

Evaluation of water fluoridation scheme in Cumbria: the CATFISH prospective longitudinal cohort study

Michaela Goodwin,^{1*} Richard Emsley,²
Michael P Kelly,³ Matt Sutton,⁴ Martin Tickle,¹
Tanya Walsh,¹ William Whittaker⁴ and Iain A Pretty¹

¹Division of Dentistry, Faculty of Biology, Medicine and Health, The University of Manchester, Manchester, UK

²Department of Biostatistics and Health Informatics, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, UK

³Department of Public Health and Primary Care, University of Cambridge, Cambridge, UK

⁴Division of Population Health, Health Services Research and Primary Care, The University of Manchester, Manchester, UK

*Corresponding author michaela.goodwin@manchester.ac.uk

Declared competing interests of authors

Full disclosure of interests: Completed ICMJE forms for all authors, including all related interests, are available in the toolkit on the NIHR Journals Library report publication page at <https://doi.org/10.3310/SHMX1584>.

Primary conflicts of interest: Richard Emsley reports membership of the National Institute for Health and Care Research (NIHR) Clinical Trials Unit Standing Advisory Committee (2020 to present) and the Health Technology Assessment Clinical Evaluation and Trials Committee (2017–21). Michael P Kelly reports consultancy fees (included within grants) from the NIHR, Arts and Humanities Research Council (Swindon, UK) and Marie Curie (London, UK). He is also a co-investigator for Dunhill Medical Trust (London, UK) and Wellcome (London, UK), and is board member for the Scientific Advisory Board of the System Science in Public Health and Economic Research Consortium, funded by the UK Prevention Partnership (Sheffield, UK). Matt Sutton reports membership of the Health and Social Care Delivery Research (HSDR) Funding Committee (2012–21), HSDR Committee (2018–21), HSDR Researcher-Led Board (2012–16) and HSDR NHS 111 Online Sub-Board (2012–20). Martin Tickle reports grants from NIHR and honorarium from the University of Adelaide (Adelaide, SA, Australia) the University of Sydney (Sydney, NSW, Australia) and the University of Western Australia (Perth, WA, Australia) as a PhD examiner. Iain A Pretty reports funding from Colgate-Palmolive Company (New York, NY, USA), grants from NIHR and editorial board member payments from Wiley-Blackwell (Hoboken, NJ, USA). As applicants on this grant, all authors had payments from NIHR made to the institution at which they worked.

Published November 2022

DOI: 10.3310/SHMX1584

Plain English summary

CATFISH study

Public Health Research 2022; Vol. 10: No. 11

DOI: 10.3310/SHMX1584

NIHR Journals Library www.journalslibrary.nihr.ac.uk

Plain English summary

Tooth decay is the most common disease of childhood, and tooth extraction due to decay is the main reason why children have a general anaesthetic in hospital. It is known that fluoride can prevent tooth decay and can be provided via the water. Research in the USA and UK in the 1940s/50s showed that water fluoridation produced dramatic falls in tooth decay. However, the introduction of fluoride toothpaste in the 1970s also caused large reductions in dental decay.

We undertook a study in Cumbria to see if water fluoridation, reintroduced in 2013, was still useful in reducing tooth decay and if it represented good value for money. We recruited a group of children at birth from September 2014 to September 2015 (referred to as the birth cohort). In addition, a second group of children who were turning 5 years old in 2013–14 were recruited from primary schools (referred to as an older school cohort). We followed the birth cohort until age 5 years and followed the older school cohort until age 11 years, and measured whether or not the younger children had any obvious dental decay in their baby (milk) teeth and the older children had decay in their permanent (adult) teeth. We compared levels of decay in children living in areas with fluoridated water and in children living in areas without fluoridated water.

We found that, in the case of the children followed since they were born, fluoridation did make a modest difference, with 4% fewer children who drank fluoridated water having obvious decay in their baby teeth. Although a difference of a similar size (3%) was seen in children in the older school cohort, where we looked at the permanent teeth, there was not enough evidence to determine if this difference was achieved by chance. For both groups of children, fluoridated water was likely to represent value for money.

The 4% difference we found may not be large enough to convince communities to support water fluoridation schemes. Other ways of preventing tooth decay may be better now that use of fluoride toothpaste is so common and levels of tooth decay are much lower than they were 40 years ago.

Public Health Research

ISSN 2050-4381 (Print)

ISSN 2050-439X (Online)

Public Health Research (PHR) was launched in 2013 and is indexed by Europe PMC, NCBI Bookshelf, DOAJ, INAHTA and Ulrichsweb™ (ProQuest LLC, Ann Arbor, MI, USA).

This journal is a member of and subscribes to the principles of the Committee on Publication Ethics (COPE) (www.publicationethics.org/).

Editorial contact: journals.library@nih.ac.uk

The full PHR archive is freely available to view online at www.journalslibrary.nih.ac.uk/phr.

Criteria for inclusion in the *Public Health Research* journal

Reports are published in *Public Health Research* (PHR) if (1) they have resulted from work for the PHR programme, and (2) they are of a sufficiently high scientific quality as assessed by the reviewers and editors.

Reviews in *Public Health Research* are termed 'systematic' when the account of the search appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.

PHR programme

The Public Health Research (PHR) programme, part of the National Institute for Health and Care Research (NIHR), is the leading UK funder of public health research, evaluating public health interventions, providing new knowledge on the benefits, costs, acceptability and wider impacts of non-NHS interventions intended to improve the health of the public and reduce inequalities in health. The scope of the programme is multi-disciplinary and broad, covering a range of interventions that improve public health.

For more information about the PHR programme please visit the website: <https://www.nih.ac.uk/explore-nihr/funding-programmes/public-health-research.htm>

This report

The research reported in this issue of the journal was funded by the PHR programme as project number 12/3000/40. The contractual start date was in October 2013. The final report began editorial review in September 2021 and was accepted for publication in May 2022. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The PHR editors and production house have tried to ensure the accuracy of the authors' report and would like to thank the reviewers for their constructive comments on the final report document. However, they do not accept liability for damages or losses arising from material published in this report.

This report presents independent research funded by the National Institute for Health and Care Research (NIHR). The views and opinions expressed by authors in this publication are those of the authors and do not necessarily reflect those of the NHS, the NIHR, the PHR programme or the Department of Health and Social Care. If there are verbatim quotations included in this publication the views and opinions expressed by the interviewees are those of the interviewees and do not necessarily reflect those of the authors, those of the NHS, the NIHR, the PHR programme or the Department of Health and Social Care.

Copyright © 2022 Goodwin *et al.* This work was produced by Goodwin *et al.* under the terms of a commissioning contract issued by the Secretary of State for Health and Social Care. This is an Open Access publication distributed under the terms of the Creative Commons Attribution CC BY 4.0 licence, which permits unrestricted use, distribution, reproduction and adaptation in any medium and for any purpose provided that it is properly attributed. See: <https://creativecommons.org/licenses/by/4.0/>. For attribution the title, original author(s), the publication source – NIHR Journals Library, and the DOI of the publication must be cited.

Published by the NIHR Journals Library (www.journalslibrary.nih.ac.uk), produced by Prepress Projects Ltd, Perth, Scotland (www.prepress-projects.co.uk).

NIHR Journals Library Editor-in-Chief

Dr Cat Chatfield Director of Health Services Research UK

NIHR Journals Library Editors

Professor John Powell Consultant Clinical Adviser, National Institute for Health and Care Excellence (NICE), UK, and Professor of Digital Health Care, Nuffield Department of Primary Care Health Sciences, University of Oxford, UK

Professor Andrée Le May Chair of NIHR Journals Library Editorial Group (HSDR, PGfAR, PHR journals) and Editor-in-Chief of HSDR, PGfAR, PHR journals

Professor Matthias Beck Professor of Management, Cork University Business School, Department of Management and Marketing, University College Cork, Ireland

Dr Tessa Crilly Director, Crystal Blue Consulting Ltd, UK

Dr Eugenia Cronin Consultant in Public Health, Delta Public Health Consulting Ltd, UK

Dr Peter Davidson Interim Chair of HTA and EME Editorial Board. Consultant Advisor, School of Healthcare Enterprise and Innovation, University of Southampton, UK

Ms Tara Lamont Senior Adviser, School of Healthcare Enterprise and Innovation, University of Southampton, UK

Dr Catriona McDaid Reader in Trials, Department of Health Sciences, University of York, UK

Professor William McGuire Professor of Child Health, Hull York Medical School, University of York, UK

Professor Geoffrey Meads Emeritus Professor of Wellbeing Research, University of Winchester, UK

Professor James Raftery Professor of Health Technology Assessment, School of Healthcare Enterprise and Innovation, University of Southampton, UK

Dr Rob Riemsma Consultant Advisor, School of Healthcare Enterprise and Innovation, University of Southampton, UK

Professor Helen Roberts Professor of Child Health Research, Child and Adolescent Mental Health, Palliative Care and Paediatrics Unit, Population Policy and Practice Programme, UCL Great Ormond Street Institute of Child Health, London, UK

Professor Jonathan Ross Professor of Sexual Health and HIV, University Hospital Birmingham, UK

Professor Helen Snooks Professor of Health Services Research, Institute of Life Science, College of Medicine, Swansea University, UK

Professor Ken Stein Professor of Public Health, University of Exeter Medical School, UK

Professor Jim Thornton Professor of Obstetrics and Gynaecology, Faculty of Medicine and Health Sciences, University of Nottingham, UK

Please visit the website for a list of editors: www.journalslibrary.nihr.ac.uk/about/editors

Editorial contact: journals.library@nihr.ac.uk