

# Dental Public Health Fluoride Varnish (FV): Guideline and Procedure

## Site Applicability

VCH Dental Public Health Programs

## Practice Level

- Dental Hygienists: Basic Skill
- Dentists: Basic Skill

## Need to Know

This protocol is a VCH-version of the *Provincial Dental Public Health Fluoride Varnish Protocol*, developed by the BC Dental Public Health Committee (BCDPHC) (consisting of a Dental Public Health representative from each Health Authority in BC) to support a province-wide standard on the application of fluoride varnish in BC.

Fluoride varnish is widely used in dental public health settings because of its safety, cost-effectiveness and ease of application by anyone who is trained to apply it<sup>1</sup>. Unlike other professionally applied fluorides, the risk of accidental overdose of fluoride varnish is low due to its adhesive and rapid setting properties. For this reason, the application of fluoride varnish can be done by anyone who has training and follows this protocol.

Dental Public Health programs use fluoride varnish within the context of other early intervention strategies to reduce Early Childhood Caries (ECC). These strategies include caregiver education, visual screening, assessment for caries risk, and facilitation to access treatment for unmet needs. The intent of these strategies are to encourage a relationship with a family dentist and to support the caregiver to make behavioral changes that reduce their child's risk for decay.

## Guideline

### Benefits of Fluoride Varnish

According to the Association of State and Territorial Dental Directors (ASTDD), fluoride varnish is “efficacious in reducing decay in the primary teeth of high-risk children”<sup>1</sup>. Fluoride varnish prevents caries and reverses early signs of caries in young children who are at high risk for caries.<sup>1</sup> The varnish holds fluoride close to the tooth surface for a longer time than other concentrated fluoride products, which enables the remineralization of the enamel, which, in turn, prevents and reverses early signs of caries in young children.<sup>1</sup>

Each fluoride varnish application session provides an opportunity for preventive education and counseling to support the parents to become skilled at preventing tooth decay in their child<sup>5</sup>.

### **Efficacy of Fluoride Varnish**

Current evidence indicates fluoride varnish has an effective rate of 18 to 25% and as much as 59% in some cases to reduce caries incidence in higher-risk children.<sup>1,2,3</sup> The US Preventive Services Task Force (USPSTF) recommends that fluoride varnish be applied to the primary teeth of infants and children starting at the age of primary tooth eruption.<sup>4</sup> Infants, toddlers and preschool children who are caries free at the baseline risk assessment benefit most from fluoride varnish intervention.<sup>1</sup>

Presently, there is no evidence to support an optimal number of fluoride varnish applications or optimal intervals.<sup>4</sup> However, the American Academy of Pediatric Dentistry (AAPD) recommends at least bi-annual applications at 6 month intervals to control or reduce dental caries in primary or permanent teeth for moderate or high risk children.<sup>5</sup> The majority of studies demonstrate this regimen should be followed for at least 2 years for effective reductions in dental caries.<sup>1,2</sup> Repeat applications allow for increased opportunities for preventative education to support caregivers in providing daily oral care for their child. The AAPD states that fluoride application combined with other preventive measures such as dietary counseling and oral hygiene education can further reduce the incidence of caries.<sup>5</sup>

### **Fluoride Varnish Products**

Fluoride varnishes are lacquers containing 5% sodium fluoride in a colophony or resin base and provide a highly concentrated, temporary dose of fluoride to the tooth surface.

Fluoride varnish is available in tubes or single doses. Only Single dose units are used in Public Health to reduce the risk of accidental overdose, maintain correct dosing and maintaining infection control.

5% sodium fluoride colophony based varnish is recommended for caries prevention in young children.<sup>6</sup> Dosage instructions should appear on the label and the product potency (concentration/unit) must be clearly indicated. Refer to the Material Safety and Data Sheet (MSDS) for the product.

### **Fluoride Varnish Safety:**

The ASTDD Research Brief states that fluoride varnish applied 2 to 4 times or year at 3 to 6 month intervals is unlikely to contribute to fluorosis in children under the age of six as the varnish quickly sticks to the teeth and very little is ingested at the time of application. Additionally, only small amounts of fluoride varnish are ingested over time as the varnish slowly breaks away from the tooth surface.<sup>1</sup>

Colophony based fluoride varnishes are generally considered safe, efficient and well accepted by young children. If used in accordance to application and product protocol, the risk of acute toxic reactions with colophony based fluoride varnishes is considered to be minimal due to their adhesive properties, rapid setting time and small dosages used. The peak plasma fluoride levels are less than a daily fluoride tablet or brushing with fluoride toothpaste.<sup>1</sup>

To prevent accidental ingestion of a toxic dose, fluoride products must be kept in a secure container that is child proof and out of the reach of children. The container should never be left unattended. Only one dose of 5% sodium fluoride varnish per child should be available on the work surface.

Evidence supports that fluoride varnish is generally considered to be a safe product with few or rare adverse effects or contraindications when application protocols are followed; however, in order to provide a safe service, staff should be familiar with the following key safety items:

- Contraindications to fluoride varnish
- The amount of a toxic dose
- Signs and symptoms of a toxic dose
- Emergency measures should accidental toxic dose

### Contraindications to Fluoride Varnish

There are no confirmed allergic reactions to fluoride; however, reactions can occur in individuals who have a known sensitivity to **colophony** (wood resins or rosins). Colophony may be found in products that commonly come in contact with the skin, including adhesive bandages, cosmetics, creams and sunscreens as well as pine-oil cleaners, chewing gums and postage stamp glue. This is **not** a common allergy. Reports of allergic reactions involve dermatitis.<sup>9</sup> This presents in the gingival tissue where the fluoride varnish was applied, usually as redness and/or swelling of the tissue, which may cause soreness for the child. Edematous swelling has been reported in rare instances. If required, varnish is easily removed with thorough tooth brushing and rinsing.<sup>10</sup>

The following conditions would contraindicate the application of fluoride varnish. Any child presenting with these conditions **should not** receive fluoride varnish:

- Children with a known sensitivity to colophony.
- Children with asthma may be a contraindication, depending on product used. Refer to product insert.
- Children with bleeding gums may be a contraindication, depending on product used. Refer to product insert.
- Children with [ulcerative gingivitis](#) or [stomatitis](#) or any open lesion anywhere in the mouth.
- Children with large carious lesions with possible pulp involvement.

It is important to check with parent or guardian at each fluoride varnish appointment for medical updates, especially for any adverse reaction to the previous application. **Any reaction should be recorded in the child's chart, and electronic health record with the notation, 'adverse reaction or suspected colophony sensitivity'.**

### Amount of a Toxic Dose

The toxic dose of fluoride ingestion is estimated at 5mg of fluoride per kg of child body weight (the average three-year-old weighs 11 to 20kg). 5% sodium fluoride contains 22.6 mg of fluoride/ml,

therefore the dose of 0.25ml of 5% sodium fluoride varnish contains 5.6mg of fluoride and the dose of 0.4 ml of 5% sodium fluoride varnish contains 9.04 mg of fluoride which is well within safe levels.<sup>7</sup>

A child weighing 11kg would need to swallow 55mg of fluoride (or 6 x 0.4 ml single dose packages) to be considered to have ingested a toxic amount, and a child weighing 20kg would need to ingest 100mg of fluoride (or 11 x 0.4 ml single dose packages).<sup>7,8</sup>

Accidental ingestion of fluoride varnish can lead to a toxic reaction. Symptoms begin within 30 minutes of ingestion and may persist for as long as 24 hours. Fluoride is acted on by the hydrochloric acid in the stomach to form hydrofluoric acid, which is an irritant to the stomach lining.<sup>8</sup>

### Signs and Symptoms of Toxic Dose

Signs and symptoms include:

- Nausea, vomiting, diarrhea
- Abdominal pain
- Increased salivation and thirst
- Convulsions, paresthesia
- Respiratory depression and cardiovascular collapse
- Other systemic effects can involve the blood and central nervous system.

### Emergency Measures for Accidental Overdose

Should excessive amounts of fluoride be swallowed staff should call the [BC Drug and Poison Information Centre \(BC DPIC\)](#) 24-hour line and carry the number with them when providing fluoride varnish services in the community.

**BC DPIC: 1-800-567-8911 or 604-682-5050**

### Equipment and Supplies

Supplies Needed:

- Personal Protective Equipment (PPE): Refer to HA and/or respective regulatory body for PPE requirements
- hand sanitizer
- single dose 5% sodium fluoride varnish package;
- 2x2 gauze;
- light source; (optional)
- mouth mirror; (optional)
- dental bib or lap barrier;
- glass of water ;(optional)
- Isopropyl alcohol pad

## Fluoride Varnish Procedure

### 1. Conduct Caries Risk Assessment

- Conduct caries risk assessment ([Appendix A](#)) before applying fluoride determine child's caries risk, and provide [behavioural change guidance](#) to families.

## 2. Provide Family Education and Counselling

- Provide VCH Dental Program [key messages](#) when providing education and family counseling.

## 3. Obtain Informed Consent

Obtain informed consent from the parent or guardian:

- Describe the product and its benefits,
- Explain the safety of the product,
- Review the risks, including contraindications and potential adverse effects,
- Review the [application process](#) and [post-application instructions](#), and
- Ensure the parent or guardian has an opportunity to ask questions. Answer any questions the parent or guardian may have and ensure they have understood the information.

**At every application, informed consent must be obtained verbally or by signing the informed consent form ([Appendix B](#)), after reviewing [VCH/PHC Fluoride Varnish Brochure](#).**

## 4. Apply Fluoride Varnish

- Check fluoride varnish expiration date.
- Ensure informed consent is completed especially any adverse reactions to previous application.
- Don PPE per [VCH Infection Prevention and Control \(IPAC\) guidelines](#).
- Mix the fluoride varnish for at least 30 seconds prior to placement to ensure any precipitated fluoride is re-dissolved into the solution. Follow the manufacturer's instructions.
- Refer to product manufacturer guidelines for appropriate dosage for caries prevention in primary dentition.
- Keep fluoride varnish out of the reach of children.
- Parent and operator sit knee to knee – child's head in operator's lap, parent holding child's hands. If using knee-knee, place the lap barrier (dental bib) on the operator's lap. Older children may sit or stand.
- Visually assess for bleeding gums, ulcerative gingivitis or stomatitis or open lesions
- Using a gauze, remove excess moisture from the application area.
- Apply a thin coat of fluoride varnish to buccal and facial tooth surfaces. The fluoride varnish flows to the other surfaces
- Fluoride varnish sets on contact with saliva.
- Sit the child up, and offer a drink of water (optional) following application to help set varnish.
- Doff PPE per [VCH IPAC guidelines](#) and dispose of PPE and other waste in a plastic bag and safely dispose in the garbage. Make sure children cannot access discarded materials.
- Instruments, clothing, etc. that come into contact with fluoride varnish can be cleaned with isopropyl alcohol wipes.
- Provide written and verbal post application instructions (see next section).

## 5. Provide Post-Application Instructions

- Follow the [post-application instructions](#) for brushing and eating (see [Appendix C](#)).
- Encourage parent or guardian to establish a dental home for the child for regular dental care.
- If child has unmet dental treatment needs, assist family in accessing a dentist.
- Inform the parent or guardian of the appropriate recall interval. (See [Recall Guidelines](#) below)

## 6. Provide Recall Instructions

- Inform parent that fluoride varnish may be applied again in 3 to 6 months by child's dentist or public health dental hygienist.

### Documentation

- Document the fluoride varnish application in either the individual's PARIS Screening or Casenote Application by clicking the fluoride varnish tick box. Informed consent is manually documented in the Comments section in either application.

## Related Documents

- [CDA Position on Use of Fluoride in Caries Prevention](#)
- [CDSBC/CDHBC Infection Prevention and Control Guidelines](#)
- [Core Model Program Evidence Review](#)
- Provincial Dental Public Health Fluoride Varnish Protocol (*pending*)

## References

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12. Douglas J, Clark M. (2015). Integrating Oral Health into Overall Health Care to Prevent Early Childhood Caries: Need, Evidence, and Solutions. *Pediatr Dent* ;37(3):266-74

## Definitions

**Ulcerative gingivitis:** The development of an ulcer over an area of inflammation. Gingivitis is a condition in which the gums are red, swollen, and bleeding. (*Mosby's Pocket Dictionary of Medicine, Nursing, & Allied Health; Second Edition*)

**Stomatitis:** Any inflammatory condition of the mouth. (*Mosby's Pocket Dictionary of Medicine, Nursing, & Allied Health; Second Edition*)

## Appendices

- [Appendix A: Caries Risk Assessment](#)
- [Appendix B: Health Authority Informed Consent](#)
- [Appendix C: Fluoride Varnish Post-Application Instruction](#)

## Appendix A: Caries Risk Assessment

## VCH Dental Health Parent Questionnaire for Children 12 months to 5 years old

Oral health is important for your growing child. Your responses to the questions below will help Public Health staff provide support and resources that will reduce your child's risk for tooth decay. Thank you for taking the time to complete the form.

<b>1. Having special health care needs could make dental care for children more challenging.</b>			
Does your child have any health concerns? _____	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> I would like to know how my child's health concerns may affect their teeth.
<b>2. What we eat and drink, and how often we eat and drink affects the health of the teeth.</b>			
a. On a typical day, does your child eat more than 3 meals and 3 snacks?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> I would like info on how frequent eating affects teeth.
b. On a typical day, does your child drink anything other than water between meals and snacks?	<input type="checkbox"/> Yes	<input type="checkbox"/> No, only water	<input type="checkbox"/> I would like to know how frequent sipping of anything but water affects teeth.
c. Does your child fall asleep while drinking anything other than water?  What do you give? _____ How often? _____	<input type="checkbox"/> Yes	<input type="checkbox"/> No, only water	<input type="checkbox"/> I would like to know how falling asleep while drinking liquids other than water affects teeth?
d. Does your child get anything other than water if they wake in the night?  What do you give? _____ How often? _____	<input type="checkbox"/> Yes	<input type="checkbox"/> No, only water	<input type="checkbox"/> I would like to know how to stop a night bottle.
<b>3. Bacteria that cause tooth decay can spread from person to person.</b>			
a. Is tooth decay common in your family?	<input type="checkbox"/> Yes <input type="checkbox"/> Not sure	<input type="checkbox"/> No	<input type="checkbox"/> I would like more info on this topic.
b. Has your child had tooth decay in the past?	<input type="checkbox"/> Yes <input type="checkbox"/> Not Sure	<input type="checkbox"/> No	

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<b>4. Dental services are not covered by the provincial medical plan.</b>			
Does the cost of dental care limit you and your family from going to a dentist? Do you have dental benefits (insurance)? YES <input type="checkbox"/> NO <input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> I would like to know about low cost clinics <input type="checkbox"/> I would like to know about government dental benefits for children.
<b>5. Dental professionals can help prevent tooth decay.</b>			
Does your child have access to a dental office where they can have teeth checked regularly?	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Not sure	<input type="checkbox"/> I would like to know which dental offices see children my child's age. <input type="checkbox"/> I would like to know about free and low cost dental services for my child.
<b>6. Children need help brushing with a small soft toothbrush every day until they are about 8 years old.</b>			
a. Can an adult brush your child's teeth?	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Sometimes	<input type="checkbox"/> I would like tips about brushing my child's teeth.
b. Are you able to access a small soft toothbrush for your child?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> I would like more info about children's toothbrushes.
c. Sometimes children do not like to get their teeth brushed. Does your child like it when you brush their teeth?	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Sometimes	<input type="checkbox"/> I would like tips to help make brushing my child's teeth easier.
<b>7. Fluoride toothpaste can be used as soon as the first tooth erupts to prevent tooth decay.</b>			
Is fluoride toothpaste used when your child's teeth are brushed?	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Not sure	<input type="checkbox"/> I would like to know more about fluoride toothpaste and how much to use.

If you would like more information, how should we contact you? Text, email, phone, mail out or \_\_\_\_\_ (circle all that apply)

Child Name:	Child's Birth Date:
Parent/Guardian:	Today's Date:
Mailing Address:	City:
Postal Code:	Email:
Phone Number:	PID (office use only)

*The personal information collected relates directly to and is necessary for the program operation and will be kept confidential in compliance with the Freedom of Information and Protection of Privacy Act.*

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## Appendix B: Health Authority Informed Consent

### Fluoride Varnish Informed Consent

#### Things to Know about Fluoride Varnish

##### What is Fluoride Varnish?

- Fluoride varnish is a product that helps prevent tooth decay by making the enamel (outer surface of teeth) stronger. If your child has the beginning stage of tooth decay fluoride varnish can reverse the weak area and stop it from needing a filling.
- Fluoride varnish can be applied two to four times a year.
- Fluoride varnish contains a higher amount of fluoride than fluoride toothpaste.
- It sticks to the teeth and sets quickly allowing it to stay on the teeth longer, therefore very little is swallowed.
- Fluoride varnish treatment is in addition to daily use of fluoride toothpaste.

##### Are there any risks?

- Children may have an allergic reaction to what makes the product stick to the teeth (colophony/rosin). See below. If your child has an allergic reaction (rash, skin redness or swelling) when in contact with colophony/ rosins they should **not** have fluoride varnish. This is not a common allergy.

##### What is colophony or rosin?

Colophony (or rosin) is the sticky substance that comes from pine and spruce trees. It is used in many products that come into contact with the skin such as:

- adhesive bandages
- sunscreen
- skin creams
- chewing gum
- postage stamp glue

##### How is fluoride varnish applied?

- Teeth are gently wiped with gauze.
- A small amount of fluoride varnish is applied to the teeth with a small brush.

##### What happens after fluoride varnish is applied?

- Varnish is left on the teeth for 6 hours without brushing.
- Children can eat and drink during this time, but avoid crunchy or hot foods
- Post-application instructions will be given.



## Appendix C: Fluoride Varnish Post-Application Instructions



Dental Program info
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### Fluoride Varnish Post-Application Instructions

Child's Name \_\_\_\_\_ Date \_\_\_\_\_

Today your child had fluoride varnish applied to his/her teeth.

#### For the next 6 hours:

- Be alert for signs of allergic reaction\*.
- Offer only soft foods.
- Avoid crunchy foods such as raw carrots, apples, popcorn and chips.
- Avoid hot drinks.
- Do not brush your child's teeth.

*\* Possible allergy to colophony in the fluoride varnish was ruled out before this product was applied. However, if your child should have an adverse reaction such as burning, itchiness, redness and/or swelling in and /or around the mouth, brush the fluoride varnish off the teeth immediately. Tell your health care providers.*

You or your child may notice a coating on the teeth. This is normal after a fluoride varnish application. This feeling will go away over time.

If you have any questions or concerns about the fluoride varnish application, please call the Vancouver Coastal Health Dental Hygienist at the number listed above.

Fluoride varnish may be applied again in 3-4 months by your child's dentist or public health dental hygienist.

Fluoride varnish can be removed/cleaned from skin of hands, clothing or any hard surfaces with isopropyl alcohol. Do not use isopropyl alcohol on skin of face.

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<b>Owners:</b> <i>(optional)</i>	VCH  <b>Developer Lead(s):</b> <ul style="list-style-type: none"><li>• BC Dental Public Health Committee (BCDPHC)</li><li>• VCH Regional Dental Practice Committee (RDPC)</li></ul> <b>Development Team members:</b> <ul style="list-style-type: none"><li>• VCH Community Dental Hygienist-North Shore</li><li>• VCH Community Dental Hygienist-Richmond</li><li>• VCH Community Dental Hygienist-Powell River</li><li>• VCH Community Dental Hygienist-Sunshine Coast</li></ul>

## Review / Revised Date

- Dec 20, 2021 – Updated Appendix A