



# Water fluoridation

## Health monitoring report for England 2014

### Executive summary

#### Background

Dental caries (tooth decay) is a significant public health problem in England. Sizeable inequalities in the incidence of caries exist between affluent and deprived communities, and it is a common cause of hospital admissions in children.

Fluoride is a naturally occurring mineral found in water in varying amounts. It is also present in some food. During the early twentieth century, lower levels of tooth decay were found to be associated with certain fluoride levels in drinking water. This observation led ultimately to water fluoridation schemes, which adjust levels of the mineral in community water supplies in an effort to reduce tooth decay.

In some parts of England the level of fluoride in the public water supply has been adjusted to one mg per litre (one part per million). Currently, around six million people live in areas with fluoridation schemes. Many schemes have been operating for over 40 years.

#### Public Health England monitoring role

PHE, on behalf of the secretary of state for health, is required by legislation to monitor the effects of water fluoridation schemes on the health of people living in the areas covered, and to produce reports at no greater than four-yearly intervals. This report fulfils this requirement and will be used as part of an ongoing dialogue with local authorities prior to publication of a further report within the next four years. This executive summary refers to areas with adjusted fluoride levels as 'fluoridated'.

The report looks at indicators of health in people in fluoridated and non-fluoridated areas. Key findings are:

## Dental health indicators

### Dental health of five-year olds

On average, five-year olds in fluoridated areas are 15% less likely to have had tooth decay than those in non-fluoridated areas.

When deprivation and ethnicity (important factors for dental health) are taken into account, five-year olds in fluoridated areas are 28% less likely to have had tooth decay than those in non-fluoridated areas.

[Note: The above calculations are odds ratios. The chances of a child not having had tooth decay are calculated for fluoridated areas, and then for non-fluoridated areas. A comparison of their respective odds is then made. Statistically, this way of describing the relationship between the two sets of children is clearer and more accurate than the form of words originally used in this executive summary]

### Dental health of 12-year olds

On average, 12-year olds in fluoridated areas are 11% less likely to have had tooth decay than those in non-fluoridated areas.

When deprivation and ethnicity are into account, 12-year olds in fluoridated areas are 21% less likely to have had tooth decay than those in non-fluoridated areas.

### Impact of dental health inequalities

The reduction in tooth decay in children of both ages in fluoridated areas appears greatest among those living in the most deprived local authorities.

### Hospital admissions of children aged one to four

In fluoridated areas there are 45% fewer hospital admissions of children aged one to four for dental caries (mostly for extraction of decayed teeth under a general anaesthetic) than in non-fluoridated areas.

### Dental fluorosis (mottles or flecks on teeth caused by fluoride)

A previous study of fluoridated Newcastle upon Tyne and non-fluoridated Manchester found that the number of 12-year old children with moderate dental fluorosis or more (fluorosis score of TF4 and above) is very low, at around 1% in Newcastle and 0.2% in Manchester.

Children in fluoridated Newcastle upon Tyne are more likely than those in non-fluoridated Manchester to develop fluorosis of any level. However, children in fluoridated Newcastle have less tooth decay than those in non-fluoridated Manchester.

## Non-dental health indicators

In comparing a range of selected health indicators in fluoridated and non-fluoridated areas, statistical adjustments were made to take account of population differences in age, gender, deprivation and ethnicity.

### Hip fractures

There was no evidence of a difference in the rate of hip fractures between fluoridated and non-fluoridated areas.

### Kidney stones

There was evidence that the rate of kidney stones was lower in fluoridated areas than non-fluoridated areas.

### All-cause mortality

While there was some evidence that the rate of deaths from all recorded causes was lower in fluoridated areas than non-fluoridated areas, the size of the effect was small.

### Down's syndrome

There was no evidence of a difference in the rate of Down's syndrome in fluoridated and non-fluoridated areas.

### Bladder cancer

There was evidence that the rate of bladder cancer was lower in fluoridated areas than non-fluoridated areas.

### Osteosarcoma (a form of bone cancer) among under 25-year olds

There was no evidence of a difference in the rate of osteosarcoma between fluoridated and non-fluoridated areas.

### Osteosarcoma (a form of bone cancer) among people aged 50 and over

There was no evidence of a difference in the rate of osteosarcoma between fluoridated and non-fluoridated areas.

### All cancer

There was no evidence of a difference in the rate for all types of cancer between fluoridated and non-fluoridated areas.

### Conclusion

The report provides further reassurance that water fluoridation is a safe and effective public health measure. PHE continues to keep the evidence base under review and will use this report as part of an ongoing dialogue with local authorities before publishing a further report within the next four years.

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