

# Critique of the review of 'Water fluoridation for the prevention of dental caries' published by the Cochrane Collaboration in 2015

IN BRIEF

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adequacy of study design and risk of bias. The potential benefits of using wider criteria in order to achieve a fuller understanding of the effectiveness of water fluoridation are discussed.

## INTRODUCTION

The Cochrane Review on water fluoridation

water fluoridation (artificial or natural) on the prevention of dental caries, and (ii) to evaluate the effects of water fluoridation (artificial or natural) on dental fluorosis. The authors concluded that the initiation of water fluoridation results in reductions in caries which translate into a 35% reduction in primary teeth and a 26% reduction in permanent teeth, with an increase of 15% in the percentage of children free of decay experience in primary teeth and an increase of 14% in the percentage of children free of decay experience in permanent teeth. However, they found that there was very little recent or contemporary evidence, meeting the Cochrane Review's inclusion criteria, that has evaluated the effectiveness of water fluoridation for the prevention of dental caries. They said that around 70% of the studies they reviewed pre-dated the introduction of fluoride-containing toothpaste in the mid to late 1970s. They also reported that there is insufficient evidence to determine whether water fluoridation results in a change in disparities in caries levels across socio-economic status (SES) groups (although this was not a stated review objective). The authors did not identify any evidence, meeting the Review's inclusion criteria, to determine the effectiveness of water fluoridation for preventing caries in adults; they argued that there was insufficient information to determine the effectiveness of water fluoridation for preventing caries in children.

The purpose of this critique is to examine the methods and assumptions used in the 2015 Cochrane Review and to put the Review into context in the wider body of evidence regarding the effectiveness of water fluoridation. While the overall conclusion that water fluoridation is effective in caries prevention is consistent with previous reviews, many important public health questions could not be answered by the Cochrane Review because of the restrictive inclusion criteria used to judge adequacy of study design and risk of bias. The potential benefits of using wider criteria in order to achieve a fuller understanding of the effectiveness of water fluoridation are discussed.

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agents at an individual-level (such as fluoride-containing toothpastes) and, commonly, these trials last for three years so that three year caries incidence and increments in intervention and reference groups may be compared. However, trials follow the same individuals, whereas the studies included in the Cochrane Review almost always follow the same communities. The authors of the Cochrane Review infer that, in a non-randomised trial, recording caries experience in both communities before commencement of water fluoridation and finding similar caries experience in the two communities before water fluoridation, the communities would remain similar over time. This is surprising, since the Cochrane Review inclusion criterion stipulates that the baseline examination should be within three years of implementation of water fluoridation: an acknowledgement that the communities may, mainly through population change, lose comparability after three years. While this assumption

on four possible confounding factors be recorded and included in analyses: 'sugar consumption/dietary habits, SES, ethnicity, and use of other fluoride sources.' The

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Declarations of interest

AJRG was a member of the MRC (UK) working group on water fluoridation and health and is a trustee of The Borrow Foundation. AJG is a member of the Australian Government Department of Health, Nutritional Reference Values Fluoride Expert Working Group and the National Health and Medical Research Council Fluoride Reference Group. HPW is Principal Investigator of the FACCT study funded by the Irish Health Research Board and is an evaluation of the impact of changes in the policy on children's oral health in Ireland. She is an independent advisor to the British Fluoridation Society. CJ is a member of the British Fluoridation Society, the Cochrane Oral Health Group and commented on the Cochrane review protocol. JFB is vice-chairman, British Fluoridation Society. PC is a communications adviser to the National Alliance for Equity in Dental Health and the British Fluoridation Society. PVC was Chief Dental Officer for Canada. JJ is President, American Fluoridation Society. MPK is co-investigator on the CATFISH study of a water fluoridation scheme in Cumbria. MAL was a member of the Advisory Panel for the York Review, a member of the MRC Expert Group and formerly Chair of the British Fluoridation Society. JMcG is manager, Fluoridation Activities, American Dental Association. DO'M is a member of the Irish Expert Body on Fluorides and Health. PPS is the President, Ontario Association of Public Health Dentistry. WMT was a member of the panel which produced the Royal Society of New Zealand report on community water fluoridation. SMW works for The Borrow Foundation. SPZ is Chief Dental Officer with Israeli Ministry of Health. The other authors declare no interests.

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