

A 2007-2009 Canada Health Measures Survey (CHMS) from Health Canada determined the prevalence of dental benefits.¹ It found that:

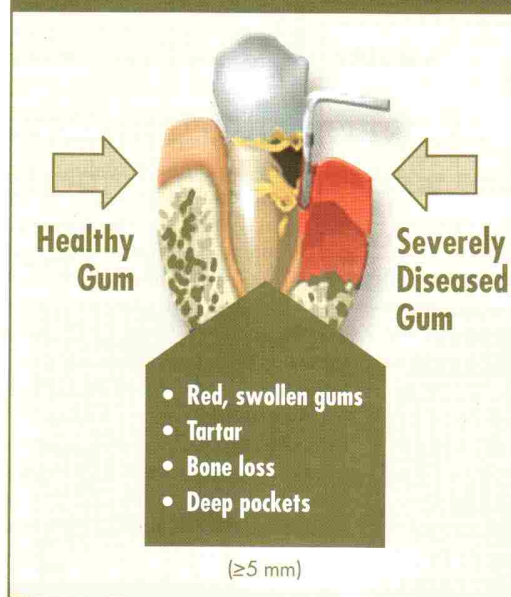
- ◆ 63 per cent of Canadians have private dental insurance
- ◆ six per cent have public (government funded) insurance
- ◆ 32 per cent have no dental insurance

The high prevalence of private dental insurance, along with out-of-pocket payments of the uninsured, leads to significant overall expenditures. The Canadian Institute for Health Information estimates that Canadians spent \$12.2 billion in 2009 or about \$360 per capita on professional dental care. In 1998, total direct dental care costs ranked second only to cardiovascular disorders and ahead of mental disorders and digestive diseases.

Highly Valued

A dental plan is highly valued and well used by employees. About \$6.7 billion (55 per cent) of dental care funding comes from private insurance. This amounts to about \$310 per covered person. The true magnitude of these costs can be seen when we con-

Figure 1
Periodontal Health Versus Disease



Locally Acting Antibiotics: A Targeted Approach to Treating Periodontal Disease

sider that, on average, private insurance reimburses about \$350,000 to each of Canada's 19,000 dentists.

Periodontal costs represent a significant portion of total dental plan expenditures.

Harmful bacteria found in oral plaque (complex bacterial colonies, also known as a biofilm) on the tooth and gum surfaces can cause an immune reaction that results in gum pockets. These pockets form a portal for harmful bacteria to invade the gums to reach tooth-supporting ligament and bone and form deeper pockets.

For periodontal disease in its mild form, known as gingivitis, gums are inflamed and can appear red in colour. Periodontitis is a more severe form that involves loss of ligament and bone around the tooth. Even in its serious forms periodontal disease is often symptomless, so patients can be surprised if their dentist or dental hygienist indicates the presence of this condition.

Figure 1 depicts a healthy gum and tooth state on the left side and periodontal disease on the right side. It can be seen on the periodontal disease side that the probe can be inserted deeper into the gum pocket due to the loss of gum-to-tooth attachment. Also, the sponge-like bone that helps support the tooth has been partially eroded. Plaque and tartar adhere to the tooth and root surfaces.

Periodontal disease is pervasive. Figure 2 shows the prevalence of periodontal conditions among Canadian adults based on the CHMS. Only about eight per cent of adults have a healthy periodontal condition. The remainder, more than 90 per cent of adults, has some form of periodontal condition.

Various epidemiological studies indicate an asso-

ciation between more severe forms of periodontal disease and numerous medical conditions including cardiovascular disease, ischemic stroke (oxygen insufficiency in the brain due to narrowing of an artery), type-2 diabetes, and respiratory diseases in the infirm elderly. While cause and effect between periodontitis and these diseases has not been definitively established, researchers conjecture that the periodontal pockets could serve as a gateway for harmful bacteria or immune by-products to enter the blood stream and reach organ systems far removed from the mouth.

How is Periodontal Disease Treated?

Good oral hygiene practices – such as brushing, flossing, and rinsing with an antiseptic mouth rinse – help minimize plaque in the mouth. According to the CHMS, about 73 per cent of Canadians (with teeth) brush twice per day. However, Canadians fare much worse when it comes to flossing. Here the survey found that only 28 per cent of Canadians floss five or more times per week.

However, even when performed properly, these self-care practices may not reach all plaque and tartar (calculus) that is trapped in gum pockets. The standard treatment for uncomplicated periodontitis is for dental care professionals to physically remove periodontal plaque and tartar through regular scaling and root planing (SRP).

Because periodontal disease has an infectious origin, antibiotics may be warranted to help kill residual bacteria and impede the inflammatory response (which may cause destruction of supporting bone



HEALTHCARE

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Figure 2
Prevalence of Periodontal Conditions

Condition (Listed in order of increasing severity)	% of adults
Healthy	7.5
Gingivitis	25.4
Calculus (tartar)	46.9
Pockets = 4 mm	11.2
Pockets >= 5 mm	8.9

around the tooth). Where periodontitis is extensive, antibiotics taken by mouth for a period of 10 to 14 days may be used to supplement SRP.

When periodontitis is more localized, dentists may use special antibiotic formulations to target individual gum pockets. These formulations, known as locally administered antibiotics (LAAs), have the advantage of reducing the amount of antibiotic that needs to be administered to the periodontal patient. This reduction may be advantageous in reducing the risk of antibiotic resistance and the chance of incurring a dose related side effect. One such LAA, ARESTIN, was launched in Canada about one year ago. It releases low, but effective, concentrations of minocycline for over two weeks into the gum pocket. It has been shown to augment the effectiveness of SRP to help shrink pocket depth.

Why is pocket depth important? Tooth loss is directly correlated with increased pocket depths.² A residual gum pocket depth of five millimetres (moderate to severe periodontitis) after treatment is associated with a 22 per cent probability of tooth loss within 10 years. For pocket depths of greater than or equal to seven millimetres (severe periodontitis), the risk of tooth loss dramatically rises to 64 per cent.

By contrast, reducing pockets to less than five millimetres is beneficial. Researchers in one study estimated that ARESTIN plus SRP improved the odds of reducing gum pocket depth to less than five millimeters over SRP alone by a factor of 1.6 (after adjusting for treatment variables).³

Based on experience in the United States, a periodontal disease patient could require on average five gum sites to be treated with an LAA after SRP. Assuming a professional fee of \$65 per unit of time and a material cost of \$21 per tooth site, the cost would be about \$170. A U.S. claim utilization review showed that the direct incremental cost of adding ARESTIN coverage (with no coverage restrictions) amounted to less than 0.2 per cent of overall plan cost. This percentage does not factor in the potential savings resulting from enhanced periodontal treatment.

Tooth loss or surgery to prevent tooth loss can be an expensive proposition for

the patient and for the patient's plan sponsor. Periodontal diseases that result in tooth loss may require costly restorative measures such as bridges, implants, or dentures (see Figure 3). Deep gum pockets that do not result in tooth loss may require more intensive periodontal treatment such as increased frequency or duration of scaling or periodontal surgery. In addition, employees may have to take time off work to attend dental procedures or recuperate from dental surgery.

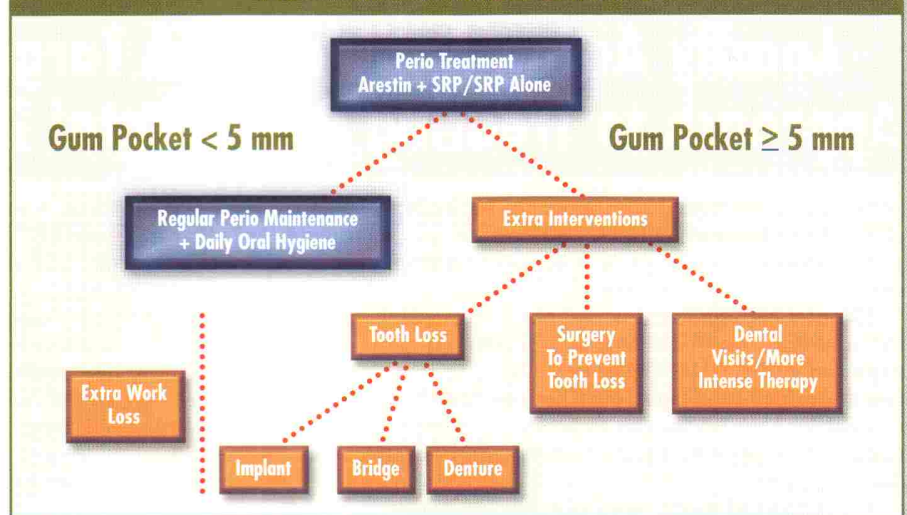
To get an idea of the potential cost benefit, analysis of the scientific literature indicates that about seven fewer teeth would be lost per 100 patients using ARESTIN plus SRP versus SRP alone. Taking into account the cost of possible LAA reapplication, if necessary, within five years, surgery, restorations to replace the missing teeth, lost work time, and higher treatment needs for teeth not extracted, but with deep pockets,

- ◆ After the use of SRP where the gum bleeds on probing (a sign of active inflammation)
- ◆ At most one unit of time for the professional fee (unless there are unusual circumstances)

Periodontal disease continues to be widespread, even for people covered under private benefit plans. To help reduce its prevalence and its negative sequelae, plan sponsors may want to consider the following options:

- ◆ Encourage proper daily flossing through employee communication or other methods. Only about one-quarter of Canadians floss more than five times per week.
- ◆ Promote smoking cessation. Oral conditions are strongly associated with smoking. CHMS dental examiners found that 49 per cent of current smokers have some sort of treatment need identified compared to 30 per cent of those who have never smoked.
- ◆ Review the current coverage status for

Figure 3
Periodontal Treatment Outcomes



the savings per ARESTIN-treated patient would likely range somewhere between \$40 and \$110, on average about \$75, over a five-year period. If employee expenditures are considered, the savings per ARESTIN-treated patient would range between \$104 and \$125.

Steps Plan Sponsors Can Consider

Coverage for LAAs varies. Some plan sponsors cover them under the dental plan, some cover the drug expense under the drug plan, and many plans do not cover LAAs.

Plan sponsors wishing to add LAA coverage may include coverage criteria such as the following to maximize cost-effectiveness:

- ◆ Adults only
- ◆ Gum pocket depths of greater than or equal to five millimetres

LAAs and consider the value of including coverage using appropriate underwriting guidelines.

- ◆ Monitor plan utilization to detect plan abuse/misuse. ■

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1. Report on the findings of the oral health component of the Canadian health measures survey 2007-2009, Health Canada, 2010

2. Matuliene et al. Influence of residual pockets on progression of periodontitis and tooth loss: results after 11 years of maintenance, *J Clin Periodontol*, 2008

3. Williams et al. Treatment of periodontitis by local administration of minocycline microspheres: a controlled trial, *J Periodontol*, 2001