

The York Review of Water Fluoridation – Key Points for the Busy Practitioner

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Since its serendipitous discovery by McKay at the turn of the century, the story of fluoride in drinking water has arguably been a case of scientific progress for public good, on the one hand, and energetic resistance by minority pressure groups, on the other. In other words, what Lord Jauncey famously referred to as hostility to fluoridation obscuring scientific judgement.¹ In the middle there is arguably a less engaged general population² and decision makers seeking to act in their best interests but concerned at the extreme views held by a vocal minority.

Water fluoridation in the UK has seen great benefits for those resident in the schemes developed since the mid 1960s, mainly in the West Midlands and the North East, but many areas with high levels of dental caries remain excluded. Tackling this problem has not been helped by perceived failings in the Water Industry Act. The current government came to power with promises to take the public health agenda forwards on a number of fronts and their actions in regard to water fluoridation will be a part of fulfilling this promise. An intention to progress the issue was announced in the 1998 public health green paper³ and the NHS Centre for Reviews and Dissemination at the University of York was commissioned to undertake a systematic review of

the evidence surrounding water fluoridation, this being announced in the 1999 public health white paper.⁴ The report appeared in draft form in July 2000 and has now appeared in final form⁵ and as papers in the British Medical Journal.⁶⁻⁸ The review has been conducted in an open manner through the York website and the advisory panel included both dental academics and three prominent anti-fluoridationists, namely the President and two Vice-Presidents of the National Pure Water Association. The process thus appears to be a model for how potentially contentious scientific issues might be reviewed in the future.

DOES WATER FLUORIDATION PREVENT DENTAL CARIES?

Overall, evidence from 26 studies was taken into account for this aspect of the report and confirmed a reduction in the incidence of dental caries in areas where the water supply was fluoridated. In numerical terms, this represented an average reduction of 2.25 decayed, missing and filled teeth per child and an associated 15% increase in the proportion of children who were caries free. It is estimated that one extra person will be caries free, for every six people who receive fluoridated water. Naturally, communities that will receive the greatest benefit are those where the caries levels are highest.

The review considered the impact of fluoridated toothpaste in the 1970s on the effectiveness of water fluoridation. Ten studies were considered, all dating

since 1974. These showed that, although fluoridated toothpaste reduced the difference in baseline caries between fluoridated and non-fluoridated areas, water fluoridation reduced the caries levels still further.

It is well known that inequalities in dental caries exist related to social deprivation. The report examined the evidence from those UK studies with adequate deprivation data and found that water fluoridation appeared to reduce these inequalities. Although it was not possible to confirm this reduction in all age groups due to lack of available data, 5-year and 12-year-old children from deprived groups appeared to benefit, despite starting with higher average levels of decay than their less deprived counterparts.

These findings are however based on a smaller number of studies than the authors would have liked and the studies examined did not give a consistent value to the amount of benefit achieved. This is because many other studies were rejected on the strict scientific criteria used by the team. The overall message, however, is still that water fluoridation confers benefit, even if fluoridated toothpaste is already in use by the target population.

DOES WATER FLUORIDATION CAUSE ILL HEALTH?

The review team considered a number of studies which have looked at so-called 'negative' effects of fluoridation. The majority of studies concerned enamel mottling but other conditions were also looked at. On fluorosis they found that there was

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some evidence that water fluoridation at the currently accepted optimum level will result in a rise in enamel mottling. The degree to which this happens and whether this is dentally important is still unclear, there being a lack of consensus between different studies. When considering mottling which is noticeable or 'likely to be of aesthetic concern', it appears that any increase in risk associated with water fluoridation is likely to be small. This finding is hindered by the relatively small numbers of studies and the difficulties in separating out mottling due to fluoride and mottling due to other reasons. The best estimate that can be arrived at is that around 48% of the population will have some measurable (but not necessarily noticeable) fluorosis at 1 ppm and around 12% will have noticeable fluorosis, though these estimates are not precise. This finding, whilst not to be ignored, has to be balanced against the benefits of water fluoridation. A smaller number of studies looked at bone fracture, bone development and cancer. Some studies showed a negative effect, others a positive effect (less disease) and the research team concluded that there was generally no convincing evidence either way. Interestingly, it appears that there is some evidence of reduced risk of hip or spine fracture in older white women who have had long term exposure. Whilst there were isolated studies of other conditions such as dementia and birth defects, none was of a high enough quality to allow firm

conclusions to be drawn.

WHAT HAPPENS NEXT?

Despite the findings overall supporting water fluoridation, this review has emphasized the shortage of high quality studies. This is partly because the majority of research was carried out 3 or 4 decades ago, to the scientific standards pertaining at the time, and the situation is worse for mottling studies than for caries. It seems worth pursuing the dental effects (caries and mottling) further, through new studies incorporating contemporary research methods, particularly as recent UK studies suggest that the prevalence of fluorosis in UK fluoridated areas is far lower than the York review concludes. The potential impact on reducing hip and spine fractures might also be worth pursuing in the longer term, given the relatively high incidence of this condition. The anti fluoride lobby have predictably criticized the findings of the report, saying that evidence of harmful effects (i.e. poor quality studies and conjecture) was rejected by the review team. This report is another blow (if one was needed) to their credibility though logic never was their watch-word. The involvement of three members of the NPWA in a review that has supported water fluoridation must have left them in some disarray. The government has welcomed the report and has said that it will now take up discussions both with the Medical Research Council (to

look at what new studies are needed) and water companies and local authorities to see how new schemes might be implemented. In the 1999 public health white paper,⁴ the government stated that responsibility for ensuring public consultation is likely to pass from health authorities to local authorities and that legislation will be introduced to take private water companies out of the decision-making process. Progress is therefore expected on two fronts. Let's all hope it doesn't take too long.

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Self-Assessment Answers

- | | |
|------------|-------------|
| 1. A, B, D | 6. B, C, D |
| 2. C | 7. B, D |
| 3. A, B | 8. D |
| 4. B, C, D | 9. A, C |
| 5. A, B | 10. A, C, D |