indeed. If one ignores the authors' comforting but misleading generalisation and takes a closer look at the basic data, a very much more alarming picture emerges.

So, having seen this sort of flummery often before, I decided to take a close look at the data themselves, using a rather more careful approach to look beyond the data to the actual context of the study.

How many Americans were actually at risk of fluorosis?

First, remember that this study makes a statement about the prevalence of DF amongst all Americans within specific age groups. Secondly, recall that DF is initiated by environmental exposure to fluoride during the first few years of life. So the first question to ask is not 'What proportion of Americans have dental fluorosis?' Instead, what we need to ask is 'What proportion of Americans who lived in fluoridated water areas during their childhood years went on to develop fluorosis?'

You may recall that this was the approach taken by Dr Elise Bassin when she re-examined her supervisor's data on fluoridation and osteosarcoma. And in exactly the same way, I found that the answers I was getting were entirely different to those that the authors claim to have found.

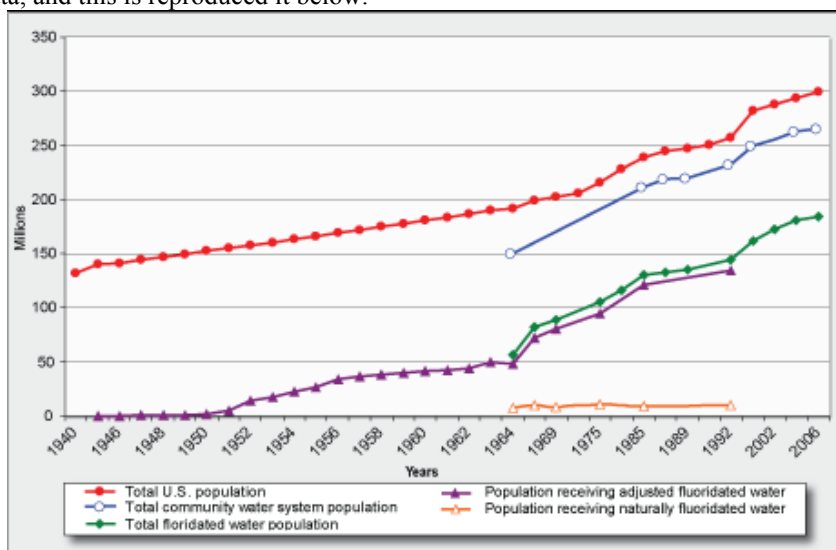
How many at risk?

The study describes the crude DF prevalence within the American population between the ages of 6 and 49, so we need to go back to 1960 to see what proportions of Americans in this age range were actually exposed to fluoridated water as children. There is no single value for the entire group, nor even for each sub-group - in fact, the proportion varies from almost none to around 60%.

Before around 1960 few communities were supplied with fluoridated water, so most Americans over 60 years of age are unlikely to have been at risk. But as the mania for fluoridation grew, more and more communities were fluoridated, and the proportion of the American population at risk over the last half century rose dramatically, and generalising about the prevalence of DF in the population of all people aged between 6 and 49 years is scientifically disreputable and entirely improper.

The historical records

The American National Center for Chronic Disease Prevention and Health Promotion (CDC) has published a chart³ containing the relevant data, and this is reproduced it below.



The chart shows the numbers of citizens of the USA and the numbers supplied with fluoridated water, from 1942 to 2006.

³ **Fluoridation Growth by Population, United States 1940–2006.** National Center for Chronic Disease Prevention and Health Promotion (<http://www.cdc.gov/nohss/FSGrowth.htm>)

There are a number of problems with this chart - the time-scale shown is curiously non-linear and erratic, whilst the record of the number of people exposed to naturally and artificially fluoridated water supplies is incomplete. However, it provides a rough summary of the historic data, sufficient to allow us to make at least a preliminary reappraisal of the study data.

The changing risk of childhood exposure to fluoride.

Taking the median values for each decadal age group as an indicator of the proportion actually exposed to fluoridated water, the chart shows that the proportion of people now over 60 years of age and who were also at risk of fluorosis through exposure in childhood is negligible, and virtually none of these people would ever have consumed water that had been artificially contaminated with fluoride.

But the chart suggests that approximately 60% of today's pre-teen children have been exposed to fluoridated water as infants or children, whilst around 57% of teenagers, 52% of 20-29 year olds, 46% of 30-39 year olds, and 31% of 40-49 year olds were at risk. Clearly, the raw data on which the authors of the latest CDC study have relied needs to be subject to considerable correction before the prevalence of fluorosis amongst those actually at risk during childhood can be assessed.

Revised estimates of the prevalence of fluorosis in at-risk individuals.

Older people. The 8.7% DF prevalence rate amongst the 40-49 year old group rises to approximately 28% once it is corrected for the relatively low coverage of fluoridated water areas that existed in the 1960s. As the spread of fluoridation increased, so more people became at risk. Amongst those who were teenagers in the 1986-7 survey, but who were in fact vulnerable as children during the 1970s, the corrected prevalence of fluorosis is in fact 22.6% / 0.46 - i.e., **49%**.

The prevalence of the most disfiguring forms of DF - moderate and severe - of 3%, as identified by the authors, rises after correction to **9.6%**. So **one in ten** Americans in their forties now have teeth that are so damaged by fluorosis that they require treatment by cosmetic dentists, just to hide the damage caused by this alleged cure for bad teeth. The acceptability of this supposed 'public health trade-off' has never have been negotiated with the informed consent of the target populations.

The thirty-somethings. The 1986-7 teenagers in this study were born in the late 1960s and early 1970s, and were in their mid-thirties at the time of this study. Since it is claimed that DF only develops in childhood and the teenage years, so its prevalence in this group of 30-39 year olds would be expected to be similar to that in the 40-49 year olds - i.e., around 28%.

But the corrected level of DF in this group as teenagers is 22.6% / 0.43, or **52%**. This is almost double that of the 40-49 year old age group. It suggests that the prevalence of DF may be rising rapidly, and that individuals may continue to develop more easily detected signs of DF during their thirties and forties, perhaps due to progressive deterioration of their poorer quality fluorosed tooth enamel.

Teenagers.

This sharp rise in the prevalence of DF is confirmed by other data in the study. The authors state that

In 1986–1987, 22.6% of adolescents aged 12–15 had dental fluorosis, whereas in 1999–2004, 40.7% of adolescents aged 12–15 had dental fluorosis. . . . The prevalence of very mild fluorosis increased from 17.2% to 28.5% and mild fluorosis increased from 4.1% to 8.6%. The prevalence of moderate and severe fluorosis increased from 1.3% to 3.6%.

In fact, as I have shown above, the corrected figure for all levels of fluorosis in the earlier set of teenagers is 52%. As only 57% of present day teenagers were actually at risk as children, the corrected prevalence for their group is not 40.7% as the authors claim, but 40.7% / 0.57, or **71%**. So fluorosis amongst American teenagers has risen by 36% in only a dozen years, and this appears to be a trend of increasing prevalence and severity in this group as its members get older.

The corrected prevalence of moderate and severe DF amongst the 1986-7 teenagers is 1.3% / 0.46, or **2.8%**, and of the later group of teenagers, is 3.6% / 0.52, or **6.9%**, an increase of 150% in a dozen years or so. So the base level of moderate and severe DF (2.8% in those born in the 1970s) appears to be rising at around 10% a year, within that 60% of the population as a whole that was actually fluoridated as children. This is a social and psychological disaster for young people at this emotionally vulnerable age.

If in addition, and as the data imply, the prevalence of DF in present-day teenagers continues to increase as they age, as it did in the 1986-7 group then within, at most, thirty years virtually all children living in fluoridated water areas of America may eventually develop some degree of dental fluorosis, with at least one in ten having the most severely disfiguring forms. This is an entirely different picture from that presented by the authors of the CDC study

Children. The last group of subjects in this study contains the 6-11 year olds, born during the 1990s. Of these, 33.4% had fluorosis at the time of the study, but only around 55% of them would have lived in fluoridated communities. So the prevalence of fluorosis in those children who were actually at risk during their critical years is not 33.4%, as claimed, but 33.4% / 0.55, i.e., closer to **60%**.

Why have the older children got more and worse fluorosis?

The present day teenagers in this study would be expected to show a higher prevalence of DF than the younger children. The larger permanent teeth emerge mainly during teenage years, and may show immediate signs of fluorosis on emergence, especially in its more severe forms. But some of the more obvious signs may only develop some years after emergence, and the prevalence and severity of DF appears to increase as the person gets older. This implies that the prevalence of DF in children in the 6-11 year old group in this study can also be expected to increase as they grow up, and that their fluorosis experience will be identical to that of the earlier group of teenagers included in this study.

Is the prevalence of DF accelerating?

The data disclosed in this study reveal a rapid recent rise in the prevalence and severity of DF, particularly amongst young people. The doubling of fluorosis amongst teenagers in the last dozen years or so has not been reflected in a comparable increase in the proportion of water supplies that are fluoridated - indeed this is actually levelling out at around 60%. So the continued increase in the prevalence of DF almost certainly reflects an escalating environmental contamination by other forms of fluoride.

The marked rise in the prevalence of the most severe form of DF in the last decade or two is of particular concern. Historically, severe fluorosis has always been a rare condition, and only associated with consuming natural water supplies that were grossly contaminated by geological sources of fluoride. At the beginning of the last century, only a handful of organo-fluorine compounds, all naturally occurring, were known. Now, over one million such compounds are manufactured commercially, and new products are being developed every day. Whilst dental products are a particular hazard, the attempts of pro-fluoridation proponents to blame the rise in DF on an increase in children swallowing fluoride toothpaste is stretching the bounds of credibility far beyond breaking point.

This is now clear evidence that excess exposure to environmental fluoride in all its forms has reached epidemic, and indeed, pandemic, proportions. Immediate action is needed to reverse the rapidly increasing risks of fluoride poisoning to the general public. DF is the only reliable visible sign that a person has been over-exposed to fluoride in childhood - but that does not mean that those who do not have DF do not also have fluoride overload. Once individuals grow beyond the critical childhood period when their new teeth are developing, there is simply no mechanism whereby the condition can be easily observed.

The CDC study in context

This latest study unwittingly provides startling evidence of just how far down the road to universal fluoride poisoning America has travelled. But similar evidence is emerging from all other countries where this discredited practice is still imposed on a generally hostile and non-consenting public. In every such country improper statistical techniques are routinely used to manipulate inconvenient data, in order to lend a spurious appearance of safety and efficacy that is designed to conceal the true impact of fluoride overload within highly heterogeneous and vulnerable populations. The results are seized upon indiscriminately by both pro- and anti-fluoride campaigners, in efforts to promote the public image of their particular points of view. The result is the chaotic argument and debate that is evident worldwide today.

If publications are permitted to be released without adequate independent peer review, the interminable and tedious debates over the supposed merits of universal chronic mass fluoride poisoning will continue unabated. The confusion and reluctance of those in authority to take a positive stand to implement the Precautionary Principle, despite the overwhelming evidence against water fluoridation, permits autocratic governments to impose a totally improper and damaging regime on their unwilling but powerless subjects.

I have provided here an extremely simple initial examination of the data released by these authors, in the hope that others more expert than I may make a more critical professional review of the data. A similar approach to the analysis of equally contentious data sets, derived from studies on populations in other countries where fluoridation is still practised, is long overdue. The results are almost certain to confirm that the conclusions that I have drawn in this review are likely to be replicated elsewhere.

Only when the intrinsic value of information is recognised in its own right, and treated with the respect and propriety that is necessary to profit from its collection, can science be seen to be playing its true role in modern society. The deliberate mis-application of scientific principles to uphold entrenched opinion, in whatever field, can only be regarded as scientific fraud, and should never be tolerated.