

Fluoride – Prevention of Dental Caries and Maintenance of Oral Health

Queensland Health Guideline

QH-GDL-411:2013

1. Purpose

This guideline provides recommendations regarding best practice to support the use of fluorides in Queensland.

2. Scope

This guideline applies to dental practitioners and health professionals providing advice about fluorides and / or administering fluorides in Queensland Health settings. Compliance with this guideline is not mandatory, but sound reasoning must exist for departing from the recommended principles within this guideline.

3. Related documents

- *Fluoride Varnish, Queensland Health Guideline*, Office of the Chief Dental Officer, Clinical Excellence Queensland, April 2021.
- *Guidelines of the use of fluorides in Australia: update 2019*. Australian Research Centre for Population Oral Health, Australian Dental Journal 2020; 65: (1): 30-38.
- *Healthy Mouths Healthy Lives, Australia's National Oral Health Plan 2015-2024*, COAG Health Council, Australian Government, 2015.
- *Policy Statement 2.2.1 – Community Oral Health Promotion: Fluoride Use (Including ADA Guidelines for the Use of Fluoride)*, Australian Dental Association, November 2020.
- *Water Fluoridation and Human Health in Australia, NHMRC Public Statement 2017*, Australian Government, 2017.
- *Water Fluoridation and Human Health in Australia: Questions and Answers*, NHMRC, Australian Government, 2017.
- *Water Fluoridation Act 2008*, Queensland Government.
- *Water Fluoridation Regulation 2020*, Queensland Government.
- *Queensland Water Fluoridation Code of Practice 2013*, Water Program, Environmental Health Regulation and Standards, Health Protection Unit, Department of Health.
- *Fluoride in drinking-water*, Water Sanitation and Health (WSH), World Health Organization, 2006.

4. Guideline for the Role of Fluorides in Preventing Dental Caries and Maintaining Oral Health

Fluoride is the key to prevention and control of dental caries however it is important to actively encourage other evidence-based strategies and behaviours which promote and maintain good oral health, namely:

- practise good oral hygiene
- choose healthy snacks like fruits, cheese and vegetables
- limit sugary foods and drinks
- chew sugar free gum
- not smoke
- breastfeed where possible
- wear a mouthguard when playing contact sports
- seek regular dental care
- arrange for children to have a dental assessment by two years of age
- drink plenty of fluoridated tap water.

4.1. Water fluoridation

Fluoridation of drinking water is an effective, efficient, socially equitable and safe population health measure for the prevention of dental caries. The consumption of optimally fluoridated water should be promoted to all Queenslanders and supported by all levels of government.

The fluoridation of public water supplies has been practised around the world for more than 75 years and is supported by leading organisations in Australia and internationally including the World Health Organization, the Australian Medical Association, the Australian Dental Association and the American Academy of Pediatrics.

In Australia, community water fluoridation has been the cornerstone of public health efforts to prevent dental caries since the 1960s. In Queensland, a major rollout of fluoridation of drinking water supplies began in 2008, commencing with the south east corner. Currently approximately 72% of Queenslanders have access to a fluoridated drinking water supply.

The National Health and Medical Research Council (NHMRC) supports Australian states and territories to fluoridate drinking water supplies within the range of 0.6 - 1.1 mg/L or 0.6 – 1.1 part per million (ppm) fluoride, with the relevant government health authority determining the appropriate operational level.

People of all ages benefit from drinking fluoridated water throughout life. Children benefit from water fluoridation as soon as their teeth are formed – giving them the best chance of having healthy teeth for life. Teenagers benefit from water fluoridation as they are at higher risk of developing dental caries due to risk factors such as poor oral hygiene, a cariogenic diet or active orthodontic treatment. Young adults benefit as they spend less time and money on expensive dental treatment. Middle aged adults can enjoy a healthier more comfortable lifestyle by avoiding the pain and costs of dental treatment. Older adults who

are keeping their teeth longer than previous generations, will benefit from being well-protected against dental caries.

Importantly, water fluoridation provides an additional benefit in caries prevention to that provided by fluoride toothpaste.

4.1.1 Bottled drinking water

The Australia New Zealand Food Standards Code permits between 0.6 – 1 mg/L or 0.6 – 1 ppm of naturally occurring and added fluoride in bottled drinking water – a similar level to the level recommended by the NHRMC for drinking water to provide optimal dental health benefits. As a legal requirement, any bottled water with added fluoride sold in Australia or New Zealand must be clearly labelled as such.

The addition of fluoride to bottled waters provides a potential opportunity for individuals to maintain fluoride access if they are regular bottled water consumers or do not have access to a fluoridated drinking water supply. It is important to note that not many bottled waters contain fluoride at beneficial levels, and the issue of access, coupled with cost, means those most in need are least likely to benefit.

4.1.2 Reconstituting infant formula

While breast milk is the best nutrition for infants, infant formula is used widely in Australia. Infant formula can safely be reconstituted with optimally fluoridated water, at around 1 ppm.

4.2. Self-use fluoride products

4.2.1 Fluoride toothpastes

Fluoridated toothpaste is an effective measure for the prevention of dental caries and its widespread use has been a major factor in the reduction of dental caries since the late 1960s.

In Australia, fluoridated toothpastes are available in three concentrations: low / junior or children's toothpaste with a fluoride concentration of 0.5 – 0.55 mg/g or 500 - 550 ppm, standard / adult toothpaste with a fluoride concentration of 1 – 1.5 mg/g or 1 000 - 1 500 ppm, and high concentration toothpaste with a fluoride concentration of 5 mg/g or 5 000 ppm.

For very young children however, standard / adult strength fluoride toothpaste (1 – 1.5 mg/g or 1 000 – 1 500 ppm fluoride) is also associated with a higher risk of developing dental fluorosis. To reduce this risk, low / junior or children's fluoride toothpaste (0.5 – 0.55 mg/g or 500 - 550 ppm fluoride) should be used for children up to 6 years of age.

Children under 8 years of age should be assisted and supervised during toothbrushing as they generally do not have the manual dexterity required to perform a thorough clean on their own.

Toothpaste should be stored out of the reach of young children to avoid overuse or accidental ingestion.

Dental practitioners and trained health professionals may vary their advice regarding toothpaste use based on individual dental caries risk and in consideration of whether fluoridated water is consumed. Variations may include more frequent use of fluoride

toothpaste, commencement of low / junior or children's fluoride toothpaste use at a younger age, earlier commencement of the use of standard / adult fluoride toothpaste or use of other fluoride products for additional caries protection.

Toothpaste recommendations for infants and young children:

For infants, from as soon as teeth appear up to 18 months of age, teeth should be cleaned twice a day with a wet toothbrush or wet cloth for babies by a parent or carer without toothpaste.

From 18 months up to 6 years of age, teeth should be cleaned twice a day with low / junior or children's fluoride toothpaste (0.5 - 0.55 mg/g or 500 - 550 ppm fluoride) under adult supervision.

A small pea-sized amount of toothpaste should be used on a small soft toothbrush.

Children should be encouraged to spit out after brushing. Excess toothpaste should not be swallowed.

Toothpaste recommendations for older children and adults:

For all adults and children aged 6 years or over, teeth should be cleaned twice a day with a pea-sized amount of standard / adult fluoride toothpaste (1 - 1.5 mg/g or 1 000 - 1 500 ppm fluoride) on a small, soft toothbrush.

A pea-sized amount of toothpaste should be used on a small soft toothbrush. Excess toothpaste should be spat out after brushing, not swallowed.

Teenagers, adults and older adults with elevated risk of dental caries may use high concentration fluoride toothpaste (5 mg/g or 5 000 ppm fluoride) on the prescription and supervision of a dental practitioner or trained health professional.

4.2.2 Fluoride supplements

Fluoride supplements in the form of tablets or drops to be chewed and / or swallowed are not recommended for use.

4.2.3 Fluoride mouth rinses

Fluoride mouth rinses may be prescribed by a dental practitioner for individuals aged six years or over who have a higher risk of developing dental caries.

Fluoride mouth rinses should be used outside normal tooth brushing times and should not be a substitute for brushing with fluoridated toothpaste.

Mouth rinses should be spat out, not swallowed.

4.3. Professionally applied fluoride products

Fluoride products used in the practise of dentistry include gels and varnishes with high concentrations of fluoride. Professionally applied fluoride products can be used for both primary and secondary prevention of dental caries. Primary prevention aims to prevent carious lesions developing on sound tooth surfaces. Secondary prevention is remineralisation of initial, precavitated lesions and of root caries.

The recommended frequency of application of professionally applied fluoride products is two to four times per year based on an assessment of risk.

4.3.1 Fluoride varnish

Fluoride varnish is indicated for use for dental caries prevention and desensitising sensitive teeth in the deciduous and permanent dentitions. It is particularly useful in preventing dental caries in young children e.g. fluoride varnish programs, and for individuals determined to be at high risk including people with special needs, patients undergoing orthodontic treatment, patients with partial dentures; aged-care residents and vulnerable populations.

Many fluoride varnish products are available on the Australian market however only one is currently registered to both prevent caries and treat dentine hypersensitivity. All other varnishes are currently only registered to treat dentine hypersensitivity. As such, use of these alternative fluoride varnishes to prevent dental caries is considered off-label¹.

Fluoride varnish contains 22.6 mg/mL or 22 600 ppm fluoride ion suspended in an alcohol and resin base. Fluoride varnish is applied to tooth surfaces where it sets rapidly on contact with saliva forming a waxy coating. This coating is worn off over time by chewing and toothbrushing. The recommended frequency of varnish application is twice per year however more frequent applications are indicated for children, adults and older adults at higher risk of dental caries i.e. up to four applications per year.

Fluoride varnish is well tolerated by patients, including children.

4.3.2 Fluoride gels and foams

Fluoride gels offer an alternative vehicle for dental caries prevention for individuals at high risk when other professionally applied fluoride products are either not available or deemed unsuitable.

There is no evidence to support the use of fluoride foams.

¹ Off-label use refers to the use of a registered medicine outside of the indications, dose, route of administration or patient group set out in the relevant Therapeutic Goods Administration Product Information. Dental practitioners are encouraged to use caution when considering off-label use and to clearly communicate the potential risks and benefits to patients and / or their parent / guardian / carer before deciding on treatment.

4.3.3 Silver diamine fluoride

There is renewed interest in silver diamine fluoride since its development in the 1960s. It is a colourless alkaline liquid containing silver and fluoride stabilised in ammonia. The silver component has antimicrobial properties and the fluoride is remineralising.

Silver diamine fluoride is effective in arresting active carious lesions in the primary dentition and root caries in older adults. Its major side effect is the black staining of carious lesions caused by the precipitation of metallic silver and silver oxide. While this is an indication of caries arrest, it is an important consideration if aesthetic acceptance is a concern and should feature in an informed consent discussion.

Application of silver diamine fluoride is relatively quick and simple making it a useful option where traditional treatment approaches are not feasible e.g. for patients with behavioural or medical management challenges; where access to care is limited or not available; to buy time with a young child; for residential aged care and domiciliary care patients; to stabilise / arrest carious lesions to avoid treatment under general anaesthetic.

In Australia, silver diamine fluoride is currently registered to treat dentine hypersensitivity rather than to prevent dental caries. As such, use of silver diamine fluoride to prevent dental caries is considered off-label.

Note: Silver fluoride is also available on the Australian market however almost all worldwide research evidence demonstrating effectiveness has been undertaken using silver diamine fluoride.

5. Document approval details

Document custodian

Chief Dental Officer, Clinical Excellence Queensland.

Approval officer

Deputy Director-General, Clinical Excellence Queensland.

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Version Control

Version	Date	Comments
1.0	9 September 2013	New guideline
2.1	29 March 2021	New template; revised title; additional related documents; general expansion of all sections consistent with current evidence; advice regarding off-label use; addition of silver diamine fluoride
2.2	6 September 2023	Guideline reviewed – new template