

Summary of: An alternative marker for the effectiveness of water fluoridation: hospital extraction rates for dental decay, a two-region study

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FULL PAPER DETAILS

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Refereed Paper

Accepted 16 December 2013

DOI: 10.1038/sj.bdj.2014.180

British Dental Journal 2014; 216: E10

Background Contemporary evidence for the effectiveness of water fluoridation schemes in the UK is sparse. The utility of routinely collected data in providing evidence warrants further research. **Objectives** To examine inpatient hospital episodes statistics for dental extractions as an alternative population marker for the effectiveness of water fluoridation by comparing hospital admissions between two major strategic health authority (SHA) areas, the West Midlands SHA – largely fluoridated – and the North West SHA – largely unfluoridated. **Method** Hospital episodes statistics (HES) were interrogated to provide data on admissions for simple and surgical dental extractions, which had a primary diagnostic code of either dental caries or diseases of pulp and periapical tissues for financial years 2006/7, 2007/8 and 2008/9. Data were aggregated by SHA area and quinary age group. Directly standardised rates (DSR) of admissions purchased for each primary care trust (PCT) were calculated and ranked by index of multiple deprivation (IMD). **Results** A significant difference in DSRs of admission between PCTs in the West Midlands and North West was observed (Mann-Whitney U test [$p < 0.0001$]) irrespective of IMD ranking. The difference in rates between the two most deprived PCTs was 27-fold. **Conclusions** After ranking by IMD, DSRs of hospital admissions for the extraction of decayed or pulpally/periapically involved teeth is lower in areas with a fluoridated water supply. The analysis of routinely collected HES data may help identify the impact of water fluoridation schemes.

EDITOR'S SUMMARY

Each year, dihydrogen monoxide (DHMO) is a known causative component in many thousands of deaths and is a major contributor to damage to property and the environment (<http://www.dhmo.org>). Just a few of the many known perils of DHMO are:

- Death due to accidental inhalation, even in small quantities.
- Prolonged exposure to solid DHMO causes severe tissue damage.
- Gaseous DHMO can cause severe burns.
- Leads to corrosion of many metals.

Good old, wet and wonderful dihydrogen monoxide! This is an old joke I know but it goes to prove a point. Evidence is important; research results are important but perhaps more important still is the discerning interpretation of the results. It is this interpretation that leads to effective policies and decisions.

For example, this paper provides further valuable evidence that water fluoridation is a cost-effective method of reducing dental decay in children. Indeed it shows that

water fluoridation is capable of a 27-fold reduction in the rate of hospitalisations of children for dental extraction in the most deprived areas of the UK.

However, the invaluable understanding of evidence such as this is often ignored by those in opposition to water fluoridation. Somehow it is the misleading messages about the dangers of high concentrations of fluoride that make it to the public arena. Obviously there is a valid ethical argument here concerning the balancing of individual rights. Yet the subtleties of this plausible debate are often lost in a fit of panic-inducing hyperbole and fallacious interpretation of the evidence. Somehow this is not countered successfully by the wealth of research evidence and knowledgeable expertise in support of water fluoridation.

Chlorine is added to public water supplies to kill disease-causing bacteria. This is something that the majority of people would not do without. Why not then adjust the level of fluoride in public water to mitigate against dental caries – disease-causing bacteria? In my experience, many

people in the UK already think that their water is fluoridated where it is not, and they are perfectly happy about it. In fact, they sometimes become indignant when they realise it isn't fluoridated and they are not receiving the benefits!

It seems to me that we need more decision makers who are trained to understand and interpret the evidence, and to communicate it effectively. In the UK parliament, for example, out of 650 MPs about 1% are dentists or doctors; 0.2% have worked in scientific research and just 7% have a higher degree in a science subject or have any experience working in a science/engineering field. As scientists and healthcare professionals we tend to *advise* on policy. Perhaps more of us need to ensure that we, or our colleagues, are in positions where we *decide* on policy.

The full paper can be accessed from the *BDJ* website (www.bdj.co.uk), under 'Research' in the table of contents for Volume 216 issue 5.

Ruth Doherty
Managing Editor

DOI: 10.1038/sj.bdj.2014.160

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IN BRIEF

- Demonstrates the usefulness of routinely collected hospital episodes data in assessing child oral health.
- Suggests a method that can be readily and inexpensively replicated.
- Highlights that even when deprivation is taken into account, when comparing West Midlands with the North West, 0-19-year-olds in unfluoridated areas appear to experience a greater rate of extractions than those in fluoridated areas.

COMMENTARY

Two thoughts come to mind on reading this paper. Firstly, general anaesthesia for the extraction of teeth in children must surely represent the ultimate failure in dentistry. Many adults who are anxious about dentistry attribute this fear to an adverse dental experience in childhood and those who have experienced a general anaesthetic for tooth removal as a child will do doubt remember it like it was yesterday. Secondly, water fluoridation is effective in preventing dental caries, yet despite a commitment to pursue water fluoridation in a 1998 White Paper, no new fluoridation schemes have been introduced in England in the last 30 years.

The data presented in this analysis demonstrate differences in the rates of general anaesthesia for tooth extraction in two strategic health authority (SHA) areas in the North of England – the West Midlands, whose 3.4 million residents have benefited from water fluoridation for approaching half a century and the North West SHA, which is not fluoridated. The key finding can be summarised as follows. The directly standardised relative rate of general anaesthesia in Liverpool was 27 times that in Birmingham, even though these cities were only one place apart when ranked by the Index of Multiple Deprivation. The authors go on to estimate that the cost savings accruing to the West Midlands SHA over one year was in the order of four million pounds in avoided extractions – and this calculation ignores the fact that the population in the West Midlands was one third smaller than that in the North West.

There are of course some limitations to ecological studies using routine data, such as that reported here and these are

acknowledged by the authors. It is possible that not all dental general anaesthesia is captured by the Hospital Episode Statistics database. Coding errors are also a possibility with routine data and referral for extraction under general anaesthesia can be influenced by the availability of local specialist paediatric services and alternatives to general anaesthesia.

However, the large numbers involved in this study suggest that despite these methodological and other constraints, there can be little doubt that water fluoridation can play a very significant part in alleviating the misery of a dental general anaesthesia in children, particularly in the case of those in the most disadvantaged circumstances who are at greatest risk of dental decay.

Professor Ivor G. Chestnutt
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AUTHOR QUESTIONS AND ANSWERS**1. Why did you undertake this research?**

Access to information from the national dental epidemiology programme provides a huge advantage in being able to regularly assess levels of dental disease and other conditions. Assessing population oral health through examining the impacts in terms of treatment can be more challenging, although in children we can make more valid assumptions about the reasons for missing and filled teeth. We were interested in seeing if there were other ways of assessing child oral health by looking at hospital episode statistics, particularly as all general anaesthesia is now carried out in hospital environments. This research was undertaken to see if there was an effective and relatively cheap way of assessing population oral health using contemporary data to look at an alternative marker that is not assessed as part of the NHS dental epidemiology programme and to see if such analyses demonstrated any putative oral health benefit in fluoridated *versus* unfluoridated areas, having taken relative deprivation into account.

2. What would you like to do next in this area to follow on from this work?

The next stage would be to better understand the demographics of the patient base experiencing the extractions, the numbers of teeth affected in each patient, the recording and coding practices undertaken in hospitals and to assess the impact of other services such as salaried primary dental care services. Whilst this analysis in general matched the picture that we get from the NHS dental epidemiology programme, it is possible that this might not apply in all areas due to local variations in the recording and coding of cases. This research has implications for the commissioning of services as well as assessing the impact of dental disease.