Evaluation of Tobacco Use Cessation (TUC) Counselling in the Dental Office

Ian Needleman[a]/Saman Warnakulasuriya[b]/Gay Sutherland[c]/
Michael M. Bornstein[d]/Elias Casals[e]/Thomas Dietrich[f]/Jean Suvan[a]

Abstract: Tobacco use cessation (TUC) in dentistry is critical to reducing the effect of a major risk factor for both oral and systematic diseases. The effect of TUC interventions has been widely reported. The data show that the success of TUC without professional support is negligible but that behavioural and pharmacological interventions are effective. Furthermore, the greater the intensity of support, the greater the quit rate and success rates are similar comparing different health care professionals including dental professionals. Although few studies have been performed in dental practice, it is clear that TUC should be embedded in routine oral health care. In addition to evaluating the effect of TUC, several studies have investigated barriers to implementing TUC in dental settings. A large number of barriers have been reported. These studies highlight the importance of further training for dental professionals but also identify the need for major cultural and policy changes to facilitate the provision of TUC. Research on barriers to TUC in dental care could be facilitated by employing qualitative or mixed methods designs and studies that evaluate the impact of changing such barriers on TUC provision. Such an approach will help to close the gap between research findings and implementation. Regarding the measurement of outcomes from TUC, no gold standards exist currently. Therefore both self-reported and biochemical measures of tobacco use should be reported in evaluation studies. It is also clear that feedback from biochemical testing of tobacco use can increase success rates in tobacco use cessation.

Key words: tobacco use cessation, smoking cessation, smoking, risk factors, oral health, barriers, primary prevention

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Tobacco use cessation (TUC) in dentistry is critical to reducing the effect of a major risk factor for both oral and systematic diseases. Dental health care providers (particularly dentists and dental hygienists but also including other dental care professionals) may see their patients on a frequent and recurring basis. As a result, it has been suggested that dental personnel have unparalleled opportunities to educate and help those who use tobacco to quit (Christen et al, 1990).

In order to make recommendations for tobacco use cessation in dental practice, this paper will review interventions for which evidence of efficacy exists. Sources of evidence consulted include guidelines and systematic reviews (including Fiore et al, 2000; Stead and Lancaster, 2005; Marlow et al, 2003). Less-studied interventions like hypnosis, acupuncture, exercise, anxiolytics or opioid agonists require further clinical evidence before recommendations can be made.

An ideal tobacco use cessation programme must be individualised, accounting for the reasons the person uses tobacco, the environment in which the use occurs, available resources to quit and individual preferences about how to quit. The clinician should always bear in mind that cessation can be very diffi-

[a] *International Centre for Evidence-Based Oral Health, Unit of Periodontology, UCL Eastman Dental Institute, UCL, London, UK.*

[b] *Dept of Oral Medicine, WHO Collaborating Centre for Oral Cancer & Precancer, King's College London Dental Institute at Guy's, King's & St Thomas' Hospitals, London, UK.*

[c] *Tobacco Research Unit, Institute of Psychiatry, King's College London, UK.*

[d] *Department of Oral Surgery and Stomatology, School of Dental Medicine, University of Berne, Switzerland.*

[e] *Department of Community and Preventive Dentistry, University of Barcelona, Spain.*

[f] *Dept of Health Policy and Health Services Research, Dept of Periodontology and Oral Biology, Boston University Goldman School of Dental Medicine, Boston, USA.*

Reprint requests: *Dr Ian Needleman, International Centre for Evidence-Based Oral Health (ICEBOH), Unit of Periodontology, UCL Eastman Dental Institute, 256 Gray's Inn, Road, London WC1X 8LD, UK. E-Mail: i.needleman@eastman.ucl.ac.uk*

cult to achieve, and it is important to be patient and persistent in developing, implementing and providing each patient with an individual cessation-programme. There is increasing evidence that the success of any tobacco use cessation strategy or effort cannot be divorced from the health care system in which it is embedded. Data indicate that cessation requires coordinated interventions between different institutions and professionals.

Several behavioural and pharmacologic interventions are recognised as having high levels of supporting evidence of effect (Fiore et al, 2000, Silagy et al 2002, Marlow et al, 2003). These include counselling by various health care providers, nicotine replacement and bupropion therapies. High levels of evidence means that there are 'multiple well-designed randomised clinical trials, directly relevant to the recommendation, that yield a consistent pattern of findings' (Fiore et al, 2000). Indeed, the data are compelling that pharmacological and counselling treatment each independently boost cessation success. These data suggest that optimal cessation outcomes may require the combined use of both counselling and pharmacotherapy.

Behavioural interventions

Behavioural counselling interventions in clinical settings are an important means of addressing prevalent health-related behaviours, such as lack of physical activity, poor diet, substance (tobacco, alcohol, and illicit drug) use and dependence, and risky sexual behaviour (Butler et al, 1999). In the dental setting, oral hygiene may be viewed in a similar context. The 5As model, as defined by the US 2000 Public Health Services Clinical Practice Guidelines, is a user-friendly method that starts by asking the patient about his or her tobacco use, advising all tobacco users to quit (highlighting oral health effects of tobacco), assessing, assisting and arranging follow-up. The 5As have been proposed as a user-friendly, brief intervention approach, adaptable to an in-office tobacco cessation program (Christen, 2001).

Individual brief counselling (two to five minutes advice) has been found to increase the absolute rate of abstinence by 2.5% over usual care (OR 1.69). The abstinence rate will increase if follow-up visits are included and results are not dependent on the type of health-care worker involved (Marlow et al, 2003). West and co-workers (West et al, 2000) described the incremental effects of smoking cessation interventions on abstinence for six months and longer. They showed that very brief opportunistic advice from a physician to stop smoking (lasting not more than three minutes) will help an additional 2% of smokers to quit their habit.

Motivational interviewing (MI) is a style of behaviour change counselling (motivational enhancement therapy) developed originally to prepare people to change substance abuse behaviours. MI is a patient-centred approach that begins with the patient's goals and encourages them to reach those goals. It was applied for the first time to tobacco cessation practices in 1998, in a hospital emergency room with adolescents (Colby et al, 1998) but results did not show a significant effect, although the sample size was small (n=40). Motivational interviewing was also applied in the UK to a group of adults using a 10-minute intervention delivered by general practice registrars trained only for a period of two hours (Butler et al, 1999). The effect of MI was low (3% success rate for MI compared to 1.5 for brief advice at six month's follow-up for self-reported last month's abstinence), although it achieved statistical significance compared to brief advice. This size of effect might be related to the short time spent on training (two hours). More studies in different clinical settings and populations are needed before MI could be disseminated as a behavioural smoking cessation method (Dunn et al, 2001).

The intensity of the intervention has an impact on its success. Minimal intervention (<3 min) had an estimated cessation rate of 13.4% (95% CI: 10.9, 16.1) while the success rate grew to 16% (95% CI: 12.8, 19.2) with a longer intervention (3-10 min) and up to 22.1% (95% CI: 19.4, 24.7) with activities above this time (Fiore et al, 2000). Moreover, the number of sessions has also an impact on the rate of success, rising from a rate of 12.4% for one session to 24.7% for a programme of at least eight sessions (Fiore et al, 2000).

Meta-analyses from two systematic reviews have shown similar findings. A Cochrane review of group counselling in various formats showed higher success for quitting with group counselling compared to no intervention (OR=2.17 95% CI: 1.37, 3.45) (Stead and Lancaster, 2005) while the USDHHS review (Fiore et al, 2000) showed an estimated abstinence rate of 13.9% (95% CI: 11.6, 16.1) compared to no intervention (OR=1.3, 95% CI: 1.1, 1.6). Fiore et al (2000) found telephone counselling to have some effect on tobacco use cessation counselling (OR=1.2 95% CI: 1.1, 1.4).

The evidence regarding self-help materials is rather sparse, and the large variety of different products included in this intervention (booklets, leaflets, brochures, videos, CDs, helpline and computer or in-

ternet resources) makes it difficult to apply a general conclusion. The review of 12 studies by Marlow (2003) showed an OR=1.24 compared to no intervention. Fiore et al (2000) concluded that some evidence supported the use of these materials (OR=1.2), and it was also identified as having the highest strength of evidence (Fiore et al, 2000).

Pharmacological interventions

The adjunctive use of nicotine replacements has been extensively studied in numerous randomised controlled trials and subsequent meta-analyses. Nicotine replacement therapy (NRT) is available in different forms: patch, gum, lozenges, nasal spray and inhaler. Five published meta-analyses consistently report that the use of transdermal nicotine patches, as an adjunct to counselling, is significantly more effective than the use of a placebo (Li Wan Po, 1993; Tang et al, 1994; Fiore et al, 2000; Gourlay, 1994; Silagy et al, 1994). Transdermal nicotine more than doubled the one-year quit rates obtained in control groups with combined ORs of different meta-analyses ranging from 2.07 to 2.6. Nicotine patches increase the success rate by 7.0-7.7% (Silagy et al 1994, Fiore et al, 2000). Meta-analyses give good evidence to recommend the use of the transdermal nicotine patch as an adjunct to smoking cessation services with a rating of highest strength of evidence.

Three meta-analyses assessing the adjunctive use of nicotine chewing gum reported significantly increased cessation rates to control interventions (Tang et al, 1994; Silagy et al, 1994; Cepeda-Benito, 1993). These meta-analyses report that the use of nicotine gum increases one-year cessation success by approximately 50%, with combined ORs of different meta-analyses ranging from 1.4 to 1.6.

Bupropion (BUP) is an antidepressant also used as a new anti-smoking product for its properties. If fact, initial interest in the use of bupropion for smoking cessation arose from anecdotal reports of successful quit attempts by smokers taking the drug as an antidepressant (Brothwell, 2001). Bupropion is not indicated in patients with epilepsy or in individuals at risk of seizures. Two randomised controlled trials on the adjunctive use of bupropion for tobacco use cessation reported that bupropion significantly increases the proportion of people who successfully quit smoking (Hurt et al, 1997; Jorenby et al, 1999). The adjunctive use of bupropion approximately doubled the quit rate obtained with placebo at 12 months (BUP 300 mg 23.1% vs. placebo 12.4% (Hurt et al. 1997), and BUP 30.3% vs. placebo 15.6% (Jorenby et al, 1999). Minimal side-effects were reported in both studies, with the most common adverse events being insomnia, headache and dry mouth. On the positive side the use of bupropion seemed to avoid gaining as much weight as for placebo (1.5 vs. 2.9 kg) after quitting tobacco (Hurt et al, 1997; Hughes, 2003b). One of these studies looked at a combination therapy using both bupropion and transdermal nicotine (patch). While higher abstinence rates were reported with combination therapy than with bupropion alone, the difference was not statistically significant (Hurt et al, 1997). A Cochrane review of seven trials found an average 10% better cessation rate with bupropion compared to placebo (OR=2.1) (Hughes et al, 2003b). Adverse effects include seizures with a rate of 1/1000 (similar to any antidepressant) and risk of dry mouth in 10% of individuals. These studies provide good evidence to recommend the use of bupropion as an adjunct to tobacco use cessation (highest strength of evidence).

Implications for clinical practice/health care

- The success of tobacco use cessation without professional support is negligible.
- Tobacco use cessation activities (both behavioural and pharmacological) have been proven effective. Behavioural support approximately doubles quit rates. The greater the intensity of support, the greater the quit rate. NRT and buproprion approximately double quit rates compared with placebo.
- Combinations of behavioural support and pharmacotherapy boost quit rates further.
- With training, a wide range of health professionals can achieve similar success rates.
- Most of the interventions described have the potential to be carried out in a dental setting.

Implications for research

- More evidence is required on cessation activities in relation to smokeless tobacco (ST) users.

WHAT IS THE EFFECT OF TOBACCO-USE CESSATION COUNSELLING IN THE DENTAL OFFICE?

It has been stated that *'no dentists practising in the 21st century can ignore tobacco use of their patients'* (Jones, 2000). Dental health care providers generally see their patients on a frequent and recur-

ring basis, therefore these treatment providers have unparalleled opportunities to educate and help those who smoke to quit smoking (Christen et al, 1990). However, the provision of advice is lower among dentists than physicians (Tomar et al, 1996; Warnakulasuriya, 2002). In the COMMIT study run in the USA in 1989, 48% of dentists reported counselling versus 94% of physicians (Jones et al, 2000). The proportion of dentists offering smokeless tobacco cessation advice is also low (Severson et al, 1998).

Severson and co-workers (1990) found that although 65% of dentists advised their patients to quit tobacco but only a few recorded these data, and few patients were provided with self-help materials by their dental team (from 11-27%). A comprehensive study from Minnesota (USA) found that while 46% of dentists asked their patients about tobacco use, only 19% discussed cessation strategies or techniques, and only 2% offered their patients any kind of follow-up intervention (Hastreiter et al, 1994).

In the UK, only about 50% of dentists asked their patients about tobacco use, and approximately 30% provided brief advice to quit tobacco (Warnakulasuriya et al.1999). Other UK studies among general dental practitioners showed even lower figures. A study in 1996 showed that only 37% of dentists believed that they were effective in smoking cessation and only 18% of dentists actually recorded the smoking status of their patients (John et al, 1997). There is new evidence to suggest that this situation is improving and that more dentists are now keen to participate in tobacco use cessation programmes (Johnson et al, 2005), at least in the UK. Data from private practitioners in the USA showed that they were more active regarding tobacco use than their colleagues in the NHS (Tomar et al, 1996). Still, more than 40% of dentists do not routinely ask their patients about their tobacco use, and 60% do not routinely advise tobacco users to quit (Tomar, 2001). Additionally, less than one-half of the dental schools and dental hygiene programmes in the US provide clinical tobacco intervention services. More data from 1746 individuals in a US national survey reported that 33% of dentists asked all or nearly all their patients about tobacco use, 66% advised smoking patients to quit, and 29% provided some kind of tobacco use service (Dolan et al, 1997). Researchers attribute some of the observed discrepancies to over-reporting by health care providers.

Canadian data from rural dental professionals showed that 22% of dentists and 16% of hygienists routinely ask their patients about tobacco use, but only 19% of dentists and 13% of hygienists advise smokers to quit (Brothwell et al, 2004). According to these data, only 18% of dental offices provided follow up for interested patients.

Warnakulasuriya (2002) reviewed data from different studies about dental professionals' attitudes and practices towards smoking cessation and noted an upward trend in the use of nicotine replacement therapy prescriptions among dentists.

Tobacco cessation in dentistry

The trials reporting on tobacco cessation programmes and protocols discussed in the following section are listed in Table 1.

A pioneering study about the effectiveness of interventions for tobacco cessation in the dental office by Christen and co-workers (Christen et al, 1984) introduced the use of a nicotine gum for assisting smoking cessation by dentists. After 15 weeks, they reported significant differences in quit rates between patients provided with the experimental nicotine-containing gum (12.4%) and the placebo gum (4.8%).

Another early trial with 44 dentists from private dental offices, receiving a one-hour lecture training, reported test group quit rates of 16.9% compared to 7.7% for the control group at twelve months (Cohen et al, 1989a). In this case, the use of a brief advice (consisting of assessment, advice, setting a quit date and checking patients' progress) with regular reminders plus the use of nicotine gum showed the highest success rate (16.9%) after a year, while brief advice plus regular reminders achieved a 8.6% rate success and an only advice group achieved a 7.7% success rate, showing that private practice practitioners could be very effective regarding tobacco cessation. There was biochemical validation of tobacco use status with carbon monoxide determination. These initial studies showed the positive effect of programmes that included NRT, in particular with the use of chewing gums. These outcomes are very similar to studies performed in medical practice, as discussed earlier.

A further study reported on 118 volunteers in a hospital-based smoking cessation programme in which nicotine gum (2mg) was used as an adjunct to behavioural modification (Cooper and Clayton, 1989). The authors report quit rates after a one-year period of 40-47%.

A UK study assessed the feasibility of using primary care dentists and the dental team to provide smoking cessation advice in practice (Smith et al, 1998). In addition to dentist's counselling, nicotine patches were made available on request. Salivary co-

Table 1 Smoking and smokeless tobacco cessation trials/studies by dentists/hygienists

First author (year)	Publication/ study type	Setting	Method	Period	Quit rate (%)
Christen (1984)	Randomised, double blind, parallel, placebo-controlled study	University-based dental research facility	Nicotine gum (n=105) vs. placebo gum (n=103)	15 weeks outcome	Experimental group 12.4%
Cohen (1989a)	Randomised controlled trial	Dentists in 50 private practices	Four different groups: dentists provided brief advice in smoking cessation (BA), ba and reminder/stickers attached in their charts (BA&R), BA and nicotine gum (BA&Q), or all measures together (ALL)	One year outcome data	BA: 7.7% BA&R: 8.6% BA&G: 16.3% ALL: 16.9%
Cooper (1989)	Prospective longitudinal study without control group	Hospital-based	Nicotine gum (2 mg) as an adjunct to behavioural modification (group support) for an extended time period (24 weeks) in heavy smokers (more than 20 cigarettes per day)	One year outcome data	0% to 47% "success" rate
Stevens (1995)	Randomised	Dental practices in a controlled trial prepaid group practice health organization (HMO)	Male smokeless tobacco users were selected (n = 518) for the study and randomly assigned a usual care group control group and an intervention group consisting of advice to quit, a videotape, a self-help hygienist	One year outcome data	Control: 12.5% Intervention group: 18.4%:
Smith (1998)	Prospective study without control group	54 primary dental care practices in the UK	First: Training and educational materials were supplied to members of the dental teams participating Second: Brief advice/counselling and nicotine patches were made available to smokers (10 or more cigarettes per day) Salivary cotinine levels measured	9 months outcome data	Of 54 enrolled practices only 22 recruited patients 11% of the participants were successful in giving up tobacco
Severson (1998)	Randomised clinical trial	75 dental practices in Oregon (hygienists and dentists as tobacco cessation providers)	Two protocols examined: For cigarette smoking and for smokeless tobacco (ST) Smokers (n = 1350): participants were assigned to three groups, control group with usual care, minimal intervention, and extended intervention ST (n = 239): participants were assigned to two groups, control group with usual care, and and extended intervention	One year outcome data	Smokers: Control: 2.4% Minimal intervention: 2.6% Extended ST: Control: 3.3% Extended intervention:: 10.2%

tinine assay was used for validation of smoking levels at the initial visit and at nine months after treatment initiation. Of 54 enrolled dental practices only 22 recruited patients. One hundred and fifty-four patients were evaluated, but only 74 reported at nine months. Of the total cohort, 17 (11%) were successful in their smoking cessation effort. Although the performance of the participating practices was uneven, the authors conclude that the success of this cessation programme closely parallels those reported in general medicine practice settings. The authors commented that practices utilising a 'team approach' had higher success rates.

To examine the effectiveness of advising patients who use tobacco to quit Severson conducted a randomised clinical trial (the only RCT located investigating cessation in smokers in a dental setting) to test a brief office-based intervention with all tobacco users in 75 fee-for-service dental practices in Oregon (Severson et al, 1998). Dentists and dental hygienists trained with a three-hour workshop, used a basic intervention protocol for smokers including determining tobacco use status, identifying and recording findings related to tobacco use, giving direct advice to quit (with special information of the effects of tobacco on oral health) and giving some informative leaflets plus sugarless sweets and other items to help the patient in the cessation programme.

The basic intervention was enforced providing an intensive quitting programme, including setting a quit date, giving the patient a video tape (for home viewing) and carrying out a follow-up phone call two weeks after the quit date. The whole package of measures achieved a quit rate at 12 months for smokeless tobacco users of 10.2% versus a 3.3% for dental offices not providing any support. Quitting tobacco meant a whole week of sustained abstinence just before the date in which patients where asked about their tobacco use. Surprisingly, there was no difference in quit rates for smokers at 12 months (test groups 2.5% and 2.6%, control group 2.4%). There was no biochemical verification of the patient's self-reported tobacco use.

Another study examined the effectiveness of a single cessation intervention for smokeless tobacco users delivered by dentists and dental hygienists in the course of routine dental hygiene care to 518 subjects (Stevens et al, 1995). Success was defined as no smokeless tobacco use at both three- and 12-month follow-up as reported by subjects via interview or mailed questionnaire. Results indicated no smokeless tobacco use by 18.4% in the intervention group and 12.5% in the control group.

A new Cochrane systematic review assessed the effectiveness of randomised/pseudo-randomised clinical studies for tobacco cessation offered to smokers and smokeless tobacco users in the dental office or in a community setting with at least six months of follow-up (Ebbert et al, 2006). Six trials met the inclusion criteria; all of these studies assessed the efficacy of interventions for smokeless tobacco users, only one included cigarette smokers. Three studies were conducted in a dental practice setting, and three involved oral health care professionals (dentists and/or hygienists) providing interventions to athletes within high school or college community settings. All studies employed behavioural interventions and only one offered pharmacotherapy. When the six trials were pooled, a statistically significant increase in the odds of tobacco abstinence at 12 months or more was observed, compared to usual care or no contact controls (OR 1.48; 95% CI: 1.21-1.80). Based on these data, the authors calculated a number needed to treat (NNT) of 33, i.e. for every 33 people given TUC in a dental setting, one additional person will cease tobacco use. However, the authors report statistically significant heterogeneity between the studies that could not be explained through subgroup or sensitivity analysis.

An interesting different approach to the tobacco issue was a study from San Diego, USA, which tested whether orthodontists can prevent preteens/adolescents from initiating smoking (Hovell et al, 2001). This multi-site trial with 154 participating orthodontic private practices found that orthodontists do not automatically provide anti-tobacco prevention services. The authors further observed that orthodontists were uncomfortable talking to youths for whom there was no evidence of a so-called 'misbehaviour'. This suggests that orthodontists need more training to become comfortable with counselling young individuals not to start smoking. The authors conclude that preventing tobacco use in adolescence may halt additional risk behaviours and thereby reduce morbidity/mortality even more than expected from tobacco control alone.

Implications for clinical practice/health care

- Oral health care professionals could play an important role in promoting tobacco cessation for smokers in dental settings, but the magnitude of effect is still unclear
- Oral health care professionals can play a significant role in promoting tobacco cessation for smokeless

tobacco users in dental settings, based on the limited studies available in the literature

Implications for further research

- Research is urgently needed addressing the impact of the following factors on the efficacy and effectiveness of TUC: types of dental personnel, types of interventions (feasible in dental settings including brief opportunistic advice and support, including combinations of pharmacological and behavioural interventions), identification of optimal TUC strategies with different patient profiles
- These issues should be addressed with appropriate definitive research designs, including RCTs with adequate follow-up (at least six months) and conducted in different settings (practice, hospital, community)

WHAT ARE THE APPROPRIATE OUTCOME MEASURES IN TOBACCO-USE CESSATION STUDIES?

For the purpose of this review, we will consider tobacco cessation to be the endpoint of interest in tobacco cessation studies in dental practice. Specifically, we will not consider the question whether or not oral health benefits (e.g., differences in periodontal treatment outcome) of a tobacco cessation intervention should be measured. Longitudinal studies evaluating the effect of tobacco cessation interventions on oral health outcomes are scarce (e.g. outcome of periodontal therapy (Preshaw et al., 2005) and tobacco cessation per se may be considered a surrogate endpoint (Hujoel, 2004). However, tobacco cessation is clearly the immediate goal of a tobacco cessation intervention, and the documented benefits of tobacco cessation for various medical diseases and conditions clearly justify cessation itself as an outcome.

Self-report or biochemical measures?

The central question when considering how to assess tobacco cessation is whether to rely on subjects' self-reports of abstinence/continued tobacco use or whether biochemical "validation" is necessary. Because biochemical measures are believed to be more objective and less susceptible to bias, they have been considered mandatory in cessation trials (Scott et al., 2001). The most frequently considered biochemical measures to "validate" tobacco status are cotinine (measured in blood, saliva or urine), thiocyanate (measured in blood, saliva or urine) or carbon monoxide (measured in blood [CoHb] or in exhaled air, not suitable for smokeless tobacco).

However, biochemical measures do not provide a gold-standard, and are less than perfect. It is illustrative of this problem that biochemical measures are considered the gold-standard in studies that evaluate the accuracy of self-report (Patrick et al., 1994), while self-report is considered the gold-standard in studies that evaluate biochemical measures (Jarvis et al., 1987).

Cotinine, a metabolite of nicotine, has a half-life of 15-20h and is considered the most accurate biochemical measure of tobacco status (Jarvis et al., 1987; Scott et al., 2001; Velicer et al., 1992). However, since nicotine replacement will likely be used by some individuals in a cessation trial, even if it is not part of the primary intervention, cotinine may not be an appropriate measure in a cessation study, at least in the short-term (Scott et al., 2001). Thiocyanate has poor sensitivity and specificity and is hence not a useful outcome in smoking cessation studies (Jarvis et al., 1987). Exhaled carbon monoxide (CO) measurement is currently the best studied biochemical measure that is considered appropriate and has been used for cessation studies in dental settings (Preshaw et al., 2005; Scott et al., 2001). CO is absorbed rapidly into the bloodstream and has a relatively short half-life of 3-5 hours in sedentary adults. The half-life is dependent on the respiratory rate and may be less than 1 hour during exercise. Hence, CO levels are influenced by time of day and time elapsed since last cigarette. Assessments late in the day may be considered more valid (Benowitz, 1983), and self-report of frequency of tobacco use can improve accuracy (Bauman et al., 1982). Specificity can be affected by other environmental sources of CO, including for example air pollution or exposure to environmental tobacco smoke. Reported sensitivities and specificities of exhaled CO for classifying active are typically in the range of 80-90% (Benowitz, 1983; Jarvis et al., 1987), which imply considerable misclassification rates. Hence, when compared to cotinine, CO measurements overestimate false negative rates when utilized to verify self-reported abstinence (Velicer et al., 1992).

Measurement of exhaled CO is relatively inexpensive, easy and has the additional advantage of not requiring resources to obtain and store samples. Furthermore, it provides immediate feedback, a charac-

teristic that may serve as a motivational tool and improve cessation rates (Barnfather et al., 2005; Jamrozik et al., 1984). However, the fact that measurement of exhaled CO requires direct contact with study subjects can be an immediate problem in clinical research. Ascertainment of CO levels from a large proportion of study subjects may not be feasible in large-scale dental office based intervention studies. Even in smaller scale clinical intervention studies, drop-out rates may be high. In a recent clinical study on the effect of quitting smoking on periodontal treatment outcomes, 23 out of 49 patients (47%) were not available for follow-up (Preshaw et al., 2005). Similarly, in a study of a smoking cessation program conducted in UK dental practices, 80 out of 154 subjects (52%) did not provide saliva samples for cotinine assays at follow-up (Smith et al., 1998). Such drop-out rates pose an immediate threat to validity of any study, making the use of biochemical measures less appealing, while self-reported measures of smoking cessation are much easier to obtain by mail or telephone interview. Furthermore, biochemical measures can only determine the point prevalence of abstinence and their value is limited when measuring continuous abstinence in long-term studies (see below).

The rationale to use biochemical validation of abstinence is the assumption that unsuccessful quitters will tend to underreport tobacco use. Self-report of current tobacco use among recent abstainers (i.e. cessation trial setting) is often considered particularly unreliable (Scott et al., 2001). It is common practice in research on smoking cessation that subjects who are lost to follow-up are considered smokers or relapsers, and this generally seems to be a reasonable assumption (Foulds et al., 1993). However, the possibility exists that differences between self-report and biochemically validated cessation rates may be overestimated because subjects who have missing values for the biochemical validation are considered smokers (Hays et al., 1999; Rigotti et al., 1997).

The validity of self-report is dependent on several factors (Velicer et al., 1992): (i) the type of study, (ii) the nature of the target population, and (iii) the presence of demand characteristics.

Tobacco cessation studies can be broadly categorized based on the intensity of the intervention into: self-change studies, minimal intervention studies, minimal interaction studies, clinic studies and intensive intervention studies and the likelihood of false-reporting increases with increasing intensity of the intervention (Velicer et al., 1992). In clinic or intensive intervention studies, close relationships are developed with the counsellors, who also assess tobacco status. Under such higher demand conditions, biochemical validation of self-report may be necessary to improve accuracy. For example, special intervention subjects in the Multiple Risk Factor Intervention Trial (MRFIT) who reported to be quitters had biomarker levels between those of never and continuing smokers (Ockene et al., 1982).

The type of population under study may be even more important than the type of study. For example, adolescent or student populations and high risk/medical patients may exhibit considerably higher rates of false negatives (Pechacek et al., 1984) (Patrick et al., 1994). Demand characteristics have been extensively studied in the context of the "bogus pipeline", where biological samples are collected (but not analyzed) with an assertion to study subjects that biochemical validation will be performed (Murray et al., 1987). However, it has been suggested that an effective procedure to ensure anonymity can reduce the need for the bogus pipeline (Murray and Perry, 1987). A review of study characteristics and the rates of false negative reports found that false negative rates are similarly low for untreated volunteer samples and intervention studies. However, false negative rates were >10% for special populations (high risk/medical patients) (Velicer et al., 1992).

Several excellent discussions of self-report measures in the context of tobacco cessation have been published (Hughes et al., 2003a; Velicer et al., 1992). Several distinct self-report measures of tobacco cessation are typically assessed: point prevalence abstinence (the proportion of subjects not using tobacco at a specific point in time), continuous abstinence (the proportion of subjects abstaining since the intervention), and prolonged abstinence (proportion of subjects not using tobacco for a specified time interval). Each of these measures provides complementary information on the outcome of a tobacco cessation intervention.

Point prevalence abstinence is frequently used and is the only self-report measure that can be validated by use of biochemical measures. However, particularly in the context of a cessation study, it is important to specify a minimum period of abstinence for classification, e.g. 24 hours, 7 days or 30 days, a choice that affects the potential for biochemical verification. Another advantage is that the measure allows lapses or relapses to occur following treatment without making it necessary to classify a subject as a permanent failure. However, this may also be viewed as a disadvantage as a former smoker at one point in time may be a current

smoker at a later point in time. This also means that point prevalence measures are less stable than continuous abstinence measures as they depend on the minimum duration of abstinence used to define quitters as well as the point in time at which the assessment is made. The use of point prevalence generally includes as former smokers individuals with varying quit times. Therefore, point prevalence measures may be difficult to interpret in relation to the health effects of tobacco cessation, because of the heterogeneity of former smokers with respect to quit time. However, the importance of this limitation in the context of cessation interventions depends on the health outcome considered, specifically the time it takes for tobacco cessation to have a measurable effect. For example, it will be much more important for health outcomes which improve rapidly after tobacco cessation (e.g., respiratory function (Bosse et al., 1981; Scanlon et al., 2000)). In such cases, novel approaches that capture exposure to tobacco over time may be helpful if the study results are to be interpreted in relation to health outcomes (Dietrich and Hoffmann, 2004).

Continuous abstinence reflects the proportion of smokers who have abstained continuously since the intervention. It is more stable over time and across studies. However, an obvious problem with the measure is the fact that tobacco cessation may not follow such a clear pattern in many individuals. Typically, many subjects experience lapses or relapses (Cohen et al., 1989b). Continuous abstinence can only decline over time, as more quitters lapse or relapse, and the measure is insensitive to delayed quits.

Prolonged abstinence can be viewed as a combination of continuous and point prevalence abstinence measures. Subjects are counted as quitters if they have been continuously abstinent for a defined time period (e.g. 1 year); however, this time period does not necessarily include the intervention. It can as such be viewed as a prolonged point prevalence. The major advantage of prolonged abstinence vs. continuous abstinence is that it allows for a grace period after the set quit date and such allows for long-term abstainers that initially slip. A 2-week grace period has been recommended for most cessation intervention trials; however, the length of the grace period may need to vary depending on the specifics of the intervention under study (Hughes et al., 2003a).

Since relapse is inversely related to time since cessation (Hunt et al., 1971) one-year abstinence rate would be more stable than a short period point prevalence. However, only after 5 years or more of prolonged abstinence are the risks of relapse considered negligible (DHHS, 1989; Krall et al., 2002).

The specifics of each of these self-report measures make them suitable for different purposes at different times during the course of a tobacco cessation study (Velicer et al., 1992). Point prevalence will be an appropriate measure earlier in a study, as the immediate goal of practically any intervention is to stimulate action. A tobacco intervention that fails to stimulate action early on, will also fail in the long-term. Hence, a dynamic, sensitive short-term point prevalence will be the adequate measure at an early stage of the intervention (e.g. at 3 months post-intervention). In contrast, at 2 years post-intervention, a measure assessing successful maintenance of quit status, like a one-year prolonged abstinence proportion, may be a more appropriate outcome measure.

To summarise, biochemical measures do not provide a gold-standard and are not without problems, despite their believed objectivity. Hence, studies that do not include biochemical verification of self-report should not be lightly disregarded as invalid. Interestingly, of the 6 studies included in a recent systematic review of tobacco-use cessation interventions in the dental setting, no biochemical confirmation was used to validate self-report in 3 studies. In the remaining 3 studies, biochemical confirmation was initially utilized and abandoned, or used to enhance self-report (i.e., "bogus pipeline") (Ebbert et al. 2006).

It is also evident from the above that self-report measures of abstinence remain the primary outcome measure in cessation studies, whether or not augmented with biochemical measures. The use of a combination of different self-report measures is likely the most appropriate approach.

Implications for clinical practice/health care

- Feedback from biochemical testing of tobacco use has a motivational effect on tobacco users to attempt quitting.
- Feedback from biochemical testing of tobacco use can increase the success rate in tobacco cessation.

Implications in/for further research

- Self-report supported by biochemical abstinence measurements should be employed.
- New biomarkers are needed (with ideal properties including inexpensive, valid, user friendly, etc).
- Biochemical validation and follow-up for a minimum of six months to assess outcomes are highly desirable in TUC activities.

- The feasibility and effect of employing different outcome measures in research and clinical practice.

WHAT ARE THE BARRIERS TO TOBACCO-USE CESSATION COUNSELLING IN THE DENTAL PRACTICE?

Traditionally, smoking cessation counselling has not been a part of the dental professional's role as a care provider. However, a growing number of dental practices have successfully overcome a number of barriers and made this change (Warnakulasuriya, 2002). Change management theory suggests that successful change is a result of the interaction between the content of change (objectives), the context of change (environment) and the process of change (implementation plan) and incorporates identification of barriers as a key element contributing to successful change (Pettigrew et al, 1989; Dawes, 1999). Therefore, whether implementing tobacco cessation counselling in a dental practice or increasing participation by team members and patients, or increasing the effectiveness of an existing programme, consideration of the barriers is a key factor.

In order to address the question 'what are the barriers to tobacco use cessation counselling in the dental practice?' an electronic literature search was carried out as outlined previously. Additional electronic searching and checking of bibliographic references focusing on barriers in the dental practice was performed to supplement the initial search. Screening of 144 titles and abstracts resulted in 95 publications appearing to be highly relevant. Sixty-two full text articles comprised of single studies and narrative reviews were obtained and reviewed for relevance. No systematic reviews addressing barriers were located. Due to the large body of literature in this area and the progress in the field over recent years, the decision was made to focus on recent publications (1998-2005). The evidence deemed most relevant is summarised in Table 2 in descending chronological order.

Barriers

Evidence reviewed confirmed that the integration and success of tobacco cessation counselling in a dental practice setting involves change in knowledge, attitudes and behaviour of both dental team members and their patients. Research findings highlight many possible barriers to the required changes. A brief overview of the findings presented in Table 2 establishes the context of potential barriers to tobacco cessation counselling in the dental office, with the following three categories emerging as primary themes:

- Barriers to implementing tobacco use cessation counselling
- Barriers to participation in tobacco use cessation (by clinicians or patients)
- Barriers to effectiveness of tobacco use cessation counselling

The barriers from Table 2 are presented below in the context they were studied with some transcending all three categories.

Barriers to implementation of tobacco use cessation counselling

- Tobacco use by clinician (less likely to discuss or feel they can influence)
- Lack of feeling that is part of their responsibility or feeling that it is appropriate role
- Discomfort with discussing tobacco use
- Doubts by clinician of the value or legitimacy of counselling
- Lack of financial incentives
- Lack of time
- Lack of knowledge and/or skills (confidence)
- Lack of resources
- Lack of team approach and communication
- Lack of early education
- Resistance or scepticism of administrative or auxiliary team members
- Belief that patients would not cooperate
- Fear of damaging dentist-patient rapport
- Unwillingness to increase workload
- Lack of staff loyalty
- Lack of peer support
- Lack of organisation or plan
- Fatalistic attitude toward prevention
- View of tobacco cessation in prescriptive manner
- Lack of private space in practice to discuss issues such as tobacco cessation.

Barriers to participation in tobacco use cessation counselling (by clinician)

- Lack of early education
- Tobacco use by clinician (less likely to discuss or feel they can influence)

Table 2 Barriers – summary of the evidence

First author (year)	Publication/ study type	Characteristics	Contextual category	Main findings
Croucher (2005)	Review commentary	Summarizes evidence of how to incorporate smoking cessation into dental practice environments (5As)	Implementation, participation, effectiveness	- identified facilitators which included early education of dental professionals, team approach, communication within team, smoke-free office environment, financial incentives - expectation or open attitude of patient
Albert et al. (2004)	RCT	Educational intervention (academic detailing) compared to practice as usual (n=88) Learning and organizational materials, training, and financial incentives provided	Implementation of tobacco cessation into practice setting	- resistance and scepticism of support staff (admin and auxiliaries) - doubt as to effectiveness of counselling - belief that patients would not cooperate - unwillingness to deal with additional paperwork - negative feelings diminished over time
Hammond et al (2004)	Survey	Telephone survey of 616 daily smokers in Eastern Canada to inquire about knowledge and perception of available tobacco cessation assistance	Participation by patients	- only 11% recalled counselling from a health professional as a method of smoking cessation - 66% did not perceive that counselling from a dental health professional would increase their likelihood of quitting smoking
Johnson (2004)	Narrative review	Review of various concepts related to the role of the dental team in tobacco cessation	Implementation, participation (clinician and patient), effectiveness	- major barriers summarized as lack of time to spend counselling/ talking, lack cess of remuneration, lack of training and skills, client/ patient resistance, frustration over success rates, legal limitations on prescribing NRT - non-smoker dental professionals more likely to participate than smokers - clinicians educated in school about cessation more likely to participate - patients more likely to be participate if no added cost
Lund et al. (2004)	Survey	Postal questionnaire of 1500 dentists – 68% response rate, and 522 hygienists – 61% response rate	Participation	- when questioned about possible barriers (feeling it is part of their job, time constraints, feeling of adequate level of knowledge, importance to overall oral health, feeling awkward to discuss smoking habits), dentists responses differed from those of hygienists so perception of barriers different

Table 2 Barriers – summary of the evidence (continuation)

First author (year)	Publication/ study type	Characteristics	Contextual category	Main findings
Watt et al. (2004a)	Qualitative study	Face to face interviews with 60 UK general dentists to investigate factors and barriers influencing change in dental practice	Implementing in practice	- no one factor identified as most importan - facilitators of change included financial factors, regular patient attendances, staff loyalty, regular communication meetings, peer support, training (barriers were opposite of these) - in general, barriers included patient factors, organizational factors, dentist attitudes (if negative), and lack of appropriate training specifically in approach to behaviour change
Watt et al. (2004b)	Quantitative and Qualitative study	Similar to above project in focus. Questionnaire received from 149/250 dentists Part 2 of study included discussions with 10 focus groups comprised of various members of dental team including dentists, dental hygienists, dental nurses, receptionist, practice managers	Implementing in practice	- 90% dentists advise quitting and 70% record status, only 30% assist patients to quit or 24% refer for support - focus groups showed majority of interviewers had fatalistic and general negative attitude toward prevention in general - perceived tobacco cessation in light of a prescriptive approach and felt it inappropriate or of little value to lecture patients on tobacco cessation - perception present that patients want to come for treatment and to leave, do not want dental professionals interfering with their lifestyle, especially inappropriate to address with new patients, only acceptable after rapport developed- “team approach” more and less developed in various practices - organizational barriers included high staff turnover, poor communication between staff, lack of a place in dental practice to carry out a confidential or personal conversation such as tobacco cessation
Burgan (2003)	Survey	Postal questionnaire of 849 Jordanian dentists (72.2% response rate) designed to investigate views on smoking	Implementation and participation	- 35% smokers - 86.8 % of respondents believed dentists should be non-smoking role models and 77% thought dentists should participate in tobacco cessation counselling - 38.3% thought that they could convince smokers to quit, however, non-smoker dentists were more likely to respond positively than smokers

Table 2 Barriers – summary of the evidence (continuation)

First author (year)	Publication/ study type	Characteristics	Contextual category	Main findings
Helgason et al (2003)	Survey	Validated questionnaire used to survey 528 dentists and 353 dental hygienists in Sweden on involvement in tobacco cessation counselling and barriers	Participation by dentists	- least amount of work experience associated with higher use of tobacco cessation counselling - higher participation in terms of number of patients and time spent in those who had attended course tobacco cessation - barriers identified were lack of possible cessation specialists to refer patient to, lack of financial reimbursement for time spent, thought to be too time consuming and not part of their role, lack of success of previous attempts, lack of knowledge and feeling of inadequacy
John et al (2003)	Follow-up Survey (5 years after initial survey)	Postal questionnaire sent to 984 dentists in the UK (Oxford region) who had been surveyed 5 years previous (71% response rate)	Change in participation by dental practitioners in tobacco cessation activities	- 88.6% of dentists thought participation in smoking cessation activities important (increase of 6.3%) - 42.2% thought dentists effective (increase of 4.8%) - 48.4% routinely recorded smoking status (increase of 30.3%) 26.9% always discussed habit with smokers (increase of 9.5% - less than 10% reported good knowledge of NRT
Rikard-Bell et al (2003)	Survey (of patients)	Survey of 1160 patients (26% smokers) from 135 Australian dental practices with pre and post consultation with pre and post consultation questionnaires	Patient participation	- smokers were significantly less likely than non smokers (62% vs. 77%) to hold positive views of their dentists' interest in their smoking status and discussing smoking (48% vs. 66%) - similar no. smokers and non-smokers stated they would not change dentists if asked about smoking status regularly (58% vs. 62%) - only 1/3 of smokers thought they would try to quit if the dentist recommended it - lack of confidence in dentists' ability to be involved in tobacco cessation
Trotter et al (2003)	Qualitative study (focus group)	Question and discussion amongst 10 Australian dentists	Implementation, dentist participation	- 25% of dentists thought it was inappropriate to ask regularly about smoking or assist in tobacco cessation. These were least likely to seek further training in the area - strong support of handing out pamphlets - attitudes emerged signalling that viewing tobacco cessation as a legitimate task for dental practice must precede attempts to educate on techniques to assist.

Table 2 Barriers – summary of the evidence (continuation)

First author (year)	Publication/ study type	Characteristics	Contextual category	Main findings
Watt et al (2003)	Review commentary	An overview of smoking cessation suggesting a systematic approach to cessation counselling (4As)	Implementation, participation and effectiveness	- barriers identified to include cost, lack of time, lack of knowledge and confidence, concerns over dentist-patient relationship, doubts of effectiveness, lack of resources
Albert et al (2002)	Survey	Mail survey (29 close ended questions) of 75 dental offices to investigate dentists', knowledge, attitudes and behaviours of tobacco cessation counselling in office	Implementation, participation and effectiveness	- 95% of clinicians were enthusiastic to receive training, 12.5% felt time restraints were not a barrier to implementing tobacco cessation into office routine, 25% felt that reimbursement was not a barrier - perceived success was associated with frequency that advice was given (proportion of visits), discussions of smoking and general health, discussions of specific strategies of cessation, time spent on counselling (highest correlation with perception of success) - dentist responsible for smoking cessation advice in 96% of offices, the dental hygienist in 3% of offices, 9.4 % had received previous training in smoking cessation techniques, 12.3% recorded counselling interventions - dentist age not associated with frequency of giving advice, however, correlation existed between confidence about smoking cessation knowledge and frequency of tobacco cessation discussions with patients - "disconnect" exists between advice to quit use of specific strategies, assisting or arranging strategies for patient to quit - few "systems" in place in practices
Warna kulasuriya (2002)	Review article	Narrative review	Implementing, participation, and effectiveness	- lack of reimbursement - inadequate training to assist patients in tobacco cessation - lack of time in a busy schedule - adequate knowledge of harmful effects of smoking but inadequate knowledge of how to counsel on behaviour change - clinician confidence associated with level o - fear of alienating patients - difficulty adapting to set protocol

Table 2 Barriers – summary of the evidence (continuation)

First author (year)	Publication/ study type	Characteristics	Contextual category	Main findings
Damiano (2001)	Review article	Narrative review describing issues around remuneration	Implementing and participation (clinician and patient)	- in USA, large variance amongst patient insurance plan coverage of smoking cessation with approx. 25% of a sample of insurance plans covered cessation activities to even a minimal level - generosity of program associated with patient and practitioner participation - if patient must pay, less will to participate, if dentist does not earn, less willing to provide - insurance companies see the return as too long term, not yet con vinced to enough to include coverage
Gordon (2001)	Review article	Narrative review addressing need, effectiveness and barriers to tobacco cessation through dental offices	Implementing, participation, and effectiveness	- dentists more comfortable to discuss with smokeless tobacco users than smokers - easier to discuss if visible effects in oral cavity present - fear of alienating patients seen as barrier although agree that patients expect appropriate inquiries and advice - lack of confidence amongst both hygienists and dentists - lack of available support material - professionals who attended training reported a higher rate of involvement in cessation activities
Hovell et al (2001)	RCT	2 year study of 154 orthodontic practices randomised to provide tobacco prevention counselling to teens or no counselling	Implementing and participation	- uncomfortable discussing smoking with an individual for which there was no indication of “misbehaviour” - difficulty in maintaining protocol compliance of clinicians in test group – doubts and discomfort with protocol - no difference found in incidence of tobacco use between groups
Lund (2000)	Survey	ADA questionnaire	Implementing, increasing participation of dental team	- 74% did not currently provide tobacco cessation services - 50% felt it was beyond the scope of their services and/or training, should be left for physicians - some had tried but had a bad experiences (upset patients)

Table 2 Barriers – summary of the evidence (continuation)

First author (year)	Publication/ study type	Characteristics	Contextual category	Main findings
Clover et al (1999)	Survey	Questionnaire survey of 136 Australian dentists about current practice, perception of barriers and dentists' strategies	Implementing, and participation	Over 60% perceived barriers to include: - inadequate materials available - lack of knowledge or comfort discussing issues and recommending interest – not convinced of role and responsibility - inadequate remuneration - feeling that patients do not want to discuss it
Warna-kulasuriya et al. 1999	Survey	Questionnaire survey of 2000 dentists	Dentists' views and practices	Barriers: - lack of training - lack of reimbursemnt - lack of time

- Discomfort with discussing tobacco use
- Lack of time
- Lack of knowledge and/or skills (confidence) – those who have taken a course more likely to participate
- Lack of resources
- Lack of patient perceived benefit of counselling by health professional (positive feedback)
- Lack of financial incentives for dental professionals
- Lack of visible effects of tobacco use in oral cavity
- Lack of team approach and communication
- Frustration over success rates
- Failures in previous attempts
- Legal limitations on prescribing NRTs.

(by patient)

- Lack of openness or expectation of dental personnel involvement
- Lack of feeling that their dentist is interested (smokers tend to be less positive than non-smokers about their perception of dentist interest in their habit)
- Costs to patient (if fee charged)
- Lack of confidence that a dental health professional could influence tobacco use
- Lack of patient awareness of availability
- Discomfort discussing tobacco use.

Barriers to effectiveness of tobacco use cessation counselling

- Time spent in counselling
- Lack of resources and sources for referral
- Lack of regular patient attendances
- Discomfort discussing tobacco use
- Non-existence of smoke-free practice
- Lack of time (based on perception that success is based on time spent)
- Lack of knowledge and/or skills (confidence)
- Approach to tobacco cessation in prescriptive manner.

DISCUSSION

With the focus on addressing the question 'what are the barriers to tobacco cessation in the dental practice', this section has highlighted some of the published evidence relevant to this issue. Studies varied

in context and design, resulting in differing risks for potential bias in study results. These details have not been addressed in the context of this summary.

Many barriers were common across various studies, with review articles highlighting similar points. It is clear that barriers may be related to dental professional factors, practice factors or patient factors. Variability in potential barriers may be present and dependent on the various external and internal factors, such as population level, cultural factors or dental practice organisational factors. The importance of well-designed 'systems' and communication within the team has been highlighted in studies from the medical community (Braun et al, 2004). Although, the barriers identified may be similar, the magnitude of each in a given setting at a set point in time may vary. Surveys of dental professionals' attitudes toward and involvement in tobacco cessation activities have been conducted throughout the world with variable results (Johnson, 2004). In fact, such results may differ not only by country and region, but even within patient populations or practice settings. This infers that each individual and practice must take the time to analyse the barriers relevant to their specific situation and appropriately set a well-designed, step-by-step plan.

The 5As, ask, advise, assess, assist, and arrange (as defined by the US 2000 Public Health Services Clinical Practice Guidelines) have been proposed as a user-friendly, brief intervention approach to an in office tobacco cessation programme (Christen, 2001). This approach has been discussed in numerous articles and guidelines, However, is it being used? Evidence suggests that although many dental professionals discuss smoking as an issue related to oral and overall health with their patients, a gap still exists between this and the suggestion of strategies toward cessation (Albert et al, 2002; 2005; Severson et al, 1998; Tomar, 2001). Few practices seem to have 'systems' in place for facilitating cessation or referral to cessation specialists, if necessary (Albert et al, 2002).

Lack of knowledge and confidence emerged from almost each article as a barrier. It has been suggested that a primary barrier is lack of education on cessation techniques during educational programmes of dentists and hygienists. In addition, continuing education modules need to be more readily available (Warnakulasuriya, 2002), and there is a need to establish legitimacy of tobacco cessation in the dental teams' attitudes (Trotter and Worcester, 2003). Considering the dental team in the context of behaviour change models, could it be argued that the 5As might also apply to changing the behaviour of dental personnel themselves? Are all dental professionals ready to receive intervention at the 'assisting' and 'arranging' level? That is, are they ready to participate in educational courses addressing the 'how'? Maybe the need still exists to emphasise the 'why'. Is communication at the ask, advise and assess level a possible key to increase commitment of the dental team to tobacco cessation activities? Information may need to be designed to target all the 5As among dental professionals first. A continuing education course designed to increase knowledge of strategies in smoking cessation may not be effective at initiating or reinforcing change. This could be attributed to an underlying negative attitude of the dental professional toward the changes necessary to increase involvement in tobacco cessation at any level. The challenge may still be motivating some clinicians to participate in a course. Hovell et al (2001) wrote that even in a tobacco cessation research study setting (programme fully provided), clinicians have been reported to be non-compliant with implementing the study protocol as provided. Therefore, is it valid to lecture to dental professionals to initiate behaviour change or is a different approach needed to help overcome barriers?

A correlation between health professionals' smoking habits and their involvement in tobacco cessation counselling was suggested by Hall et al (2005) who described a sample of 152 UK nurses. Those who were smokers had a less positive attitude about participation in tobacco cessation counselling and perceived it to be less effective than those who are non-smokers. Burgan et al (2003) reported similar correlation in a survey of Jordanian dentists. A mandate has been proposed to specifically promote smoking cessation amongst health professionals because smoking by health professionals has been identified as a barrier to their participation in tobacco cessation counselling (Hall, 2005). This may be particularly relevant to populations such as Poland, where it was recently reported that 23% of dental faculty, 37.5 % of dental hygienists and assistants, and 58.3% of dental administrative staff smoke (Balczewska, 2004).

In The Bulletin of the WHO, Reibel (2005) commented that 'given the evidence, tobacco cessation activities should be as natural as oral hygiene measures in dental offices'. The message is that it needs to be an integral part of therapy. However, the attitude toward preventive measures in general needs to be amended to incorporate current knowledge of facilitating behaviour change (Watt et al, 2004b). In some practices, tobacco cessation is approached in a similar context as oral hygiene has traditionally been ad-

dressed - in a paternalistic, lecturing, prescriptive approach. Training of dental professionals has traditionally been focused on clinician-rendered treatment for disease rather than on assisting people to change their behaviour (Monaghan, 2002). Scientific advances that have altered our understanding of health and oral health have elucidated the importance of lifestyle factors to health. As the approach to oral health promotion measures is viewed from a behavioural viewpoint, this may facilitate the effectiveness of dental professionals in both tobacco cessation and other preventive measures, such as oral hygiene.

To facilitate required changes, the dental team members may need to expand not only their knowledge and skills, but also their perception of roles (Mecklenburg, 2001). The dental practice needs to include the involvement of dental auxiliaries in tobacco cessation programmes (Monaghan, 2002; Watt et al, 2004b). Much of the published surveys and data located on this topic investigated dentists only. In the studies where dentists and hygienists were surveyed, differences between the two groups became apparent particularly in terms of attitudes and perceptions of barriers (Albert et al, 2002; Lund, 2000; Watt et al, 2004b). In a survey conducted by Albert et al (2004) it was reported that the dentist was responsible for tobacco use cessation advice in 96% of offices and the dental hygienist in only 3% of offices.

A team approach has been proposed as vital to overcoming barriers (Smith et al, 1998). The team approach should take into consideration differences in team members' roles within the practice with the intent to maximise the efficiency of each member in the overall objective to influence tobacco use. A strategic plan is recommended for implementation of a programme into a practice. The team approach would include team members in the formulation of the plan, therefore avoiding implementation that is haphazard or individual (Christen, 2001). Formulation of a plan or ongoing communication once a plan has been implemented also serves to confirm or alleviate perceptions of barriers. For example, lack of time has been cited as a barrier to tobacco cessation counselling. However, many approaches based on brief intervention have been proposed suggesting that impact on schedule is minimal. Each team should assess this issue of time in the context of their setting.

CONCLUSIONS

Numerous barriers may influence implementation of, participation in, and effectiveness of tobacco cessation counselling in the dental office, with no one factor being identified as the most influential.

Implications for clinical practice/health care

- Characteristics of each dental practice defines the barriers to be found
- Barriers should be anticipated and discussed among the dental team as part of the strategic planning of in-office tobacco use cessation programmes
- Different barriers may emerge through time, so regular review of barriers to TUC is needed.

Implications in/for further research

- Questionnaire studies may have little influence on future knowledge. Future studies should investigate alternative designs, such as qualitative as well as mixed methods. These designs would possibly give further opportunities to discover factors influencing barriers not listed in existing surveys and assist in closing the gap between research findings and implementation.
- Research questions that should be investigated include the validity and impact of reported barriers and the effect of removing barriers. These barriers will range from governmental policy and priorities issues to personal and practice-related barriers.

Implications for education

- Discussion of potential barriers should be incorporated into tobacco use cessation training programmes in undergraduate, graduate and con- tinuing education programmes. Emphasis should be placed on identification of barriers in a specific situation or practice.

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