



Public Health
England

Protecting and improving the nation's health

Water Fluoridation

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Evidence on:

- Dental health effects
- General health effects

Regulation of fluoride/ fluoridation



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What is the evidence for the dental health benefits of fluoridated water?

Is there evidence of harm?

Background

- Origins – observation of different levels of tooth decay in areas with different levels of F- in water, including the effect of changing water sources – early to mid 20th Century
- Early fluoridations schemes, USA & Canada 1940s on, UK pilots 1950s
- Implementation of schemes in several countries - mid 20th Century onwards

Background

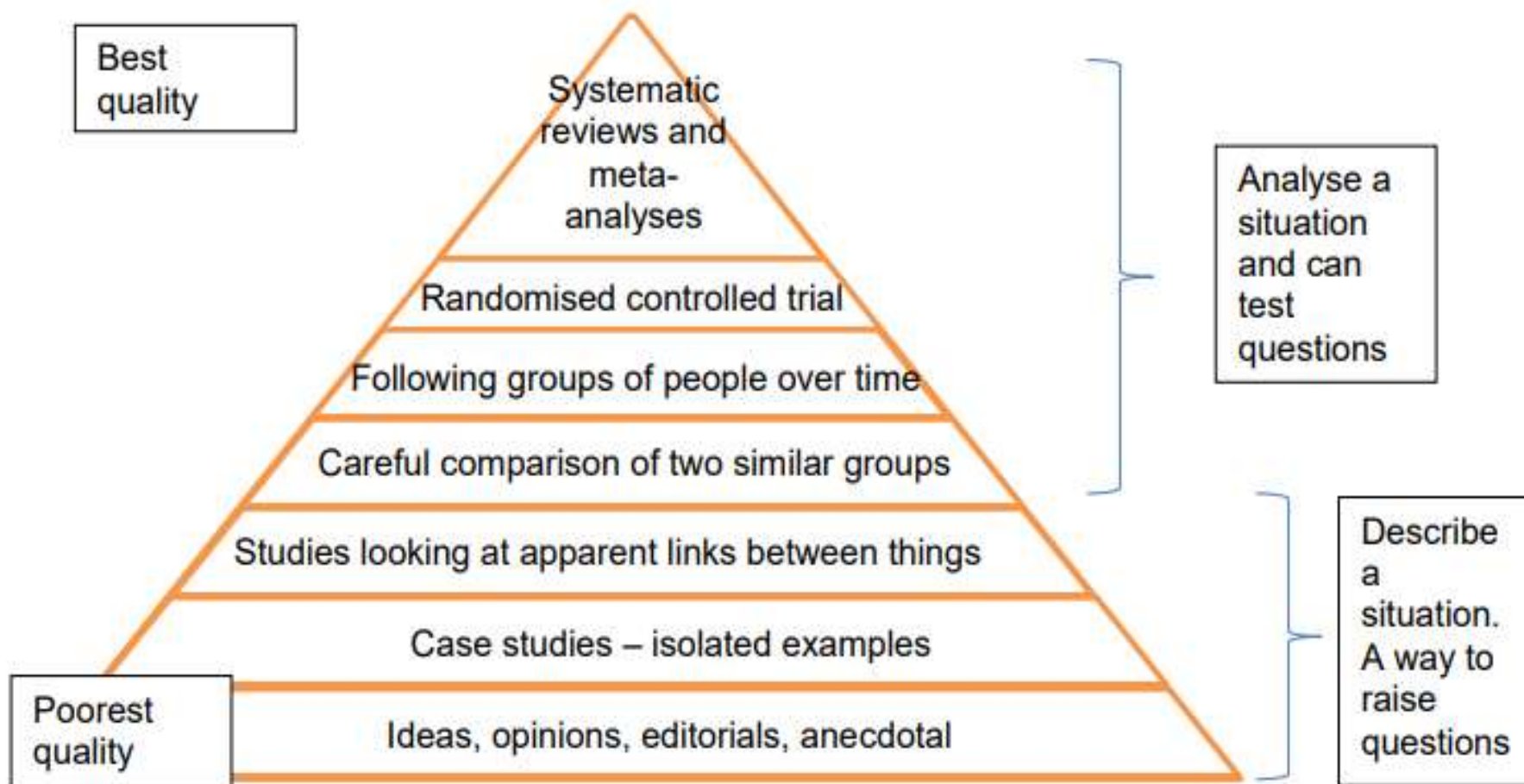
- Widespread introduction of fluoride toothpaste 1960s onwards
- Falling decay levels in many countries
- Increasing focus on inequalities
- Improvements in health surveillance
- Ongoing assertions of harm

Ongoing research questions

- Is CWF *still* effective in contemporary context of lower decay levels, inequalities and availability of F- toothpaste?
- Is there a problem with dental fluorosis (mottling?)
- With improved surveillance and 70+ yr experience of fluoridation, is there any credible scientific evidence that fluoride in water is harmful to health?

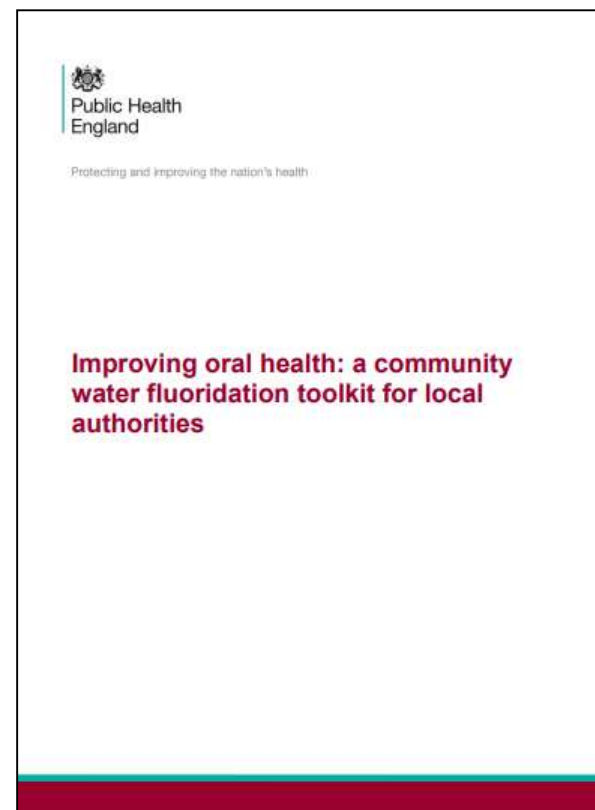


Evidence Hierarchy



Is CWF effective?

- Strong evidence base – 9 evidence reviews since 2000 (see PHE 2016 toolkit) plus review 2017 & two in 2019
- PHE monitoring reports 2014, 2018 show contemporary reductions in decay levels (and impacts) between fluoridated & non-fluoridated communities



2018 PHE monitoring report

- 5yr olds - odds of experiencing decay were reduced by 23% in the least deprived areas and 52% (95% CI 47%-56%) in the most deprived areas (2014 report also looked at 12-year-olds, showing reduced decay levels)
- Hospital admissions for removal of decayed teeth in 0-19yr olds 59% lower

2018 PHE monitoring report

- The reduction in the number of 5yr olds experiencing decay is greater in more deprived areas (more disease to prevent) narrowing differences in dental health between more and less deprived children.
- A larger number of the most deprived 0-19yr olds benefited from reduced hospital admissions, lessening differences between more and less deprived communities.

Is the evidence base perfect?

- Less known about impact on adolescents and adults – fewer studies but approx 25% reduction reported for adults
- One recent systematic review (Cochrane 2015) commented that studies of the impact of implementing new schemes “before and after” often pre-date the widespread availability of F-toothpaste - limited recent research opportunities in England
- Quality of hospital admission data

What about dental fluorosis?

- Higher levels of dental fluorosis seen in fluoridated areas – but apparently of no/mild aesthetic concern.
- No significant difference in satisfaction with appearance of teeth, or where it does cause concern, there is an equal level of dissatisfaction due to other factors e.g. trauma, orthodontic malalignment or decay.
- Possibly improves with age
- Sense check – are fluoridated areas filled with brown-toothed children complaining about their smiles?

Harmful to health?

- 2018 water quality standards in England allow for up to 1.5mg/l F⁻ in drinking water.
- Naturally fluoridated areas in England have had significantly higher levels (>5mg/l) before water standards imposed. Several areas of UK naturally higher levels; some similar to or slightly above fluoridation scheme target level of 1mg/l.
- Exposure to fluoride from water, food, toothpaste, air
- Cup of tea contains approx. 5mg/l
- Natural Bottled Mineral Water regulations allow <5mg/l

Harmful to health?

- Numerous evidence reviews since 2000 - no evidence of harm to health from fluoridated water
- Within England, PHE monitoring reports 2014, 2018 show no evidence of harm to health.

CDC (2018)

Expert panels consisting of scientists from the United States and other countries, with expertise in various health and scientific disciplines, have considered the available evidence in peer-reviewed literature and have not found convincing scientific evidence linking community water fluoridation with any potential adverse health effect or systemic disorder such as an increased risk for cancer, Down syndrome, heart disease, osteoporosis and bone fracture, immune disorders, low intelligence, renal disorders, Alzheimer disease, or allergic reactions.

Canadian CADTH (2019)

There was evidence that there may be no association between water fluoridation at the current Canadian levels and bone cancer, total cancer incidence, hip fracture, Down syndrome, and IQ and cognitive function. There was insufficient evidence to draw a conclusion for an association between water fluoridation at the current Canadian levels and other reported health outcomes. Several limitations of the evidence in the current review were identified, and, therefore, caution is warranted in interpreting the evidence.

Harmful to health?

- Busy research area with highly variable quality of outputs – caution needed in interpreting single studies.
- Peer review of papers prior to publication is essential, but notoriously flawed.
- Assessing new research can take longer than the time to produce and disseminate it - constant ongoing lag between new research being published and assessment by the wider scientific community.

Summary

- Significant dental health benefits continue to be observed
- Increase in dental mottling but not of any public health impact from this
- No credible scientific evidence of harm to health after 70+ years experience