

# CJDH JCHD

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## Antibiotic Prophylaxis

Part I: Recommendations of the British Society for Antimicrobial Chemotherapy Working Party



THE CANADIAN DENTAL  
HYGIENISTS ASSOCIATION  
L'ASSOCIATION CANADIENNE  
DES HYGIÉNISTES DENTAIRES



## A Global Perspective

by Bonnie Blank, AASc, BSc(DH), MA



WHEN I ENTERED THE DENTAL HYGIENE profession, I became aware of the opportunity to practise in other parts of the world and bring the "message" of prevention and good oral health to others. Several of my previous students have ventured to locations such as Bermuda, Switzerland, and Australia. We are fortunate in my college's Dental Hygiene Program to host students and faculty from Sweden. This international exchange benefits both programs through sharing of information and practice.

*We will have the opportunity to view our profession from a global perspective and think in a new way about what we do.*

I am honored and excited that Canada is hosting the 17th International Symposium on Dental Hygiene (ISDH) this year.

Canada will host the symposium in Toronto from July 19 to 21, 2007. Twenty-four countries will be represented at the event and we will have the chance to meet dental hygienists from around the world and to hear speakers from other countries. The symposium is a face-to-face forum to exchange knowledge and practice. We will have the opportunity to view our profession from a global perspective and think in a new way about what we do.

The International Federation of Dental Hygienists (IFDH) formed officially on June 28, 1986, in Oslo, Norway and celebrated its 20th anniversary last year. The IFDH, an international, non-governmental organization, unites dental hygiene associations from around the world. It was preceded by the International Liaison Committee established in 1973 with Canada as one of the founding member countries.

The objective of the IFDH is to represent the profession of dental hygiene globally and to promote professional alliances with its association members as well as with other associations, federations, and organizations with similar objectives.

The IFDH provides a formal network by which dental hygienists worldwide can promote collegiality among nations, commitment to maintaining universal standards of dental hygiene care and education, and access to quali-

**A Global Perspective ...continued on page 153**

## Une perspective globale

par Bonnie Blank, A.A.Sc., B.Sc.(DH), M.A.

ORSQUE JE SUIS ENTRÉE DANS LA PROFESSION de l'hygiène dentaire, j'ai pris conscience des possibilités qui existaient d'exercer dans d'autres parties du monde et de transmettre le « message » de l'importance de la prévention et de la bonne santé buccodentaire à d'autres. Plusieurs de mes anciennes étudiantes se sont aventurées dans des pays comme les Bermudes, la Suisse et l'Australie. Nous sommes privilégiés puisque le programme d'hygiène dentaire de mon collègue accueille des étudiants et des membres du corps professoral venant de Suède. Cet échange international bénéficie aux deux programmes en nous permettant de partager les informations et la pratique.

*Nous aurons l'opportunité de voir notre profession dans une perspective globale et de réfléchir d'une façon différente sur ce que nous faisons.*

Je suis honorée et enthousiasmée que le Canada soit l'hôte du 17<sup>e</sup> Symposium international sur l'hygiène dentaire (17<sup>th</sup> International Symposium on Dental Hygiene - ISDH) cette année.

Le Canada accueillera le symposium à Toronto du 19 au 21 juillet 2007. Trente-quatre pays seront représentés à cet événement et nous aurons la chance de rencontrer des hygiénistes dentaires venant de partout dans le monde et d'entendre des conférenciers venant d'autres pays. Le symposium est un forum face à face qui permet d'échanger sur les connaissances et la pratique. Nous aurons l'opportunité de voir notre profession dans une perspective globale et de réfléchir d'une façon différente sur ce que nous faisons.

La Fédération internationale des hygiénistes dentaires (International Federation of Dental Hygienists - IFDH) a été formée officiellement le 28 juin 1986 à Oslo, en Norvège, et a célébré son 20<sup>e</sup> anniversaire l'an dernier. La IFDH, une organisation non gouvernementale internationale, unit des associations d'hygiène dentaire de partout dans le monde. Elle a été précédée par le Comité de liaison international (International Liaison Committee), créé en 1973, dont le Canada était un des pays membres fondateurs.

**Une perspective globale ...suite page 160**



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# CONTENTS



## EVIDENCE FOR PRACTICE

**Antibiotic Prophylaxis. Part I: Recommendations of the British Society for Antimicrobial Chemotherapy Working Party**  
*by Frieda Pickett, RDH, MS* ..... 128

**Global Oral Cancer Screening Programs: Review and Recommendations**  
*by Heather Biggar, RDH, BSc(DH), Amanda Forrest, RDH, BSc(DH), Catherine F. Poh, DDS, PhD* ..... 138

**Abstracts from IADR Meeting, March 2007, New Orleans**  
 ..... 155

## OBSERVATIONS

**Statistics Canada's Canadian Health Measures Survey (CHMS)**  
*by the Office of the Chief Dental Officer* ..... 151

## DEPARTMENTS

**President's Message de la présidente**  
*A Global Perspective / Une perspective globale* ..... 123

**Executive Director's Message de la directrice générale**  
*The International Symposium of Dental Hygiene / Le Symposium international de l'hygiène dentaire* ..... 127

**News: CDHA Board — Highlights of Meeting** ..... 147

**CDHA Dental Hygiene Recognition Program** ..... 149

**Book Review: Periodontal Medicine: A Window on the Body** ..... 161

**The Library Column: Herbal Supplements and Oral Health** ..... 163

**Probing the Net: Antibiotic Prophylaxis; Screening for Oral Cancer** .. 164

**Classified Advertising** ..... 166

**Advertisers' Index** ..... 166



## The International Symposium of Dental Hygiene

by Susan Ziebarth, BSc, MHA, CHE



## Le Symposium international de l'hygiène dentaire

par Susan Ziebarth, B.Sc., M.H.A., C.H.E.

*In the Great Society, work shall be an outlet for man's interests and desires. Each individual shall have full opportunity to use his capacities in employment which satisfies personally and contributes generally to the quality of the Nation's life.<sup>1</sup>*

– Lyndon B. Johnson

*Dans une grande société, le travail doit être un exutoire pour les intérêts et les désirs de l'homme. Chaque personne doit avoir la pleine opportunité d'utiliser ses capacités dans un emploi qui la satisfait personnellement et qui contribue d'une façon générale à la qualité de vie de la nation.<sup>1</sup>*

[Traduction] – Lyndon B. Johnson

IN MANY WAYS, THIS QUOTATION CAPTURES THE ESSENCE of your professional association, CDHA. CDHA's goals are to support you in your interests and desires professionally so that you are able to contribute to the oral health and general health of Canadians. One of the key phrases in this quotation is the idea of "full opportunity."

*The International Symposium of Dental Hygiene (ISDH) is being held in Toronto with dental hygienists travelling from across the globe to join us in sharing and learning together to advance the knowledge and understanding within the profession.*

Have you ever stopped to consider the meaning of opportunity? It is defined as "a good chance; a favourable occasion; a chance or opening offered by circumstances."<sup>2</sup> This year you have, what will be for many CDHA members, a nearly once-in-a-career opportunity. The International Symposium of Dental Hygiene (ISDH) is being held in Toronto with dental hygienists travelling from across the globe to join us in sharing and learning together to advance the knowledge and understanding within the profession.

The last time this event was held in North America was 19 years ago and we know it will be at least 9 years before it returns. Dr. Susanne Sunell, the scientific chair for the

### The International Symposium of Dental Hygiene

...continued on page 153

<sup>1</sup> Lyndon B. Johnson, *Manpower Report of the President* (March 5, 1965)

<sup>2</sup> *The Canadian Oxford Dictionary* (Don Mills: Oxford University Press; 2001. p.1019).

DE BIEN DES FAÇONS, CETTE CITATION REND L'ESSENCE de l'ACHD, votre association professionnelle. Les buts de l'ACHD sont de vous appuyer en ce qui concerne vos intérêts et vos désirs professionnels afin que vous soyez en mesure de contribuer à la santé buccodentaire et à la santé générale de la population canadienne. Une des expressions clés de cette citation est l'idée de « pleine opportunité ». Vous est-il déjà arrivé de penser à la signification du mot opportunité? Elle est définie comme « une

*Le Symposium international de l'hygiène dentaire se tiendra à Toronto et des hygiénistes dentaires venant de partout dans le monde se joindront à nous pour partager et apprendre ensemble à faire progresser des connaissances et des visions communes à l'intérieur de la profession.*

grande chance, une occasion favorable, une chance ou une possibilité offertes par les circonstances ». Cette année, vous aurez ce qui sera, pour bien des membres de l'ACHD, une opportunité à peu près unique dans une carrière. Le Symposium international de l'hygiène dentaire (*International Symposium of Dental Hygiene – ISDH*) se tiendra à Toronto et des hygiénistes dentaires venant de partout dans le monde se joindront à nous pour partager et apprendre ensemble à faire progresser des connaissances et des visions communes à l'intérieur de la profession.

### Le Symposium international de l'hygiène dentaire

...suite page 148

<sup>1</sup> Johnson, Lyndon B., *Manpower Report of the President* (5 mars 1965)



# Antibiotic Prophylaxis. Part I: Recommendations of the British Society for Antimicrobial Chemotherapy Working Party

by Frieda Pickett, RDH, MS

## ABSTRACT

The American Heart Association's (AHA) committee for establishing guidelines for antibiotic prophylaxis to prevent bacterial endocarditis is currently in the final stages of drafting new recommendations. The British Society for Antimicrobial Chemotherapy is the British group that deals with recommendations for antibiotic prophylaxis prior to dental treatment for those at risk for endocarditis. This group has recently published new guidelines. In the past, the AHA has followed parts of the British Society's recommendations. This two-part series will review issues related to the efficacy of antibiotic prophylaxis prior to dental procedures. Part 1 will report the new British Society's recommendations for antibiotic prophylaxis prior to dental treatment to prevent bacterial endocarditis. Part 2 will include a review of the upcoming American Heart Association's recommendations for antibiotic prophylaxis.

**Keywords:** antibiotic prophylaxis; dental care; endocarditis, bacterial

## INTRODUCTION

**R**ECOMMENDATIONS HAVE RECENTLY BEEN PUBLISHED to guide oral health professionals when making judgments related to antibiotic prophylaxis prior to specific dental treatments.<sup>1</sup> These new recommendations regarding antibiotic prophylaxis to prevent bacterial endocarditis (BE) were formulated by the British Society for Antimicrobial Chemotherapy (BSAC), a counterpart organization to the AHA's Committee on Rheumatic Fever, Endocarditis and Kawasaki Disease. For the past three regimens, the BSAC has published updated guidelines first, parts of which were adopted by the AHA committee. Oral health professionals who have practised for many years have seen the AHA and BSAC recommendations for antibiotic prophylaxis change dramatically since the AHA published the initial guidelines in 1955. The early guidelines recommended antibiotics for several days prior to the dental procedure and for the antibiotics to continue for several days following the dental procedure. This was changed

Dental hygiene literature has always strongly supported the recommendations of the American Heart Association. In most instances, alternative research data have not been fully discussed. Therefore, most dental hygienists believe that science has supported the view that taking a recommended antibiotic prior to dental treatment, according to the AHA recommendation, will prevent bacterial endocarditis in individuals predisposed by valvular disease or replacement. Pallasch summarized published research findings, identifying fallacies associated with the use of antibiotic prophylaxis to prevent bacterial endocarditis.<sup>2</sup> He noted that the bacteria causing most cases of endocarditis have changed and that antibiotics in the regimen may not be effective for those organisms. As well, the mechanism of action for antibiotic prophylaxis is unknown. The most compelling of the data cited was that, despite the use of antibiotic prophylaxis for many years in individuals at risk, the incidence of BE has not been reduced. This was verified in a later update of the inci-

*Oral health professionals who have practised for many years have seen the AHA and BSAC recommendations for antibiotic prophylaxis change dramatically since the AHA published the initial guidelines in 1955.*

in the 1980s when a one-day, two-dose regimen was established. This was followed in 1997 by a one-day, one-dose regimen. The drugs of choice for antibiotic prophylaxis have remained consistent through most of the years and are in the penicillin classification of antibacterial agents. The alternative drugs, in the event of penicillin allergy, have been modified as newer, more effective drugs have become available for this purpose.

dence of infective endocarditis (IE).<sup>3</sup> This lack of change in incidence is reported to be related to the changing epidemiologic profile. The majority of cases prior to the 1970s were related to rheumatic heart disease and congenital cyanotic cardiopathies. After the effective eradication of rheumatic fever, these valvulopathies gradually disappeared but were replaced by other predisposing factors, such as intravenous drug use, valve prostheses, degenerative valve sclerosis, and placement of intravascular stents



## RÉSUMÉ

Le comité de l'*American Heart Association (AHA)* qui élabore les lignes directrices concernant l'antibioprophylaxie pour prévenir l'endocardite bactérienne en est actuellement à l'étape finale de rédaction des nouvelles recommandations. La *British Society for Antimicrobial Chemotherapy* est le groupe britannique qui statue sur l'antibioprophylaxie avant un traitement dentaire pour les personnes à risque pour l'endocardite. Ce groupe a récemment publié de nouvelles lignes directrices. Dans le passé, l'*AHA* a suivi en partie les recommandations de la *British Society*. Cet article en deux volets fera un survol des questions liées à l'efficacité de l'antibioprophylaxie avant les soins dentaires. La première partie fera rapport des nouvelles recommandations de la *British Society* concernant l'antibioprophylaxie avant un traitement dentaire pour prévenir l'endocardite bactérienne. La deuxième partie inclura un survol des recommandations à venir de l'*American Heart Association* concernant l'antibioprophylaxie.

and intracardiac devices. These had two consequences: (1) no reduction in the incidence of IE, and (2) major changes in the microbiological profile of IE.<sup>3</sup> Pallasch identified the adverse effects of antibiotic prophylaxis to be increased risk of antibiotic toxicity or allergy, increased risk of superinfections, selection of antibiotic-resistant microorganisms, and induction of antibiotic resistance gene expression or transfer.<sup>2</sup>

Prescribing antibiotic prophylaxis for individuals with certain cardiac defects prior to specific dental and medical procedures that could cause a bacteremia aims at preventing the development of bacterial endocarditis (BE). The success of antibiotics in achieving this goal is not well documented, and BE has been shown to develop in predisposed individuals who took antibiotic prophylaxis as recommended.<sup>4</sup> Peterson established the following five principles of antibiotic prophylaxis.<sup>5</sup> Antibiotic prophylaxis may be justified if

1. the surgical procedure has a significant risk of infection;
2. the correct antibiotic for the surgical procedure is selected;
3. the antibiotic level is high;
4. the timing of the antibiotic administration is correct; and
5. the shortest antibiotic exposure is employed.

Applying these principles to antibiotic prophylaxis to prevent endocarditis following dental procedures, (1) infective endocarditis (IE) associated with dental procedures is rare;<sup>2</sup> (2) antimicrobial resistance of the most frequent causative microorganisms (staphylococcus, enterococci) to amoxicillin, clindamycin, and macrolides has been reported;<sup>2,3</sup> (3) the loading dose of 2 grams is sufficient to give a high antibiotic level; (4) administering the antibiotic one hour prior to the appointment provides an adequate blood level prior to causing a bacteremia; and (5) the current regimen calls for a one-dose protocol. Therefore, the current regimen for antibiotic prophylaxis meets three of the five principles offered by Peterson. Evidence from several case control studies strongly suggests that no association exists between dental treatment and bacterial endocarditis.<sup>6,7,8</sup> The first case control study analyzed data from 54 hospitals in the Philadelphia, Pennsylvania, area. It included persons with community-acquired IE not associated with IV drug use who were compared with community residents, matched by age, sex, and

neighbourhood. The results reported were that dental treatment was no more frequent among case-patients than controls (adjusted odds ratio, 0.8 [95% CI, 0.4 to 1.5]). Of 273 case-patients, 104 (38%) reported previously diagnosed cardiac lesions compared with 17 controls (6%) (adjusted odds ratio, 16.7 [CI 7.4 to 37.4]). Case-patients more often reported mitral valve prolapse (adjusted odds ratio, 74.6 [CI, 6.4 to 58.4]), congenital heart disease (adjusted odds ratio, 6.7 [2.3 to 19.4]), cardiac valvular surgery (adjusted odds ratio, 74.6 [CI, 12.5 to 447]), rheumatic fever (adjusted odds ratio, 13.4 [CI, 4.5 to 39.5]), and heart murmur without other known cardiac abnormalities

### ***Evidence from several case control studies strongly suggests that no association exists between dental treatment and bacterial endocarditis.***

(adjusted odds ratio, 4.2 [CI, 2.0 to 8.9]). Among case-patients with known cardiac disease (individuals who should have received antibiotic prophylaxis), dental therapy was significantly less common ( $P=0.03$ ) than among controls (adjusted odds ratio, 0.2 [CI, 0.04 to 0.7]) over the three-month period of the study. Few participants received prophylactic antibiotics. The authors concluded that dental treatment does not seem to be a risk factor for IE, even in those with valvular abnormalities and further, that few cases of IE would be preventable with antibiotic prophylaxis, even with 100% effectiveness assumed. Strom et al.<sup>8</sup> presented data in the most recent population-based case control study from 1988 to 1990. Community-acquired IE cases ( $N= 273$ , 238 with native valves, 35 with prosthetic valves) unassociated with intravenous drug use were compared with matched community residents. Those who developed IE were more likely than controls to suffer from prior severe kidney disease (adjusted OR [95%CI]= 16.9 [1.5 to 193],  $P=0.02$ ) and diabetes mellitus (adjusted OR [95% CI]= 2.7 [1.4 to 5.2],  $P= 0.04$ ) and had more often experienced a previous skin infection (adjusted OR [95% CI]= 3.5 [0.7 to 17],  $P= 0.11$ ). The authors concluded that within the limits of the available sample size, the data showed that patients who developed IE differed from people without IE with regard to specific risk factors, but not



regarding recent medical or dental procedures. No association was found between IE and the frequency of routine dental care within the previous year, tooth brushing frequency, or use of devices (toothpick, Water Pik, gum stimulator) or between IE and complete dentures. A small decreased risk was suggested with use of dental floss once daily or more compared with no use (OR=0.64 [95% CI 0.39 to 1.04; P= 0.07). In those with IE whose cultures revealed dental flora (106 cases and their matched controls), an increased risk was associated with having teeth compared with being edentulous (adjusted OR = 7.02 (95% CI 1.25 to 39.6), P=0.03). No association was seen with pulmonary, gastrointestinal/oral, cardiac, or genitourinary procedures or with surgery.

In the past, most individuals who developed endocarditis were reported to have a known pre-existing cardiac defect.<sup>3,9</sup> However, more recently, this trend has shifted with nearly half of the reported cases of endocarditis having no known previous cardiac disease.<sup>10</sup> While clinical practice guidelines of many professional organizations are now developed using an evidence-based approach involving systematic reviews of the highest levels of evidence, no randomized controlled trials in humans have been done to assess the efficacy of antibiotic prophylaxis to prevent BE following dental procedures. It is considered unethical to use humans as test subjects when the procedure being tested could result in morbidity or mortality. A systematic review was recently published that found no association between antibiotic prophylaxis prior to dental procedures and the prevention of bacterial endocarditis prophylaxis.<sup>11</sup> The recommendations by the BSAC and the AHA are based on the consensus that antibiotics might be helpful to prevent serious cardiac infection resulting from oral bacteria. In order for dental hygienists to treat clients appropriately and safely, it is imperative that dental hygienists be familiar with the most current recommendations regarding the use of prophylactic antibiotics. Furthermore, dental hygienists play an important role in health promotion and education and must therefore be familiar with the most current literature and decision-making rationale for these recommendations. The aim of this two-part article is to review relevant factors associated with the potential risk for BE and to explain the rationale for new recommendations regarding the use of prophylactic antibiotics to minimize this risk. Part One will summarize recent recommendations of the Working Party of the British Society for Antimicrobial Chemotherapy. Part Two will discuss upcoming recommendations of the American Heart Association. Differences between the two professional recommendations will be discussed in Part Two.

#### **INFECTIVE vs BACTERIAL ENDOCARDITIS**

Infective endocarditis (IE) is an infection of cardiac valves or the inner lining of the heart. The infection can be due to bacteria, fungi, or other forms of microorganisms. When the infection is caused by bacteria (principally staphylococci or the viridans group streptococcus species), it is referred to as "bacterial endocarditis."<sup>12</sup> Viridans group streptococci are part of the normal flora of the oral

cavity, gastrointestinal, and genitourinary systems, the pharynx, as well as the skin and conjunctiva of the eye. Staphylococci are primarily bacteria found on the skin. Antibiotics included in the AHA recommendations are effective only against bacteria. This is the reason the AHA recommendations are specific for bacterial endocarditis, not infective endocarditis.

#### **HISTORY OF ANTIBIOTIC PROPHYLAXIS TO PREVENT BACTERIAL**

##### **Endocarditis**

The first recommendation in the United States for antibiotic prophylaxis prior to dental procedures (to prevent subacute bacterial endocarditis in those predisposed to endocarditis) was made by the AHA in 1955. The recommendations have been accepted by Canadian dental professionals over the ensuing years. At this time, therapy was based on the assumption that if antibiotics were useful to treat infections, surely they must prevent them.<sup>2</sup> In truth, antibiotics are not curative but rather provide time for the host defense system, temporarily overwhelmed by microbial pathogenicity, to re-establish homeostasis.<sup>12</sup> The 1955 regimen was a multi-day regimen where antibiotics would be given three to four days prior to the dental procedure and be continued for several days following the dental procedure. The initial recommendation was that when a heart murmur or other cardiac valve disease existed, antibiotics were to be taken prior to any dental procedure.

*Antibiotics are not curative but rather provide time for the host defense system, temporarily overwhelmed by microbial pathogenicity, to re-establish homeostasis.*

As the years progressed, the regimen for antibiotic prophylaxis to prevent BE was revised many times. In the 1980s, the BSAC published a dramatic change from prior recommendations and suggested a one-day, one-dose regimen. The AHA committee responsible for developing antibiotic prophylaxis guidelines followed parts of the regimen of the BSAC and suggested a one-day regimen, but with a two-dose schedule with a loading dose of 3 grams of penicillin V as the drug of choice followed by 1.5 grams six hours following dental treatment. This was later changed to include either penicillin V or amoxicillin and the dose was lowered to 2 grams. Alternate drugs to be used when a penicillin allergy existed have included various forms of erythromycin, clindamycin, other macrolide antibacterial agents (clarithromycin, azithromycin), and several cephalosporins. In the early regimens, the antibiotic was to be given by IV infusion in certain medical circumstances. All those recommendations and special circumstances were simplified in 1997.<sup>9</sup>

## ADVERSE DRUG EFFECTS OF ANTIBIOTIC PROPHYLAXIS THERAPY

The evidence supporting antibiotic prophylaxis began to change in the 1980s when it was reported that antibiotic resistance was increasing. A recent review of antibiotic resistance data reported that the oral cavity is now home to viridans group streptococci with a 30% to 50% resistance rate to penicillins and macrolide agents and that beta-lactamase production (formerly known as penicillinase, an enzyme that metabolizes penicillins to a biologically inactive form and prevents penicillins from working) involves 25% or more of *Porphyromonas* and *Prevotella* isolates.<sup>13</sup> Overuse of antibiotics, or using an antibiotic when it is not indicated, is a major factor in this problem.

### *Periodontal pathogens per se are very rarely a cause of endocarditis.*

Besides the increase in the development of bacteria resistant to antibiotics (including penicillin, amoxicillin, erythromycin, and clindamycin), allergy and gastrointestinal symptoms (nausea, gastrointestinal pain) are adverse drug effects associated with the use of antibiotics. It has been estimated that 1.36 people per million could die from anaphylaxis during endocarditis prophylaxis, whereas only 0.26 deaths per million would be the result of dental treatment-induced endocarditis.<sup>14</sup> Periodontal pathogens per se are very rarely a cause of endocarditis, with only 102 reported cases due to *Actinobacillus actinomycetemcomitans*, 2 due to *Prevotella oralis*, 1 due to *Prevotella bivia*, 1 due to *Bacteroides melaninogenicus*, 5 due to *Veillonella* species, and none due to *Porphyromonas* species.<sup>2</sup> It should be noted that the antibacterial agents in the current AHA regimen are ineffective against these organisms.

## BRITISH SOCIETY FOR ANTIMICROBIAL CHEMOTHERAPY 2006 WORKING PARTY REPORT

The Working Party of the BSAC recently published an updated regimen for antibiotic prophylaxis to prevent endocarditis.<sup>1</sup> It reviewed regimens of the AHA, plus guidelines from the European Cardiac Society and the British Cardiac Society. The group reviewed published human and animal studies that linked a variety of dental procedures that could potentially result in BE in susceptible individuals. Microbiological studies revealed that bacteria previously associated with most cases of endocarditis have shifted through the years, from mainly viridans group streptococci to staphylococci.<sup>10</sup> The Working Party acknowledged that endocarditis could develop even if antibiotics in the prophylaxis regimen were taken. It recommended that medical supervision of predisposed individuals was essential (infection control, prompt removal of colonized intravascular devices, and management of chronic infections) to monitor situations that could lead to cardiac infection. The Working Party's 2006 recommendations noted that a case control study by Strom et al.<sup>6</sup> of 273 patients found no link between dental treatment and endocarditis. It further noted that evidence from several

studies<sup>15,16,17</sup> was accumulating, verifying that bacteremia could result from everyday activities such as chewing, toothbrushing, and flossing. Additional evidence was revealed indicating these everyday activities over a period of one year were six million times more likely to cause bacteremia than a single dental extraction.<sup>15</sup> The BSAC report concluded that bacteremia occurring during dental treatment did not significantly increase the risk for endocarditis. This was in keeping with a Cochrane systematic review that revealed no evidence exists to support the use of prophylactic penicillin prior to invasive dental procedures to prevent endocarditis.<sup>11</sup> The British Working Party noted that in an ideal situation, a prospective double-blind trial to evaluate the risk/benefit of prophylactic antibiotics should be completed, but also noted that this is unlikely to take place because a large population of patients would be required and BE is a relatively rare event. Despite the lack of evidence to support the administration of antibiotic prophylaxis to prevent BE prior to dental procedures that could cause a bacteremia, the Working Party believed that dental professionals would be reluctant to accept a radical, although logical, step to stop recommending the use of antibiotic prophylaxis to prevent BE. The Working Party compromised and recommended prophylaxis only for high-risk individuals who, should BE develop, might suffer significant morbidity or death (see box 1). The high-risk conditions included having a prior occurrence of IE, having a cardiac valve replacement, and having a surgically constructed systemic or pulmonary shunt or conduit. One major difference between their recent recommendations and the 1997 AHA regimen is that specific dental procedures requiring prophylaxis are not identified and the recommendation to receive antibiotic prophylaxis applies only to individuals at high risk of BE. This decision likely recognizes the clinical studies showing that simple manipulation of teeth can cause a bacteremia and bacteremia developed in dental procedures unassociated with bleeding.<sup>15</sup> Applying this concept to "dental procedures involving dentogingival manipulation," the activities could include testing for tooth mobility, biting down on the radiographic positioning device, and use of the slow speed handpiece to polish amalgams.

### BOX 1. PROPHYLAXIS FOR DENTAL PROCEDURES

High-risk cardiac factors requiring antibiotic prophylaxis:

- Previous infective endocarditis
- Cardiac valve replacement surgery (mechanical or biological prosthetic valves)
- Surgically constructed systemic or pulmonary shunt or conduit

Dental procedures requiring antibiotic prophylaxis:

- All dental procedures involving dentogingival manipulation [or endodontics]\*

Source: 2006 British Society for Antimicrobial Chemotherapy Guidelines, *J Antimicrob Chemother.* 2006;57:1036.

Note: endodontics omitted in Table 1 of the article, but included in the written discussion.

## BSAC RECOMMENDATIONS

The BSAC Working Party recommendations involved not only dental treatment, but also several medical procedures. Only those recommendations related to dental procedures are included in this article. The recommendation for antibiotic prophylaxis prior to dental procedures is included in table 1. The drug of first choice is amoxicillin at a dose of 3 grams for individuals 10 years of age or over, to be administered one hour prior to the dental procedure. The Working Party did not include the rationale for the 3-gram dose recommendation (compared with 2 gram dose used in the United States). When a penicillin allergy exists, clindamycin is recommended as the alternate antibacterial agent. For those who cannot swallow pills, a liquid suspension of azithromycin is recommended. An IV administered regimen is included for those who are unable to take oral medications. When several sequential dental visits are necessary, these should ideally be performed at intervals of at least 14 days to allow for healing of mucosa/periodontal tissues and to avoid the development of antibiotic resistance. When further dental procedures cannot be delayed for 14 days, the suggestion is to alternate between amoxicillin and clindamycin. When the patient in the previous scenario is allergic to penicillin, expert advice should be sought to determine the regimen. Additionally, a pre-operative mouthrinse with chlorhexidine gluconate 0.2% (10 ml for one minute) is recommended. High-risk individuals should receive antibiotic prophylaxis for all dental procedures involving dentogingival manipulation or endodontics. The Working Party stated that these recommendations are not based on prospective, randomized controlled trials, as no such trials

exist and that the recommendations are consensus based. The BSAC antibiotic prophylaxis guidelines may hold no evidentiary status in Canadian courts for malpractice defence and the Canadian Dental Association will likely consider which guidelines to adopt.

*The Working Party recognized that good oral hygiene is likely the most important factor in reducing the risk of endocarditis in susceptible individuals.*

## MEDICAL ASSESSMENT

The Working Party recognized that good oral hygiene is likely the most important factor in reducing the risk of endocarditis in susceptible individuals. The Working Party recommended that for those individuals diagnosed with cardiac anomalies that could lead to IE, physicians should recommend a dental evaluation enabling treatment that optimizes oral health to be completed soon after the cardiac diagnosis. Similarly, those individuals who have a medical procedure that puts them into a high-risk category for IE (placement of cardiac valve, conduit, aortic graft) should be referred for a dental evaluation. Ideally, dental treatment should be completed prior to placement of intracardiac prostheses and at least two weeks before cardiac surgery to allow for oral healing. When that is not possible, all elective dental procedures should be delayed for three months after surgery to avoid potential infection.<sup>1</sup>

Population	Adults and Adolescents > 10 yrs	Children ≥ 5 yrs - < 10 yrs	Children < 5 yrs	Dosing Regimen
General	Amoxicillin 3 g po	Amoxicillin 1.5 g po	Amoxicillin 750 mg	1 hour
Allergic to penicillin	Clindamycin 600 mg po	Clindamycin 300 mg po	Clindamycin 150 mg po	1 hour
Allergic to penicillin and unable to swallow capsules	Azithromycin 500 mg po	Azithromycin 300 mg po	Azithromycin 200 mg po	1 hour
Intravenous regimen expedient	Amoxicillin 1 g IV	Amoxicillin 500 mg IV	Amoxicillin 250 mg IV	Just before the procedure or at induction of anaesthesia
Intravenous regimen expedient and allergic to penicillin	Clindamycin 300 mg IV <sup>a</sup>	Clindamycin 150 mg IV <sup>a</sup>	Clindamycin 75 mg IV <sup>a</sup>	Just before the procedure or at induction of anaesthesia

Source: 2006 British Society for Antimicrobial Chemotherapy Guidelines, J Antimicrob Chemother. 2006;57:1037.

Notes: <sup>a</sup> Given over at least 10 minutes. When a course of treatment involves several visits, the antibiotic regimen should alternate between amoxicillin and clindamycin. Pre-operative mouthrinse with chlorhexidine gluconate 0.2% (10 ml for 1 min)

**Table 1.** Antibiotic prophylaxis for dental procedures





***Prophylaxis against IE should primarily be concerned with the maintenance of good periodontal health in order to reduce the magnitude and frequency of spontaneous bacteremia, which is more likely to cause IE than dental procedures.***

**CLIENT EDUCATION**

As health promotion experts, dental hygienists have the obligation to discuss with clients new protocols along with the rationale and implications. The British Working Party developed an information sheet to give to individuals who have been told by medical providers, either currently or in the past, to take antibiotics prior to certain dental procedures (see box 2). This information should be explained to the at-risk patient in order to alleviate any fears or concerns related to the exclusion of antibiotic prophylaxis prior to certain dental procedures. The recommendations advise that “patients should understand that maintaining periodontal and dental health is a prime factor to reduce the risk of endocarditis.”<sup>1</sup> There is still significant debate as to who is “at risk” from a dentally induced bacteremia and which oral procedures require chemoprophylaxis. Prophylaxis against IE should primarily be concerned with the maintenance of good periodontal health in order to reduce the magnitude and frequency of spontaneous bacteremia, which is more likely to cause IE than dental procedures.<sup>17,18,19</sup> It has been shown that the presence or absence of dental disease may have little to do with bacteremia.<sup>15,18</sup>

**GINGIVAL HEALTH AND BACTEREMIA**

The 1997 AHA guidelines<sup>9</sup> for antibiotic prophylaxis to prevent bacterial endocarditis stress the need for gingival health and recommend that oral health care clinicians

emphasize attaining and maintaining periodontal health as a strategy to reduce the cardiac risks associated with transient bacteremias. This concept was stressed by Kaye<sup>19</sup> who concluded that individuals at risk for developing IE should establish and maintain the best possible oral health as this is more likely to prevent IE than application of antibiotic prophylaxis prior to dental procedures. The AHA 1997 recommendations indicate prophylaxis only for oral procedures involving “significant bleeding” whereas the British Working Party noted that there was evidence that everyday activities (brushing, flossing) resulted in transient bacteremias<sup>15,17</sup> and directed its recommendation to include any dental procedure involving dentogingival manipulation. A single blind parallel study<sup>20</sup> in 30 volunteers with untreated periodontitis revealed that subjects with the deepest pocketing did not necessarily develop bacteremia following probing, ultrasonic scaling, or toothbrushing when compared to more healthy subjects. The authors concluded that those with a healthier periodontium may be at a greater risk of physiological bacteremia or that periodontitis may cause individuals to develop processes to minimize bacteremia, irrespective of probing depths. Another study<sup>21</sup> tested the hypothesis that the risk of experiencing bacteremia after everyday oral procedures is associated with the severity of periodontal inflammation. After examining the frequency of bacteremia after various oral procedures (chewing, toothbrushing, scaling), it was found that there were no statisti-

**BOX 2. PATIENT INFORMATION HANDOUT**

**Prevention of Infective Endocarditis Guidelines Information for Patients and Parents  
February 2006, British Society of Antimicrobial Chemotherapy (BSAC)**

A BSAC group of experts has spent a lot of time carefully looking at whether dental treatment procedures are a possible cause of infective endocarditis (IE) (sometimes called bacterial endocarditis), which is an infection of the heart valve.

After a very detailed analysis of all the available evidence, they have concluded that there is no evidence that dental treatment procedures increase the risk of these infections.

Therefore it is recommended that the current practice of giving patients antibiotics before dental treatment be stopped for all patients with cardiac abnormalities, except for those who have a history of healed IE, prosthetic heart valves, and surgically constructed conduits.

The main reasons for this are the lack of any supporting evidence that dental treatment leads to IE and the increasing worry that administration of antibiotics may lead to other serious complications such as anaphylaxis (severe allergy) or antibiotic resistance.

The advice from the BSAC is that patients should concentrate on achieving and keeping a high standard of oral and dental health, as this does reduce the risk of endocarditis. Help for this will be provided by your dental professional.

Source: 2006 British Society for Antimicrobial Chemotherapy Guidelines. J Antimicrob Chemother. 2006;57:1041.



cally significant differences among any of the three groups (healthy, gingivitis, periodontitis) regarding the incidence nor the magnitude of bacteremia following chewing and toothbrushing. Bacteremia following ultrasonic scaling was significantly higher in periodontitis than in gingivitis clients or healthy control individuals. When the results of the previous two studies are compared, the major differences in their findings of bacteremia following scaling (13% vs 75%) are difficult to explain. The substantial variation between these studies may reflect different methods used for culturing the bacteremia. Recently one study reported that in people with chronic periodontitis or plaque-induced gingivitis, chewing resulted in a bacteremia; however, the bacteremia did not contain oral microorganisms.<sup>22</sup> Again, data among studies differ, as the two studies described earlier reported oral microorganisms in blood samples.<sup>20,21</sup> Since daily activities (chewing, oral hygiene procedures) and procedures resulting in cuts to the skin or mucosa are the most likely activities leading to spontaneous bacteremia,<sup>17</sup> and the health of the periodontium may not be as relevant in spontaneous bacteremia formation as was formerly thought,<sup>15,20,22</sup> this supports the need for more definitive research to clarify these areas of confusion. However, it must be stressed that bacteremia formation is different from endocarditis formation. The chemoprophylaxis with procedures that produce “significant bleeding” issue may be a moot point if dental procedures are not associated with causing bacterial endocarditis, as suggested by the case control studies and systematic reviews discussed earlier.

## CONCLUSION

This first part of a two-part series of articles reviewing the rationale and newly developed recommendations for the use of prophylactic antibiotics for the prevention of bacterial endocarditis has outlined the recommendations of the British Society for Antimicrobial Chemotherapy and discussed its rationale for the development of these recommendations. Concern for the need and lack of evidence for the use of prophylactic antibiotics was discussed. Significant changes in prophylactic antibiotic recommendations have been made by the British Society, supporting their inclusion for only three groups of high-risk individuals: those with a past history of IE, those who have undergone cardiac valve replacement surgery (either mechanical or biological prosthetic valves), and those with surgically constructed systemic or pulmonary shunts or conduits. In the above high-risk individuals, those who are undergoing dental procedures involving dentogingival manipulation or endodontics should receive antibiotic prophylaxis. These recommendations may have an impact on the development of the revised American Heart Association recommendations for preventing BE. Part Two of this paper will outline the new AHA recommendations and compare them with the British Society’s recommendations. Canadian dentists and dental hygienists will be required to follow the recommendations adopted by the Canadian Dental Association.

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# Global Oral Cancer Screening Programs Review and Recommendations

by Heather Biggar, RDH, BSc(DH),\* Amanda Forrest, RDH, BSc(DH),† and Catherine F. Poh, DDS, PhD‡

## ABSTRACT

The need for effective oral cancer screening techniques and programs has been widely evidenced as leading to earlier diagnosis of at-risk lesions and increasing survival rates while reducing mortality. Although various international studies have been conducted on oral cancer screening techniques, there is a distinct lack of standardization in determining which populations should be screened and which techniques should be employed. In order to compare and evaluate oral cancer screening programs, a literature review of selected international screening programs was performed based on geographic locations and the size of study (number of persons screened). The results showed that those individuals at high risk for oral cancer were mainly individuals who were smokers and excessive alcohol consumers, over the age of 30, male, of low socio-economic status, with compromised health status (HIV/AIDS etc.), and who had a previous history of cancer. Key issues surrounding program approaches (opportunistic versus invitational); target populations; screening techniques employed; qualifications of examiners; compliance with referrals; biases, outcomes and limitations; as well as sensitivity, specificity and positive predictive values were identified and compared among the selected screening programs. Our recommendations regarding oral cancer screening focus on high-risk individuals being screened at regular intervals (preferably once per year) with the screening performed using standardized criteria for lesion identification, referral, and examiner training and calibration. Registered dental hygienists, trained and experienced in soft tissue examination, are playing a critical role in oral cancer screening. They are able to identify mucosal abnormalities or potential malignant oral lesions at an early stage, which consequently may improve treatment success and survival rates.

**Keywords:** mouth neoplasms; diagnosis, oral; referral and consultation; patient compliance; mass screening; smoking

## INTRODUCTION

ORAL CANCER IS THE SIXTH-MOST COMMON CANCER worldwide with over 300,000 new cases diagnosed globally each year. In 2004, the World Health Report stated that the incidence of oral cancer was 10 cases per 100,000 in many developed countries including Canada and is 10 times higher in India.<sup>1</sup> It has one of the worst prognoses among major human cancers (< 50%, five-year survival rate), largely because these cancers are often diagnosed at late stages (stage III or IV). With the advance of treatment modalities, this dismal survival rate has not changed over several decades. Even when effective, treatment has a severe impact on the quality of life of patients including disfigurement and compromised oral functions such as eating and talking; this places significant financial pressure on both the individual and the health care system. Key to reducing mortality and morbidity of this disease is the identification of lesions-at-risk at an early and more readily treatable stage.

*Oral cancer is the sixth-most common cancer worldwide.*

Most early oral cancers and pre-cancers are asymptomatic. In a recent randomized, controlled trial involving 191,873 participants in India where 87,655 subjects received at least one visual oral screening examination, a 34% reduction in mortality was observed among individuals screened over a nine-year period.<sup>2</sup> This underscores the value of screening, which will lead to earlier diagnoses of lesions at risk of cancer and subsequently increase survival rates and reduce mortality.

Few international studies with large cohorts have been conducted on oral cancer screening. A comprehensive comparison of these programs examining the techniques employed and the screening results would be beneficial in providing a more practical approach in strategy development and implementation of an oral cancer screening that will be suitable for various communities in Canada.

The purpose of the current review was to compare contemporary international oral cancer screening programs and techniques by considering key factors and issues. The intended outcome was to generate recommendations for further research in the field and to provide recommendations to dental professionals including the promotion of oral cancer awareness and early detection.

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## RÉSUMÉ

Le besoin de techniques et de programmes efficaces de dépistage du cancer buccal, menant à un diagnostic précoce de lésions à risque et à une augmentation du taux de survie tout en réduisant le taux de mortalité, a été largement démontré. Bien que différentes études internationales aient été réalisées, un manque important de standardisation demeure lorsqu'il s'agit de déterminer quelles populations devraient faire l'objet d'un dépistage et quelles techniques devraient être utilisées. Afin de comparer et d'évaluer les programmes de dépistage du cancer buccal, une analyse documentaire a été réalisée en se fondant sur les secteurs géographiques et l'effectif de l'étude (nombre de patients dépistés). Les résultats ont montré que les personnes à risque élevé pour un cancer buccal ont été identifiées comme des personnes qui : fumaient, faisaient une consommation excessive d'alcool, étaient âgées de plus de 30 ans, étaient de sexe masculin, avaient un statut socioéconomique bas, avaient un état de santé fragilisé (VIH, SIDA, etc.) ou avaient des antécédents de cancer buccal. Des points importants ont été identifiés et comparés pour certains programmes de dépistage sélectionnés, lesquels incluaient : les approches des programmes (opportunistes versus organisés); les populations ciblées; les techniques de dépistage utilisées; les qualifications des sondeurs; le respect des demandes de consultation; les erreurs systémiques, les résultats et les limitations; et les valeurs de sensibilité, de spécificité et les valeurs prédictives positives. Nos recommandations concernant le dépistage du cancer buccal se concentrent sur le dépistage à intervalles réguliers (préférentiellement une fois par année) chez les personnes à risque élevé par un examen réalisé en tenant compte des critères standardisés pour l'identification des lésions, des demandes de consultation, de la formation des sondeurs et de l'étalonnage. Les hygiénistes dentaires autorisé(e)s, formé(e)s et expérimenté(e)s ont un rôle important à jour dans le dépistage du cancer buccal. Ils et elles sont en mesure d'identifier les anomalies des muqueuses ou les lésions buccales potentiellement malignes à un stade précoce, ce qui, par conséquent, peut améliorer les chances de réussite du traitement et les taux de survie.

## METHODS

This investigational review and critical literature analysis focuses on comparing international oral cancer screening programs. The literature search was conducted during the month of November 2005 using PubMed as a search engine and employing the following MeSH terms for searching: oral cancer, oral examination, referral, compliance, screening, and smoking. Journal articles dated earlier than 1980 were discarded and although four of the selected articles were dated between 1984 and 1989, the majority of the literature compiled was dated later than the year 2000 and reflected some of the most current research available. A total of 40 papers of various oral cancer screening programs were amassed. Thirty-five of these were selected for review based on the size of the screening cohort (greater than 200) and representation of a wide variety of geographic areas including Italy, India, United States, Canada, Japan, Cuba, and the United Kingdom. Various professionally recommended research articles and statements published by the World Health Organization were also included in the reviewed literature.

Throughout the literature, several common threads of information were identified, which were used to highlight consistencies and discrepancies among the screening programs reviewed. The key factors of these screening programs were compared. They include the following: approaches to screening (opportunistic versus invitational programs); screening techniques used; qualifications of individuals performing screening; sensitivity, specificity, and positive predictive values; target population; compliance with referral; biases, outcomes and research limitations. These elements were used as a basis for comparison among the studies in order to establish a set of core recommendations for screening programs and techniques.

*Opportunistic screening programs commonly encompass a larger number of examinations; however, the compliance with referrals after screening is variable.*

## RESULTS AND DISCUSSION

### Approaches – opportunistic versus invitational programs

In general, the screening programs used either an opportunistic or invitational approach in recruiting participants. Although both formats are relatively common, each has positive and negative elements that must be considered when developing a screening program.

Opportunistic programs use a pre-existing health program or clinic (that the subjects are already actively attending) to access the target population.<sup>3,4</sup> Invitational programs “invite” individuals from the target population to attend voluntarily via mail, posted advertisements, or house-to-house invitations.<sup>5-8</sup> Opportunistic screening programs commonly encompass a larger number of examinations; however, the compliance with referrals after screening is variable, from 28.8% in a Cuban study<sup>3</sup> to 67% for one study in India.<sup>4</sup> This limited compliance of referral following screening in opportunistic screening studies may be due to subjects' mandatory participation and lack of ownership.

Invitational programs, by contrast, usually have a smaller sample size and individuals who consent to a voluntary screening tend to be low-risk, more health conscious, and more compliant with referrals.<sup>5-7</sup> One invitational study in India found a compliance rate with referrals as high as 85%.<sup>5</sup>

In addition, it has been suggested that high-risk subjects (smokers, heavy drinkers, males, and the elderly) are often medically or dentally underserved and less likely to participate in an invitational study.<sup>3,8-11</sup> This results in a sampling bias, which is crucial to analyzing the screening outcome.<sup>9</sup> Opportunistic programs may be deemed more successful in terms of a more random approach with less selection bias than invitational programs. Based on these pros and cons, the selection of approach should depend largely on the purpose of the studies and the targeted population.

#### **Sensitivity, specificity, and positive predictive value**

Sensitivity is the probability that a referable lesion is present (or screening test is positive), given that the person has the disease in question (oral cancer).<sup>12,13</sup> Specificity is the probability that a referable lesion is not present (or screening test is negative), given that the person does not have the disease, known as the “true negative rate.” Positive predictive value (PPV) is the probability that a person has the disease, given a positive test result. When sensitivity is low, there are a high number of false negatives, whereas when specificity is low, there is a high rate of false positives. Notably, when a screening program produces a high

the use of lighting, retraction devices, and/or palpation. Specific details of the examination were often not provided in the research methodology, leading to notable inconsistencies among studies.

Some programs have reported the adjunctive use of visual aids, including toluidine blue staining and most recently the fluorescence visualization technique.<sup>12,15-19</sup> Toluidine blue dye, also known as toloum chloride, is used to enhance the identification of suspected mucosal lesions.<sup>12,20,21</sup> Toluidine blue is a vital blue dye with a high affinity to nucleic acid.<sup>12</sup> Dysplastic changes associated with a higher concentration of nucleic acid (DNA and RNA) demonstrate higher frequency of positive staining.<sup>19</sup> A recent study provides strong evidence that a toluidine blue positive oral dysplastic lesion is six times more likely to become cancerous and was found to have a strong association with a high-risk molecular pattern using loss of heterozygosity.<sup>15,19</sup> Hence, referral for further investigation of positively stained lesions after excluding possible inflammation and infection is well supported.<sup>12</sup> It is worth noting that toluidine blue has been found to be a highly sensitive technique—sensitivity of 79.5% and specificity of 62%—that may produce a large proportion of false positives due to the inflammatory conditions of many

*There is a long-standing debate as to the qualifications necessary for individuals who perform the oral examinations for screening programs. The debate revolves around reproducibility, training, calibration, and cost-effectiveness.*

rate of false negatives (low sensitivity), the individuals may be falsely reassured and carcinogenic behaviours passively supported.<sup>14</sup> Conversely, when a high rate of false positives (low specificity) occurs, there may be an increase in subjects' fear and anxiety about potential treatment in the absence of true disease. With the advent of molecular assessment, histology remains the current gold standard in confirming oral cancer diagnoses. If a diagnosis is not confirmed through a biopsy, there is no way to estimate the correct sensitivity, specificity, or positive predictive value, which has been the most commonly absent information in the reviewed programs. In a small study of 292 participants in a British screening program, relatively high values for sensitivity (71%), specificity (99%), and PPV (86%) were reported.<sup>8</sup> These results indicate a moderate-to-low rate of false positives among individuals screened, a low rate of false negatives, and a strong probability that those who screened positive for oral cancer were accurately diagnosed.

#### **Screening techniques**

There is limited information available on the screening techniques implemented in oral cancer screening programs. Direct visual oral inspection was the most commonly used technique; however, the forms of inspection varied greatly or were unclear among programs regarding

lesions.<sup>9,12,21</sup> To improve the specificity and reduce the false positivity, a trained and experienced dental professional is required to rule out possible confounding factors.

A novel oral cancer screening technique developed by the researchers at the BC Cancer Agency is direct fluorescence visualization (FV) using a blue light. This simple hand-held device employs tissue optics to highlight mucosal abnormalities in the oral cavity.<sup>16-18</sup> This tool has also been used in individuals with a history of dysplasia or cancer and is currently being introduced in communities, such as the high-risk community of Vancouver's Downtown Eastside. The initial findings indicate that this tool could serve as an easy-to-use, very promising, and valuable clinical adjunct in oral cancer screening.

#### **Qualifications of individuals performing the screening**

There is a long-standing debate as to the qualifications necessary for individuals who perform the oral examinations for screening programs. The debate revolves around reproducibility, training, calibration, and cost-effectiveness. In many international studies, dentists most commonly are responsible for conducting oral examinations; however, the cost restraints are often prohibitive. As a result, trained personnel in some studies varied from grade 10 education with specific health care training to university graduates.<sup>4,22</sup> However, limited experience, training/



education, and lack of calibration make it difficult to draw conclusions as to the feasibility and reproducibility of examinations conducted by these individuals.<sup>2,4,10,22,23</sup>

Due to a shortage of human resources in one India study by Mathew et al, the feasibility of oral self-examination was explored as part of an oral cancer screening program.<sup>22</sup> The lesions that are detected in this high-risk population with a high prevalence of oral pre-malignant lesions and cancers are known to be generally overt and easily recognizable. Due to the extensive use of known car-

cinogens such as betel nuts and limited access to regular screening in this area, oral lesions may become large and disfiguring tumors before they are diagnosed. Therefore, oral cancer self-examination was found to be feasible for this specific population. In populations where oral lesions are much smaller and only clinically apparent, the efficacy of self-examination remains inconclusive.

In developed countries such as Canada and the United States, dental hygienists are trained to perform oral cancer screening as part of regular dental hygiene care.<sup>24-27</sup> This represents an opportunistic format of oral cancer screening, however dental hygienists are also playing a valuable role in community screening initiatives.<sup>28</sup> Based on the knowledge and training of dental hygienists and their accessibility, dental hygienists indeed play an important role in oral cancer screening and referral.

**Target population**  
Given the very low incidence of oral cancer in individuals who are non-smokers and who are under the age of 30, mass population screenings for oral cancer have not been widely indicated.<sup>21,29</sup> As a result, oral cancer screening programs generally target high-risk populations in both developed and developing countries based on the issue of cost-effectiveness.

**Target population**

The majority of oral cancer screening programs have been initiated in developing countries such as India, Sri

Lanka, and Cuba where high-risk populations are most accessible.<sup>2-4,10,23,30</sup> In developed countries, high-risk populations do exist; however, the compliance rate is reportedly poor for these types of individuals.<sup>31</sup> Low compliance in high-risk individuals has been associated with low socio-economic status and a lack of symptoms.<sup>31</sup>

The mean age of subjects recruited for screening in the reviewed studies was calculated at 39.5 years (excluding the Cuba study<sup>3</sup> outlier where no age limits were set), the median was 35 years, and the age range was 30–60 years

(table 1). The ages of subjects who screened positive were determined in only four studies due to a lack of complete reporting details in the majority of studies regarding age ranges of positively screened subjects. In the study by Ikeda et al., which investigated only the presence of oral leukoplakia and mucosal diseases, 81% of leukoplakia lesions were found in individuals  $\geq 30$  years.<sup>32</sup> In the study by Ramadas et al., 86% of individuals with positive screening results were calculated to be  $\geq 45$  years of age.<sup>10</sup> In the Cuba study (Fernandez et al.), the highest incidence of oral cancer was found to be in males  $\geq 50$  years old.<sup>3</sup> In the study by Field et al., the only subject diagnosed with squamous cell carcinoma was 55 years of age while three subjects (aged  $\geq 49$  years) were diagnosed with leukoplakia.<sup>29</sup> In summary, as indicated in most studies reviewed, high-risk populations consist of individuals over 30 years of age who are tobacco-users, heavy drinkers, and male.<sup>3,8-11</sup>

Low socio-economic status has been reported to be a risk factor in the development of oral cancer. This is a complicated factor that might result from a limited access to medical care for late diagnosis, and from poor nutrition and poor general health.<sup>10,31</sup> It is noteworthy that socio-economic status is population-specific and cannot be applied equally to both developed and underdeveloped countries. Further investigation is necessary in order to substantiate the precise effect of social factors on the development of oral cancer.

**Oral cancer screening programs generally target high-risk populations in both developed and developing countries based on the issue of cost-effectiveness.**

Study	Number of subjects	Incidence; age*
Ikeda et al., 1991 (Japan) <sup>32</sup>	3, 131	81%; $\geq 30$ years of age
Ramadas et al., 2003 (India) <sup>10</sup> – interim findings	114, 601	86%; $\geq 45$ years of age
Fernandez et al., 1995 (Cuba) <sup>3</sup>	12, 990, 677	27%; $\geq 15$ years old (all subjects $\geq 15$ years with dental concerns were screened)
Field et al., 1995 (UK) <sup>29</sup>	1, 369	5%; $\geq 49$ years (only three cases of leukoplakia detected)

\* Incidence: percentage of leukoplakia of the screened subjects; Age: Age of leukoplakia detected.

**Table 1.** Age-related incidence of oral leukoplakia



### Compliance with referrals

Achieving acceptable compliance rates is a challenge in most subject-based research, as was noted among the screening programs reviewed where compliance rates varied significantly or were not mentioned at all. It is understood that compliance may be related to a multitude of factors such as gender, age, health awareness, socio-economic status, and known oral risk habits. Nagao et al. found that compliance was poor in men over the age of 60 as well as in smokers and drinkers<sup>6,7</sup> whereas Sankaranarayanan et al. supported the theory that men are often less compliant than women.<sup>23</sup> Decreased compliance has also been attributed to negative advertisements for oral cancer screening programs that employed “scare tactics” to recruit subjects.<sup>8</sup> The Cuban screening program experienced poor compliance with referrals due to the government-imposed structure of the program that did not encourage ownership in the screening process—subjects were obliged to participate.<sup>3</sup> Interestingly, compliance has been noted to be enhanced in cases where the screening program was made convenient for the subjects such as when it was offered in close proximity to where the subjects worked.<sup>29</sup>

### Biases and limitations

In reviewing the literature, numerous biases were identified that may have negatively impacted the outcomes of the studies. Despite efforts to select a representative sample from the given population, a disproportionate number

of males versus females was noted among subjects.<sup>6,29</sup> As stated above, compliance often differs between males and females; therefore a gender bias has the potential to impact study outcomes. In one longitudinal study, an examiner bias and an information bias were noted as both health care workers and subjects knew whether they were of intervention or control status.<sup>2,10,23</sup> Since the control arm did not receive screening, this bias may have affected the conduct of the interview and possibly led to retrospective correction.

Length bias has been found to occur in cases where there is the tendency for a screening program to detect the more slowly progressive forms of a disease.<sup>9,33</sup> Discrepancies between mortality and survival rates of oral cancer screening programs may be due to length biases that result in the underdiagnosis of fast-growing disease. Longitudinal studies are therefore strongly indicated in order to detect both fast and slow forms of disease progression.

Overdiagnosis bias is defined as the detection of “pseudo-disease,” a subclinical condition that would not have produced signs or symptoms before the subject died of other causes.<sup>33</sup> In any screening program, some proportion of screen-detected cases will be pseudo-disease because of competing mortality. Overdiagnosis causes the overestimation of sensitivity, specificity, and positive predictive values. This particular bias was not mentioned in any of the literature reviewed and may be a potential cause of reporting error.



## Dental Hygiene Educators of Canada

# Annual Educators Workshop & Reception

July 18, 2007 · Westin Harbour Castle Hotel, Toronto

11 a.m. – 1 p.m.	Dental Hygiene Program Directors' Lunch & Meeting <small>* this event is limited to Directors or Coordinators of Canadian Dental Hygiene programs</small>
1 p.m. – 3 p.m.	Annual General Meeting (Members only)
3 p.m. – 5 p.m.	Annual Educators' Workshop: <i>Developing Inter-Professional Learning Experiences in Dental Hygiene Education</i>
5:30 p.m. – 7:30 p.m.	Reception & Awards Presentation – All Educators Welcome

Registration:	<i>Before June 15, 2007</i>	<i>After June 15, 2007</i>
	Members: \$50	Members: \$60
	Non-members: \$75	Non-members: \$85
	Canadian Dental Hygiene Directors' Luncheon	
	Members: \$45 (registration available until June 15, 2007)	

For complete program and registration information, please visit [www.dhec.ca](http://www.dhec.ca)

## SIGNIFICANT FINDINGS

Table 2 summarizes the numerous oral cancer screening programs reviewed, the purpose of each study, and the subsequent outcomes.

Various limitations of the oral cancer screening programs were identified through this literature review. Few studies provided details on screening techniques that were employed, which hinders program comparison and creates inconsistencies between programs. Sensitivity, specificity, and PPV were not consistently reported, again preventing programs from being consistently compared or contrasted. Currently, there are no standardized screening program guidelines established for age-related risk factors, detection of precursor lesions, examination techniques, or referral criteria. Despite the fact that many of these studies were longitudinal in design, survival analysis and intent-to-treat were not mentioned. This may have led to incorrect reporting of individuals lost due to dropout prior to the completion of the study.

A recent publication by the Cochrane Collaboration (May 2006) reflected a comprehensive literature search conducted to assess the effect of current screening methods on oral cancer mortality rates.<sup>35</sup> Although this systematic review was not originally included in the initial literature review for this paper, its subsequent publication

demands reference. In this Cochrane review, 112 citations were examined; however, only one randomized controlled trial was found (Sankaranarayanan et al., 2005), which has been widely quoted due to the 34% reduction in mortality rates found among high-risk individuals who were screened as compared to the control group.<sup>35</sup> Despite the agreement that this reduction in mortality rates reflects positively on the advantages of oral cancer screening programs, especially in high-risk populations, the weaknesses of this longitudinal study were highlighted in the Cochrane review and echoed many of the same weaknesses mentioned in this paper. As a result, the need still remains for further well-designed longitudinal, randomized, controlled trials to investigate the outcomes of oral cancer screening in both high- and low-risk populations. It is only by amassing a significant foundation of such literature that strong guidelines for screening can be established.

## RECOMMENDED STRATEGIES FOR DEVELOPING AN ORAL CANCER SCREENING PROGRAM

With regard to oral cancer screening program design, certain recommendations should be considered. Standardized criteria for lesion identification, recording, and referral should be established. As well, standardized training pro-

Study	Objective	Significant Findings
Bouquot, 1986 (Minnesota) <sup>34</sup> 32,000 subjects	To characterize the prevalence of the most common oral lesions	The 30 most common lesions were ranked according to gender-specific prevalence rates from the studies included in this comparison. Leukoplakia (incidence: 29.1 per 1,000) was the most common mucosal lesion and oral carcinoma (incidence: 1.1 per 1,000) was 24th overall.
Ikeda et al., 1991 (Japan) <sup>32</sup> 3,131 subjects	1. To show the epidemiological status of oral mucosal lesions, specifically leukoplakia, in a selected Japanese population 2. To estimate the validity of the diagnosis of oral leukoplakia by general practitioners	Results suggested that, to carry out an efficient oral health program in Japan, it would be better to limit mass screening for leukoplakia to men $\geq 30$ & women $\geq 40$ .
Talamini et al., 1994 (Italy) <sup>31</sup> 627 subjects	To quantify the relationship between various individuals' characteristics and compliance with an ear, nose, and throat professional examination	The identification of high-risk individuals is expensive and the compliance with a head and neck cancer early detection program is relatively low, especially in smokers.
Field et al., 1995 (UK) <sup>29</sup> 1,369 subjects	To assess the feasibility of conducting a systematic oral mucosa examination at company headquarters, to describe the target screening population, to measure the participation rate, and to determine initial results	A methodical and thorough examination of the oral mucosa can be realistically carried out as part of a routine dental inspection. Feasibility was determined and the program is to be expanded to screen all employees of the company.
Sankaranarayanan et al., 2005 (India) <sup>2</sup> 191,873 subjects	To assess the effect of visual screening on oral cancer mortality in high-risk individuals	34% $\downarrow$ in mortality and 50% $\uparrow$ in 5-year survival rate in the intervention group (screened high-risk individuals)

**Table 2.** International oral cancer screening programs: outcomes

*It is therefore recommended that individuals at high risk for oral cancer be screened at regular intervals using standardized, reproducible techniques in order to achieve early detection of malignant and pre-malignant lesions as well as to promote oral cancer prevention and awareness.*

cedures and examiner calibrations should be established to maximize diagnostic consistency, recognizing that there are several levels of examination including visual only or visual and tactile. False positive and false negative diagnoses as well as biases must be minimized in the program design while optimizing referral compliance and outcomes. In terms of program approach, the appropriate selection of opportunistic or invitational program design must be determined for the target population in order to enhance screening outcomes. It is also important that standardized criteria for screening techniques be established and implemented in a reproducible fashion. It is advantageous to promote screening programs effectively; however, negative advertising associated with oral cancer screening should be avoided as this may reduce program attendance and compliance. To improve the cost-effectiveness of screening programs, identification of high-risk populations for screening is essential (table 3). It is therefore recommended that individuals at high risk for oral cancer be screened at regular intervals using standardized, reproducible techniques in order to achieve early detection of malignant and pre-malignant lesions as well as to promote oral cancer prevention and awareness.

Heavy smokers and/or excessive alcohol consumers  
Individuals over 30 years of age  
Male gender  
Compromised health status (HIV/AIDS, Hepatitis B carrier, Hepatitis C infection)  
Previous history of oral cancer  
Nutrition factors (especially low consumption of fruits and vegetables)

**Table 3.** Characteristics of high-risk populations<sup>3,8-11,27,36</sup>

### THE ROLE OF THE DENTAL HYGIENIST IN ORAL CANCER PREVENTION

Traditionally, dental hygienists have been integral providers of oral health prevention and management. The primary goal of oral cancer screening is prevention so logically, dental hygienists play a critical role in oral cancer screening and early detection.

Registered dental hygienists are highly trained individuals responsible for the assessment, treatment, and maintenance of the periodontal unit. Detailed treatment planning and individualized client care including thorough intra- and extra-oral exams and careful reviewing of health history and tobacco/alcohol use allows the dental hygienist the opportunity to identify individuals at higher risk for oral cancer and perform effective screening techniques. It

has been determined that early diagnosis of oral cancer leads to an excellent prognosis in treatment. Therefore regular dental hygiene visits provide a valuable setting for oral cancer screening.<sup>37</sup>

In many Canadian provinces and American states, it is within the dental hygiene scope of practice to identify tissue abnormalities and make referrals to an appropriate specialist, which makes oral cancer screening an important role and responsibility for every dental hygienist. Even where dental hygienists may not self-initiate, they need to be professionally prepared and responsible for oral cancer examinations and risk counselling. According to surveys in British Columbia, Nova Scotia, Maryland, North Carolina, California, and Italy, many dental hygienists—despite having received training in oral cancer screening—still report not performing oral cancer screenings on a regular basis so a gap has been identified between knowledge and clinical application of oral screening techniques.<sup>24-27,36,38</sup> Thus, there remains a need for continuing education for dental hygiene professionals to improve clinical perceptions and skills in detecting oral lesions that require further triage and management.


Although dental hygienists are by definition “opportunistic screeners” based on the dental clinic environment in which they regularly treat clients and perform oral cancer examinations, the opportunity also exists for dental hygienists to extend their influence to population-based screening programs. In Vancouver’s Downtown Eastside, an oral cancer screening program of the area’s high-risk population has been successful in screening 200 individuals and identifying 31 cases of leukoplakia, 13 (42%) of which showing positive toluidine blue staining.<sup>28</sup> To date, 12 of these 13 cases have been biopsied, showing 2 cancers and 8 pre-cancers.<sup>28</sup> This oral cancer screening program has benefited directly from the involvement of a local dental hygienist who has been actively involved in the screening process and data collection as part of her graduate research in oral cancer screening programs of high-risk populations. Dental hygienists are encouraged to join the outreach screening activities to the communities in need, to participate in health fairs or through education pathway to raise the awareness for oral cancer in general population.

Being “frontline screeners,” dental hygienists should understand the nature of oral cancer, constantly update their knowledge of its detection and prevention, and most importantly, conduct oral cancer screening for all adult clients at the time of their regular dental visits for hygiene procedures. Working together with a strong commitment to change, dental hygienists have the opportunity to make a dramatic difference in the outcomes for clients with pre-malignant oral disease and oral cancer.

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# CDHA Board — Highlights of Meeting

March 1–3, 2007, Ottawa

All members were present.


1. **“Ends” of CDHA:** The association’s Ends, which state the goals to be achieved, were recently adjusted to reflect the changes in our environment and preliminary interpretations were provided by Susan Ziebarth, Executive Director. These will guide the staff in planning our future initiatives.
2. **Reports to the Board:** The provincial associations and Dental Hygiene Educators of Canada (DHEC), along with our observers, the military and the national Dental Hygiene Certification Board, provided reports that were updated and reviewed to give a cross-section view of our members’ activities across Canada.
3. **Code of Ethics:** The *Code of Ethics* of CDHA was reviewed and found to be current. This document is reviewed on a three-year cycle.
4. **International Symposium on Dental Hygiene (ISDH):** The ISDH with the theme “The Many Cultures of Dental Hygiene” is being hosted by CDHA in Toronto from July 19–21, 2007. Alison MacDougall, RDH, the junior CDHA representation on the International Federation of Dental Hygiene Board, delivered an informative presentation on the composition, history, and mandate of the ISDH. The board also reviewed their responsibilities at the conference and the activities taking place. Many thanks are due the staff at CDHA for their efforts in making the conference a success.
5. **Dental Hygiene Culture:** To enhance our communication and program development, the Board of Directors, with facilitation by Sandy Kolberg, PhD, of Strategems Inc., began the process of developing an identified culture of dental hygiene.
6. **Student Summit:** The Student Summit held in January 2007 in Toronto proved very successful and President Elect Carol-Ann Yakiwchuk brought the board up to date on the day-long mini-conference. The post-conference evaluation forms are being collated and the information will assist in any future plans.
7. **Learning Outcomes Project:** The initial session of the Learning Outcomes Group, of which the CDHA is the Secretariat, was held in early February 2007. The group is composed of dental hygienists from many different areas of concentration and regions. The process will continue with a web-based survey and focus groups to be organized.
8. **Office:** The CDHA headquarters is currently in a transition phase as some services, which had been outsourced, are moving back in-house to be handled directly by the staff. This has been possible due to technical and educational development.
9. **Advocacy for Dental Hygiene:** The CDHA is proud to be affiliated with and represented on many committees and organizations. Through our involvement, we are gaining recognition and respect for our body of knowledge in the oral health field. For a complete list of our involvements, please visit the CDHA website.
10. **Future Meetings of the Board:** Teleconference on August 28, 2007; in-person meeting, October 18–21, 2007, in Ottawa. 

## Le Symposium international de l'hygiène dentaire (suite de la page 127)

La dernière fois que cet événement a été tenu en Amérique du Nord, c'était il y a 19 ans et nous savons que cela prendra au moins 9 ans avant qu'il ne le soit de nouveau. Dre Susanne Sunell, la présidente scientifique du symposium, a travaillé avec diligence avec son comité central de planification, regroupant Patty Wickstrom, Lynda McKeown, Kim Benkert, Donna Bowes et Laura Myers, pour préparer la voie à un magnifique événement. Des conférenciers invités de renommée internationale vous attendent à l'ISDH, ainsi qu'un programme composé de plus de 150 résumés analytiques sélectionnés par des groupes nationaux de bénévoles qui révisent les résumés. De plus, le marché international vous donnera l'occasion de voir les plus récents produits qui peuvent vous aider, ainsi que vos clients, et d'en discuter. Des ateliers spéciaux pré-symposium des plus intéressants seront offerts aux chercheurs, le tout planifié et organisé par les Éducateurs en hygiène dentaire du Canada (EHCD).

Nous sommes très enthousiastes à l'idée de vous présenter le programme des événements sociaux auxquels vous pourrez également participé tous les soirs.

L'ambiance internationale sera au rendez-vous avec un spectacle en direct, incluant le rythme des tambours taiko et un joueur de koto, lors de la réception de bienvenue et de remise des prix de la Fondation Sunstar pour la promotion de la santé buccale. Le dîner Symphonie des saisons est une soirée interactive rassemblant les quatre saisons de splendeur du Canada – une expérience sensorielle remplie d'énergie, d'images spectaculaires, de sons et d'arômes. Imagerie théâtrale, talents musicaux maison, cuisine exceptionnelle... nous avons pensé à tout, de A à Z. Tout ce que vous devez vous rappeler, c'est de venir avec appétit! N'oubliez pas de vous joindre à nous pour faire le tour du monde et appuyer la *Canadian Foundation for Dental Hygiene Research and Education* lors du dîner de gala « Le tour du monde en quatre-vingts jours » et de l'encan silencieux de Crest Oral-B.

Une opportunité professionnelle comme celle-là ne se présente pas souvent dans notre cour nationale. Assurez-vous de ne pas la manquer. Pour obtenir les informations les plus récentes et pour vous inscrire, visitez le site [www.cdha.ca](http://www.cdha.ca). 

# CDHA 2007 Dental Hygiene Recognition Program

The CDHA is pleased to announce the 2007 Dental Hygiene Recognition Program. This program, made possible through the contributions of CDHA Corporate Partners, is designed to recognize distinctive accomplishments of member dental hygienists and dental hygiene students. Entry details are available on CDHA's members' website, [www.cdha.ca](http://www.cdha.ca), under the "Networking and Recognition" section. The deadline for the submission of prize applications is **November 30, 2007**.

		PRIZE CATEGORIES
		<p><b>Crest Oral-B/CDHA Dental Hygiene Diploma Student Prize</b> One \$1,000 prize to be awarded to a dental hygiene student in a diploma program for contributing to the advancement of the profession in the context of educational and volunteer activities.</p>
		<p><b>Crest Oral-B/CDHA Dental Hygiene Baccalaureate Student Prize</b> One \$1,500 prize to be awarded to an undergraduate dental hygiene student for contributing to the advancement of the profession in the context of educational and volunteer activities.</p>
		<p><b>Crest Oral-B/CDHA Health Promotion Prizes</b> The following three prizes are awarded for the creative promotion of the dental hygiene profession. Entries will be judged on the basis of creativity, planning, volunteer recruitment, educational elements, community impressions and impact as well as innovative partnerships: 1. Individual prize of \$1,000; 2. Clinic Team prize of \$2,000; 3. Dental Hygiene Schools prize of \$2,000 * Half of each health promotion prize will be shared with the winner's local dental hygiene chapter.</p>
		<p><b>Dentsply/CDHA Leadership Prize</b> One \$2,500 prize to be awarded to a student enrolled in a dental hygiene program in recognition of a significant contribution to the local, academic or professional dental hygiene community through involvement and leadership.</p>
		<p><b>Johnson &amp; Johnson/CDHA Community Health Prize</b> One \$3,000 prize to be awarded to a student, or group of students, enrolled in the final year of a dental hygiene program in recognition of the commitment to improving oral health through community service by implementing an innovative community oral health project.</p>
		<p><b>Philips Sonicare/CDHA Professionalism Prize</b> One \$2,500 prize in recognition of a graduating dental hygiene student who has demonstrated distinguished professionalism throughout his/her dental hygiene education.</p>
		<p><b>Sunstar/G.U.M./CDHA Achievement Prize</b> One \$2,000 prize to be awarded to a student enrolled in the final year of a dental hygiene program who has overcome a major personal challenge during his/her dental hygiene education.</p>
		<p><b>Sunstar/G.U.M./CDHA Global Health Initiative Prize</b> One \$3,000 prize in recognition of a registered dental hygienist who has committed to volunteering as part of an initiative to provide oral health related services to persons in a disadvantaged community or country.</p>
		<p><b>TD Meloche Monnex/CDHA Visionary Prize</b> One \$2,000 prize awarded to a student currently enrolled in a Masters or Doctoral program related to dental hygiene in recognition of a vision for advancing the dental hygiene profession.</p>



# Programme de reconnaissance en hygiène dentaire de l'ACHD pour 2007

L'ACHD est heureuse de présenter le programme de reconnaissance en hygiène dentaire pour l'année 2007. Ce programme, rendu possible grâce aux dons des entreprises partenaires de l'ACHD, est conçu pour reconnaître les réalisations distinctives des hygiénistes dentaires et des étudiantes et étudiants en hygiène dentaire membres de l'ACHD. Les détails concernant les procédures d'inscription sont affichés sur le site Web réservé aux membres de l'ACHA, à la section "Networking and Recognition". La date limite pour soumettre les demandes d'inscription aux différents prix est le **30 novembre 2007**.

		CATÉGORIES DE PRIX
		<b>Prix de Crest Oral-B/ACHD destiné aux étudiantes et étudiants diplômés en hygiène dentaire</b> Un prix de 1 000 \$ offert à un étudiant ou une étudiante, inscrit(e) dans un programme en hygiène dentaire menant à un diplôme, pour sa contribution à l'avancement de la profession dans le cadre d'activités éducatives et d'activités de bénévolat.
		<b>Prix de Crest Oral-B/ACHD destiné aux étudiantes et étudiants bacheliers en hygiène dentaire</b> Un prix de 1 500 \$ offert à une étudiante ou un étudiant en hygiène dentaire au niveau du baccalauréat pour sa contribution à l'avancement de la profession dans le cadre d'activités éducatives et d'activités de bénévolat.
		<b>Prix Promotion de la santé de Crest Oral-B/ACHD</b> Les trois prix suivants sont offerts pour la promotion créative de la profession de l'hygiène dentaire. Les inscriptions seront jugées selon les critères suivants : créativité, planification, recrutement de bénévoles, éléments éducatifs, impressions et impact sur la collectivité, ainsi que sur la dimension innovatrice des partenariats : 1. Prix individuel de 1 000 \$; 2. Prix d'équipe clinique de 2 000 \$; 3. Prix d'école d'hygiène dentaire de 2 000 \$ * La moitié de chaque prix accordé pour la promotion de la santé sera partagée avec le chapitre local de l'association d'hygiène dentaire des gagnantes et gagnants.
		<b>Prix Leadership Dentsply/ACHD</b> Un prix de 2 500 \$ offert à un étudiant ou une étudiante, inscrit(e) dans un programme en hygiène dentaire, en reconnaissance d'une contribution significative à la communauté locale académique ou professionnelle de l'hygiène dentaire par son engagement et son leadership.
		<b>Prix Santé communautaire de Johnson &amp; Johnson/ACHD</b> Un prix de 3 000 \$ offert à un étudiant ou une étudiante ou à un groupe d'étudiantes et d'étudiants, inscrit(e)s en dernière année d'un programme en hygiène dentaire, en reconnaissance de son ou de leur engagement pour l'amélioration de la santé buccodentaire dans un service communautaire par la mise en œuvre d'un projet de santé buccodentaire communautaire innovateur.
		<b>Prix Professionnalisme de Philips Sonicare/ACHD</b> Un prix de 2 500 \$ offert à un étudiant ou une étudiante sortant d'un programme en hygiène dentaire qui a fait preuve d'un professionnalisme remarquable tout au long de sa formation en hygiène dentaire.
		<b>Prix Réalisation de Sunstar/G.U.M./ACHD</b> Un prix de 2 000 \$ offert à un étudiant ou une étudiante, inscrit(e) en dernière année d'un programme en hygiène dentaire, qui a surmonté un défi personnel important durant sa formation en hygiène dentaire.
		<b>Prix Programme de santé mondiale de Sunstar/G.U.M./ACHD</b> Un prix de 3 000 \$ offert à un ou une hygiéniste dentaire autorisé(e) qui s'est engagé(e) comme bénévole dans un programme visant à offrir des services liés à la santé buccodentaire à des personnes faisant partie d'une communauté ou d'un pays défavorisé.
		<b>Prix Visionnaire de TD Meloche Monnex/ACHD</b> Un prix de 2 000 \$ offert à un étudiant ou une étudiante, actuellement inscrit(e) dans un programme de maîtrise ou de doctorat lié à l'hygiène dentaire, en reconnaissance de sa vision de l'avenir pour l'avancement de la profession de l'hygiène dentaire.

# Statistics Canada's Canadian Health Measures Survey (CHMS)

by the Office of the Chief Dental Officer



**T**HE OFFICE OF THE CHIEF DENTAL OFFICER (OCDO) was created in 2004 at Health Canada to improve the oral health status of Canadians and to increase awareness about the prevention of oral diseases. As there had not been a national oral health assessment since 1972, the gathering of current epidemiological information became one of the office's top priorities.

***The CHMS mobile clinic is currently stationed in Clarington, Ontario, until the end of May 2007.***

Around the same time as the OCDO was established, Health Canada and the Public Health Agency of Canada partnered with Statistics Canada on its Canadian Health Measures Survey (CHMS), a "direct measures" health survey. The results from the CHMS will help to establish baselines of many health issues, to explore relationships between risk factors and health status, and to look at new emerging public health issues. An example of the type of information that can result from this type of survey comes from Australia. From 1999 to 2001, Australia conducted a direct measures survey and found that for every known case of diabetes, there was one undiagnosed case. The sur-

The mobile clinic trailers. *Inset:* The oral health room

vey revealed that approximately one million Australians over the age of 25 have diabetes. Australia has used these results to develop diabetes awareness programs and to inform health care planning in their country.

The Canadian Health Measures Survey will collect information on the health of Canadians in two phases. The first phase consists of a household questionnaire that asks about the respondent's medical history, current health status, nutrition, oral health, smoking habits, alcohol use, as well as demographic and socio-economic variables. The second phase is a series of direct physical measurements of the respondent including their blood pressure, height and weight measurements, blood and urine samples, oral examination, and physical fitness testing.

An oral health module was included in the CHMS in order (1) to evaluate the association of oral health with major health concerns such as diabetes, respiratory and cardiovascular diseases; and (2) to determine relationships between oral health and certain risk factors like poor nutrition, environmental factors, and socio-economic factors such as low income levels and education. The clinical oral examination phase will also establish a national baseline level of the DMFTs (Decayed, Missing, Filled Teeth) of Canadians.

The survey started in late March 2007 in Clarington, Ontario, and will continue until spring 2009. Over this two-year collection period, the CHMS will take measures of approximately 5,000 randomly selected people between the ages of 6 and 79. The clinical portion of the CHMS will be conducted in mobile clinics that will travel to 15 randomly selected communities across Canada. The CHMS clinic will stay at each site for six to eight weeks, collecting direct measures from approximately 350 local respondents. Each mobile clinic consists of two trailers, 15.3 metres long (51 feet) by 2.4 metres wide (8 feet), connected by a pedway. There are two mobile clinics in use for the survey.

The household interviews will be conducted by trained Statistics Canada personnel and the responses will be entered directly into a computer by the interviewer. The oral health household questionnaire was developed by an Oral Health Steering Committee consisting of key dental stakeholders from the University of Toronto, the University of Montreal, the Canadian Dental Association (CDA), the chair of the Federal/Provincial/Territorial Dental Working Group (FPTD), and the chair of Canadian Dental Regulatory Authorities Federation (CDRAF).

The oral health household questionnaire was designed to assess respondent's perception of the general health of their mouth and addresses the following topics:

- satisfaction with appearance of the teeth (dentures);
- comfort with or avoidance of certain types of foods;
- presence of any persistent pain in the mouth;
- how much, if any, time was taken away from work, school, or normal activities because of the need for dental check-ups, dental treatment or problems with the mouth;
- oral health habits (including brushing, flossing, and visits to a dental professional); and questions surrounding insurance and costs associated with visiting a dental professional.

The results from the oral health clinical survey will also be directly entered into a computer program by a recorder according to the dentist's dictation. This computer application was designed to minimize data entry errors and to identify inconsistent and inaccurate responses via pre-programmed edits. The examination will be done using a standard dental chair, dental light, mouth mirror, and a Williams periodontal probe. The oral health component consists of four segments in the computer application.

1. The **Oral Health Introduction Block** outlines the script for the clinic coordinator (dental recorder) to introduce both him- or herself and the dentist to the respondent.
2. The **Oral Health Questions Block** details the questions for the dentist to ask about the health of the respondent's mouth. For example, did the respondent have a toothache, pain in their mouth, any sensitivity to food or drinks or any bleeding when brushing?
3. The **Oral Health Restriction Block** is a series of screening questions for the dentist to ask to determine whether the respondent has a health condition (e.g., the existence of either congenital heart disease or

immuno-suppression therapy) that may cause them to be more susceptible to certain infections as a result of the probing. Any respondent who answers "yes" to any one of the screening questions is excluded from the probing portion of the oral health exam.

4. The **Oral Health Examination Block** is the final segment and outlines the assessment the dentist will follow to determine the health of the respondent's teeth and gums. This assessment involves
  - recording the status of all natural and artificial teeth;
  - recording the presence or absence of any oral pathology;
  - recording a fluorosis score for the anterior permanent maxillary incisors of respondents aged 6–12 (using the Dean's Index);
  - recording the orthodontic status (for respondents ages 12–59) and any current orthodontic treatment;
  - performing a periodontal assessment using the Gingival Index to assess the severity and prevalence of gingivitis, the Debris Index to assess oral debris, the Calculus Index to assess oral calculus, and recording the amount of periodontal disease, attachment loss, and depth of probing (for respondents 15 years and older);
  - assessing the status of each tooth (e.g., assessing dental caries, recording missing teeth, recording if teeth have been filled), recording the number of surfaces with amalgam fillings, and recording whether there has been any traumatic injury to any of the four permanent upper and four permanent lower incisor teeth;
  - determining if the respondent has any dental treatment needs based on the dentist's clinic expertise.

The dentists administering the oral health clinical component were provided by the Department of National Defence (DND) through a partnership with Health Canada. The DND contributed 10 of their dentists for the duration of the CHMS data collection period.

A significant amount of work went into the development of the oral health clinical component to ensure that the data generated will be valid and reliable. During the summer of 2006, a pre-test of the entire oral health module including the oral health computer application was completed. The aim of the pre-test was to determine how long it would take to do the oral health examination for each age group and to confirm the suitability of the clinical component, the equipment, and the qualitative questions. There were a few modifications to the oral health module as a result of the pre-test.

In January 2007, Statistics Canada held a general CHMS training for all CHMS physical measures staff. This session covered many topics for the staff of the CHMS mobile clinic including, for example, the *Statistics Act* and confidentiality, safety in the clinic, media awareness, communication material, and WHMIS (Workplace Hazardous Materials Information System) training.

A calibration session for all of the Canadian Forces dentists was also held during a week in January 2007 at the

Canadian National Institute of Health, a private dental hygiene school in Ottawa. Seven Canadian Forces dentists were trained along with two back-up dentists/trainers. This session was led by a dentist trained to the World Health Organization (WHO) Gold Standard level and was intended to calibrate all of the dentists to the WHO level to ensure both inter- and intra-examiner reliability. In addition, the session ensured that there are now two Canadian examiners trained at the WHO Gold Standard level, thus providing resources for future calibration sessions.

During February and March 2007, Statistics Canada held a one-month dress rehearsal on the entire CHMS. All seven of the Canadian Forces dentists and the two back-up dentists/trainers participated. The dress rehearsal was designed to ensure that the timing and the flow of both the respondents and the information worked and to provide the CF dentists and clinic coordinators (dental recorders) an opportunity to work together.

The CHMS mobile clinic is currently stationed in Clarington, Ontario, until the end of May 2007. From there, it will move into the Montérégie region of Quebec in late spring and to Moncton, New Brunswick, in summer 2007.

The initial data dissemination is planned for late 2009. The information resulting from the survey will be beneficial for the entire dental field, including dental hygienists. The data will provide a basis for future policy and program development as well as numerous research possibilities. Currently there is only the one-time funding for the CHMS, but it is hoped that the survey will become an ongoing part of Canada's health information system.

More details about the CHMS can be found at [www.statcan.ca/chms](http://www.statcan.ca/chms) or [www.statcan.ca/ecms](http://www.statcan.ca/ecms). Information on the Office of the Chief Dental Officer can be found at [www.healthcanada.gc.ca/ocdo](http://www.healthcanada.gc.ca/ocdo) or [www.santecanada.gc.ca/bdc](http://www.santecanada.gc.ca/bdc).

Information on the Canadian National Institute of Health can be found at [www.cnih.ca](http://www.cnih.ca). 

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### **A Global Perspective** (continued from page 123)


ty oral health care. This symposium will give us the opportunity to discuss global issues as well as learn from many of the world experts in the field of dentistry. There will be educational opportunities for viewing various educational modalities.

With the onset of technology, especially the Internet, we can access information from all corners of the world from our homes or offices. This increases our ability to use a vast amount of information and uphold the highest standard of care. However, it is challenging with these technological to stay up-to-date with the newest developments in our profession. How many times have clients mentioned that they saw a new product advertised on television or on the Internet that you had not even heard about? They come to you to inquire about the authentic-

ty of this product and want to know if you recommend it.

While technology is without a doubt a great help in terms of information gathering, we still need to network with other oral health professionals in our field and hear what they have to say about keeping our profession alive and stimulating. One of the many advantages of attending conferences and symposia.

So I look forward to seeing you in Toronto this July. Whether you attend the symposium or not, you can be proud that your country is hosting this global event and you can look forward to hearing about it. CDHA is working very hard to represent you, its members, as we welcome the world to this special event.

You can reach the president at [president@cdha.ca](mailto:president@cdha.ca). 


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### **The International Symposium of Dental Hygiene** (continued from page 127)

symposium, has worked diligently with her core planning committee, Patty Wickstrom, Lynda McKeown, Kim Benkert, Donna Bowes, and Laura Myers, to set the stage for a wonderful event. Awaiting you at the ISDH are internationally renowned invited speakers and a program created from more than 150 abstracts selected by national panels of volunteer abstract reviewers. In addition, the global marketplace will provide you with the opportunity to talk about and view the latest products to assist you and your clients. Special pre-symposium workshops for researchers are available as is an exciting workshop planned and hosted by Dental Hygiene Educators Canada (DHEC).

We are very excited to bring you the program of social events that are also available to you every evening. The world vibe will be showcased with live entertainment including the beat of the taiko drums and a koto player at

the Sunstar Foundation for Oral Health Promotion Awards & Welcome Reception. The Symphony of Seasons Dinner is an interactive evening bringing together Canada's four seasons of splendour—a sensory experience filled with energy, spectacular sight, sounds, and aromas. With dramatic imagery, homegrown musical talents, and exceptional cuisine; we have thought of everything from eh to zed. All you need to remember is to bring your appetite! Don't forget to join us to travel the world and support the Canadian Foundation for Dental Hygiene Research and Education at Crest Oral-B's Around the World in Eighty Days Gala Dinner & Silent Auction.

A professional opportunity like this does not often present itself in our own national backyard. Make sure you don't miss out. For the most up-to-date information and to register, please visit [www.cdha.ca](http://www.cdha.ca). 





# Abstracts from the 85th General Session of the IADR

March 21-24, 2007, New Orleans, Louisiana

These abstracts were among those presented at the 85th General Session of the International Association for Dental Research in New Orleans from March 21–24, 2007. The IADR has given us permission to publish a selection of abstracts in the journal.

## CARIES

### 0208 EFFECTS OF NOVEL FLUORIDE DENTTABS® ON REMINERALISATION OF WHITE-SPOT LESIONS

T. KREMNICZKY, W.H. ARNOLD, and P. GAENGLER, University of Witten/Herdecke, Germany

**Objectives:** It was the aim of this *in-vitro*-study to assess the remineralisation potential of a novel tooth cleaning tablet with different fluoride content. **Methods:** Twenty three caries free impacted wisdom teeth were examined, enamel surfaces were cleaned, wax coated leaving two 3x4mm windows for exposure to Demin./Remin. cycles. The teeth were randomly assigned to 4 Groups of 5 (control) teeth and 6 (experimental) teeth. Demin. by standardised HEC-gel, pH 4.7 at 37°C for 72h, was alternated by rinsing in standardised Remin. solution, pH 7.0 at 37°C for 72h, total challenge time 360h. The negative control Group N was treated during Remin. cycles with saline only; positive control Group P was treated with Remin. standardised solution; Denttabs®-experimental Group D1 was exposed to Remin. solution containing 1 Denttabs®-tablet with 1450ppmF per 5ml Remin. solution; Denttabs®-experimental Group D2 was rinsed with Remin. solution and Denttabs®-tablet with 4350ppmF. After the cycling each tooth was cut into serial sections to be analysed by polarising light microscopy and to assess quantitatively and semiqualitatively the different zones of white-spot lesions in the 3 most representative sections. The statistical analysis was based on the *Mann-Whitney-Test* and *Kruskal-Wallis-Test*. **Results:** Both control Groups N(-) and P(+) exhibited microscopically and macroscopically characteristic white-spot lesions. The Remin. potential of the body of the lesion and of the total lesion increased considerably from N<P<D1<D2. Denttabs®-2 administration showed partial/total Remin including lamination and/or disappearance of the body of the lesion (median of 10 standard measurements per section of lesion extension in µm: N 203.6; P 135.7; D1 71.4; D2 35.7). The different results of all 4 Groups were statistically with both tests highly significant (p<0.01). **Conclusion:** Based on these results the novel Denttabs® formulation represents a highly effective oral hygiene product and the Remin. potential is correlated to the fluoride content.

### 0500 CPP-ACP PASTE WITH FLUORIDE: IN VITRO ROOT SURFACE CARIES FORMATION

C.P. TRAJTENBERG, University of Texas - Houston/Health Science Center, USA, C. FLAITZ, University of Texas Houston / Health Science Ctr, USA, and J. HICKS, Baylor College of Medicine, Houston, TX, USA

**OBJECTIVE:** This *in vitro* study evaluated the effects of a casein phosphopeptide-amorphous calcium phosphate paste (CPP-ACP) that contains fluoride on artificial caries formation in human root surfaces. **METHODS:** 15 human teeth with sound root surfaces were sectioned into 3 portions. Each portion from a single tooth was assigned to one of the three treatment groups: 1) CPP-ACP with No Fluoride (MI Paste, GC America, n=15); 2) FL-CPP-ACP with Fluoride Added (MI Paste with Fluoride, GC America, n=15); and 3) No Treatment Control (n=15). CPP-ACP and FL-CPP-ACP root segments were treated with the appropriate assigned agent for 120 seconds, followed by air-water rinsing for 60 seconds, and then exposed to synthetic saliva for 24 hours. CPP-ACP and FL-CPP-ACP treatment, rinsing and synthetic saliva exposure were repeated on a daily basis over a 14-day period. No treatment control root segments were exposed to synthetic saliva only for

a 14-day period. Artificial root surface caries were created over a 10-day period (alternating 16 hours demineralization followed by 8 hours remineralization). Longitudinal sections (3 sections/root segment) were obtained and lesion depths were determined using polarized light microscopy (n=45 lesions/group, ANOVA, DMR). **RESULTS:** Mean root surface lesion depths were: 1) No Treatment Control Group: 326±31µm; 2) CPP-ACP Group: 268±23µm; 3) FL-CPP-ACP Group: 197±26µm. Mean lesion depth reductions compared with the No Treatment Control Group were: 18% for CPP-ACP Group (P<.05, ANOVA, DMR) and 39% for FL-CPP-ACP (P<.05, ANOVA, DMR). Mean lesion depth reduction for FL-CPP-ACP was 26% compared with CPP-ACP (P<.05, ANOVA, DMR). **CONCLUSIONS:** Treatment of root surfaces with CPP-ACP and FL-CPP-ACP significantly improved caries resistance of root surfaces compared with the no treatment control group (P<.05). Incorporation of fluoride into CPP-ACP paste significantly lessened the effects of an *in vitro* root surface caries challenge compared with CPP-ACP alone (P<.05). (Funded by GC America, Inc.)

### 0502 EFFICACY OF MARKETED DENTIFRICES USING AN IN SITU CARIES MODEL

D. ZERO<sup>1</sup>, H.M. PROSKIN<sup>2</sup>, R.M. BUCH<sup>3</sup>, C. KOLLAR<sup>3</sup>, M.L. BOSMA<sup>4</sup>, and S.R. SMITH<sup>4</sup>, <sup>1</sup>Indiana University School of Dentistry, Indianapolis, USA, <sup>2</sup>Howard M. Proskin & Assoc, Rochester, NY, USA, <sup>3</sup>GlaxoSmithKline, Parsippany, NJ, USA, <sup>4</sup>GlaxoSmithKline, Weybridge, United Kingdom

**Objectives:** To compare the enamel fluoride uptake and remineralization potential of two commercially available dentifrices – containing either sodium fluoride/silica or sodium monofluorophosphate/sodium fluoride/dicalcium phosphate. **Methods:** 48 subjects participated in this 4 test period cross over and laboratory evaluator-blind study. There was a 1-week washout period between each test leg which included a 2-3 day lead-in with a dental prophylaxis followed by the use of non-fluoride dentifrice. Subjects' mandibular partial dentures were modified to hold partially demineralized enamel specimens in the buccal flange. Each test dentifrice was used for a two-week period. The products used were: test dentifrice containing 675ppm F from sodium fluoride/silica base; marketed dentifrice containing 1350ppm F from sodium fluoride/silica base (NaF); test dentifrice containing 2700ppm F from sodium fluoride/silica base; and a marketed dentifrice containing 1450ppm F (1000ppm F from sodium monofluorophosphate, 450ppm F from sodium fluoride) (MFP/NaF). The surface microhardness (SMH) test was used to assess changes in the mineral status of partially demineralized enamel specimens. Enamel fluoride uptake (EFU) of sound and partially demineralized enamel specimens was determined using the microdrill enamel biopsy technique (Sakkab et al., 1984). **Results:** After 14 days, the NaF dentifrice provided significantly greater %SMH Recovery (p= 0.0018) and significantly greater EFU (p<0.0001) than the MFP/NaF dentifrice. An increasing trend was observed for means of the three sodium fluoride dentifrices (675ppm F, 1350ppm F, and 2700ppm F) for the %SMH Recovery scores and for the EFU scores. **Conclusion:** This *in situ* study demonstrated that a dentifrice containing 1350ppm fluoride from sodium fluoride/silica base had significantly greater remineralization potential and fluoride uptake than a dentifrice containing a combination of 1000ppm fluoride from sodium monofluorophosphate and 450ppm F from sodium fluoride in a dicalcium phosphate base. A dose response was demonstrated for the sodium fluoride dentifrices.

## 1031 A NEW THEORY ABOUT THE DEVELOPMENT OF SECONDARY CARIES

N.J.M. OPDAM, B.A.C. LOOMANS, E.M. BRONKHORST, and J.J.M. ROETERS, Radboud University Nijmegen Medical Centre, Netherlands

**Introduction:** Secondary caries is considered to start at the outer surface of the tooth adjacent to a restoration in presence of an active biofilm. A carious lesion along the dentin-enamel junction (DEJ) detected after removal of a restoration is considered to be 'residual' caries (Mjör *et al.*, 2000; Kidd, 2001). In this study it is hypothesized that cusp-movement during loading induces percolation and microleakage in absence of a biofilm with secondary caries at the DEJ as a result. The presence of a crack visible after removal of a restoration facilitates percolation. **Objectives.** To evaluate the relation between the presence of cracks and carious lesions along the dentin-enamel junction in teeth with an amalgam restorations. **Methods:** Premolar and molar teeth needing replacement of Class I and II amalgam restorations were included in this study. Exclusion criteria were teeth with restorations with marginal fractures, visible marginal cavitation (indicating presence of a carious lesion) or caries detected on a radiograph. In 99 teeth amalgam restorations were carefully removed including the corrosion products before cavity walls were visually inspected for the presence of caries at the DEJ and cracks in cusps. Data were statistically analyzed using a Chi-square test at  $p < 0.05$ . **Results:** Statistical analysis revealed a significant effect of the presence of cracks and the presence of caries along the DEJ ( $p < 0.001$ ).

	Cracks visible	No cracks visible
Caries along DEJ	36	7
No caries along DEJ	24	32

**Conclusion:** The outcome of the study suggests that in the development of secondary caries percolation due to the presence of cracks plays an important role.

## SALIVA RESEARCH

### 1039 VARIATIONS IN SALIVARY CARIES PROTECTIVE FUNCTIONS IN HEALTHY INDIVIDUALS

M. KIM, A. CHAN, J. ALEKSEJUNIENE, and C. CLARK, University of British Columbia, Vancouver, Canada

The importance of saliva qualities to caries defense has been previously emphasized. **Objectives:** Study hypothesis: even in healthy individuals caries defense functions vary widely and are interrelated. **Methods:** Under standardization (no smoking, toothbrushing, eating, drinking for 60 min), following functions were studied: saliva flow rates (ml/min), stimulated saliva buffer capacity (scores 0-12), resting saliva pH (5.0 to 7.8). Saliva-Check kits were used for the pH and buffer capacity assessments. Glucose clearance (in M) was measured by glucose monitor at 3, 5, and 7 minutes after the glucose rinse. A fluoride retaining rate (in M/L) assessed at 0min, 5min, 10min, 15min and 20min after the 0.2% fluoride rinse. Counts of Mutans Streptococcus and Lactobacilli in saliva grouped subjects into low, moderate or high caries risk groups. A convenience sample included healthy subjects (no diseases, neither medication use). The biological functions were related by Pearson correlation and significance set at  $P < 0.05$ . **Results:** The resting saliva flow rate varied from 0.20 ml/min to 1.17 ml/min, the stimulated saliva from 0.33 ml/min to 3.11ml/min, pH values were from 5.0 to 7.8 and buffer capacity scores from 6 to 12. The fluoride retaining rate varied most at 5minutes and least at 15 minutes after the fluoride rinse. There was a wide range of variation in glucose clearance patterns at all follow-up periods. These functions were inter-related (coefficient, P-value): the flow rate of resting with the pH of resting saliva (0.485,  $P=0.049$ ) and the buffer capacity with glucose clearance time (0.626,  $P=0.012$ ). Subjects with low and moderate risk caries groups presented better values of protective functions than subjects with high caries risk. **Conclusion:** A wide variation in each of studied protective functions was observed in healthy individuals. The protective functions such as pH, flow rate, buffer capacity and glucose clearance presented related effects.

## CHILDREN

### 1665 TESTING A PROGRAM TO PREVENT EARLY CHILDHOOD CARIES: KNOWLEDGE OUTCOMES

S. LI, J. VERONNEAU, M.-C. LOIGNON, S. SHAPIRO, R.W. PLATT, and P.J. ALLISON, McGill University, Montreal, Canada

**Objectives:** To test the effectiveness of an educational program in the prevention of early childhood caries in Quebec, Canada. **Methods:** A community-based, multi-centre, single-blinded, randomised controlled trial design was used. A sample of 821 parent/child dyads was recruited when the infants were approximately 6 months old. The dyads were randomised to receive the test intervention or normal care (no service). The test intervention was an educational program in which dental hygienists delivered caries-prevention material to the dyads on a one-on-one basis on four occasions, at 6 month intervals. Baseline sociodemographic, socioeconomic, and caries-related knowledge and behaviour data were collected from parents at recruitment. The same data were collected 24 months following recruitment. Knowledge variables concerned dietary and bacterial causes of caries and means to prevent caries. These variables were evaluated by parents using a self-complete questionnaire. Knowledge variables were described using the percentage of parents marking the most appropriate response. Knowledge variables at outcomes evaluation were compared between test and control groups using a chi square test. **Results:** Of the 821 dyads recruited, 749 (91.2%) were seen for outcomes evaluation. There were no differences in sociodemographic and socioeconomic characteristics between those completing the study and those dropping out. Of 11 knowledge variables, the test group obtained a significantly higher percentage of appropriate responses than the control group for 6 variables, 1 variable was of borderline difference in the same direction and 4 variables showed no difference between groups. Following a Bonferonni correction for multiple tests, five variables were different between the groups. Knowledge of cross-infection control, oral hygiene practices and some dietary issues were different while other diet-related knowledge was similar between groups. **Conclusion:** The test intervention appears to have some effect on caries-related knowledge of parents of 30 month old children. Funding by the Canadian Institutes of Health Research.

### 2430 EARLY ENAMEL DEFECTS LEADING TO EARLY CHILDHOOD CARIES: COHORT STUDY

A. ROSENBLATT, A. RIBEIRO, A. OLIVIERA, and A.M. CHAVES, Universidade De Pernambuco, Recife, Brazil

**Objective:** The purpose of this study was to determine if enamel defects might be a good predictor of subsequent early childhood caries. **Method:** Using a prospective cohort design, low income Brazilian children, from birth to 54 months of age, were examined at home, at 6 month intervals, with natural light using dental mirror, probe (WHO), by the knee-to-knee technique. The teeth were cleaned with gauze and teeth were examined for enamel defects using the Development Defects Enamel (DDE) index and caries was registered according to the WHO criteria. Two groups were identified: those with and those without early enamel defects. To control for confounding variables, we also examined breastfeeding, diet, oral hygiene and exposure to fluoride. Descriptive statistics, non parametric tests, and logistic regression models were performed. **Results:** At 54 months 48.3% of the subjects with enamel defects and 26.2% of the subjects without enamel defects developed early childhood caries (ECC) ( $p=0.02$ ). Among all enamel defects, enamel hypoplasia demonstrated the highest risk of subsequent caries. Further, in the multivariate analyses, at 54 months, only enamel defects significantly correlated with caries ( $p=0.001$ ). Conversely, only fluoride use was significantly protective against ECC ( $p=0.02$ ). **Conclusion:** Enamel defects are very strong predictors of ECC development.

## 2206 TWO EFFICACY STUDIES OF A CHILDREN'S PRE-BRUSH PLAQUE TINTING MOUTHRINSE

C. CHARLES<sup>1</sup>, T. LISANTE<sup>1</sup>, Q. ZHAO<sup>1</sup>, J. QAOQISH<sup>2</sup>, M.C. LYNCH<sup>1</sup>, C.R. GOYAL<sup>2</sup>, and N. SHARMA<sup>2</sup>, <sup>1</sup>Pfizer Inc., Morris Plains, NJ, USA, <sup>2</sup>Biosci Research Canada, Ltd, Mississauga, Canada

**Objectives:** To determine the efficacy of Listerine® Agent Cool Blue™ Plaque-Detecting Rinse (ACB) in helping children remove plaque from their teeth when used before brushing, twice daily, over a 30-day period in two randomized, examiner-blind, single-center, parallel-group design, clinical trials. The secondary objectives were to monitor oral tissue tolerance and to assess gingivitis levels. **Methods:** Following IRB approval about 100 (50 per treatment group) generally healthy 6-12 year old children who met the necessary inclusion/exclusion criteria were enrolled in each study. They rinsed twice daily (10 ml for 30 seconds) with their assigned mouthrinse, before brushing. An ADA-Accepted children's toothbrush and fluoride toothpaste were dispensed for home use for 30 days. Oral tissues, gingivitis (Modified Gingival Index [MGI]), and plaque (Turesky Modification of the Quigley-Hein Plaque Index [PI] scored on 6 surfaces) examinations took place at baseline and after 15 and 30 days of use. Compliance was assessed by reviewing subject diaries and supplies. **Results:** ACB demonstrated 13.5% and 22.1% reduction in PI at day 30, in studies 1 and 2, respectively, compared to control ( $p < 0.001$ ). In addition, ACB reduced MGI by 7.0% in study 1 ( $p < 0.001$ ), and 19.6% in study 2 ( $p < 0.001$ ), compared to control. **Conclusions:** Listerine® Agent Cool Blue™ Plaque-Detecting Rinse was well tolerated and when used twice daily, before brushing, provided statistically significant reductions in both plaque and gingival indices.

## 2116 CARIES DEVELOPMENT IN TEETH OF CHILDREN REGULARLY ATTENDING A DENTIST

K.M. MILSOM<sup>1</sup>, A. THRELFALL<sup>2</sup>, A. BLINKHORN<sup>2</sup>, and M. TICKLE<sup>2</sup>, <sup>1</sup>University of Manchester, Chester, United Kingdom, <sup>2</sup>University of Manchester, United Kingdom

**Objectives:** To measure the incidence of dental caries in primary molar teeth of children aged 3-6 years who attended NHS dental services in the Northwest of England. To measure the outcomes of dental restorative treatment in this group of children. **Methods:** Detailed dental records of children born between 03.07.95 and 23.12.97 attending the practices of 50 volunteer NHS dentists in the Northwest of England were assembled over a period of three years. Data from these records were analysed to estimate caries incidence rates at the subject and tooth level. **Results:** The study population consisted of 739 children aged between 2.8 and 6.2 years at baseline. At the start of the study, 620 children (84%) were caries free. The age specific incidence of a first caries event in caries free children increased with age. At age four the incidence of the first carious lesion was 9.5 per 100 person years and at age seven it was 19.6 per 100 person years. The tooth specific incidence of caries was found to be approximately five times greater in children that already had caries recorded than in children that did not have any caries at baseline. A sub-analysis was undertaken on 566 children that were continuously followed for more than 2 years. Out of 486 children with no caries at baseline 132 (27%) developed caries in molars during follow-up. By contrast, of 79 children with one or more carious primary molars at baseline, 57 (71%) developed further carious lesions. **Conclusion:** Due to the substantially different risk of developing new cavities, children who present with caries should be considered as a different population to those who are caries free. The principal aim of public health and primary care preventive strategies should be to keep young children caries free.

## WHITENING

### 0121 CLINICAL EFFICACY OF TWO DIRECT-TO-CONSUMER WHITENING STRIPS

I. MAGNUSSON<sup>1</sup>, B. HALES<sup>1</sup>, B. THACKER<sup>1</sup>, K. KARPINIA<sup>1</sup>, M.L. BARKER<sup>2</sup>, and S. FARRELL<sup>2</sup>, <sup>1</sup>University of Florida, Gainesville, USA, <sup>2</sup>The Procter & Gamble Company, Mason, OH, USA

[Check symbols in this] **Objective:** This clinical study compared efficacy of two direct-to-consumer whitening strips. **Methods:** 57 subjects were randomized to one of two whitening regimens: Oral-B®

Rembrandt® Whitening Strips Premium worn once a day for 7 days (7-day strips) or Crest® Whitestrips® Premium Plus containing 10% hydrogen peroxide and worn twice a day for 10 days (10-day strips). Treatment followed the manufacturers written instructions which included 30 minutes wear time per strip application. Tolerability was assessed from subject interviews and oral examination, and efficacy was measured objectively from CIELAB digital measurements. Whitening response was compared at Day 6, Day 8 and at the end-of-treatment (Day 8 for the 7-day strip and Day 11 for the 10-day Strip) using the analysis of covariance method. **Results:** The study population consisted of healthy adults averaging 30.3 years of age. At each study visit, the 10-day strip group demonstrated significantly greater improvement of  $b^*$  and  $L^*$  ( $p < 0.0051$ ) relative to the 7-day strip group. At the end-of-treatment, use of 7-day strips resulted in adjusted means of -1.19 for  $\Delta b^*$  and 1.30 for  $\Delta L^*$ , while the use of 10-day strips resulted in adjusted means of -2.32 for  $\Delta b^*$  and 2.23 for  $\Delta L^*$ . The 10-day strip group demonstrated significantly greater ( $p < 0.0001$ ) tooth color improvement (both  $\Delta b^*$  and  $\Delta L^*$ ) relative to the 7-day strip group at end-of-treatment. Both treatments were generally well-tolerated. **Conclusion:** Use of a direct-to-consumer 10% hydrogen peroxide, 10-day whitening strip resulted in a significantly greater tooth whitening response relative to that of a 7-day marketed strip.

### 2666 BLEACHING EFFECT COMPARISON OF TWO DIFFERENT CONCENTRATIONS OF HYDROGEN PEROXIDE

S. KIM-PUSATERI, S. CIANCIO, and M. BESSINGER, State University of New York - Buffalo, USA

**Objective:** To compare the effectiveness of two concentrations of a chairside bleaching agent. **Methods:** A total of 76 teeth in 19 subjects were evaluated. Included were non-restored maxillary incisors with baseline shade of B54 (Trubyte) or darker. Eligible subjects were randomly assigned to groups receiving either 25% or 32% hydrogen peroxide (Sapphire Bleaching System). Subjects received either two 30 or three 20 minute applications of the bleaching agent following the manufacturers instructions. Variables were evaluated at baseline, immediate post-treatment, and one week post-treatment: tooth shade,

gingival index, plaque index, tooth sensitivity. L\*a\*b\* values were measured using a commercial dental colorimeter (ShadeVision, X-Rite) and delta E values were calculated. Data was analyzed using a two-sample independent t-test at 95% confidence level. **Results:** There was no significant change in gingival index, plaque index, or sensitivity following treatment ( $p>0.05$ ). There was no significant difference in delta E or visual shade values for groups receiving 25% or 32% hydrogen peroxide following two applications ( $p=0.14$ ) or three ( $p=0.85$ ). Three applications of 25% and 32% gave shade changes ( $x(\text{SEM})$ ) of 11.1(0.78) and 12.0(0.38), and for two applications 11.3(0.74) vs. 12.2(0.87) with the differences being non significant ( $P>0.05$ ). One week post treatment no significant shade changes were noted ( $P>0.05$ ). **Conclusions:** Both concentrations (25% and 32%) of hydrogen peroxide had similar bleaching effect. This finding was seen both with visual scoring and with colorimetric evaluations. Use of the products three times showed no advantage over using twice. No adverse effects on gingival tissues or tooth sensitivity were found. Changes in visual and colorimetric scores one week post bleach were minimal, suggesting that both products effects were due to bleaching and not to osmotic changes at the time of bleaching. Supported, in part, by a grant from DenMat Corp.

## PERIODONTOLOGY

### 1843 PREVALENCE OF PERIODONTAL DISEASE IN THE UNITED STATES: NHANES 1999-2004

**P. EKE**, Center for Disease Control, Atlanta, GA, USA, and **L. BARKER**, U.S. Centers for Disease Control and Prevention, Atlanta, GA, USA

**Objective:** To estimate the prevalence of moderate and severe periodontal disease among dentate adults in the U.S. population. **Methods:** National prevalence of moderate and severe periodontal diseases among dentate adults aged 20 years and older was estimated from the 1999 – 2004 National Health and Nutrition Examination

Survey (NHANES). Analysis was limited to the mesial probing site on each of 28 teeth, exclusive of 3<sup>rd</sup> molars; distal site data were not available for 1999 – 2000. Moderate disease was defined as two or more interproximal sites with  $\geq 4$  mm clinical attachment loss (CAL), or two or more interproximal sites with  $\geq 5$  mm Probing Pocket Depth (PPD). Severe disease was defined as two or more interproximal sites with  $\geq 6$  mm CAL, and one or more interproximal sites with  $\geq 5$  mm PPD. **Results:**

#### Prevalence\* of Moderate and Severe Periodontal Disease: 1999-2004

Age Group	% Moderate PD (se)	% Severe PD (se)
20 – 34	0.82 (0.21)	0.06 (0.05)
35 – 49	4.32 (0.67)	0.48 (0.24)
50 – 64	9.98 (0.96)	1.68 (0.50)
65 – 74	13.11 (1.49)	1.54 (0.46)
75+	18.32 (2.47)	2.90 (0.84)
Total	6.42 (0.50)	0.90 (0.15)

\*Age and sex adjusted to U.S. 2000 standard population. Overall, the prevalence of moderate and severe periodontal disease ranged from 0.82% to 18.3% and 0.06% to 2.9% for adults aged 20-34 years, and adults aged 75 years and older, respectively. Moderate disease was most prevalent in males, non-Hispanic blacks, the lowest family poverty ratio group (<100%), and persons with less than high school education. Severe disease was more prevalent among males than females for all age groups (except those aged 75 years and older), persons with family poverty income ratio between 100% – 200%, and those with less than high school education.

**Conclusion:** Severe and moderate periodontitis is still prevalent in the U.S. Moderate disease, which is most amenable to preventive measures, was most prevalent in non-Hispanic black males, the poorest and least educated.





## Une perspective globale (suite de la page 123)

L'objectif de l'IFDH est de représenter internationalement la profession de l'hygiène dentaire et de favoriser les alliances avec ses associations membres ainsi qu'avec d'autres associations, fédérations et organisations ayant des objectifs similaires.


L'IFDH offre un réseau officiel au sein duquel les hygiénistes dentaires du monde entier peuvent promouvoir la collégialité entre les nations, l'engagement à maintenir des normes universelles de soins et d'éducation en hygiène dentaire ainsi que l'accès à des soins de santé buccodentaire de qualité. Ce symposium nous donnera l'opportunité de discuter de problèmes mondiaux et d'apprendre davantage grâce aux exposés de plusieurs experts internationaux oeuvrant dans le domaine de la dentisterie. Il y aura des opportunités éducatives de voir des modalités éducatives variées.

Avec l'apparition de la technologie, notamment l'Internet, nous pouvons accéder à des informations venant de tous les coins du monde, à partir de nos maisons ou de nos bureaux. Cela augmente notre capacité d'utiliser une grande quantité d'informations et de maintenir de normes de soins élevées. Mais, avec toute cette technologie, c'est également un défi de se maintenir à jour sur les

plus récents développements de notre profession. Combien de fois avez-vous des clients vous mentionner qu'ils ont vu un nouveau produit annoncé à la télévision ou sur Internet dont vous n'aviez même pas entendu parler? Ils s'adressent à vous pour s'informer sur l'authenticité de ce produit et pour savoir si vous le recommandez.

Bien que la technologie soit sans aucun doute d'une grande aide en termes de cueillette d'informations, nous devons encore nous réseauter avec d'autres professionnels de la santé buccodentaire dans notre domaine et écouter ce qu'ils ou elles ont à dire pour garder notre profession vivante et stimulante. C'est l'un des nombreux avantages d'assister à des conférences et à des symposiums.

Alors, j'espère vous voir à Toronto en juillet. Mais, que vous assistiez ou non au symposium, vous pouvez être fiers et fières que votre pays soit l'hôte de cet événement international et vous pouvez vous attendre à en entendre parler. L'ACHD travaille très fort pour représenter ses membres, c'est-à-dire vous, alors que nous nous préparons à accueillir le « monde » lors de cet événement spécial.

*Vous pouvez rejoindre la présidente à [president@cdha.ca](mailto:president@cdha.ca).* 

# Periodontal Medicine: A Window on the Body

by Chapple ILC, Hamburger J. London: Quintessence; 2006  
250 pages, 262 illustrations. ISBN 1-85097-079-3

THIS BOOK PRESENTS AN INTERESTING AND UNIQUE perspective. It relates oral pathology concepts, non-plaque induced lesions and conditions of the periodontal and oral mucosal tissues, and a variety of systemic diseases and syndromes that could cause them. It includes important clinical information and emphasizes proper documentation and management of various lesions and conditions. This is a compact text, with 11 chapters that describe over 100 conditions, some commonly seen, others rare.

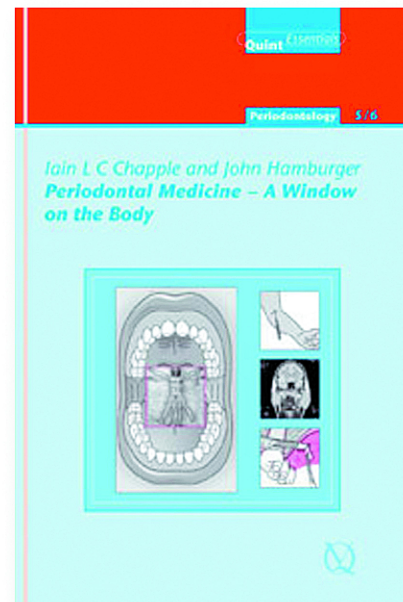
The book recognizes a broad scope of clinical periodontology and stresses the importance of medical management in addition to traditional surgical and non-surgical modes of treatment. The importance of working relationships among medical and surgical practitioners, and dental specialists, is highlighted so the highest level of care can be provided.

A large number of good-quality colour clinical pictures exist with some radiographs and photographs of bacteriological and histological specimens. A number of practical tables describe terminology, definitions, information on various tests, gingival descriptions, and descriptions of lesions and conditions. The book also includes explanatory diagrams, miscellaneous pictures, and silly jokes.

The two authors of the book are clinically active; hold university teaching positions with hospital liaisons; and are actively involved in research of patho-biology of periodontal diseases and the clinical and pathological aspects of syndromes, immuno-related tissue responses, and drug-induced lesions of the oral mucosa. They have written other publications related to oral medicine. One of the authors is also the periodontology editor for the book.

Chapters 1 and 2 provide an excellent review of medical history. They describe the implications of the findings; a systematic approach to extra- and intra-oral examinations; description of the lesions and conditions including location, nature of associated tissues, size shape, attachment to underlying structures, colour, surface characteristics, nature of the base of the lesion, consistency, associated pathology locally or elsewhere on the body; and localized or generalized presentation of the lesion(s). These chapters also describe special investigations such as specificity and sensitivity tests, biopsy, methods to identify various microorganisms, and blood and serology tests. Differential diagnosis, objectives, and approaches for the interpretation of data collected, working diagnosis, and definite diagnosis are also included.

Chapters 3 to 10 of the book address the gingiva, including localized and generalized colour changes, enlargement, ulceration, and recession. Benign and malignant conditions within these categories are discussed.



Chapter 11 describes less common non-plaque-induced conditions such as uncontrolled or unexplained gingival bleeding. Under the heading "Radiological Categorisation," it describes the following:

- root resorption,
- inter- and peri-radicular radiopacities,
- well-circumscribed radiolucencies,
- multilocular radiolucencies,
- poorly defined radiolucent lesions,
- radiolucent lesions as presentations of disseminated disease,
- generalized radiolucencies,
- radiolucent lesions with radiopacities,
- benign and malignant conditions.

The format followed in the book is interesting, with the clinical appearance of a lesion being the initial point of discussion, followed by a sequence of logical steps to arrive to the differential and definite diagnosis. It then describes the management of the disease either by the clinician or through a referral for secondary care.

Plaque-induced periodontal conditions are not included. Radiology and imaging are also not addressed in this book, although some x-rays are included. Instead, the readers are referred to another book of this series, which has a more comprehensive radiology and imaging review.

The table of blood and serologic investigations does not include the quantitative values but offers indications and general comments.

**Book Review** ...continued on page 165



# Herbal Supplements and Oral Health

by CDHA Staff

**M**RS. ROBERTS, AGED 72 YEARS, IS A NEW CLIENT IN your dental hygiene practice. During the intraoral examination, you commend her on the health of the palatal tissue underneath her maxillary partial denture. Mrs. Roberts tells you that “the roof of my mouth used to be red and sore until I started using an oil of oregano mouthrinse.” How do you respond to this client? Where do you find reliable information on herbal products? What do you say to another client who is using garlic capsules to treat an ear infection?

*As a professional, it is critical to obtain scientific data about the safety and efficacy of these products.*

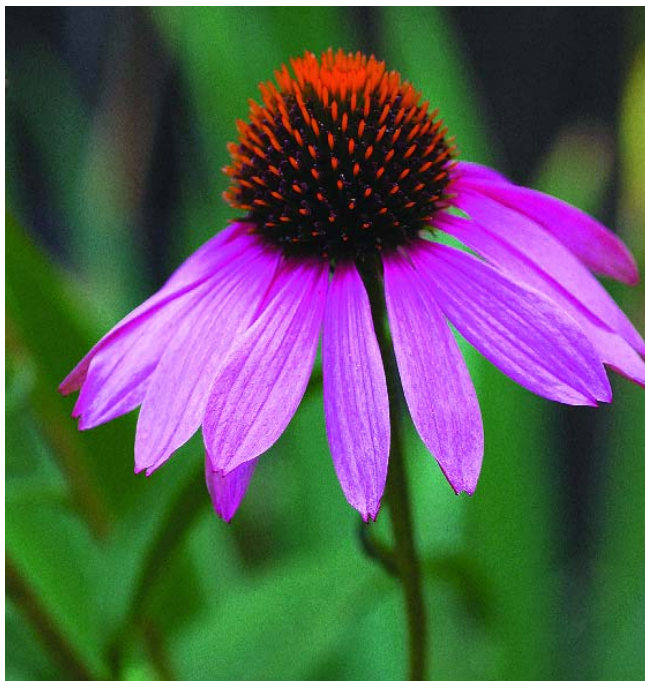
The use of herbal products and supplements has become big business. So the Natural Health Products Directorate of Health Canada wanted to find out more about what Canadians knew about these natural health products. The Directorate therefore conducted a survey in 2005 that revealed 71% of Canadians use herbs and other dietary supplements for a wide variety of reasons. (Visit [www.hc-sc.gc.ca/dhp-mps/pubs/natur/eng\\_cons\\_survey\\_e.html](http://www.hc-sc.gc.ca/dhp-mps/pubs/natur/eng_cons_survey_e.html) for more information about the survey.) As a professional, it is critical to obtain scientific data about the safety and efficacy of these products. It is your responsibility as an evidence-based practitioner to provide this information to your clients.

Herbal medicines contain many pharmacologically active chemicals that can potentially raise or lower the levels of prescribed medications to a significant extent. Fortunately, there are a number of reliable sources—both print and electronic—that present current scientific research on medicinal herbs. These resources describe factors such as safety, herb-drug interactions, side effects, and contraindications.

The following texts may be useful for your reference shelf:

Kuhn MA, Winston D. *Herbal Therapy & Supplements: A Scientific & Traditional Approach*. Philadelphia: Lippincott; 2000. ISBN 0-7817-2643-3.

This book is a joint effort by a registered nurse with a PhD in physiology and a noted herbalist. The introductory chapter reviews the concept of herbal therapy, the issue of standardization, and the research process used to evaluate herbs. Extensive descriptions of the herbs follow in alphabetical order by their common name. There is a comprehensive index that lists herbs by both their botanical and common names.



Purple coneflower, *Echinacea purpurea*

*Nursing Herbal Medicine Handbook*. Philadelphia: Springhouse; 2001. ISBN 1-58255-100-6.

This handbook is designed to give you information on the herbs and dietary products your clients may be using. Facts about which foods and medicines should be avoided when someone is using a certain herb, and potentially harmful ways these products can interact, are provided.

A number of reputable web-based resources are available and a brief description for four of these databases follows:

*Memorial Sloan-Kettering Cancer Center* provides objective information for health care professionals. The database includes a clinical summary for each agent and details about constituent's adverse effects, interactions, and potential benefits or problems. A consumer version of each monograph is also available. (See [www.mskcc.org/mskcc/html/11915.cfm](http://www.mskcc.org/mskcc/html/11915.cfm))

*International Bibliographic Information on Dietary Supplements* (IBIDS) is a collaboration between two government agencies: the Office of Dietary Supplements (of the U.S. National Institutes of Health and Food and

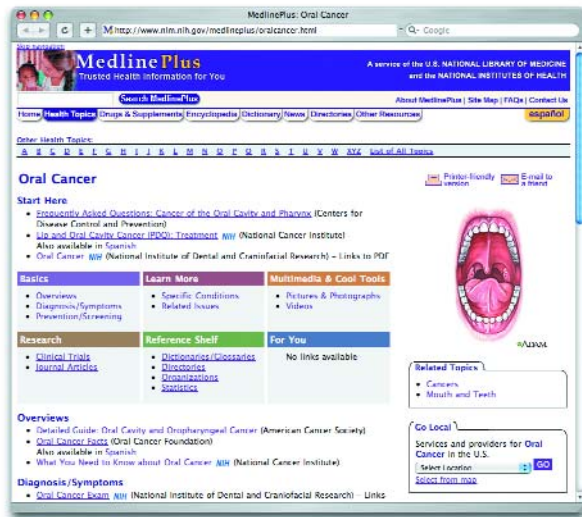
**Herbal Supplements and Oral Health**

*...continued on page 165*

# Antibiotic Prophylaxis; Screening for Oral Cancer

by CDHA Staff

**A**NTIBIOTIC PROPHYLAXIS IS A TOPIC OF GREAT INTEREST to all oral health professionals and the new guidelines of the American Heart Association are due out this spring. Here are a few websites that will add to your knowledge about this subject.



## Promoting Good Antimicrobial Prescribing (BSAC)

[www.bsac.org.uk](http://www.bsac.org.uk)

On this home page of the British Society for Antimicrobial Chemotherapy (BSAC), under "Highlights," is a link to "Promoting Good Antimicrobial Prescribing." Here is a list of available presentations, such as "Promoting good antimicrobial prescribing," "Diagnosing and assessing infection in general practice," "Impact of antibiotic policies, guidelines and pathways of care on clinical, microbiological and economic outcomes," "Is antibiotic prescribing a patient safety issue?"

<http://jac.oxfordjournals.org/cgi/content/abstract/dk1121v1>

Here can be accessed the full-text 2006 guidelines for the prevention of endocarditis, published in the *Journal of Antimicrobial Chemotherapy*.

## Antibiotic prophylaxis (American Dental Association)

[www.ada.org/prof/resources/topics/antibiotic.asp](http://www.ada.org/prof/resources/topics/antibiotic.asp)

This site on antibiotic prophylaxis has four divisions: Overview, the *Journal of the American Dental Association*, Patient Education, and Additional Resources. The JADA section contains articles on this topic, such as "Combating antibiotic resistance," "Antibiotic interference with oral contraceptives," and "A legal perspective on antibiotic prophylaxis." In the Patient Education area, there is a PDF sheet written especially for the patient, "Receiving antibiotics before dental treatment."

## Clinical guideline on antibiotic prophylaxis for dental patients at risk for infection

(American Academy of Pediatric Dentistry)

[www.guidelines.gov/summary/summary.aspx?view\\_id=1&doc\\_id=7496](http://www.guidelines.gov/summary/summary.aspx?view_id=1&doc_id=7496)

The U.S. National Guideline Clearinghouse contains the most recent guidelines. This guideline is issued by the American Academy of Pediatric Dentistry. However, the site is valuable because you can browse the database by categories such as disease/condition, organization, treatment or intervention (chemicals and drugs, techniques and devices, disciplines). You are also able to browse guidelines that are being developed and access a guideline archive.

## Recommended Antibiotic Prophylaxis (CDHO)

[www.cdho.org/Recommend.pdf](http://www.cdho.org/Recommend.pdf)

This four-page document was published in 2004 and provides clear tables with the following information:

- Antibiotic prophylaxis recommendations (no follow-up dose recommended)
- Cardiac conditions associated with endocarditis
- Incidence stratification of bacteremic dental procedures

## Endocarditis Prophylaxis Information

(American Heart Association)

[www.americanheart.org/presenter.jhtml?identifier=11086](http://www.americanheart.org/presenter.jhtml?identifier=11086)

This site is aimed at the patient and the introductory information is written in a clear non-medical terms as much as possible. It lists "Dental procedures for which endocarditis prophylaxis is recommended" and "Other procedures for which endocarditis prophylaxis is recommended." It also provides a downloadable PDF version of a wallet card that can alert the patient's physicians and other care providers. The site then goes into specifics about dosages, appropriate antibiotics, etc. for the health professional.

## CDA Position on Antibiotic Prophylaxis for Dental Patients at Risk

[www.cda-adc.ca/\\_files/position\\_statements/antibiotic\\_prophylaxis.pdf](http://www.cda-adc.ca/_files/position_statements/antibiotic_prophylaxis.pdf)

This position was approved in February 2005 and clearly lays out the CDA's position. Following the position are tables with the conditions for which antibiotic prophylaxis is recommended, considered, and not recommended. The last table shows the antibiotic prophylactic regimen for certain dental procedures.



### **Oral Cancer (PDQ®): Screening**

(U.S. National Cancer Institute)

[www.cancer.gov/cancertopics/pdq/screening/oral/patient](http://www.cancer.gov/cancertopics/pdq/screening/oral/patient)

This site has two main divisions, one for the general public and the other for health professionals. The public side consists of several sections such as an overview, the risks of oral cancer, and the various screening tests. The professional version looks at the summary of the evidence concerning screening, significance and evidence of benefit of screening, and updated incidence and mortality estimates for 2007 (for the United States). Everything is well referenced.

### **Oral Cancer (Medline Plus)**

[www.nlm.nih.gov/medlineplus/oralcancer.html](http://www.nlm.nih.gov/medlineplus/oralcancer.html)

This comprehensive site is a portal to a wide range of information. Main categories are Overview, Diagnosis/

Symptoms, Prevention/Screening, Specific Conditions, Related Conditions, Pictures & Photographs, Videos, Clinical Trials, and Journal Articles. Links are to U.S. government sites, medical and dental organizations. A valuable site and well worth perusing.

### **Opportunistic Oral Cancer Screening**

(Occasional Paper of the British Dental Association)

[www.bda.org/about/docs/mouth\\_cancer.pdf](http://www.bda.org/about/docs/mouth_cancer.pdf)

The aim of this 19-page PDF document is to “develop realistic advice” for oral health professionals who “seek to adopt best practice in soft tissue screening.” It reviews oral cancer, screening techniques, risk factors for the disease, talking to patients about oral cancer, record keeping, the actual examination, using tolonium chloride, and “putting screening into practice.”

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## **Herbal Supplements and Oral Health** (continued from page 165)

Nutrition Information Center) and the National Agricultural Library (of the Agricultural Research Service, U.S. Department of Agriculture). This contains over 730,000 citations regarding dietary supplements from four major database sources: biomedical-related articles from MEDLINE, botanical and agricultural science from AGRICOLA, worldwide agricultural literature through AGRIS, and selected nutrition journals from CAB Abstracts and CAB Health. (See [www.ods.od.nih.gov/Health\\_Information/IBIDS.aspx](http://www.ods.od.nih.gov/Health_Information/IBIDS.aspx).)

Health Canada Drugs and Drug Products site contains natural health product information tailored for a wide audience. For the consumer, it includes “Frequently Asked Questions” and “It’s Your Health” sections plus a list of licensed natural health products. The Natural Health Products Research Program supports natural health products and knowledge-based development. (See [www.hc-sc.gc.ca/dhp-mps/prodnatur/index\\_e.html](http://www.hc-sc.gc.ca/dhp-mps/prodnatur/index_e.html).)

The National Center for Complementary and Alternative Medicine of the National Institutes of Health is the lead U.S. agency for scientific research on complementary and alternative medicine. It provides an introduction to dietary supplements, reviews safety factors, and publishes “herbs at a glance” fact sheets. (See <http://nccam.nih.gov/>.)

In summary, herbal medicines have become a popular way for people to treat their own ailments but with this ability comes the potential for misinformation and problems. We hope that the information in this column will be useful for both you and your clients.

*Note:* A search for “oregano” on the IBIDS database returned 128 research articles on oregano oil. It appears that Mrs. Roberts may be supported in her use of this aromatic oil as studies have shown it to hold antifungal properties. Garlic is used in naturopathic medicine as an antibacterial agent for the treatment of otitis media.

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## **Book Review** (continued from page 161)

Some of the clinical photographs (for example, page 20) appear to be inverted. This could possibly be the result of indirect vision photography.

A particular description of developmental conditions, referring to dehiscence and fenestration (page 164), appears to be unclear, and this reviewer ventures to say it is incorrect.

In Table 7-2, “Clinical features of recurrent aphthous stomatitis” (page 140), the specified sites provided for the occurrence of the major and herpetiform type differ from the sites indicated in other publications. However, it is worth adding that these immunological-related conditions do change their expected site of presentation when the immune system is severely compromised.

The target audience would include general dental practitioners or specialists, dental hygienists, dental educators, preventive dental assistants, dental therapists, and other health providers such as physicians and nurses. These health providers could benefit from the excellent oral pathology review with its systematic approach for assessment data collection, differential diagnosis, definite diagnosis, treatment options for the various lesions and conditions, and links to systemic diseases.

This book is an excellent source of relevant and important information.

– Maria Tigner, DDS (National University of Mexico), DipDH, RRDH, Professor, Dental Hygiene Program, Algonquin College, Ottawa

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**BRITISH COLUMBIA**

**HOPE** Add a smile to our practice! Dental hygienist, full time preferred (4 days/week). Low stress, family oriented, great team and patients. NEW GRADS WELCOME! No evenings or weekends, excellent wages and signing bonus. Hope is located 90 minutes east of Vancouver in beautiful Fraser Valley with breathtaking scenery. Apply with confidence. Contact Dr. Martin Drobis, Box 1870, Hope, BC V0X 1L0. Telephone **604-869-5412**; fax **604-869-9613**; e-mail [drobis@telus.net](mailto:drobis@telus.net).

**KELOWNA** Full-time/part-time dental hygiene position available to start immediately. General practice with focus on cosmetics, implants, and perio. Please forward applications to Dr. D.H. Buschel at 2149 Springfield Road, Kelowna, BC V1Y 7X1 or e-mail to [drbuschel@shaw.ca](mailto:drbuschel@shaw.ca).

**OSOYOOS** Exciting and fulfilling career opportunity! Looking for a full-time RDH to join our progressive family practice in the beautiful lakeside resort town of Osoyoos, in the South Okanagan of BC. We provide excellent growth opportunities for an ambitious, energetic, professional team player! We offer the latest technology and periodontal techniques as well as limitless continuing education opportunities! Dr. Bartsch offers a thorough introductory training period on all advanced technology used in the office. We offer travel opportunity for humanitarian dental missions as well as office wellness programs based on your individual interests. Moving expenses potentially reimbursable. Position available immediately. Please fax your résumé or forward it to [drbartsch@synvalley.com](mailto:drbartsch@synvalley.com), fax **250-495-2394**. Telephone: **250-495-2393**. Contact Michelle or Alicyn with any questions and to arrange an interview with Dr. Jason Bartsch.

**SECHELT** Cowrie Street Dental Clinic located in the heart of downtown Sechelt on the beautiful Sunshine Coast. We are seeking a dental hygienist to work full-time. Patient care is the focus of our practice. Benefits available. Sechelt is an ocean-side community experiencing rapid growth. Outdoor recreation is abundant here and we are just a quick 40-minute ferry

ride from Vancouver. Tired of the harsh weather? Consider us in beautiful Sechelt. Fax to **604-885-4613** or e-mail to [cowrie\\_dental@dccnet.com](mailto:cowrie_dental@dccnet.com).

**SIDNEY** Dental hygienist required in bright, modern, high-tech family practice in Sidney-by-the-Sea, 25 minutes north of Victoria on Vancouver Island. Days and hours are flexible. To learn more about our office, see our webpage at [www.sidney-centredental.com](http://www.sidney-centredental.com). Please e-mail Drs. Braun and Sollid for more information at [lorenjaci@shaw.ca](mailto:lorenjaci@shaw.ca) or fax **250-655-7183**.

**ALBERTA**

**RURAL ALBERTA** family dental practice needs full-time dental hygienist. Practice is located 30 minutes north of Calgary. No evenings or weekends. Great doctors, great offices, and a great team to work with. Please e-mail résumé to [cdonaven@shaw.ca](mailto:cdonaven@shaw.ca) or fax it to **403-946-4283** or **1-866-291-0041**. New grads welcome.

**MAYERTHORPE** Dental Hygienist needed to fill short-term locum position starting May to allow present hygienist leave-of-absence for family care responsibilities. This could possibly change into permanent part-time position. Come join our friendly dental team. Work 2 or 3 days/week. Our busy family practice is only 1¼ hours northwest of Edmonton. Competitive wages with transportation remuneration available. Please send your résumé to Dr. Rodney Giebelhaus: fax **780-786-4591**; e-mail [mayerthorpedentalclinic@persona.ca](mailto:mayerthorpedentalclinic@persona.ca); telephone, **780-786-2878**; postal address, Box 1020, Mayerthorpe, AB T0E 1N0.

**YUKON**

**WHITEHORSE** Pine Dental Clinic. Full- and part-time dental hygienist required immediately for a great office. Located in the beautiful city of Whitehorse, Yukon. If you enjoy the outdoors, then this is the job for you. We have great staff and wonderful patients. Don't let this job pass you by. It is an experience that you will never forget. Contact us by phone at **867-668-2273** or fax your résumé to **867-668-5121**.

**CONTINUING EDUCATION**

**ISDH, TORONTO** Get in on the action! Attend the International Symposium on Dental Hygiene (ISDH 2007), Toronto, Canada, July 19-21, 2007. Register today at [www.cdha.ca](http://www.cdha.ca).

**CDHA CLASSIFIED ADS**

Classified job ads appear primarily on the CDHA's website ([www.cdha.ca](http://www.cdha.ca)) in the Career Centre (*Members' Only* section). On-line advertisers may also have their ad (maximum of 70 words) listed in the journal *CJDH* for an additional \$50. If an advertiser wishes to advertise only in the print journal, the cost will be the same as an on-line ad. These classified ads reach over 11,000 CDHA members across Canada, ensuring that your message gets to the target audience promptly. Contact CDHA at [info@cdha.ca](mailto:info@cdha.ca) or **613-224-5515** for more information.

**Advertisers' Index**

Christine Thibault . . . . .	158
Citagenix Inc. . . . .	148
Colgate-Palmolive Canada Inc. . . . .	124
Crest Oral-B . . . . .	125, 126
D-Sharp . . . . .	157
Dentsply Canada . . . . .	IBC
GlaxoSmithKline . . . . .	141
Hu-Friedy Manufacturing Company Inc. . . . .	OBC
Johnson & Johnson Inc. . . . .	130
Meloche Monnex . . . . .	160
Musée de la nature et des sciences . . . . .	159
Ondine Biopharma . . . . .	134
Quantum Inc. . . . .	147
Sunstar Butler . . . . .	IFC, 154, 162



