Root Caries Prevention & The Prevora Antibacterial Tooth Coating

A guide for the dental professional

The Prevora antibacterial tooth coating is an effective decay preventive agent for adult tooth decay at the gum line, and is of significant value when used in a conscientiously applied program of oral hygiene and regular professional care.

Prevora is a prescription drug (D.I.N. 02046245) approved by Health Canada for the reduction of root caries in adults at high risk of dental caries.

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Webinars on Prevora are regularly conducted. Refer to www.prevora.com for the most convenient schedule.

Table of Contents

1. What is Prevora?

- Prevora is a clear, temporary coating applied by the dental professional to the full dentition of the adult dental patient who is at risk of root caries. It contains 10% chlorhexidine.

- Prevora is the only proven and approved preventive treatment for root caries.

- Prevora Stage 1 is approved as a prescription drug by Health Canada (D.I.N. 02046245) "for the reduction of root caries in adults at high risk of dental caries". Prevora Sealant Stage 2 is also approved by Health Canada as a medical device.

- The patient receives 4 weekly treatments in the first 8 weeks of the treatment plan, then a single treatment at 6 month recall appointments until he/she is no longer at risk.

Prevora works. In high risk older adults, this coating reduced root caries by 41% ($p < 0.05$) over one year. This is the highest reduction of root caries reported in the literature for a well-controlled study.

- Prevora is safe. In controlled clinical studies, there were no serious adverse reactions attributed to the drug and non-serious reactions amounted to 3.5 in 100 treatments and included temporary, minor stinging of the gums or tongue and a transient bitter taste. Tooth discoloration is a very rare event with Prevora.

Why should I be interested in Prevora?

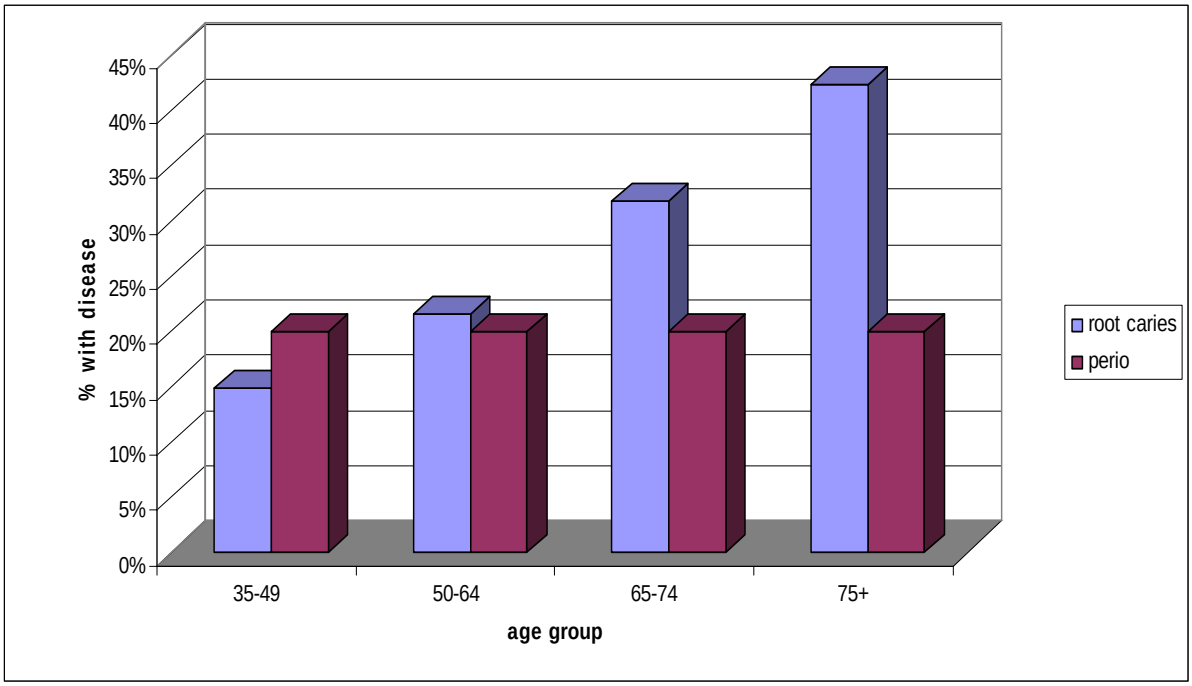
- Root caries is the most common dental disease past the age of 50. It is more common than periodontitis. A recent study conducted by family dental practices in Ontario found that 8 out of 10 patients over age 40 are at significant risk of root caries. As the population ages, this disease will increasingly occupy your day. Root caries prevention is the largest unmet need in your practice.

- National surveys of Canadians show that older Canadian dental patients are significantly interested in Prevora and expect their hygienist to talk to them about this new treatment. Data from family clinics in Ontario show that each hygienist will have at least one patient each day who will want to discuss and learn about Prevora.

2. When should I use Prevora? Who needs it, what are the risk factors?

Adult dental caries, including both coronal and root caries, afflicts the majority of Canadians aged 55 and older.[1] American data shows that the odds for root caries rise with age; applied to Canada, this suggests that more than 30% of Canadian seniors experience this chronic disease (Figure 1). **After age 50, root caries is more common than periodontal disease** and rivals other chronic diseases in terms of prevalence. For people aged 45 -64, root caries is as common as chronic joint symptoms (32%), hypertension (32%), arthritis (29%), and is far more common than symptoms of mental illness (14%), heart disease (13%), and diabetes (10%).[2]

Figure 1
The prevalence of root caries and periodontal disease by age



Sources: CDC, Trends in oral health status: US, 1988-1994, and 1999-2004, Vital and Health Statistics, Series 11, #248, April 2007; Albandar JM et al. 1999. Destructive periodontal disease in adults 30 years of age and older in the United States, 1988-1994. J Periodontol.70: 13-29.

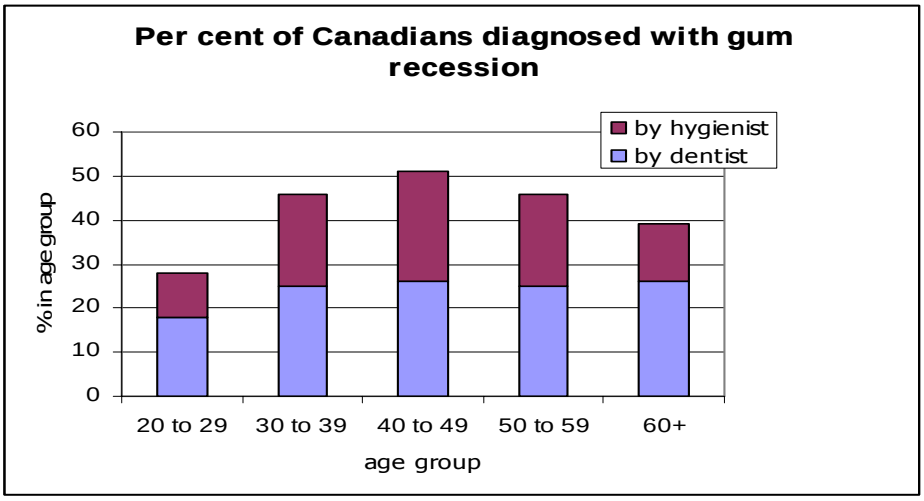
[1] U.S. Department of Health and Human Services. 2000. Oral health in America: A report of the Surgeon General.
[2] Centers for Disease Control and Prevention, NCHS. 2002. Vital Statistics, Series 10, Summary of health statistics for U.S. adults: National health interview survey.

Risk factors:

There are several risk factors for root caries, most of which are associated with advancing age.

- Gum recession: Adults with gum recession are four times more likely to experience root caries.[3] About half of Canadian adults between ages 40 and 65 are diagnosed with gum recession by their dental professional (Figure 2).

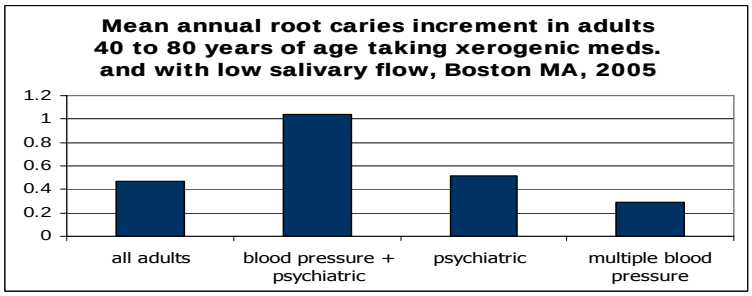
Figure 2



source: CHX Technologies, Online Surveys 2006.

- Multiple-medication use: More than one third of Canadian seniors take 3 or more prescription drugs on a daily basis.[4] Dry mouth often develops from multiple-medication use and dry mouth is associated with root caries. Studies show that antihypertensives, diuretics, antianxiety medications, total days taking medications[5] and number of medications are significantly associated with root caries (Figure 3).

Figure 3



source: Singh ML, Papas AS, Biesbrock AR. 2006. Root caries increment in a medication-induced salivary hypofunction population. AADR Abstract #1472.

[3] Lawrence HP, Hunt RJ, Beck JD. 1995. Three-year root caries incidence and risk modeling in older adults in North Carolina. J Public Health Dent., 55: 69 – 78.
[4] Millar W. 1998. Multiple medication use among seniors. Statistics Canada, Health Reports, v.9, #4, Catalogue 82-003.
[5] Shulman JD, Bolin KA. 2006. Is root surface caries associated with xerogenic medications? American Association of Dental Research Abstract 0477.

- Periodontal disease: Patients with some loss of attachment of 9 mm or more were found to be more than three times at risk of root caries.[6] Two studies of patients undergoing periodontal maintenance care (scaling and root planing) report that these patients are very likely to develop root caries. Ravald et al found over 4 years, 66% patients undergoing periodontal scaling and root planing experienced root caries.[7] Reiker et al reported 82% of periodontal maintenance patients experienced root caries over a 22 year follow-up period.[8] Importantly, the level of *S. mutans* increases in sub-gingival plaque after scaling and root planing.[9]

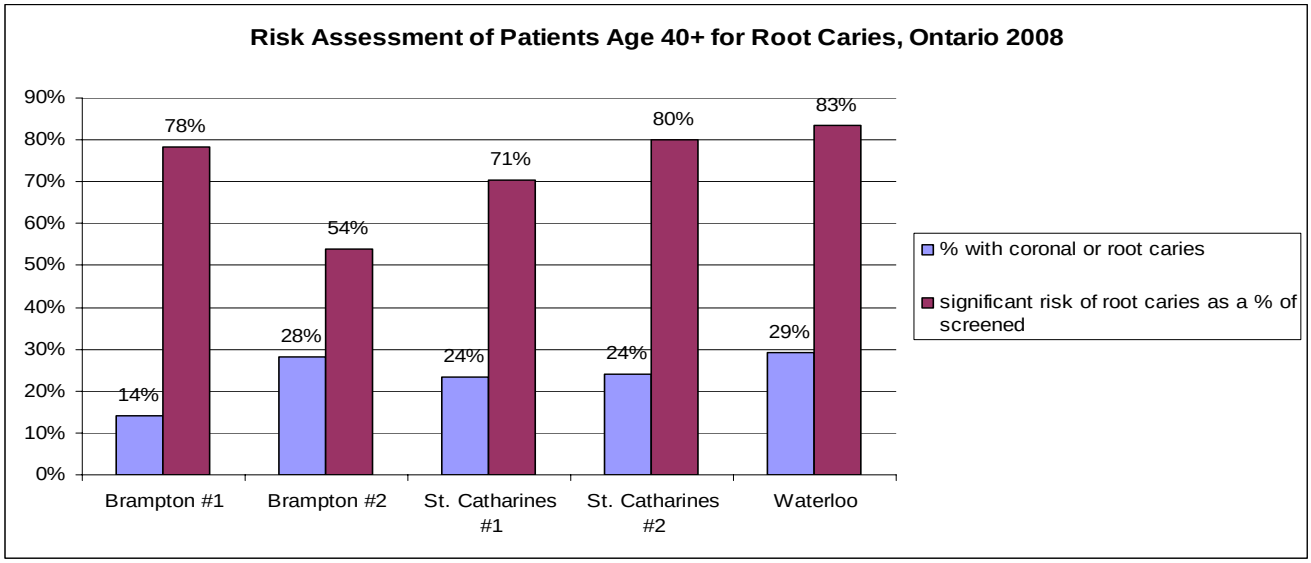
- Smoking: Smoking further increased the risk of root caries in older adults taking xerogenic medications in Boston.[10]

- Behavioural factors: Infrequent cleaning of teeth, heavy plaque deposits, a removable partial denture, frequent consumption of sugar- rich foods also significantly increase the risk for root caries.[11]

How common are these risk factors in a family dental practice?

From risk assessment studies conducted by several family dental clinics in Southern Ontario, about 8 out of 10 adults age 40+ are at significant risk of root caries (Figure 4).

Figure 4



Source: CHX Technologies, 2008

[6] Steele JG, Sheiham A, Marcenes W, Fay N, Walls AWG. 2001. Clinical and behavioural risk indicators for root caries in older people. Gerodontology, 18: #2, 95 – 101.
[7] Ravald N, Hamp S. 1981. Prediction of root surface caries in patients treated for advanced periodontal disease. J Clin Periodontol, 8: 400-414.
[8] Reiker J et al. 1999. A cross-sectional study into the prevalence of root caries in periodontal maintenance patients. J Clin Periodontol, 26: 26-32.
[9] Van der Reijden et al. 2001. A cross-sectional study into the prevalence of root caries in periodontal maintenance patients. J Clin Periodontol, 26: 26-32.
[10] Singh ML, Papas AS, Biesbrock AR. 2006. Root caries increment in a medication induced saliva hypofunction population. American Association of Dental Research Abstract 1472.
[11] Steele JG et al, op.cit.

3. How do I use Prevora?

Note: An instructional video on the application techniques and the best way of presenting Prevora to your patients is available on the website www.prevora.com.

Before starting the Prevora treatment, ensure that the dentition contains no open caries lesions or restorations with imperfect margins. Prepare for the application with a tray as shown below, consisting of cotton rolls, cotton pellets or fine brushes, a forceps, air syringe and the box of Prevora Stage 1 and Prevora Sealant Stage 2.

1. Give a rubber cup prophylaxis using flour of pumice and water, or non-oil based prophylactic paste.

2. Thoroughly rinse and floss the patient's teeth with un-waxed floss to remove pumice and residual dental plaque. Ensure the cleanliness of the distal surface of the last tooth in each arch by wiping it with a cotton pellet held in a pair of forceps.

3. Isolate one quadrant of the dentition with cotton rolls and a saliva ejector.

4. Dry all teeth in that quadrant with an air syringe.

5. Using a cotton pellet held in forceps, or a fine brush suitable for reaching interproximal areas, apply Prevora Stage 1 to the interproximal areas of all posterior teeth in the quadrant.

6. Again dry the tooth surfaces of that quadrant with the air syringe and apply Prevora Stage 1 to all tooth surfaces; dry Prevora Stage 1 briefly with an air syringe.

7. Apply Prevora Sealant Stage 2 over the Prevora Stage 1 with a second cotton pellet or with another fine brush; dry Prevora Sealant Stage 2 with an air syringe.

8. Repeat steps 4 through 8 on each of the other quadrants.

9. Advise the patient: (i) that the dried Prevora film will begin coming off the teeth during the next meal; (ii) to avoid eating hard foods for at least 4 hours after treatment; (iii) to avoid tooth-brushing for 24 hours after treatment and then to resume tooth-brushing with a new brush; (iv) not to chew gum for 24 hours, and; (v) to avoid flossing for 3 days.

10. Instruct the patient to control sugar intake and to follow regular oral hygiene practices, including brushing with a fluoridated dentifrice and frequent flossing. Provide the patient with the post-treatment slip or the patient information leaflet (included in every box of Prevora) which further explains this treatment and the important procedures to be followed after treatment.

11. Repeat this initial Prevora application every week for 3 more weeks after the initial application, followed by a single application at six months and thereafter according to professional judgement. The patient should be followed-up for an assessment of caries risk and experience between 3 and 6 months thereafter, according to standard recall procedures for patients at risk of dental caries. Instruments, clothing etc. in contact with Prevora Stage 1 may be cleaned with alcohol.

4. What is the composition of Prevora?

There are two components to the Prevora antibacterial tooth coating (Table 1).

Table 1 Stages of the Prevora Tooth Coating

Coating	Composition
Prevora Stage 1	• 10% w/v chlorhexidine acetate • 20% w/v Sumatra benzoin • 70% w/v ethyl alcohol
Prevora Sealant Stage 2	• 28% w/w polymethylmethacrylate • 6% w/w triethyl citrate • 66% purified water

Prevora Stage 1 contains 10% chlorhexidine, or almost 100 times more chlorhexidine than the rinse you are familiar with. This high concentration of chlorhexidine is important to prevent the re-emergence of the biofilm (plaque) for an extended period of time.

The Sumatra benzoin is a natural substance which helps the chlorhexidine stay on the teeth to prevent the re-emergence of the biofilm.

Prevora Sealant Stage 2 is methacrylate (acrylic), the same coating used to make enteric coated aspirin. It works to protect the chlorhexidine in Stage 1 from being washed away by the saliva or scraped away by food. The tryiethyl citrate is a common and safe pharmaceutical ingredient which thickens the methacrylate for ease of application on the tooth surface.

5. How safe & effective is Prevora?

Safety?

For every 100 applications, data from controlled studies show that there are 3.5 minor adverse events:

- Irritation to the gums, tongue or lips, resulting from misapplication of Prevora to the soft tissues
- A temporary bitter taste, also from misapplication beyond the tooth surface.

There have been no reported serious side effects or hospitalizations resulting from Prevora.

Patients with sensitivities to chlorhexidine, Sumatra benzoin or methylmethacrylate should not receive Prevora, nor should pregnant or nursing women. Patients with asthma should have their medications with them during treatment.

Staining?

Tooth staining associated with Prevora has not been observed. This is because the chlorhexidine coating is applied to a cleaned tooth surface after a prophylaxis, because the Prevora Sealant Stage 2 protects the chlorhexidine from food interactions, and because Prevora uses a different type of chlorhexidine than the rinse.

What does it look like and feel like on the tooth?

Prevora is transparent, although sometimes there may be small white spots if moisture is present during its application. These white spots are only temporary.

Prevora has the sensation of a coating on the teeth. This sensation lasts a few hours, and the patient needs to be advised of this sensation before treatment.

How effective is Prevora?

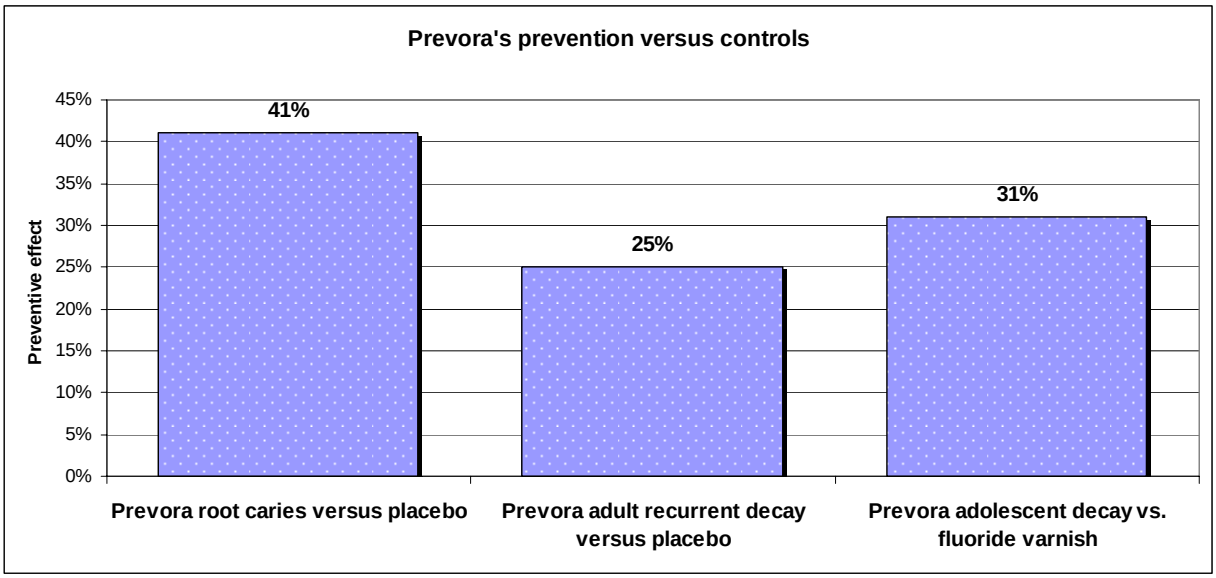
Two randomized, controlled studies have been completed on Prevora Stage 1. These studies are unique in the dental research literature in several respects:

- These studies had relatively large study populations.
- These studies involved patients considered to be at high risk of caries.
- These studies involved patients between age 11 and age 80.
- These studies used a placebo control as well as other controls.
- The studies have been reviewed and accepted by several regulatory authorities, including Health Canada.

One of the efficacy studies focused on adolescents. It reported a significant reduction in caries, comparing active treatment versus placebo. The efficacy results range from 20% ($p < 0.05$) for all tooth surfaces in adolescent girls who followed the protocol. Prevora's treatment effect in young adolescent girls surpassed that of fluoride varnish by 31% ($p< 0.05$) over three years.

Other studies have shown Prevora's treatment effect on the root surface of older adults. The reduction in root decay was unrivalled (40.8%, $p < 0.05$) and, hence, this is the approved indicated use in Canada under D.I.N. 02046245.

Figure 5



Source: CHX Technologies, Clinical Study #001 and #002, 2004.

How does Prevora compare to fluoride and other medical treatments?

The current standard of preventive care for adults in Canada is based on the use of fluoride, primarily in 3 different dosage forms. These are: in-office fluoride gel, in-office fluoride varnish, and at-home extra-strength (5000 ppm) fluoride toothpaste prescribed by the dentist. About half of Canadian adult dental patients under the age of 60 report they receive topical fluoride at the dental office (Figure 5). Fewer than 30% of Canadians aged 60 or older report that they receive professional fluoride.

Although the administration of fluoride to adults is reportedly sporadic, it is more important to consider fluoride's efficacy in preventing adult caries, and in particular, root caries. Five overviews of the research literature on fluoride's treatment effect in adults have concluded that there is insufficient evidence about fluoride's prevention in adults.

Since 2001, a review by the U.S. National Institutes of Health[12] concluded that useful studies about fluoride were based on children only, and that there was no satisfactory evidence about the use of fluoride to prevent primary or secondary caries in adults. Similar conclusions were reached by other

[12] National Institutes of Health. 2001. Consensus Statement: Diagnosis and Management of Dental Caries throughout Life, at http://consensus.nih.gov/cons/115/115

independent researchers in 2003,[13] and 2004.[14] Another study in 2007 reported that controlled clinical trials of fluoride varnish in adults have yet to be undertaken.[15]

Specifically regarding root caries, a study by Paraskevas[16] found that fluoride mouth rinse and dentifrice did not reduce root caries over 2 years in patients undergoing periodontal maintenance care. Moreover, a controlled study in the U.K. found a fluoride varnish to be significantly ineffective compared to a 1% chlorhexidine varnish in reducing root caries.[17]

Poorly controlled studies of topical fluoride administered in the dental office provide some support for fluoride's use, possibly in combination with Prevora as part of a way to control demineralization (Prevora) and to promote remineralization. The range of root caries reduction for various fluoride treatments and dosage forms (rinses, gels, dentifrice) is from 16% for a 0.05% NaF rinse over 3 years[18] to 67% for a 1000 ppm sodium fluoride dentifrice daily for one year in a non-fluoridated community,[19] to 70% over 3 years for a semi-annual application of a 1.2% APF gel and daily use of a 0.05% F rinse.[20]

Two studies reveal that the combination of chlorhexidine and fluoride provide synergistic benefits to caries management in adults at highest risk of caries – irradiated patients.[21, 22]

The importance of patient compliance

In situations which are non-life threatening or for which the patient is not experiencing symptoms – the case with adult caries – compliance is usually low. According to the norms established by pharmaceutical studies, it is likely that only 41% of **p**atients using chlorhexidine rinse at home will take the rinse according to instruction. Moreover, studies show that compliance with home-care treatment such as the extra-strength fluoride toothpaste is also poor. In another recent study of adherence to regular tooth brushing by adults undergoing periodontal treatment, only 34% of brushings met the time standard; 20% were partly compliant, and 46% were non-compliant.[23]

In contrast, Prevora is applied professionally in the dental office so that there is little scope for patient non-compliance.

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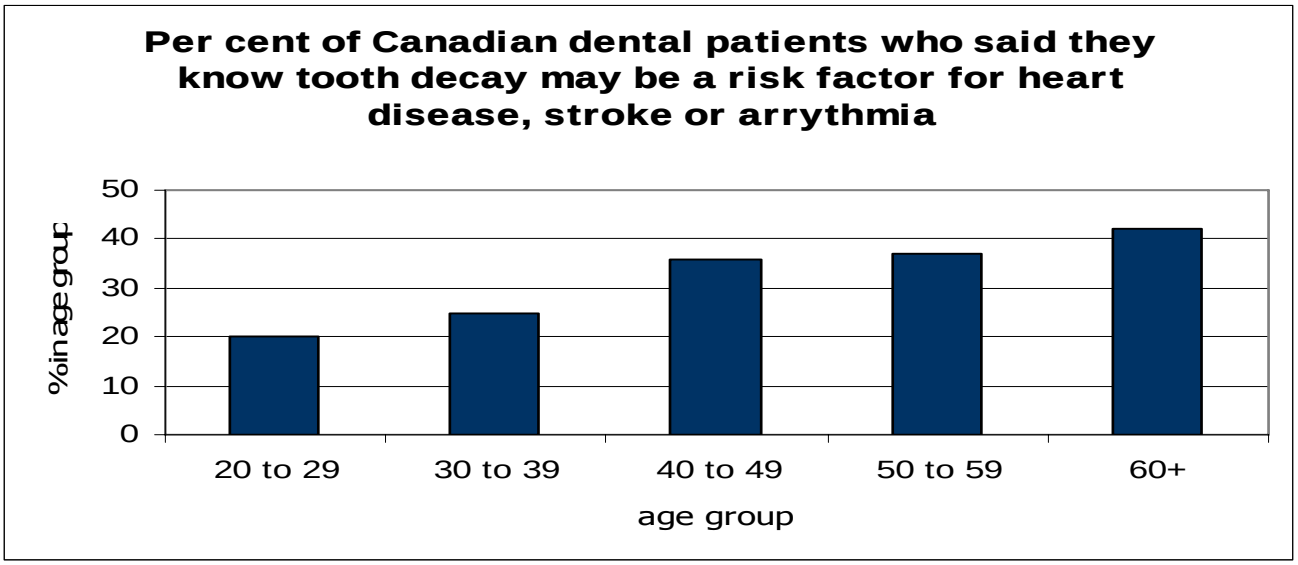
[13] Brunton P, Kay E. 2003. Pervention. Part 6: Prevention in the older dentate patient. Br Dent J, 195: 237-241.
[14] Twetman S et al. 2004. Caries-preventive effect of sodium fluoride mouthrinses: a systematic review of controlled clinical studies. Acta Odontol Scand, 62: 223-230.
[15] Spolsky VW, Black BP, Jenson L. 2007. Products- old, new and emerging. CDA Journal, 35: 724-737.
[16] Paraskevas S et al. 2004. Amine fluoride/stannous fluoride and incidence of root caries in periodontal maintenance patients. A 2-year evaluation. J Clin Periodontol., 31: 965-971.
[17] Brailford S et al. 2002. The effects of the combination of chlorhexidine/thymol and fluoride-containing varnishes on the severity of root caries lesions in frail institutionalized elderly people. J Dent Res, 30: 319-324.
[18] Ripa L et al. 1987. Effect of a 0.05% neutral NaF mouthrinse on coronal and root caries in adults. Gerodontology, 6: 131-136.
[19] Jensen M, Kohout F. 1988. The effect of a fluoridated dentifrice on root and coronal caries in an older, adult population. JADA, 117: 829-832.
[20] Wallace M et al. 1993. The 48-month increment of root caries in an urban population of older adults participating in a preventive dental program. J Pub Health Dent, 53: 133-137.
[21] Katz S. 1982. The use of fluoride and chlorhexidine for the prevention of radiation caries. JADA, 104: 164-170.
[22] Joyston-Bechal S et al. 1992. Caries incidence, mutans streptococci and lactobacilli in irradiated patients during a 12-month preventive program using chlorhexidine and fluoride. Caries Res, 26: 384-390.
[23] McCracken G, Janssen J, Heasman L, Stacey F, Steen N, deJager M, Heasman P. 2005. Assessing adherence with tooth brushing instructions using a data logger toothbrush. British Dental Journal, 198: 29 – 32.

6. What is the relationship between root caries and overall health?

More than 40% of older Canadian adults say they know of a connection between good oral health and overall health (Figure 6).[24]

Figure 6



source: CHX Technologies Online surveys of Canadian adult dental patients

Much of this understanding is based on the growing connections between periodontal health and cardiovascular health, but there have also been studies which link root caries to overall health.

There have been 11 large, longitudinal population studies since 1989 showing that dental diseases and tooth loss are associated with increased risk of atherosclerosis, coronary heart disease and cerebrovascular disease.[25] One study has shown a significant correlation between number of carious surfaces and death due to cardiovascular disease amongst a Swedish population when adjusted for age and gender.[26] When caries was part of a composite of five oral pathologies (including periocoronitis, retained root remnants, edentulism, gingivitis and dental caries), this composite made a significant contribution to an explanatory model of coronary heart disease in a Finnish adult population.[27] Swedish research has reported that community-dwelling Swedish citizens aged 80 and over with three or more active root caries had more than twice the odds of cardiac arrhythmias than persons without active root caries.[28] There was no association in this population between periodontal disease and arrhythmia.

[24] Ipsos-Reid Survey of Canadians age 40+, July 2008.
[25] Holm-Pedersen P et al. 2005. Dental caries, periodontal disease and cardiac arrhythmias in community-dwelling older persons aged 80 and older: is there a link? J Am Geriatr Soc, 53: 430-437.
[26] Jansson, L. et al. 2001. Relationship between oral health and mortality in cardiovascular diseases. J Clin Periodontol., 28: 762 -768.
[27] Janket, S., et al. 2004. Asymptotic dental score and prevalent coronary heart disease. Circulation, 109: 1095 – 1100.
[28] Holm-Pedersen, P. et al. 2005. Dental caries, periodontal disease and cardiac arrhythmias in community-dwelling older persons aged 80 and older: is there a risk? J Am Geriatr Soc., 53: 430 – 437.

One researcher, Dr. Sally Mauriello of the University of North Carolina, has pioneered on the connections between root caries and overall health. In one study, Dr. Mauriello found that root caries was more important to the risks of coronary heart disease than cholesterol, current smoking and age. In 1996, Mauriello et al reported that older adults with ≥ 2 new root caries lesions were four times more likely to die during the 3 to 5 year follow up period, than those with fewer than 2 root lesions.[29] Mauriello's subsequent study in 1999 extended and confirmed these findings.[30] Again in 2006, Mauriello et al reported that Americans aged 52-74 years with root caries had an incidence of heart attack over 5 years of 4.7% - compared to a rate of 2.4% for those without root caries. In a regression analysis, root caries was significantly associated with a heart attack in this population after adjusting for periodontal pocketing, race, age, sex, and the usual risk factors such as smoking, income, diabetes, hypertension and LDL.[31]

Mauriello has also presented important data from a major, longitudinal, prospective study of coronary heart disease called the Atherosclerosis Risk in the Community Study (ARIC). ARIC was conducted in four U.S. cities over 10 years starting in the late 1980s, involved over 15,000 participants, and has yielded seminal results. Mauriello's data on root caries and its connection to coronary heart disease are provided in Table 2. In ARIC, root caries was more important to the risks of coronary heart disease than cholesterol, current smoking and age.

Table 2
Odds Ratios for Coronary Heart Disease by Risk Factors in Community dwelling American adults aged 45-64 years
- ranked by odds ratio -

Risk factor	Odds ratio (p values)
Gender (male)	2.8 (< 0.01)
Hypertension	2.0 (< 0.01)
Former heavy smoker	1.9 (< 0.01)
Root caries (0 vs 1+)	***1.6 (< 0.02)***
Current heavy smoker	1.6 (< 0.01)
Age	1.1 (< 0.01)
LDL	<1.0 (< 0.01)
HDL	<1.0 (< 0.01)

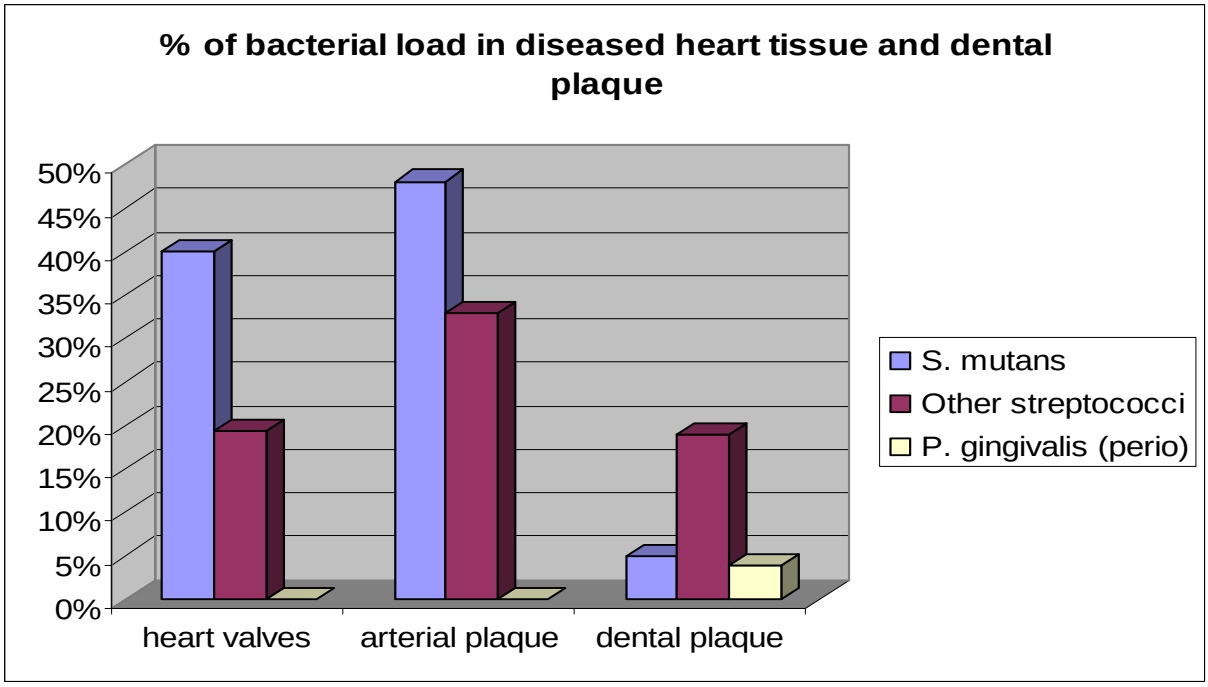
Source: Dr. Mauriello unpublished information from the Atherosclerosis Risk in Communities Study, conducted 1987 – 1998.

The biological pathway from adult caries to systemic health remains unclear. One systematic review suggests that nutrition may be the mediator between oral and systemic disease.[32] Another study found that *Streptococci mutans* was far more dominant on arterial plaque of hospitalized patients

[29] Mauriello SM et al. 1996. Risk modeling for root caries and mortality in older adults. IADR Abstract 896, J Dent Res, 75.
[30] Mauriello SM et al. 1999. Root caries incidence as a risk predictor for mortality. IADR Abstract 3582, J Dent Res., 78.
[31] Mauriello SM, Moss KL, Beck JD. Root caries prevalence and incident myocardial infarction. Abstract 1471 at the American Association for Dental Research Meeting of 2006.
[32] Ritchie, C. et al. 2002. Nutrition as a mediator in the relation between oral and systemic disease: associations between specific measures of adult oral health and nutrition outcomes. Crit Rev Oral Biol Med. 13: 291 – 300.

with heart disease, than it was in dental plaque (Figure 7); in other words, there may be a bacteremia effect from caries.

Figure 7



Source: Nakano K. et al, 2006. Detection of Cariogenic Streptococcus mutans in Extirpated Heart Valve and Atheromatous Plaque Specimens. J Clin Micro, 44: 3313 - 3317.

7. What do my adult patients know about dental prevention? What do they expect and prefer when they visit our dental office?

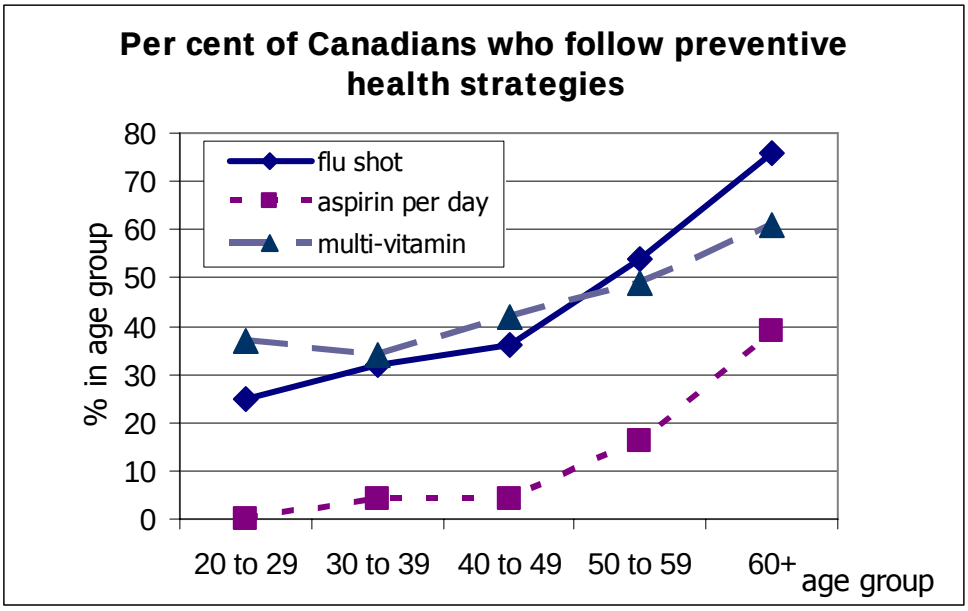
Today's older dental patients are well informed generally and know a lot about tooth decay, its causes and implications. For example, in online surveys of older Canadian adults, 87% knew that gum recession put the teeth at risk of bacterial infection causing tooth decay, and 40% also knew that tooth decay may be a significant risk factor for stroke, arrhythmia and heart disease.

Several on-line surveys have been conducted by and for CHX Technologies to evaluate the preferences of Canadians age 40+ for various types of dental services, including more preventive care. Most recently, in mid 2008, the national survey firm Ipsos-Reid canvassed 1,048 Canadians on these matters. CHX also commissioned several family clinics in Southern Ontario to evaluate their patients' response to more prevention.

The following key results have been obtained from this ongoing market research:

A focus on health: Starting when they are in their mid 40s, most Canadians become far more concerned with their health, and more focused on health prevention. Figure 10 below illustrates some examples of this behaviour: the percentage of older Canadians taking the flu shot, an aspirin a day along with a multivitamin (Figure 8).

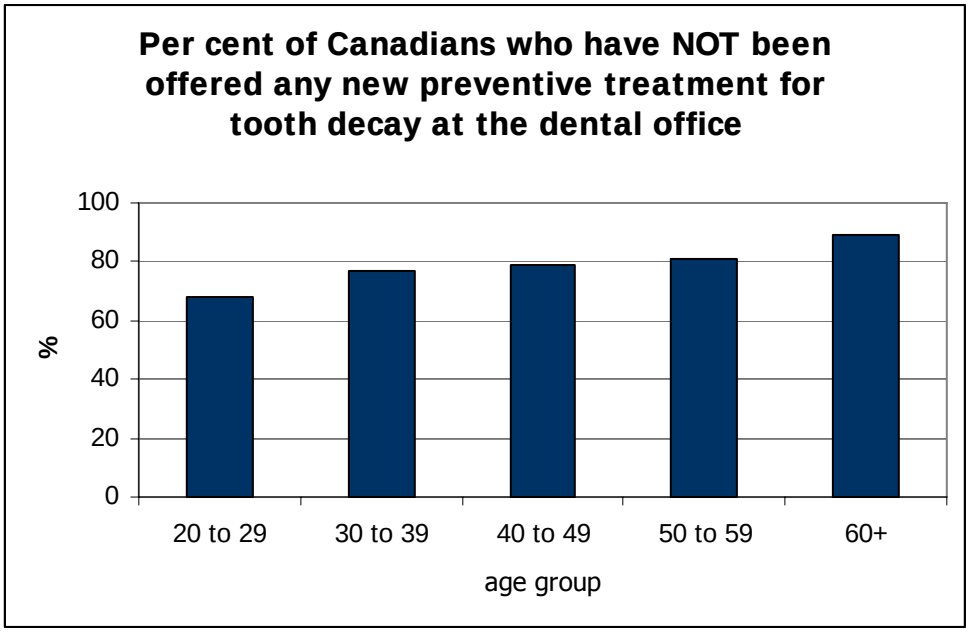
Figure 8



source: CHX Technologies, Online surveys of Canadian adult dental patients, 2006

Yet despite this interest by patients aged 40+, more than 80% of them indicated that **they had not received any recommendation for any new preventive treatment at their dental office in the past 2 years** (Figure 9).

Figure 9

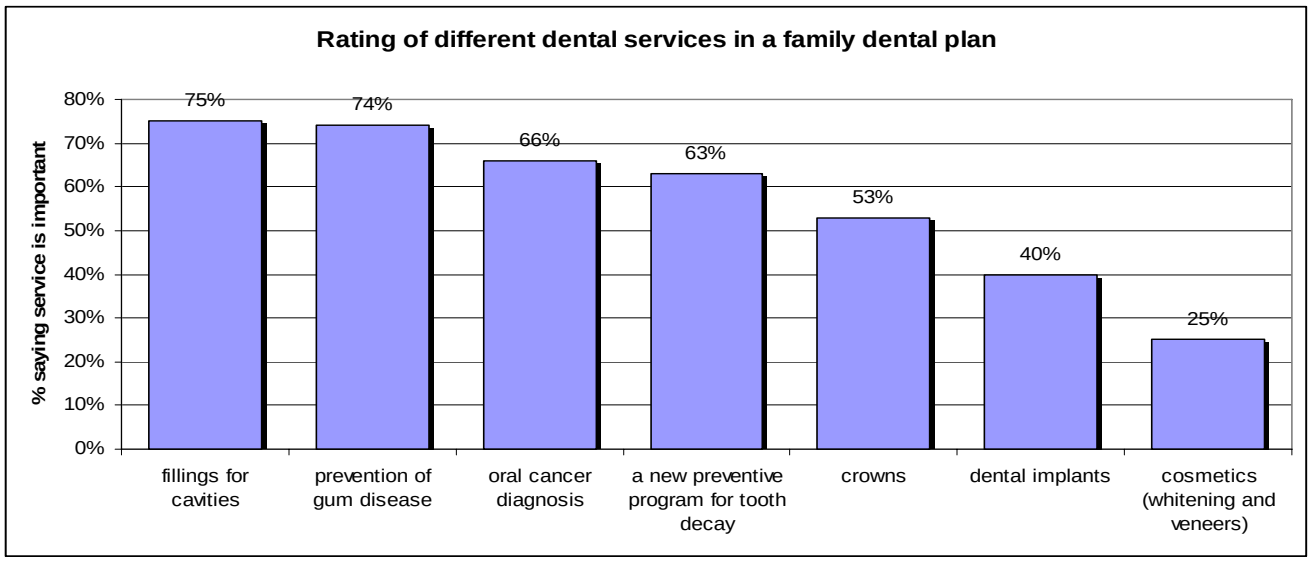


source: CHX Technologies, Online surveys of Canadian adult dental patients, 2006

Preference for preventive services is strongly evident:

- Almost 9 out of 10 respondents in the Ipsos-Reid survey expect their dental professional to speak to them about new preventive treatments like Prevora.
- 7 out of 10 respondents in the Ipsos-Reid national survey responded that they would be either very interested or interested in their dental professional speaking to them about Prevora.
- Older Canadians significantly rate more prevention of tooth decay ahead of other dental procedures such as crowns, implants and cosmetics (Figure 10).

Figure 10



Source: Ipsos Reid survey of Canadians 40+, July 2008

Role of the dental professional in the eyes of the older adult patient:

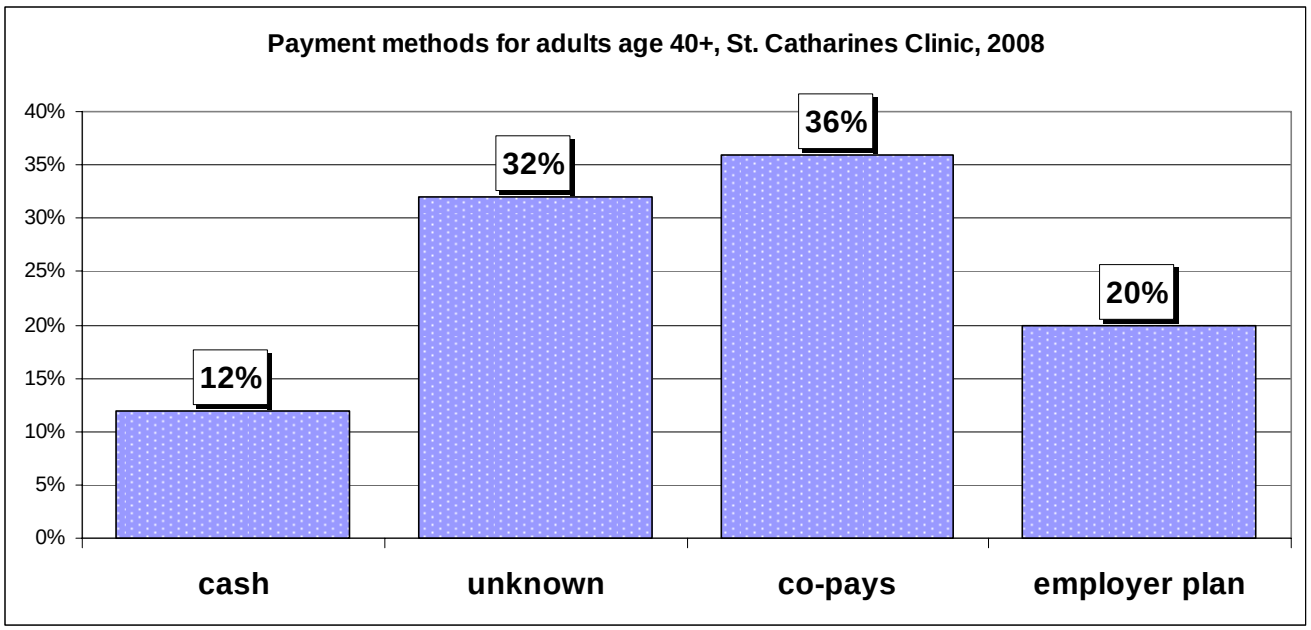
- 30% of Canadians age 40+ say the primary role of the dental professional is to recommend appropriate new preventive treatment because it is the primary reason they go to the dentist
- Another 62% say they want the dental professional to speak to them about more prevention when it is appropriate

Attitudes are changing towards user pay for dental services:

- 37% of older Canadians pay for their dental care out of pocket; this is the most common method of payment
- 39% co-pay for their dental services with their employers; only 11% say that the employer pays for the entire dental visit.
- More seniors pay for their dental care directly than younger age groups. For example, almost 6 out of 10 Canadians age 70+ pay for their dental services out of pocket.
- 24% of older Canadians paid over $400 per year for dental services out of pocket in the past 2 years. For seniors, almost one in three spent this amount each year.

In one family clinic in the Niagara Peninsula of Southern Ontario in fall 2008, over two weeks only 1 in 5 adults age 40+ had a dental plan from their employee which absorbed the total cost of professional dental care (Figure 11). Direct payment via out of pocket or co-pays amounted to at least 48% of reimbursement received by this clinic.

Figure 11



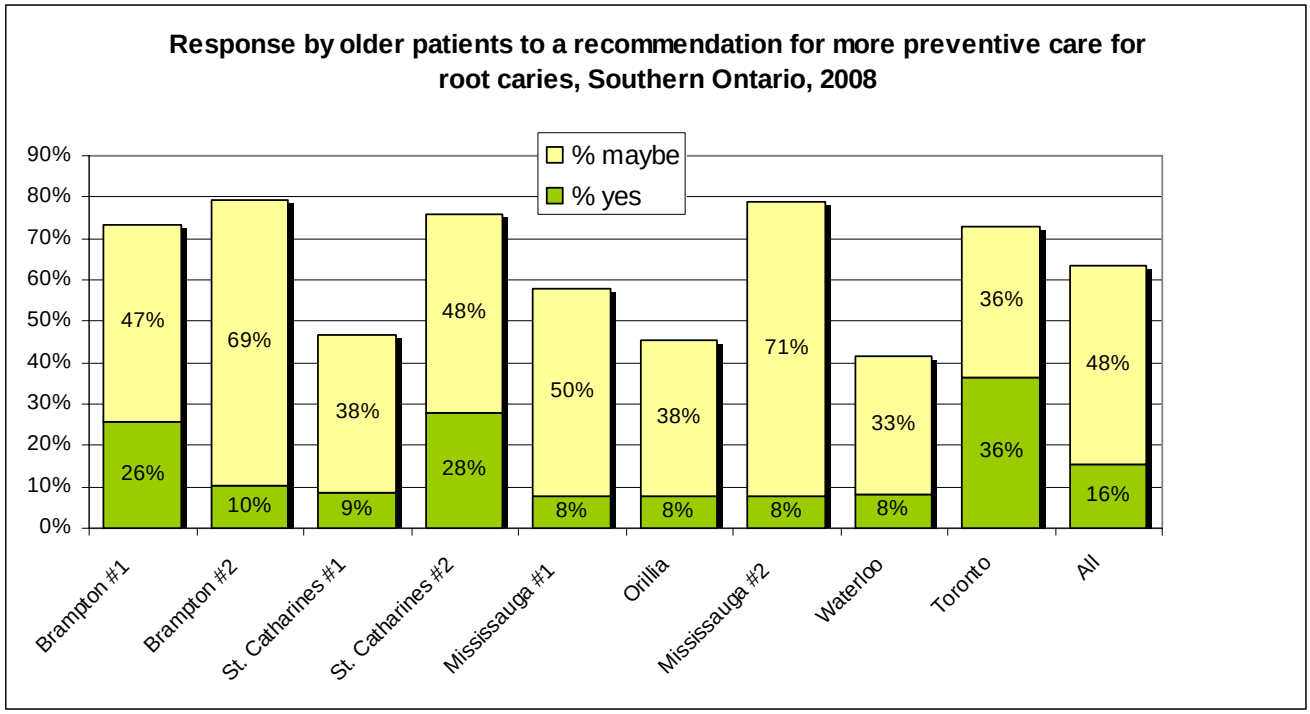
Source: CHX risk-assessment studies, 2008

Older Canadians are willing to pay for more dental prevention:

- 35% of Canadians age 40+ report they are willing to pay for more preventive care of root caries either regardless of insurance or if the cost is less than $500 per year.
- Another 29% will proceed to pay for root caries prevention if the employer's plan pays for at least half of the cost.

- Another 25% say they want to think about paying for more prevention.
- From direct experience in nine family clinics in Southern Ontario, after the patients are assessed for their risk of root caries, 2 out of 3 are either agreeable to proceeding to purchase more preventive care or will consider this purchase (Figure 12).

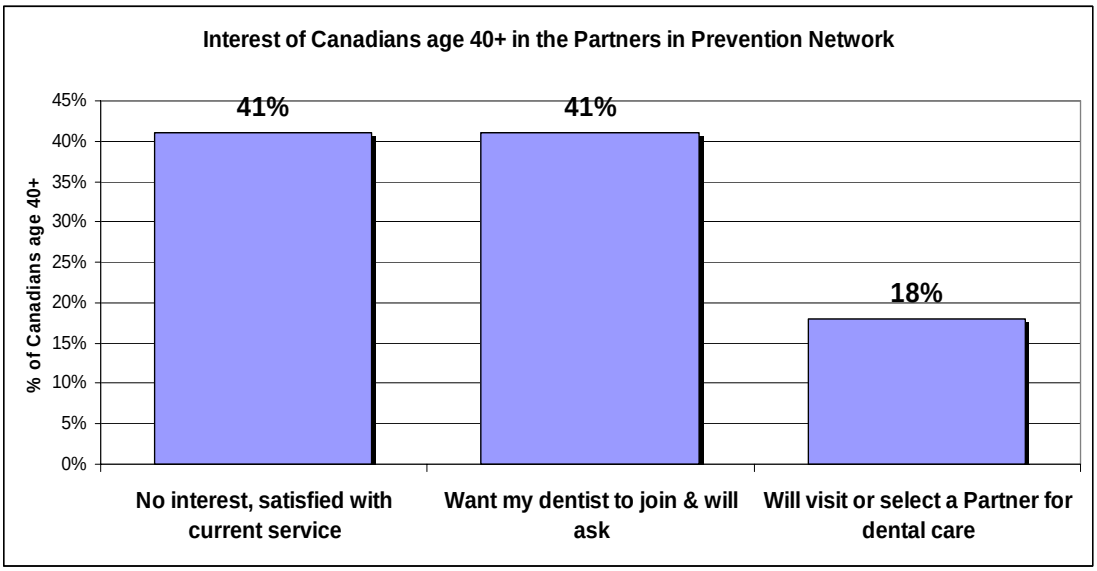
Figure 12



Source: CHX Technologies, 2008

For the patient undergoing regular scaling and root planing for periodontitis, this willingness to pay is even higher. In one specialist periodontal clinic in Toronto, the majority of patients agreed immediately to purchase more prevention from root caries (Figure 13).

Figure 13



Source: Ipsos Reid survey of Canadians 40+, July 2008

Practice management implications: In the next twenty years, population forecasts show that the patient caseload in Canadian dental will change dramatically. There will likely be **8% fewer children and students, 33% more patients between ages 45 and 64, and 81% more retirees.** Patients between ages 24 and 44, will stay about the same. Within 15 years, almost half of Canadians will be over 45.[33] In fact, by 2015, there will be more older Canadians experiencing root caries than there will be children.

Canadian industry, including dental offices, are adjusting to these new demographic imperatives by focusing on products and services which appeal to the changing needs of baby boomers, by communicating to the aging boomer and by engaging and connecting with this target audience via education sessions, dedicated displays and other inter-active services.

[33] Symington JM, Perry OR. 2004. Canada's aging population: implications for Canadian dentistry. Part 1. Oral Health, 41 – 46.

8. How do I present Prevora to my patients?

Market research shows that 7 out of 10 of your older adult patients are interested in learning about Prevora. However, because it is new, it needs to be both explained and justified to the patient – much like most other dental procedures such as scaling and root planing.

The best way and the proven way is to recommend more prevention for root caries after a comprehensive risk assessment has been conducted. The risk assessment form is included at the end of this guide.

The risk assessment form provides this objective justification for your recommendation. The form also educates the patient about what this treatment can achieve, and what they should be doing to follow the treatment regimen.

An instructional video on presenting Prevora to your patients is provided on the website www.prevora.com, and in webinars which are regularly scheduled. For the next convenient webinar, visit www.prevora.com and click on webinars.

What response can I expect after a risk assessment?

Judging from other clinics, you will get between 10% and 38% agreeing to purchase more prevention upon a risk assessment, and another 30% to 60% who will want to consider purchasing this care before their next appointment. Only 20% to 25% will say no.

Your chances of getting buy-in from your patients will increase if you:

- Have a great relationship with your patients
- Make a sincere and supportable recommendation
- Take a few minutes to explain the benefits and risks of this new treatment
- Are supported by the other staff in the office – there must be a consistent message of more prevention by all members of the care team.

The most common questions from your patients are outlined in the following section of this guide, along with answers to these questions.

9. Frequently Asked Questions

FAQs by Dental Professionals

Canadian dental professionals commonly have these questions about Prevora:

Question: How does the efficacy of Prevora compare to that of topical, in-office fluoride?
Prevora has a preventive effect of 41% on root caries in high risk adults over one year. There is insufficient evidence to know what fluoride's treatment effect is in adults. Regarding root caries prevention, Paraskevas[34] found that fluoride mouth rinse and dentifrice did not reduce root caries over 2 years in patients undergoing periodontal maintenance care.

Question: How does the efficacy of Prevora compare to that of the chlorhexidine mouth rinse?
There are no controlled studies which indicate that the 0.12% w/v chlorhexidine mouth rinse has any preventive effect on root caries. In fact, one controlled study found that regular use of this mouth rinse had no significant effect on dental caries.[35]

Question: Does Prevora stain the teeth?
Staining or tooth discoloration by Prevora has been not been reported. By contrast, after using the chlorhexidine mouth rinse, 10% of patients report staining.[36] Prevora does not stain for several possible reasons: it is used after a prophylaxis; it is dosed relatively infrequently; this coating involves a different type of chlorhexidine than the rinse; and Prevora Sealant Stage 2 may prevent the bonding of certain food ingredients in items such as tea and coffee with the chlorhexidine.

Question: Patients still seem to get root caries with Prevora – how do I explain to my patient that this preventive treatment may not completely protect them from this disease?
Most Canadian dental patients receiving Prevora have a relatively high dental IQ, and understand there is no magic bullet in fighting medical or dental infections and that without Prevora there would likely be more decay. They also understand that there is much they can do themselves to manage tooth decay and will realize any decay which happens after Prevora treatment is partly a matter of personal diet and oral hygiene. We suggest you manage the patient's expectations by explaining their risk factors, the documented level of prevention by Prevora, and what the alternatives are. An informed patient normally makes the right decisions.

[34] Paraskevas S et al. 2004. Amine fluoride/stannous fluoride and incidence of root caries in periodontal maintenance patients. A 2-year evaluation. J Clin Periodontol., 31: 965-971.
[35] Powell LV, Persson RE, Kiyak HA, Hujoel PP. 1999. Caries prevention in a community-dwelling older population. Caries Res., 33: 333 – 339.
[36] Delilbasi C, Saracoglu U, Keskin A. 2002. Effects of 0.2% chlorhexidine gluconate and amoxicillin plus clavulanic acid on the prevention of alveolar osteitis following mandibular third molar extractions. Oral Surg Oral Med Oral Pathol Oral Radiol Endod., 94: 301 – 304.

Question: What will my patients think about Prevora's level of efficacy – the 41% reduction in root decay over one year?
Canadian adult patients have found this level of protection significant. It is important to note that fluoride's effectiveness in children and adolescents is up to 26%[37], and the most commonly prescribed drugs such as statins and antidepressants have a treatment effect half that of Prevora.

Question: If this new treatment is not covered by dental insurance, will my patients pay for it directly?
Yes. Family dental offices report that after a risk assessment, up to one third of patients at risk will agree to purchase more prevention with Prevora, and another one third will consider it over the next recall interval. Patients who are paying for their dental care directly, are more inclined to pay for prevention than restoration or cosmetic services.

Question: Will my patients comply with the 4 weekly treatments in the first month?
Yes.

Question: In a typical Canadian family dental practice, how many patients would be at risk of root caries, and therefore, eligible for Prevora?
A rule of thumb is one patient per hygienist per day in the typical family dental practice is experiencing root caries or is at risk of this chronic infectious disease. About half of Canadian adults have been told by their dental professional that they have gum recession, the key risk factor for root caries. And about one in three Canadian seniors are taking multiple medications which also raise the risk of root caries. Moreover, many patients in a typical practice are undergoing regular scaling and root planing for periodontal maintenance. According to two studies of patients on periodontal maintenance, these patients are almost certainly going to get root caries.

Question: What is the procedure code for Prevora, and do insurers pay for this new treatment?
Code 13601 and Code 13602, "topical application of an antimicrobial", accurately describe the Prevora treatment. Code 13602 is used for the initial four applications, while Code 13601 is used at the single applications at recall appointments. Because it is so new, most dental insurers do not pay for Prevora. Those dental plans which honor the entire fee guide may pay for Prevora and there are some major employers (e.g. Air Canada, the Ontario Hydro retirees) which have coverage for Prevora. Many large employers now offer flexible benefit plans with healthcare spending accounts (e.g. the Royal Bank); members of these plans may pay for Prevora from their spending accounts.

Question: Do patients stay on Prevora for ever?
Some require more maintenance treatments than others. Many want to continue in Prevora maintenance because of their wish to avoid this disease. The marker by which you decide to recommend more treatment is the presence of incipient lesions.

Question: Is fluoride compatible with Prevora – should I administer topical fluoride to these patients during the same appointment?
No. Prevora should always be administered to a cleaned tooth surface which does not contain any fluoride. Administering fluoride immediately after Prevora will likely have little therapeutic effect as

[37] Marinho VC et al. 2003. Topical fluoride for preventing dental caries in children and adolescents. Cochrane Database Syst. Rev. CD002782

the inert coating of Prevora Sealant Stage 2 will likely prevent fluoride's contact with the tooth surface.

Question: Are there any data showing Prevora is beneficial to overall health?
No. But there are data linking root caries to cardiovascular health.

Question: How should I advise my patients about this new treatment?
An informed patient is a more accepting and willing patient. Hence, the preferred and most successful approach to recommendation is after a risk assessment of the patient, and a consultation with the patient about his/her risks for this disease. There are risk assessment forms provided to the Partners in Prevention offices at no charge, and the training webinar on www.prevora.com provides a good grounding on how to conduct this risk assessment and how to counsel the patient.

How do we order Prevora, and what are the terms of purchase?
You can order via www.prevora.com or by calling 1-800-463-2999. Payment is by credit card (VISA or Master Card) and delivery is over-night via UPS courier. Shipments are limited to Monday, Tuesday, Wednesday and Thursday with the order deadline at 3PM Toronto time. There is no shipping charge for orders of 3 or more boxes of Prevora.

FAQs by Dental Patients

The most common questions from dental patients are:

Patient: "Where does this bacterial infection come from and why can't I feel it?"
Answer: The bacteria causing tooth decay originate in your mother's mouth and are transmitted to your mouth when you get your first teeth as a baby. These bacteria become destructive to the teeth at various times of your life and can be particularly destructive when the gums recede to expose the tooth roots. You can't feel this infection doing its work because there are no nerves on the tooth surface. Only when it reaches the nerve deep within the tooth, does it cause pain.

Patient: "How safe is chlorhexidine, the active ingredient in this Prevora antibacterial coating?"
Answer: Very safe. In thousands of applications, the only adverse reactions observed were a short, minor tingling of the gums or tongue if the coating comes in contact with these tissues. There have been no serious side effects. Chlorhexidine is a broad spectrum antimicrobial compound used in medicine for many years.

Patient: "Why is it applied weekly in the first month, then every 6 months or so?"
Answer: Just like when you double up the initial doses of an antibiotic to fight an infection in your body, you receive an extra-strong dose of Prevora at the outset of treatment, to reduce the bacterial infections on your teeth.

Patient: "How long does this coating stay on my teeth?"
Answer: You will feel the coating for a few hours but the active ingredient stays on your teeth for days. While on your teeth, this ingredient kills or inhibits the bacteria causing tooth decay.

Patient: "Does the coating stain my teeth?"
Answer: No.

Patient: "How long does it take to apply it?"
Answer: Approximately 20 minutes.

Patient: "How effective is this coating – will I still get tooth decay?"
Answer: Prevora is more effective than fluoride for tooth decay at the gum line, but as with any medical treatment, there can't be any guarantees. In one controlled study, the coating reduced gum line decay by 41% over one year in adults at very high risk of tooth decay – a level of protection unmatched by any other study. But the coating's effect is also partly up to you. You need to continue to brush regularly with a fluoridated tooth paste and regularly floss to prevent this chronic disease. It is also important to avoid beverages with lots of sugar or which are high in acid as these can strip the coating off your teeth.

Patient: "How long do I have to get this coating? Forever?"
Answer: It depends on how well we are able to get this condition under control. As you have gum recession, we must be ever watchful of cavities at the gum line.

Patient: "Will the coating interfere with my daily activities?"
Answer: No, but there are a few simple steps to take to let this coating work to its maximum effect. First, do not eat hard foods such as a crusty bun or a steak sandwich or an apple, within 4 hours after treatment. This will allow the coating to bond to your tooth surface. Secondly, do not chew gum or brush your teeth for 24 hours after treatment, and thirdly, do not floss for 48 hours. It is also important to avoid drinking beverages which have a lot of sugar or which have a high acid content. Drinks such as colas and sports drinks can damage this coating. Patients should also use a new tooth brush after treatment.

Patient: "Why doesn't my dental plan pay for Prevora if it's approved by Health Canada and recognized by the Canadian Dental Association?"
Answer: Prevora is a new treatment and it can take time and requests by plan members to get new procedures covered. We suggest you request your HR manager to include Prevora in your group plan as soon as possible.

Appendices

A. Prevora Stage 1 Product Monograph

B. Risk Assessment Form

Product Monograph for Prevora Stage 1

Product Monograph

NAME OF DRUG

Prevora Stage 1

(Chlorhexidine Acetate)

10% w/v

THERAPEUTIC CLASSIFICATION

Antimicrobial Agent

ACTION

The antimicrobial action of chlorhexidine results from its adsorption on to the cell wall of *Streptococcus mutans*, resulting in an alteration or breakdown of the structure of these bacteria.

INDICATIONS

To be used in dental offices only. Prevora Stage 1 (chlorhexidine acetate) is indicated for the reduction of root caries in adults at high risk of dental caries.

CONTRAINDICATIONS

Prevora Stage 1 (chlorhexidine acetate) is contraindicated in patients with a history of eczema or of allergies to chlorhexidine salts or Sumatra benzoin. Such allergies are rare but have been reported in the literature. Such allergies have not been reported during or after use of Prevora Stage 1.

PRECAUTIONS

Prevora Stage 1 (chlorhexidine acetate) should be used with caution in patients with a history of asthma. Avoid application of Prevora Stage 1 or Prevora Sealant Stage 2 to the soft tissues. Failure to do so can result in temporary stinging or inflammation of the tissues.
Usage in Pregnancy: No controlled clinical trials have been carried out to ascertain if there are any adverse reactions when Prevora Stage 1 is applied to the dentition of expectant mothers. Therefore, it is recommended that Prevora Stage 1 should not be administered during pregnancy.
Usage in Nursing Mothers: Since many drugs are excreted during lactation and there have not been any studies performed using Prevora Stage 1 in nursing mothers, it is recommended that Prevora Stage 1 should not be applied if the mother is nursing.

ADVERSE REACTIONS

Chlorhexidine is known to occasionally cause a brown staining of the teeth especially when used in long-term daily mouth rinses. This staining has been infrequently reported with Prevora Stage 1 (chlorhexidine acetate) in controlled clinical trials and in Canadian dental use. Stains can be removed with a dental prophylaxis.

Immediate hypersensitivity reactions to chlorhexidine (urticaria or anaphylaxis), though rare, have been documented for other chlorhexidine formulations. These hypersensitivity reactions have not been seen in controlled clinical trials and in Canadian dental use of Prevora Stage 1.

Other minor adverse reactions include an objectionable taste associated with accidental contact of Prevora Stage 1 with the oral mucosa; localized areas of white precipitate on the margin of the gingivae or on the teeth as a result of contact of the solution with moisture before it had set; redness and/or a burning sensation at the margin of the gingivae; excessive roughness of the solution layer to the tongue All these effects are temporary and mild.

Adverse reactions were seen in the minority of patients treated and all were attributed to lapses in technique.

SYMPTOMS AND TREATMENT OF OVERDOSE

There is no experience with over-dosage with Prevora Stage 1 (chlorhexidine acetate). Consequently, the signs and symptoms have not been identified. If overdose should occur, treat symptomatically.

DOSAGE AND ADMINISTRATION

The procedure for administration of Prevora Stage 1 (chlorhexidine acetate) and Prevora Sealant Stage 2 is described below in 12 steps.
Up to 0.600 ml of Prevora Stage 1 and then Prevora Sealant Stage 2 are consecutively applied to the full dentition of adults in a single treatment. Over the course of seven months involving 5 applications, a cumulative volume of up to 3.0 ml of Prevora Stage 1 and Prevora Sealant Stage 2 is applied to the patient's teeth.

Treatment Procedures:

12. Ensure that the dentition contains no open caries lesions or restorations with imperfect margins. Prepare for the application with a tray as shown below, consisting of cotton rolls, cotton pellets or fine brushes, a forceps, air syringe and the box of Prevora Stage 1 and Prevora Sealant Stage 2.

13. Give a rubber cup prophylaxis using flour of pumice and water, or non-oil based prophylactic paste.

14. Thoroughly rinse and floss the patient's teeth with un-waxed floss to remove pumice and residual dental plaque. Ensure the cleanliness of the distal surface of the last tooth in each arch by wiping it with a cotton pellet held in a pair of forceps.

15. Isolate one quadrant of the dentition with cotton rolls and a saliva ejector.

16. Dry all teeth in that quadrant with an air syringe.

17. Using a cotton pellet held in forceps, or a fine brush suitable for reaching interproximal areas, apply Prevora Stage 1 to the interproximal areas of all posterior teeth in the quadrant.

18. Again dry the tooth surfaces of that quadrant with the air syringe and apply Prevora Stage 1 to all tooth surfaces; dry Prevora Stage 1 briefly with an air syringe.

19. Apply Prevora Sealant Stage 2 over the Prevora Stage 1 with a second cotton pellet or with another fine brush; dry Prevora Sealant Stage 2 with an air syringe.

20. Repeat steps 4 through 8 on each of the other quadrants.

21. Advise the patient: (i) that the dried Prevora film will begin coming off the teeth during the next meal; (ii) to avoid eating hard foods for at least 4 hours after treatment; (iii) to avoid tooth-brushing for 24 hours after treatment and then to resume tooth-brushing with a new brush; (iv) not to chew gum for 24 hours, and; (v) to avoid flossing for 3 days.

22. Instruct the patient to control sugar intake and to follow regular oral hygiene practices, including brushing with a fluoridated dentifrice and frequent flossing. Provide the patient with the Information for the Patient leaflet which further explains this treatment and the important procedures to be followed after treatment.

23. Repeat this initial Prevora application every week for 3 more weeks after the initial application, followed by a single application at six months and thereafter according to professional judgement. The patient should be followed-up for an assessment of caries risk and experience between 3 and 6 months thereafter, according to standard recall procedures for patients at risk of dental caries. Instruments, clothing etc. in contact with Prevora Stage 1 may be cleaned with alcohol.

PHARMACEUTICAL INFORMATION

(i) Drug substance

The active ingredient in Prevora Stage 1 is chlorhexidine acetate.

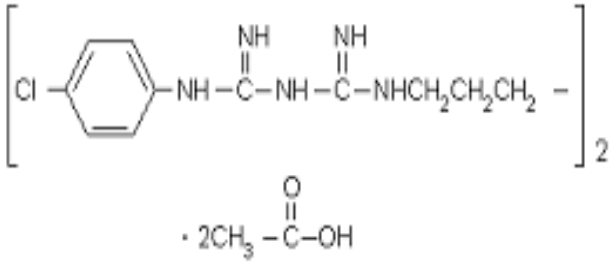
Chemical Name:

1,1′ – hexamethylenebis (5 – [4-chlorophenyl] biguanide) diacetate

Molecular Formula:

$C_{22}H_{30}Cl_2N_{10} \cdot 2C_2H_4O_2$

Structural Formula:



Molecular Weight:

625.6 a.m.u.

Description:

Chlorhexidine acetate is a white crystalline powder. It is soluble in 55 parts of water and in 15 parts of 96% ethanol.

(ii) Composition

Prevora Stage 1

Ingredient	Grams per 100mL of Prevora Stage 1
Chlorhexidine acetate BP	10
Sumatra benzoin USP	20
dissolved in absolute ethyl alcohol USP	qs

(iii) Stability and Storage Recommendations

Prevora Stage 1 (chlorhexidine acetate) is packaged in light-resistant amber glass vials. Prevora Stage 1 is to be stored in a refrigerator at between 2 and 8 degrees Celsius. Prevora Stage 1 may become darker in color with time. This is expected and does not affect the shelf life.

DOSAGE FORMS

Availability

Prevora Stage 1 (chlorhexidine acetate) is packaged in 1 mL aliquots in 2 mL glass vials at strength of 10% w/v chlorhexidine acetate.

Prevora Stage 1 along with Prevora Sealant Stage 2 (one treatment set) is packaged in a box containing 6 treatment sets or 12 glass vials.

INFORMATION FOR THE PATIENT

PREVORA STAGE 1 (CHLORHEXIDINE ACETATE)

Read all of this leaflet carefully regarding your treatment with the Prevora Stage 1 dental coating in your dentist's office. Keep this leaflet for future reference. If you have further questions, please ask your dental professional. This medicine has been prescribed for you and will be applied to your teeth by your dental professional on several occasions.

In this leaflet:

1. WHAT PREVORA STAGE 1 IS AND WHAT IT IS USED FOR:

Prevora Stage 1 dental coating is a topical oral treatment for tooth decay occurring at the root surfaces. This coating temporarily covers your teeth to reduce the bacteria on your teeth which cause tooth decay.

The active substance in Prevora Stage 1 is chlorhexidine.
The other ingredients in Prevora Stage 1 are Sumatra benzoin and absolute ethyl alcohol.

2. BEFORE YOU ARE TREATED WITH PREVORA STAGE 1:

You should not be treated with Prevora Stage 1:
If you are allergic to chlorhexidine, Sumatra benzoin or ethyl alcohol.

If you are allergic to the ingredients of Prevora Sealant Stage 2, which is a secondary coating applied immediately over Prevora Stage 1. The ingredients of this second coating are methacrylate, triethyl citrate and purified water.

Take special care before undergoing treatment with Prevora Stage 1 to report any medical condition, including asthma, eczema and other allergies, to your dentist.

Pregnancy: Ask your dentist for advice before taking or receiving any medicine.

Breast-feeding: Ask your dentist for advice before taking or receiving any medicine.

Driving and using machines: Prevora Stage 1 has not been shown to affect driving or the use of machines.

Important information about some of the ingredients of Prevora Stage 1: This dental coating can cause a temporary irritation or stinging of the gums, lips or tongue and can also have a bitter taste.

Taking other medications: Please inform your dental professional if you are taking or have recently taken any other medications, even those not prescribed.

3. HOW YOU ARE TREATED WITH PREVORA STAGE 1:

This topical, temporary coating on your teeth is applied by your dental professional in a short appointment in the dental office. The dental professional will first clean your teeth, and then apply Prevora Stage 1 to all tooth surfaces as pictured below, followed immediately by a second coating of Prevora Sealant Stage 2. This second coating temporarily protects Prevora Stage 1 from your saliva and from food abrasion.

At the start of your treatment with Prevora Stage 1, you will require 4 weekly treatments followed by another single treatment in six months. Thereafter, your need for more treatments with Prevora Stage 1 will be evaluated by your dental professional.

Effects when the Prevora treatment is finished: Temporarily, you may have a bitter taste, a sensation of a coating on your teeth and/or a stinging or burning along your gum line or tongue. The bitter taste and stinging will likely last for a few minutes, the coating for a few hours.

4. POSSIBLE SIDE EFFECTS:

If you have prolonged stinging or burning of the gums, lips or tongue, you should contact your dental professional as soon as possible.

If you notice any side effects not mentioned in this leaflet, please inform your dental professional.

5. WHAT TO DO AFTER YOU ARE TREATED WITH PREVORA STAGE 1:

To preserve this coating on your teeth for as long as possible, eat soft foods at your next meal (e.g. soup). Do not eat hard foods (e.g. meat, apples) for at least 4 hours after treatment.

Do not chew gum for at least 24 hours.

Do not brush your teeth for 24 hours after this treatment. Then begin brushing with a new tooth brush and brush 2 to 3 times daily with fluoride toothpaste.

Do not floss your teeth for 3 days following this treatment. Then resume flossing daily.

If dentures are worn, clean and disinfect at home prior to use. Disinfect using soap and warm water.

Make sure you receive all the treatments of Prevora Stage 1, as prescribed by your dentist.

It is important to the overall success of this treatment that you regularly brush your teeth with a fluoridated tooth paste, and that you control your consumption of foods and drinks which have a high amount of sugar.

6. FURTHER INFORMATION:

For any information about this dental coating, contact:

CHX Technologies, Inc.
4800 Dundas Street West, Suite 105
Toronto, Ontario M9A 1B1
Tel: 1-800-463-2999
E-mail: info@gumlinedecay.com
Web: www.gumlinedecay.com

D.I.N. #02046245 as of September 2004

MICROBIOLOGY

It has been shown *in vitro* that *Streptococcus mutans* are highly susceptible to chlorhexidine acetate. The minimum inhibitory concentration of 11 strains of *Streptococcus mutans* to chlorhexidine acetate is between 0.39 and 1.56 micrograms per mL.

Prevora Stage 1 (chlorhexidine acetate), assessed *in vitro* in buffer which was changed daily, released an initial burst of about 1.2 mg of chlorhexidine in the first 24 hours, followed by a 10 day period in which the rate of release was approximately constant (zero order kinetics). The concentration of chlorhexidine attained daily in each sample of the buffer solution remained above 10 ug/mL, which was determined to be above the minimum bactericidal concentration for several strains of *Streptococcus mutans* (M.B.C. less than 6.25 ug/mL).

There has been no evidence of an alteration in the balance of the other oral microflora or of any detectable increases in gingivitis index in association with treatment with Prevora Stage 1.

CLINICAL STUDIES

In a multi-centered, randomized, placebo-controlled, double-blinded study involving 240 patients, average age of 58.7 years, with medication-induced xerostomia (average un-stimulated salivary flow of 0.2 ml/min.), Prevora Stage 1 (chlorhexidine acetate) significantly reduced the increment of root caries over a 12 month period of observation.

Table 1 Reduction in Caries Increment in the Trial of 240 Medication-induced Xerostomic Adults
- one year period of treatment and observation and 5 treatments –

group	Caries increment	% reduction active vs. placebo	P value active vs. placebo (two sided, LOCF)
Prevora Stage 1 coronal surfaces	1.79	14.4%	0.0644
Placebo coronal	2.09		
Prevora Stage 1 root surfaces	0.77	40.8%	0.0206
Placebo root	1.30		

Five applications of Prevora Stage 1 were administered during this study, including four weekly applications in the first month and a single application at month six. The dose per application was between 300 µl and 600 µl of chlorhexidine.

In this study, there were no serious adverse events related to the application of Prevora Stage 1. Adverse events related to Prevora Stage 1 were generally mild, limited to the oral cavity and involved abnormal taste, stinging and burning of the oral mucosa and temporary loss of taste acuity.

PHARMACOLOGY

No pharmacology data are available for Prevora Stage 1 (chlorhexidine acetate). However, chlorhexidine digluconate has been studied extensively. A metabolic study was conducted using radiolabelled chlorhexidine digluconate. Animals and one human volunteer were dosed orally. The results of these studies are summarized as follows:

- Chlorhexidine is a poorly absorbed drug. In the human volunteer, no chlorhexidine was detected in the blood after the oral administration of 0.07 mg of chlorhexidine per kilogram of body weight.
- The small amount that is absorbed initially is metabolized by the liver and the kidney.
- Chlorhexidine has an affinity for mucosal surfaces in the alimentary tract, including the mouth.
- Circulating blood levels following oral dosing to dogs are extremely low.
- Detectable amounts of p-chloroaniline are not produced from the enzymatic metabolism of the chlorhexidine.

TOXICOLOGY

Animal Studies: The acute oral toxicity of chlorhexidine is low, with an LD_{50} of chlorhexidine acetate in mice of 2000 mg/kg. Chlorhexidine is poorly absorbed by the gastro-intestinal tract and almost entirely excreted in the faeces. In an acute and long-term toxicity study involving rats, the Prevora Stage 1 (chlorhexidine acetate) and its ingredients administered at 150 µl per day over 14 days to the dentition and oral mucosa, resulted in no systemic or local drug/treatment related toxicity.

Human Studies: The single dose of chlorhexidine acetate administered to adults in one treatment of Prevora Stage 1 ranges between 30 mg and 60 mg depending on the size of the mouth and number of teeth of the patient.

The maximum daily dose based on 1.0 mL of 10% w/v chlorhexidine acetate in Prevora Stage 1 would be 100 mg of chlorhexidine acetate. The total dose per week would be the same as the daily dose of 100 mg, while the total dose after 4 weeks of treatment would be 400 mg. These doses are well below the level of 2,000 mg per day that adults have shown to be able to consume for a week without adverse effects.

Long-term oral use in the form of a daily chlorhexidine mouthwash by humans has not produced changes in hematological and biochemical parameters. However, oral intolerances such as desquamation or ulceration of the oral mucosa have occurred after use of chlorhexidine mouth rinses. It has been reported that exposure of human cells in culture to chlorhexidine in equal to or greater than 0.004% resulted in impaired cellular function and/or cell death.

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Root Caries Risk Assessment Form for Patients Aged 40+

Please complete this screening form for all patients aged 40+ and file this completed form in the patient's chart

PATIENT INITIALS: _____ AGE: _____ DATE: _____

	First Assessment Date:		Second Assessment Date:	
DISEASE INDICATORS	**YES**	NO	**YES**	NO
1) History of Root Caries				
2) Cavity in Last 2 Years				
3) Visible Cavitations				
RISK FACTORS	**YES**	NO	**YES**	NO
1) Gum Recession ≥ 2.5 mm at any one site				
2) Scaling and Root Planing Maintenance Program				
3) Obvious Plaque on Teeth				
4) 3 or More Prescription Medications per Day or Inadequate saliva flow (dry mouth)				

If **1 or more Disease Indicators** or **2 or more Risk Factors** were answered as "**YES**", this patient is at risk of root caries

☐ **The patient agreed to proceed with treatment**

☐ **The patient declined treatment**

☐ **The patient asked for more information**

How to Counsel the Patient on More Prevention

This is what to say to your patients if they are at risk of root caries.

1. We have now completed the risk assessment of your oral health and you are at risk of tooth decay at the gum line. This is called root caries, the most common dental problem amongst our older patients.
2. Root decay is a difficult disease to control. It tends to spread from tooth to tooth, and fillings of these types of cavities last only 2 to 3 years. It is also linked to other health issues, such as heart disease. So, it is a disease worth preventing.
3. This problem is caused by a low-grade bacterial infection on your teeth. There is now a new preventive treatment called Prevora that can reduce this infection.
4. This treatment is approved by Health Canada. Prevora is painted on your teeth. It is clear, safe and effective. In one controlled clinical research study, Prevora reduced root decay in high risk older adults by 41% over one year – one of the largest preventive effects for root decay ever published.
5. We recommend this treatment due to the presence of your risk factors
6. Prevora's antibacterial treatment plan includes 4 applications over 8 weeks, then a single application every 6 to 9 months until you are out of risk of root decay.
7. A single application takes about 30 minutes
8. The cost of one Prevora treatment is $120.

ROOT DECAY PREVENTION PROGRAM

Appointments	Prevention Investment Fee	Date of Appointment
FIRST APPT. 30 MINUTES Application of Prevora (13602)	**$120.00**	
SECOND APPT. 30 MINUTES Application of Prevora (13602)	**$120.00**	
THIRD APPT. 30 MINUTES Application of Prevora (13602)	**$120.00**	
FOURTH APPT. 30 MINUTES Application of Prevora (13602)	**$120.00**	
TWO Follow up appointments at 6 months and 1 year Application of Prevora (13601) 6 months Application of Prevora (13601) 1 year	 **$75.00** **$75.00**	

TOTAL INVESTMENT OVER 1 YEAR = $630.00 or $53/month

PREVORA
ANTIBACTERIAL TOOTH COATING chlorhexidine diacetate

Prevora is a prescription drug used topically in the dental office to reduce root caries in adults at high risk of dental caries. It is approved by Health Canada (DIN 02046245) and is the only proven and approved preventative treatment for root caries. For more information, including scientific studies and Product Monograph, refer to www.prevora.com.