

Water fluoridation

helps protect teeth throughout life



Contents

Water fluoridation: quick facts	2
Water fluoridation helps protect teeth throughout life	3
Everybody benefits from water fluoridation	4
Baby and adult teeth both need protection against decay	5
Other ways to protect your teeth	6
Water fluoridation will not change the taste or smell of your water	7
Water fluoridation in Victoria with dates of introduction	8–9
Most Australians have fluoridated water	10
Water fluoridation in other countries	10
Water fluoridation and your health	11
Water fluoridation is safe	13
Opposition to water fluoridation	14
Further information	15
References	16

Message from the Chief Health Officer of Victoria

Tooth decay is a disease which affects both children and adults, and can cause considerable pain and suffering. When severe, tooth decay can affect appearance, self-esteem and social interaction, and it can also make it difficult to speak and chew. Treating tooth decay can be costly, in terms of time and money, and sometimes children need a general anaesthetic to have their decay treated.

Water fluoridation helps protect teeth against decay, and is the most effective way of allowing everybody access to the benefits of fluoride.

Scientific studies have shown that water fluoridation is a safe and effective way to reduce tooth decay, even though there is widespread use of fluoridated toothpaste. In Victoria, children living in fluoridated areas experience considerably less tooth decay than those in non-fluoridated areas.

This booklet has been updated to reflect new guidelines on the use of fluorides in Australia, new Victorian data and the most recent endorsement of fluoride by the World Health Organization.

More than three quarters of Victorians now drink water with either naturally-occurring or added fluoride. The map on pages 8 and 9 shows which parts of Victoria have fluoridated drinking water.

Water fluoridation is an effective, inexpensive and socially equal way to reduce tooth decay in children and adults.

Dr John Carnie
Chief Health Officer, Victoria

Water fluoridation: quick facts

- Water fluoridation helps protect teeth against decay in people of all ages, from very young children to the elderly.
- By reducing tooth decay, water fluoridation saves individuals and families money on dental treatment. It also means less time away from school and work because of tooth pain and dental treatment.
- Most Australians have had the benefit of water fluoridation for 30–50 years.
- You cannot taste or smell fluoride in your water.
- Water fluoridation is a safe way to help protect teeth against decay and is supported by leading national and international health organisations.
- The overall weight of scientific evidence does not link water fluoridation with side effects such as cancer, bone fractures, Alzheimer's disease or allergy.
- Mottling of tooth enamel can occur if young children get too much fluoride (dental fluorosis). It is generally barely noticeable, and also occurs in areas without water fluoridation. By using fluoridated toothpaste carefully the chances of dental fluorosis can be reduced without denying anybody the benefits of water fluoridation (see page 6).
- The amount of fluoride added to the water is carefully controlled and monitored.
- Water fluoridation is the most effective way to give everybody access to the benefits of fluoride regardless of age, income or education level.

Water fluoridation helps protect teeth throughout life

- Fluoride occurs naturally in water, plants, rocks, soil, air and most foods.
- Water fluoridation is the adjustment of fluoride in drinking water to a level that helps protect teeth against decay.
- Tooth decay occurs when acid destroys the outer surface of the tooth. The acid is produced from sugar by bacteria in the mouth. Fluoride can limit the amount of acid produced, and more importantly can also repair damage before it becomes permanent. A constant supply of low levels of fluoride in the mouth is best for this—fluoride in your water supply acts like a constant 'repair kit' for teeth.



Everybody benefits from water fluoridation

- Water fluoridation is the most effective way to give everybody access to the benefits of fluoride regardless of age, income or education level.
- Water fluoridation helps protect teeth against decay in people of all ages, from very young children to the elderly.
- Six-year old children living in fluoridated areas of Victoria experience 36 per cent less decay in their **baby** teeth than those in non-fluoridated areas.
- Twelve-year old children living in fluoridated areas of Victoria experience 22 per cent less decay in their **adult** teeth than those in non-fluoridated areas.
- Studies have shown that adults benefit from water fluoridation too. Drinking fluoridated water throughout life provides the most benefit.
- By preventing tooth decay, water fluoridation saves individuals and families money on dental treatment.
- Water fluoridation results in less time away from school and work because of tooth pain and dental treatment.
- In the 25 year period following its introduction, water fluoridation was estimated to have resulted in benefits to the Victorian community of around \$1 billion, through avoided dental costs and saved work and leisure time.
- Water fluoridation gives extra protection against decay even if you already brush your teeth with fluoridated toothpaste.

Baby and adult teeth both need protection against decay

- Some people think that baby teeth are not important, because children will lose them anyway. It is important, however, to look after baby teeth because:
 - Decay can be painful and expensive to treat. Usually, baby teeth are not completely lost until about 10–12 years of age.
 - Baby teeth have thinner enamel (the outer coating) than adult teeth, and decay can more easily get to the middle of the tooth. This can be extremely painful, keeping the child awake at night and sometimes is not relieved by painkillers. If not treated it can lead to a painful dental abscess (containing pus) and a swollen face. A dental abscess can cause permanent damage to the adult tooth developing underneath.
 - Baby teeth guide the adult teeth (which develop underneath) into position. If the baby teeth are lost too early, for example being pulled out because of decay, the space may close up due to movement of nearby teeth—this may require orthodontic treatment later on.
 - In 2004–05 across Victoria there were almost 5,000 children under the age of 10, including 250 two-year olds, who required a general anaesthetic for treatment of their tooth decay. In the same year, in non-fluoridated areas of Victoria, three times as many people per capita required a general anaesthetic in hospital for treatment of tooth decay than in fluoridated areas.
- It is also important to look after adult teeth. As people get older the gums can recede, exposing more of the root of the tooth. Unlike the rest of the tooth, the root is not covered by enamel and is more susceptible to decay, which can be painful and difficult to treat. Water fluoridation helps protect against root surface decay in older people.

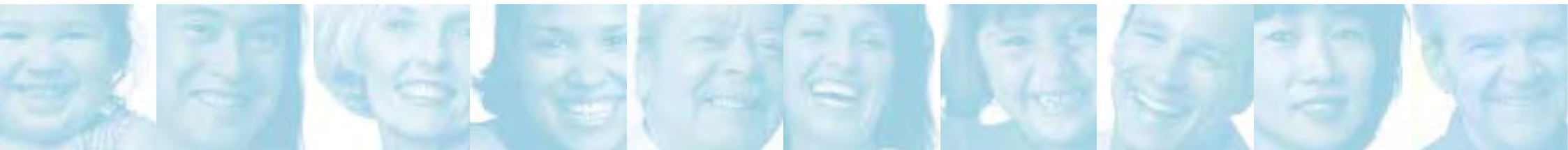


Other ways to protect your teeth

- Even if your drinking water is fluoridated, it is still important to look after your teeth through healthy eating, regular brushing, appropriate use of fluoridated toothpaste and regular dental check-ups.
- Children below the age of 18 months should have their teeth cleaned by an adult, using water and no toothpaste. A health professional, however, may recommend the use of low-fluoride children's toothpaste for children under 18 months of age.
- Children between 18 months and five years of age (inclusive) should have their teeth cleaned by an adult, using a pea-sized amount of low-fluoride children's toothpaste, smeared over the toothbrush. A health professional, however, may recommend the use of standard fluoride toothpaste for this age group.
- Once children reach six years of age, a standard fluoride toothpaste should be used.
- Fluoride drops and tablets do not give much (if any) extra protection, and increase the risk of dental fluorosis (mottled tooth enamel). Fluoride drops and tablets should not be used at all, whether your drinking water is fluoridated or not.
- Fluoride mouthrinses may be used by people aged six years or more, who are at higher risk of developing decay. Fluoride mouthrinses should not be a substitute for brushing with fluoridated toothpaste.
- Your dental professional may also use other fluoride treatments in the dental clinic.

Water fluoridation will not change the taste or smell of your water

- Fluoride has no taste or smell, so water fluoridation will not change the taste or smell of your drinking water. Your local water authority will be able to confirm if your water has fluoride in it.
- Melbourne received the gold medal award in 2003 for the best-tasting drinking water in Australia. The silver medal went to Darwin and the bronze medal to Hobart. All of these cities have water fluoridation.
- Some people choose to boil their drinking water. Boiling water will not change the amount of fluoride.
- With the exception of reverse osmosis filters, most home water filtering systems do not change the amount of fluoride in water.
- Most bottled waters in Australia do not contain fluoride.



Water fluoridation in Victoria with dates of introduction



Most Australians have fluoridated water

- Most Australians have had the benefit of water fluoridation for 30–50 years. Every capital city in Australia, except Brisbane, has water fluoridation.
- More than three quarters of Victorians have water with either naturally-occurring or added fluoride—most of these people live in Melbourne and Bendigo, Shepparton, Echuca, Horsham, Sale, Traralgon, Morwell, Moe and Warragul. People in Wangaratta and Wodonga will also have a fluoridated drinking water supply in 2007.
- Portland, Nhill, Port Fairy, Barnawartha and Kaniva have naturally-occurring beneficial amounts of fluoride in the drinking water.
- Melbourne has had fluoridated drinking water for 30 years.

See pages 8 and 9 for a map showing towns with fluoridated drinking water supplies in Victoria.

Water fluoridation in other countries

- Other countries also have introduced water fluoridation, including New Zealand, Hong Kong, Singapore, the United Kingdom, Ireland, Canada and the United States.
- Some people think that water fluoridation has been banned in Europe. In some countries water fluoridation is not practical because of very complex water systems that lack a central point to add fluoride. Some countries add fluoride to salt instead of water, which is then used in numerous products such as bread, to allow the community to benefit from fluoride.
- In 2006, the World Health Organization, the World Dental Federation and the International Association for Dental Research urged governments to develop effective legislation and programs to ensure access to fluoride for dental health in all countries.

Water fluoridation and your health

- Water fluoridation is a safe way to help protect teeth against decay and is supported by many organisations worldwide including:
 - The World Health Organization
 - The World Dental Federation
 - National Health and Medical Research Council
 - The Australian Dental Association
 - The Australian Medical Association
 - The Public Health Association of Australia
- Some people worry that water fluoridation may cause serious problems such as cancer, bone fractures, birth defects, Alzheimer’s disease or allergy. The safety of water fluoridation has been frequently re-evaluated, and the best evidence does not link water fluoridation with any of these medical conditions.
 - There have been many studies about water fluoridation. Any scientific study must be carefully reviewed to see if the results are likely to be accurate. A review is one way to consider the overall weight of evidence. One review (National Health Service Centre for Reviews and Dissemination, 2000) looked at 214 of the highest quality studies to assess the benefits and possible side effects of water fluoridation. It found that water fluoridation helps protect against tooth decay without causing any unwanted effects apart from dental fluorosis in some people (see page 12). Other reviews from Europe, North America and Australia also support the safety of water fluoridation. Some of these reviews are listed in the reference section at the back of this booklet.
 - In areas with extremely high levels of natural fluoride in the water, skeletal fluorosis (bone pain and joint stiffness) may occur. Skeletal fluorosis is common in several parts of the world including India, China, parts of the Middle East and Africa, in areas where water supplies have fluoride levels naturally higher than those recommended by the World Health Organization. Skeletal fluorosis is extremely rare in the developed world.

Dental fluorosis

- Mottling of tooth enamel (dental fluorosis) can occur if young children get too much fluoride. The use of fluoride tablets, drops or standard fluoride toothpaste by young children, adds to the chance of developing dental fluorosis. The amount of fluoride in standard fluoride toothpaste is about a thousand times higher than the amount in drinking water. For this reason, whether you have water fluoridation or not, it is important to:
 - Discourage children from swallowing toothpaste.
 - Clean children’s teeth with water and no toothpaste before the age of 18 months, unless otherwise recommended by a health professional.
 - Use only a pea-sized amount of low-fluoride children’s toothpaste, smeared over the toothbrush, for children between the ages of 18 months and five years of age (inclusive), unless otherwise recommended by a health professional.
 - Stop using fluoride drops and tablets.
 - Only use fluoride mouthrinses from the age of 6 years.
- Most dental fluorosis that does occur is barely noticeable and appears as very fine pearly white lines or flecks on the tooth enamel. It cannot develop after teeth are fully formed, and does not affect the function of teeth.
- Mottling of tooth enamel is not always caused by too much fluoride. Other causes include medications, injury to the teeth or childhood infections—if fluoride is not the cause, then it should not be called dental fluorosis.
- Dental fluorosis also occurs in areas without water fluoridation. This is why careful use of toothpaste described above is important for children in areas both with or without water fluoridation.
- By using fluoridated toothpaste carefully it is possible to reduce the chances of dental fluorosis without denying anybody the benefits of water fluoridation.

Water fluoridation is safe

- Fluoride is added to the water at fluoridation plants specially designed to add carefully controlled amounts. The total amount of fluoride in the water is monitored regularly both at the fluoridation plant and at household taps by local water authorities.
- The National Health and Medical Research Council (NHMRC) is Australia’s peak health organisation. To be acceptable to the NHMRC, a chemical added to drinking water must not be toxic at recommended maximum levels. For fluoridating drinking water, the NHMRC recommends sodium fluoride, sodium fluorosilicate and fluorosilicic acid. These fluoride compounds are added to water supplies in a controlled manner in amounts scientifically shown to prevent tooth decay.
- The fluoride added to water comes from natural rock. During the extraction process, a gas is produced. Gases are difficult to handle, so a piece of equipment called a scrubber can be used to convert the fluoride into a liquid or powder form which can be added to water supplies in a carefully controlled way. Scrubbers can also be used to reduce atmospheric pollution by gases, so some people think that because a scrubber is used, fluoride must be harmful. This is not true. Many substances we use every day are very beneficial in small amounts, but may be harmful in large amounts—examples include salt and even water itself. To help protect your teeth against decay, only very small amounts of fluoride are needed in the water (about 1 mg/L, which means that each part of fluoride is diluted in one million parts of water).
- The amount of fluoride added to your garden or farm from fluoridated water is very small—the amount of fluoride found naturally in rocks and soil is about 300 to 700 times higher than the amount added to water. Sea water typically contains fluoride at 1.2–1.4 mg/L.

Opposition to water fluoridation

- Some people believe that it is not ethical to impose anything upon individuals who do not want it. For example, when compulsory wearing of seat belts was first proposed, some people complained that it restricted individual rights and freedoms. With time, the benefits of reduced injuries and deaths from motor vehicle crashes became clear.
- Water fluoridation has been endorsed by the United States Centers for Disease Control and Prevention as one of the ten greatest public health achievements of the 20th century. While it is acknowledged that there will always be some people who do not agree with water fluoridation, it is a safe and effective way to help protect teeth throughout life. Furthermore, it allows everybody to benefit, regardless of age, education or income level.
- In 2006, the World Health Organization, the World Dental Federation and the International Association for Dental Research confirmed that ‘universal access to fluoride for dental health is a part of the basic human right to health.’
- Other authors have stated:

In considering the ethics of fluoridation... we should ask not are we entitled to impose fluoridation on unwilling people, but are the unwilling people entitled to impose the risks, damage and costs of failure to fluoridate on the community at large.

Professor John Harris, Centre for Social Ethics and Policy, University of Manchester, 1989.

Further information

On the web

Department of Human Services
www.health.vic.gov.au/environment/water/fluoridation.htm
www.dhs.vic.gov.au/rrhacs/dentalhealth

Australian Dental Association
www.ada.org.au

Dental Health Services Victoria
www.dhsv.org.au

Better Health Channel
www.betterhealth.vic.gov.au

World Health Organization
www.who.int/water_sanitation_health/oralhealth

American Dental Association
 (includes a 56-page booklet *Fluoridation Facts*)
www.ada.org/public/topics/fluoride/facts/

British Fluoridation Society
www.bfsweb.org

Telephone

Water fluoridation information line, Department of Human Services
Tel: 1800 651 723



References

1. Ahokas J, Demos L, Donohue D, Killalea S, McNeil J, Rix C, 1999. *Review of water fluoridation and fluoride intake from discretionary fluoride supplements: review for NHMRC*. Melbourne: Royal Melbourne Institute of Technology and Monash University.
 2. American Dental Association, 2005. *Fluoridation facts*. Available at <http://www.ada.org/public/topics/fluoride/facts/>.
 3. Armfield J, 2005. 'Dental caries in Australian children.' Paper presented at Workshop on the Use of Fluorides in Australia. Adelaide: The Australian Research Centre for Population Oral Health.
 4. Australian Research Centre for Population Oral Health, 2006. 'The Use of Fluorides in Australia: guidelines.' *The Australian Dental Journal* 51:(2):195–199.
 5. British Fluoridation Society, 1998. *Water fluoridation: something for older people to smile about*. Available at <http://www.bfsweb.org/documents/wfold.pdf>.
 6. British Fluoridation Society, The UK Public Health Association, The British Dental Association and the Faculty of Public Health, 2004. 'One in a Million: The facts about water fluoridation, 2nd Edition.' Available at <http://www.bfsweb.org>
 7. Centers for Disease Control and Prevention, 1999. 'Achievements in public health, 1990–1999: fluoridation of drinking water to prevent dental caries.' *Morbidity and Mortality Weekly Report* 48(41):933–940.
 8. Centers for Disease Control and Prevention, 2001. 'Recommendations for using fluoride to prevent and control dental caries in the United States.' *Morbidity and Mortality Weekly Report* 50(RR14).
 9. Centers for Disease Control and Prevention, 1999. 'Ten great public health achievements—United States, 1990–1999.' *Morbidity and Mortality Weekly Report* 48(12):241–264.
 10. Dental Health Services Victoria, 2006. Victorian School Dental Epidemiological Data 2003–05. Melbourne: Dental Health Services Victoria. *
 11. Department of Human Services Victoria, 2000. *Evidence-based health promotion resources for planning: no. 1—oral health*. Melbourne: Department of Human Services Victoria.
 12. Department of Human Services Victoria, 2002. *Fluoridation: a guide to fluoride levels in water supplied to Victorian towns and cities*. Melbourne: Department of Human Services Victoria.
 13. Department of Human Services Victoria, 2003. *Impact analysis of water fluoridation*. Prepared by Jaguar Consulting. Melbourne: Department of Human Services Victoria (unpublished).
 14. Department of Human Services Victoria, 2003. *Oral health guidelines for Victorians*. Melbourne: Department of Human Services Victoria.
 15. Department of Human Services Victoria, 2007. *Demographic analysis of trends in dental ambulatory care sensitive condition (ACSC) admissions in Victoria, 1997–98 to 2004–05*. Melbourne: Department of Human Services Victoria (unpublished).
 16. Department of Human Services Victoria, 2007. *The Australian Bottled Water Study*. Melbourne: Department of Human Services Victoria (unpublished).
 17. Department of Human Services Victoria and Dental Health Services Victoria, 2003. *Oral health promotion: a resource pack for children's services*. Melbourne: Department of Human Services Victoria and Dental Health Services Victoria.
 18. Evans W, Morgan M, Conn J, 1998. 'Dental fluorosis prevalence in Melbourne 12-year-olds is within expected limits.' Presented at the IADR ANZ Division 38th Annual Scientific Meeting, Brisbane.
 19. Harris J, 1989. 'The ethics of water fluoridation.' Centre for Social Ethics and Policy, University of Manchester. Available at the British Fluoridation Society website, <http://www.bfsweb.org/ethicsoffluorida.html>.
 20. Medical Research Council Working Group, 2002. *Water fluoridation and health*. United Kingdom: Medical Research Council.
 21. National Health and Medical Research Council, 1991. *The effectiveness of water fluoridation*. Canberra: National Health and Medical Research Council.
 22. National Health Service (NHS) Centre for Reviews and Dissemination, 2000. *A systematic review of public water fluoridation*. York: University of York.
 23. National Research Council, 1993. *Health effects of ingested fluoride*. Subcommittee on Health Effects of Ingested Fluoride. Washington DC: National Research Council.
 24. Public Health Commission Rangapu Hauora Tumataniui, 1994. *Water fluoridation in New Zealand*. Wellington: Public Health Commission Rangapu Hauora Tumataniui.
 25. Riordan P, 1999. 'Fluoride supplements for young children: an analysis of the literature focusing on benefits and risks.' *Community Dentistry and Oral Epidemiology* 27:72–83.
 26. Riordan P, Banks J, 1991. 'Dental fluorosis and fluoride exposure in Western Australia.' *Journal of Dental Research* 70(7):1022–1028.
 27. Spencer A, Slade G, 2005. 'A rationale for the appropriate use of fluorides.' Paper presented at Workshop on the Use of Fluorides in Australia. Adelaide: The Australian Research Centre for Population Oral Health.
 28. Spencer A, Slade G, Davies M, 1996. 'Water fluoridation in Australia.' *Community Dental Health* 13(suppl 2):27–37.
 29. Topsfield J, 2003. 'The finest drop in the land.' *The Age*. August 13. Available at <http://www.theage.com.au/articles/2003/08/12/1060588392405.html?from=storyrhs>.
 30. Victorian water authorities' annual reports 2005–06. Victorian population serviced by reticulated water supplies.
 31. World Health Organization, 1986. *Appropriate use of fluorides for human health*. Geneva: World Health Organisation.
 32. World Health Organization, 1994. *Fluorides and oral health: report of a WHO expert committee on oral health status and fluoride use*. Geneva: World Health Organization.
 33. World Health Organization, 2002. *World water day 2001: oral health*. Available at http://www.who.int/water_sanitation_health/oralhealth/en/print.html.
 34. World Health Organization, 2006. *Fluoride in Drinking-water*. London: IWA Publishing on behalf of the World Health Organization.
 35. World Health Organization, World Dental Federation and International Association for Dental Research, 2006. *Call to Action to promote dental health by using fluoride*. Available at http://www.fdiworlddental.org/public_health/assets/Fluoride_Consultation/Fluoride_Declaration_Final_E.pdf
- * The first edition of this booklet quoted 2002 School Dental Service data, while this edition uses data collated in 2006. Since 2005, the School Dental Service in Victoria has increasingly focused on higher-dental-needs children in both fluoridated and non-fluoridated areas. According to the Australian Research Centre for Population Oral Health, decay rates are increasing nationally (possibly linked to the same factors responsible for increasing obesity)—see references 3 and 27.

