# Table of Contents

- **Abstract** ........................................... 1
- **Plain Language Summary** ........................... 2
- **Background** ........................................ 2
- **Objectives** .......................................... 2
- **Criteria for Considering Studies for This Review** .... 3
- **Search Methods for Identification of Studies** .......... 3
- **Methods of the Review** .............................. 4
- **Description of Studies** ............................. 4
- **Methodological Quality** ............................. 5
- **Results** ........................................... 5
- **Discussion** .......................................... 6
- **Authors' Conclusions** .............................. 7
- **Potential Conflict of Interest** ....................... 7
- **Acknowledgements** .................................. 7
- **References** .......................................... 7
- **Tables** ............................................ 11
  - Characteristics of included studies .................... 11
  - Characteristics of excluded studies .................... 14
- **Additional Tables** .................................. 16
  - Table 01. Behavioural vs usual care: Smokeless tobacco users, >=12 months .................. 16
  - Table 02. Behavioural vs usual care: Cigarette smokers, >= 12 months ......................... 16
  - Table 03. Behavioural vs usual care: Actively seeking treatment, >=12 months ............... 16
  - Table 04. Behavioural vs usual care: Not actively seeking treatment, >=12 months .......... 16
  - Table 05. Behavioural vs usual care: Cluster randomization ...................................... 17
  - Table 06. Behavioural vs usual care: Individual randomization .................................... 17
- **Analyses** ........................................... 17
  - Comparison 01. Behavioural Interventions vs. Usual Care (adjusted) ......................... 17
- **Index Terms** ........................................ 17
- **Cover Sheet** ....................................... 17
- **Graphs and Other Tables** ........................... 19
  - Analysis 01.01. Comparison 01 Behavioural Interventions vs. Usual Care (adjusted), Outcome 01 Tobacco Abstinence >= 12 months (adjusted) .................. 19
  - Analysis 01.02. Comparison 01 Behavioural Interventions vs. Usual Care (adjusted), Outcome 02 Tobacco Abstinence >=12 months (adjusted) .................... 20
  - Analysis 01.03. Comparison 01 Behavioural Interventions vs. Usual Care (adjusted), Outcome 03 Method of Randomization (adjusted) ....................... 21
Interventions for tobacco cessation in the dental setting (Review)

Carr AB, Ebbert JO

This record should be cited as:

This version first published online: 25 January 2006 in Issue 1, 2006.
Date of most recent substantive amendment: 03 November 2005

ABSTRACT

Background
Tobacco use has significant adverse effects on oral health. Oral health professionals in the dental office or community setting have a unique opportunity to increase tobacco abstinence rates among tobacco users.

Objectives
This review assesses the effectiveness of interventions for tobacco cessation offered to cigarette smokers and smokeless tobacco users in the dental office or community setting.

Search strategy

Selection criteria
We included randomized and pseudo-randomized clinical trials assessing tobacco cessation interventions conducted by oral health professionals in the dental office or community setting with at least six months of follow up.

Data collection and analysis
Two authors independently reviewed abstracts for potential inclusion and abstracted data from included trials. Disagreements were resolved by consensus.

Main results
Six clinical trials met the criteria for inclusion in this review. Included studies assessed the efficacy of interventions in the dental office or a school community setting. All studies assessed the efficacy of interventions for smokeless tobacco users, one of which included cigarette smokers. All studies employed behavioural interventions and only one offered pharmacotherapy as an interventional component. All studies included an oral examination component. Pooling of the studies suggested that interventions conducted by oral health professionals increase tobacco abstinence rates (odds ratio [OR] 1.44; 95% confidence interval [CI]: 1.16 to 1.78) at 12 months or longer. Heterogeneity was evident ($I^2 = 75\%$) and could not be adequately explained through subgroup or sensitivity analyses.

Authors' conclusions
Available evidence suggests that behavioural interventions for tobacco use conducted by oral health professionals incorporating an oral examination component in the dental office and community setting may increase tobacco abstinence rates among smokeless tobacco users. Differences between the studies limit the ability to make conclusive recommendations regarding the intervention components that should be incorporated into clinical practice.
Tobacco cessation counseling interventions delivered by dental professionals may be effective in helping tobacco users to quit.

As well as the well-known harmful effects of smoking on respiratory and cardiovascular systems, tobacco use is associated with an increased risk for oral disease, including oral cancer and periodontal disease. Dental professionals are in a unique position to help tobacco users who present for dental care by providing cessation assistance. We identified and pooled six studies that showed a benefit of tobacco cessation counseling by dental professionals. The odds ratio was 1.44 (95% confidence interval 1.16 to 1.78) at 12 months, in favour of counseling, compared with usual care or no contact. The major implications of these findings are for smokeless tobacco users in the dental settings, as we found limited evidence for the effectiveness of similar interventions for cigarette smokers.

**BACKGROUND**

In addition to the well-known harmful effects of smoking on respiratory and cardiovascular systems, tobacco use has significant adverse effects on oral health. Cigarette smoking is associated with an increased risk for oral disease (Gelskey 1999; Mecklenburg 1998; Salvi 2000). Tobacco exposes the oral cavity to toxic carcinogens that may have a role in initiation and promotion of cancer, or carcinoma (Mirbod 2000). Tobacco is the major inducer of oral squamous cell carcinoma (SCC) and is considered to be responsible for 50% to 90% of oral cancer cases worldwide (Epstein 1992; Holleb 1996). The incidence of oral SCC is four to seven times greater in smokers than non-smokers (Piyathilake 1995). Oral cancer and pre-cancer occurs more frequently in smokers, and quitting smoking decreases the risk for oral cancer within 5 to 10 years (EU Work group 1998). Tobacco exposure is also harmful to periodontal health, and smoking status is an important factor in the prognosis for periodontal therapy, oral wound healing, implant therapy, and cosmetic dentistry (Mecklenburg 1998). Smoking results in discolorations of both teeth and dental restorations, and is associated with halitosis, diminished taste, and an increased prevalence and severity of periodontal disease (EU Work group 1998). Cigarette smoking is causally associated with an increased prevalence and severity of periodontitis (Gelsky 1999), even when adequate oral hygiene is practiced (Kerdvongbundit 2002). Cessation of smoking may halt disease progression and improve outcomes of periodontal therapy (EU Work group 1998).

Smokeless tobacco use has been reported to cause tooth decay (Tomar 1999) and discoloration of dental restorations (Walsh 2000). Chewing tobacco, in particular, is associated with an increased risk for dental caries due to high sugar content and increased gingival recession. Abrasive particles in chewing tobacco may contribute to significant dental attrition which may require dental restorations in advanced cases (Bowles 1995; Milesevic 1996). Cross-sectional studies have suggested that smokeless tobacco users with co-existing gingivitis have high rates of gingival recession, mucosal pathology, and dental caries (Offenbacher 1985). Smokeless tobacco use has also been associated with irreversible gingival attachment loss resulting in root exposure (Ernst 1990).

Effects of smokeless tobacco use are typically observed at anatomical locations where the tobacco contacts the mucosa, such as the labial vestibule and adjacent periodontium. Both the prevalence and severity of tobacco-related oral lesions demonstrate a dose-response relationship with the amount, frequency and duration of smokeless tobacco exposure (Little 1992a). Chronic exposure can lead to leukoplakia (Hirsch 1982), a premalignant condition (Silverman 1984; Silverman 1976). Smokeless tobacco use in the United States has been associated with an increased risk for oral cancer in a dose-response fashion (Stockwell 1986; Williams 1977; Winn 1981). Risk may vary depending upon the type of smokeless tobacco used, as the highest rates or oral cancer are observed in countries where smokeless tobacco is consumed with additives (e.g., areca nut) (Critchley 2003).

The dental practice setting provides a unique opportunity to assist tobacco users in achieving tobacco abstinence (Christen 1990). Widespread acceptance of tobacco use interventions in the dental setting have been lacking and limitations in primary care resources have curtailed further efforts (Wärnakulasuriya 2002). Compared to other health care providers, dentists more accurately estimate patient tobacco use (Block 1999). However, dental practitioners are less consistent with and supportive of intervention, less likely to report having strong knowledge or skill levels regarding tobacco cessation, and more likely to perceive barriers to tobacco intervention (Block 1999). More than 40% of dentists do not routinely ask about tobacco use and 60% do not routinely advise tobacco users to quit (Tomar 2001).

While 61.5% of dentists believe their patients do not expect tobacco cessation services, 58.5% of their patients felt such services should be provided (Campbell 1999). Barriers to providing tobacco cessation service include concern for patient resistance (Campbell 1994), lack of knowledge, lack of time (Dolan 1997), lack of financial reimbursement (Fried 1992), and a concern for poor co-ordination of care between dentistry and tobacco cessation services (Campbell 1994).

**OBJECTIVES**

We assess the effectiveness of interventions for tobacco cessation...
offered to cigarette smokers and smokeless tobacco users in the dental office or community setting. We were interested in testing the following hypotheses:

1) In dental settings, brief counseling cessation interventions are more effective than usual care for increasing tobacco abstinence rates among tobacco users.
2) Brief counseling cessation interventions conducted by dental professionals combined with nicotine replacement therapy (NRT) is more effective than NRT alone for increasing tobacco abstinence rates among tobacco users.
3) Tobacco use interventions incorporating personalized feedback from an oral examination is more effective than interventions without personalized feedback from an oral examination for increasing tobacco abstinence rates among tobacco users.
4) Tobacco use interventions conducted by dental health professionals are more effective than interventions conducted by other healthcare professionals for increasing tobacco abstinence rates among tobacco users.

**Types of outcome measures**

The outcome measure was smoking and tobacco use cessation, assessed at least six months from the delivery of the intervention. Trials which did not report tobacco use outcomes or did not have sufficiently long follow up were excluded. Biochemical validation of self-reported cessation was not required but was recorded.

**SEARCH METHODS FOR IDENTIFICATION OF STUDIES**

See: methods used in reviews.

The Specialized Registers of the Cochrane Tobacco Addiction Group and the Cochrane Oral Health Group were searched for references to tobacco use interventions by dental health professional, in the dental practice setting or otherwise. We also searched the following electronic retrieval systems and databases:

- The Cochrane Central Register of Controlled Trials (CENTRAL), 2006, Issue 2
- MEDLINE (1966-April 2006)
- EMBASE (1988-April 2006)
- CINAHL (1982-April 2006)
- Healthstar (1975-April 2006)
- ERIC (1967-April 2006)
- PsycINFO (1984-April 2006)
- National Technical Information Service database (NTIS, 1964-April 2006)
- Dissertation Abstracts Online (1861-April 2006)
- Database of Abstract of Reviews of Effectiveness (DARE, 1995-April 2006)

The following terms were used to describe the participants: smokers; smoking; cigarettes; smokeless tobacco; chewing tobacco; oral tobacco; spit tobacco; snuff; quid; chew; plug; tobacco use(rs). The following terms described the interventions: randomized; dentists; dental; hygienists; dental-patient relations; behavior modification; conditioning therapy; therapy; behavior; therapy; conditioning; group therapy; cognitive therapy; counseling; behavioural intervention; pharmacotherapy; therapy; drug, patient education, and health promotion. The following terms were used to describe the outcomes: tobacco use cessation; smoking abstinence; tobacco abstinence. The following terms describe the intervention environment: dentists; dental; hygienists; dental-patient relations, oral health.

The Medical Subject Headings (MeSH) used in MEDLINE and CINAHL were also used to focus on the dental environment:
limit retrieval to the dentistry journals subset; or subject headings Oral Health/ or exp Dentistry/ or exp Dental Staff/ or exp DENTISTS/ or DENTIST’S PRACTICE PATTERNS/ or exp dental auxiliaries/ or dental hygienists. Keywords of the various oral specialties orthodont$, periodont$ and endodont$ were also searched. There were no language restrictions. In general, records were searched by conducting searches the following way: (participants OR outcomes) AND interventions. We contacted experts in the area to locate unpublished studies in an effort to minimise publication bias.

**METHODS OF THE REVIEW**

Two authors screened the records retrieved by the searches for potential relevance against stated inclusion criteria: randomized/ pseudo-randomized clinical trial, dental setting, tobacco cessation interventions, and cessation measures of six-month minimum follow up. Two authors checked studies of possible relevance for inclusion or exclusion, and independently extracted and compared data. We resolved disagreements by discussion and consensus (using a third author when necessary).

We extracted the following information about each study:

- Site: including country and type of dental practice
- Method of randomization and allocation concealment, and whether individual or cluster randomized
- Method of participant selection
- Characteristics of the intervention (behavioural/ pharmacologic, delivered by whom)
- Characteristics of participants (type of tobacco use, interest in quitting)
- Outcome assessment (length of follow up, definition of quitting, method for validation of self-report)

For each study we selected the outcome with the most rigorous definition available with regards to maintenance of abstinence (i.e., continuous versus point prevalence) and type of tobacco abstinence (i.e., all tobacco versus smokeless tobacco only). Rates were based on an intention-to-treat analysis with drop-outs and losses to follow up assumed to be continuing tobacco users. We noted any difference in numbers lost to follow up between intervention and control groups.

Randomization and allocation concealment were graded A if the method is described in sufficient detail to ensure that allocation was blinded until after trial enrolment, B if there was insufficient detail, and C if allocation was not concealed (as in use of patient record numbers, day of attendance, etc). Where there appears to have been a large loss to follow up we assessed whether the findings were sensitive to the use of different denominators. In addition to the grading above, we assessed bias impact on strength of the evidence by identifying trials with multiple sources of bias, and we comment on the potential impact of the bias on the overall treatment effect.

The outcome from each trial was expressed as an odds ratio (OR). Where cessation is the outcome this was defined as (number of quitters in treatment group/number of smokers in treatment group)/(number of quitters in control group/number of smokers in control group). The OR was greater than 1 if people were more likely to quit in the treatment group. A pooled weighted average of ORs was estimated using a fixed-effect model, Mantel-Haenszel method, with 95% confidence interval. If any studies in a group to be pooled had corrected for clustering or differences between groups, and therefore generated ORs that do not derive directly from numbers of quitters, studies were pooled using the generic inverse variance method, with study results expressed as an estimate of treatment effect and a standard error (Higgins 2005).

Where odds ratios were derived through this method, we have displayed the raw data for information in the Additional Tables section.

We hypothesized that the following would explain heterogeneity which was explored through subgroup analyses: 1) Patients - smokers (cigarette, cigar, pipe) versus smokeless tobacco users; patients enrolled based on their interest in tobacco cessation versus patients enrolled regardless of interest in quitting (e.g., subjects enrolled in a study requiring informed consent to participate versus subjects enrolled in a study implemented in a dental practice enrolling all patients who are treated clinically); highly dependent versus less dependent tobacco users using the Fagerstrom Tolerance Questionnaire or modifications of the this dependence measure (to the extent that dependence is similarly categorized across trials); specialty practice versus general practice dental settings; 2) Interventions - interventions delivered by dentists versus dental hygienists or other dental staff; behavioural interventions versus pharmacologic interventions; 3) Outcomes - all tobacco abstinence versus tobacco-specific (cigarette smoking, smokeless tobacco) outcomes; 4) Method of randomization - cluster versus individual. We assessed heterogeneity using the I² statistic (Higgins 2003).

Sensitivity analyses included assessment of changes in the estimate of the treatment effect using the random effects model compared with the fixed effects model.

**DESCRIPTION OF STUDIES**

The review included six studies (Andrews 1999; Gansky 2002; Gansky 2005; Severson 1998; Stevens 1995; Walsh 1999). One study had to be excluded due to unavailability of subgroup denominator values from the authors (Cohen 1989). An additional study (Walsh 2003) providing one-year outcome data for an included study (Gansky 2002) was retained in order to conduct a
sensitivity analysis with two-year outcomes versus one-year outcomes. Three studies were conducted in the dental office setting (Andrews 1999; Severson 1998; Stevens 1995), and three involved oral health professionals (dentists and dental hygienists) providing interventions to athletes within high school or college community settings (Gansky 2002; Gansky 2005; Walsh 1999). The school community studies included a dental professional intervention component as a major part of the intervention.

One dental office study targeted both smokers and smokeless tobacco users (Severson 1998) and data for the smokeless tobacco user component of this study are reported in another study included in this review (Andrews 1999). The remaining four studies targeted smokeless tobacco users. In the dental office studies, studies included tobacco users not actively seeking treatment (i.e., no consenting procedure) (Andrews 1999; Severson 1998; Stevens 1995). Interventions in the dental office setting occurred during hygiene visits in general dental practices (Andrews 1999; Severson 1998; Stevens 1995). In the school community studies, tobacco users had to agree to participate and informed consent was obtained (Gansky 2002; Gansky 2005; Walsh 1999). The dental office studies restricted enrolment to 15 years of age or older (Andrews 1999; Severson 1998; Stevens 1995), one of which placed gender restrictions on inclusion (Stevens 1995). The school community studies enrolled high school and college-aged male athletes with no pre-specified age criteria.

All of the school community studies based their intervention on the Cognitive Social Learning Theory (Bandura 1986), two of which reported that the Diffusion of Innovation Theory (Rogers 1983) was instrumental for incorporating the use of peer leaders. No such theoretical foundation was mentioned for the interventions applied to the dental office studies. Nicotine replacement therapy in the form of gum (2 mg) was used in one of the school community studies (Walsh 1999). The gum was reinforced with counseling by a dental professional. In the majority of the studies, dental professionals (dentists and dental hygienists) provided counseling interventions which most often included combinations of an oral examination, feedback from the examination as to oral effects of tobacco use, a message to quit, motivational counseling using printed material or media presentations, and self-help aids. In two of the three dental office studies, the usual care group included no structured intervention (Andrews 1999; Stevens 1995), and in all the school community studies the control schools received no formal training.

In two of the three dental office studies, the dental office was the unit of randomization (Andrews 1999; Severson 1998) after blocking by average number of hygiene visits per week and number of years dentist had been in practice. In the remaining study, the patient was the unit of randomization and assignment was based upon the last digit of their identification number (Stevens 1995). In the school community studies, the school was the unit of randomization following stratification based on baseline prevalence of tobacco use.

For all included trials, participants were followed for at least 12 months and one study followed participants for 24 months (Gansky 2002). Of the five studies targeting smokeless tobacco users, four reported all tobacco abstinence outcomes (Andrews 1999; Gansky 2005; Severson 1998; Stevens 1995). Point prevalence was reported as the primary outcome in three studies (Gansky 2005; Stevens 1995; Walsh 1999). One study reported abstinence as one week (seven day) point prevalence (Stevens 1995) while three designated 30-day point prevalence abstinence (Gansky 2002; Gansky 2005; Walsh 1999). Three studies used continuous or ‘sustained’ abstinence requiring either no tobacco use at both 3 and 12 months (Andrews 1999; Severson 1998) or no current tobacco use at both 12 and 24 months after quitting before the one-month follow up (Gansky 2002).

**Methodological Quality**

Report of randomization in two studies (Gansky 2002; Gansky 2005) was sufficient and rated A. The remaining studies did not report how randomization was performed or reported it in insufficient detail to determine whether a satisfactory attempt was made to control for selection bias (Andrews 1999; Severson 1998; Walsh 1999). Pseudo-randomization based upon last digit of patient identification number was used in one study (Stevens 1995).

No biochemical confirmation was used to validate self report in three studies (Andrews 1999; Gansky 2005; Severson 1998). In the remaining three studies, biochemical confirmation was initially utilized and abandoned (Stevens 1995), or used to enhance self report (Gansky 2002; Walsh 1999) (i.e., the ‘bogus pipeline’ method).

Ability to blind was limited due to the nature of the behavioural interventions evaluated.

In one school-based study (Gansky 2005), the authors describe a ‘spill-over’ effect between the intervention and control group that was felt to bias the results of the trial.

**Results**

All analyses were conducted following adjusting for clustering of patients within practices and schools using the reported intra-class correlation coefficients (ICCs) and generic inverse variance method.

When the six clinical trials of dental interventions compared to usual care or no contact controls are pooled (including all tobacco users) [Comparison 1, Outcome 1], a statistically significant increase in the odds of tobacco abstinence at 12 months or more was observed (odds ratio [OR] 1.44; 95% confidence interval [CI]:
1.16 to 1.78) but heterogeneity was evident between the studies ($I^2 = 71.4\%$). Inclusion of the 12-month outcome data (Walsh 2003) instead of the two-year outcome data (Gansky 2002) did not change the results. Severson 1998 included a three-arm design for cigarette smokers (extended intervention versus minimal intervention versus usual care) and for the purposes of the pooling we included only the smokers in the extended intervention compared to usual care.

Heterogeneity was explored by assessing the prespecified potential explanations. **Patients:** Heterogeneity is not explained by separating cigarette smokers and smokeless tobacco users [Comparison 1, Outcome 1, Subgroups 1 and 2], although there is only one study that enrolled cigarette smokers (Severson 1998). When pooling of the studies in which subjects were enrolled based upon their tobacco use status and not upon an expressed interest to receive an intervention [Comparison 1, Outcome 2], an increased odds of tobacco abstinence was observed for those actively seeking treatment (OR 1.41; 95% CI: 1.07 to 1.86; Subgroup 1) and for those not actively seeking treatment (OR 1.48; 95% CI: 1.05 to 2.09; Subgroup 2). The two subgroups had overlapping confidence intervals. Since all of the studies in which subjects were enrolled based upon their tobacco use status were also conducted in the dental office setting, we cannot determine the influence of each factor independently. Dependence was measured differently or not at all across studies so a comparison cannot be made regarding differences in baseline dependence. Interventions in the dental office setting were conducted in general dental practices during hygiene visits within general dental practices only, so comparisons between general practice and subspecialty care cannot be made. **Interventions:** Interventions in all studies were a team effort with the dental hygienists as the primary behavioural interventionists. **Outcomes:** When the studies assessing interventions for smokeless tobacco users that reported smokeless abstinence rather than all tobacco abstinence at 12 months or longer were analyzed separately, the ORs and CIs were similar to the overall analysis and heterogeneity remained significant. **Method of randomization:** Subgrouping by type of randomization did not explain the heterogeneity [Comparison 1, Outcome 3]. Overall, the source of the heterogeneity is not well-explained.

Given the high proportion of heterogeneity present in the studies reported, we performed a sensitivity analysis using a random-effects model. For Outcome 1, the significant difference seen with the fixed-effect model for an increase in the odds of tobacco abstinence at 12 months or more remained with the random-effects model (OR 1.67; 95% CI: 1.09 to 2.57). For Outcome 2, the random-effects model yielded increased point estimates yet failed to maintain significance for the subgroups [actively seeking treatment OR 1.72; 95% CI: 0.80 to 3.71, not actively seeking treatment OR 1.64; 95% CI: 0.90 to 2.98]. For Outcome 3, the significant difference seen in cluster randomized studies remained using the random-effects model [OR 1.72; 95% CI: 1.06 to 2.89].

**DISCUSSION**

Our review reveals that limited published literature exists assessing the impact of tobacco use interventions conducted by oral health professionals. However, available evidence is consistent with the hypothesis that dental interventions conducted in the dental office and school community setting are more effective than usual care for promoting tobacco use cessation. The pooled tobacco abstinence at 12 months was 1.44 (95% CI: 1.16 to 1.78). This equates to a difference in cessation rates of 3% between the groups receiving the behavioural intervention and those that do not. The number-needed-to-treat with a tobacco use intervention conducted by an oral health professional is 33.

While the overall effect of the intervention may be small, the pooling of the studies in this review represents tobacco abstinence at 12 months or longer. No consensus has been reached on the duration of abstinence that should be reported in trials of interventions for tobacco use (Hughes 2003). However, reporting of 12-month outcomes or longer may equate more closely to life-long tobacco abstinence and be less likely to give false positive results (Hughes 2003).

The results of this analysis should be interpreted with caution in light of potential methodological limitations. The existence of publication bias cannot be ruled out as unpublished reports may not be represented in the effect estimate. The methodological quality of the studies could also be a source of concern due to the inability to blind, unclear methods of treatment allocation, tobacco cessation validation based upon self reports, and inconsistent content and delivery of dental-specific intervention within the pooled studies.

Although all of the included studies contained a dental intervention component, significant heterogeneity was evident. The source of heterogeneity is unclear and our methods to assess heterogeneity were unfruitful. Among the smokeless tobacco intervention studies, heterogeneity was explained by the removal of one study (Gansky 2005). However, the estimate of effect increased dramatically upon removal of this study (OR 2.32; 95% CI: 1.67 to 3.23) compared with the total subgroup of smokeless tobacco user interventions studies including this study (OR 1.54; 95% CI: 1.21 to 1.96) [Comparison 1, Subgroup 1]. The authors of Gansky 2005 did not observe a significant treatment effect and propose that a ‘spill-over’ effect had occurred from the intervention group to the control, thus washing out any potential treatment effect. The authors support this hypothesis through previously unpublished findings and the suggestion that California athletic trainers are a closely-knit group. One year earlier, a survey of athletic trainers found that 14% provided tobacco-cessation counseling. During the study period, a similar survey observed that 30% reported providing tobacco-cessation counseling. These results need to be interpreted with caution.
All of the studies included in this review included brief advice to quit by an oral health professional. Brief advice from physicians has been shown to be an effective means to promote cessation (Lancaster 2004), and this review suggests the same can be expected from dental professionals interacting with smokeless tobacco users. Clinical practice guidelines advise brief interventions in the clinical setting where patients are asked about their tobacco use and then advised to quit. If the user is ready to quit, the clinician can offer specific assistance and provide follow-up care. An insufficient number of studies are available to determine what specific assistance measures provide additional effectiveness beyond brief advice to the dental professionals intervention.

The public health benefits of tobacco cessation interventions within the dental setting are potentially significant. The findings for the smokeless tobacco users in this review suggest that there is an advantage of cessation interventions using dental professionals; however, the limited number of studies reviewed does not allow identification of intervention components most critical for cessation.

AUTHORS’ CONCLUSIONS

Implications for practice
Interventions for smokeless tobacco users in the dental setting, either in the dental office or in the school community, may increase the odds of quitting tobacco. Insufficient evidence exists to make conclusions about the effectiveness of these interventions for cigarette smokers.

Implications for research
Additional study of tobacco cessation within the dental office setting is important to identify critical intervention components which are effective for this group of providers in this clinical setting. It is especially important to expand the knowledge base for interventions targeting cigarette smokers.

POTENTIAL CONFLICT OF INTEREST
None.

ACKNOWLEDGEMENTS

We would like to acknowledge Sylvia Bickley of the Cochrane Oral Health Group for her assistance in obtaining references for this review, and Rafael Perera of the Tobacco Addiction Group for his statistical assistance with adjustment for clustering effects. We would also like to thank Patricia Erwin, MLS, for her assistance with search strategy development and execution. We would like to thank Dr. Kristen Vickers-Douglas for her review of the study protocol, and Drs Ian Needleman and Helen Worthington for comments and suggestions on the full review draft.

SOURCES OF SUPPORT

External sources of support
- 1R21DE016024, National Institute for Dental and Craniofacial Research USA

Internal sources of support
- No sources of support supplied

REFERENCES

References to studies included in this review
Andrews 1999 [published data only]

Gansky 2002 [published data only]

Gansky 2005 [unpublished data only]

Severson 1998 [published data only]


Interventions for tobacco cessation in the dental setting (Review)

Campbell 1997

Christen 1984

Christen 1985

Cohen 1987

Cohen 1989

Cooper 1989

Gelskey 2002

Glasgow 1993

Gordon 2002

Gordon 2005

Gorin 2004

Gould 1998
Interventions for tobacco cessation in the dental setting (Review)

Copyright © 2007 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd

Greene 1994

Gritz 1991

Gritz 1993

Hovell 1995

Hovell 2001

Johnston 1996

Jones 1993

Koerber 2003

Koerber 2003

Little 1992b

Macgregor 1996

Masouredis 1997

Morgan 2000

NCI 1994

NCI 1995

O'Keefe 1995

Olson 1985

Secker-Walker 1988

Smith 1998

Williams 2002

Wood 1997

Additional references
Bandura 1986
Interventions for tobacco cessation in the dental setting (Review)

Copyright © 2007 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd

Block 1999

Bowles 1995

Campbell 1994

Campbell 1999

Christen 1990

Critchley 2003

Dolan 1997

Epstein 1992

Ernst 1990

EU Work group 1998

Fried 1992

Gelskey 1999

Higgins 2003

Higgins 2005

Hirsch 1982

Hollob 1996

Hughes 2003

Kerdvongbundit 2002

Lancaster 2004

Little 1992a

Mecklenburg 1998

Milosevic 1996

Mirbod 2000

Offenbacher 1985

Piyathilake 1995

Rogers 1983

Salvi 2000

Silverman 1976
Silverman 1984

Stockwell 1986

Tomar 1999

Tomar 2001
Tomar SL. Dentistry’s role in tobacco control. *Journal of the American Dental Association* 2001;132(Suppl):30S–35S.

Walsh 2000

Warnakulasuriya 2002

Williams 1977

Winn 1981

*Indicates the major publication for the study

**Tables**

Characteristics of included studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Andrews 1999</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Methods</strong></td>
<td>Country: USA&lt;br&gt;Recruitment: Hygiene patients&lt;br&gt;Randomization: Practices were blocked (by average number of hygiene visits per week and years dentists had been in practice), then randomized to usual care or intervention groups.</td>
</tr>
<tr>
<td><strong>Participants</strong></td>
<td>633 ST users &gt;= 15 years of age</td>
</tr>
</tbody>
</table>
| **Interventions** | 1. Intervention: Determine tobacco use, identify oral disease, strong advice to quit, set quit date within 2w, motivation video, written material, call patient within 2w.  
  2. Usual care |
| **Outcomes**  | 12 month ‘sustained’ abstinence from ST and all tobacco: subjects must have reported 7-day point prevalence ST and all tobacco abstinence at both 3m and 12m. Abstinence verification: None |
Characteristics of included studies (Continued)

Notes Intraclass correlation calculated < 0.0009.
Intervention group more likely to have previously been advised by a dental care provider to quit use of ST and were less likely to be single.
Loss to follow up was 26% (102/394) in intervention and 26% (62/239) in the control group.

Allocation concealment B – Unclear

Study Gansky 2002

Methods Country: USA
Recruitment: Principals from randomly selected high schools were contacted
Randomized: High schools stratified by baseline number and size of teams and baseline prevalence of ST use, then within strata schools were randomized to intervention or control groups

Participants ST users on high school baseball teams

Interventions Intervention: 1) Peer-led component: 50- to 60-min educational meeting with videotape and discussion, slide presentation, small-group discussion on tobacco industry advertising;
2) Dental-component: Oral cancer screening in school environment by dental hygienist, advice to quit, identified oral findings related to tobacco use, self-help guide for quitting, offered 15-min counseling in groups, dental hygienists made 5- to 10-min follow-up call.
Control: Usual care.

Outcomes 2-year continuous ST abstinence
Abstinence verification: None

Notes These data are the 2-year follow up of Walsh 2003. Reported < 10% loss to follow up.

Allocation concealment B – Unclear

Study Gansky 2005

Methods Country: USA
Recruitment: Contacted athletic trainers at California colleges
Randomization: Schools stratified by tertiles of baseline ST use then within strata colleges were randomized to intervention or control group

Participants College baseball athletes who use ST

Interventions Based upon the innovation theory and social learning theory. Consisted of the following components:
1) Video conference and follow-up newsletter: 3-hours with ATCs/dentists/hygienists;
2) Dental component: dentists/hygienists provided oral cancer screening, advised ST users to stop, identified oral lesions, provided self-help guide, offered single 10-15 min individual counseling session focusing on ST addiction, set a quit date, developing a plan, training in action and thinking skills to get ready to quit and to prevent relapse.
3) ATC follow up and referral: follow up by ATC on quit date and 3 booster sessions 1w apart;
4) Peer-led component: 50-60 min education meeting with included 3 components: 2 videos and slides of facial disfigurement.

Outcomes 30-day point-prevalence ST abstinence at 12m
Abstinence verification: None

Notes Intraclass correlation: 0.0197. 24% loss to follow up not broken down by study arm.

Allocation concealment B – Unclear

Study Severson 1998

Methods Country: USA
Recruitment: Hygiene patients in private practices
Randomization: Practices were blocked average number of hygiene visits per week and number of years dentists had in practice, then randomized to usual care, minimal intervention, or extended intervention

Interventions for tobacco cessation in the dental setting (Review)
Characteristics of included studies (Continued)

Participants Cigarette smokers

Interventions Steps for all patients in the minimal and extended intervention:
1) Determined tobacco use status from the patient's chart and health questionnaire;
2) Identified and recorded findings from the oral examination and related them to patient's tobacco use;
3) Gave advice to quit and relating advice to oral health;
4) Gave the patient a packet of materials that included pamphlets of health problems/ways to quit; a quit kit with sugarless candy and gum, flavoured toothpicks, and rubber bands. In addition, the extended intervention asked the patient to set a quit date within 2w of visit, gave the patient a motivational video, and called the patient within 2w after the hygiene visit to ask if he/she read the materials, watched the video, and either quit or is now willing to set a quit date.

Outcomes 12m 'sustained' abstinence from ST and all tobacco: subjects must have reported 7-day point prevalence ST and all tobacco abstinence at both 3m and 12m.
Abstinence verification: None

Notes ST data included in Andrews 1999. Intraclass correlation for cigarette smoking was 0.00004. 24.3% loss to follow up not broken down by study arm or type of tobacco.

Allocation concealment B – Unclear

Study Stevens 1995

Methods Country: USA
Recruitment: Hygiene patients in HMO dental offices
Randomization: Pseudo-randomized by clinic identification number

Participants Male ST users

Interventions Intervention: soft-tissue exam, cleaning, patient education, feedback on oral health and advice on self care, report of keratotic lesions asking where tobacco was placed, hygienist-directed advice to quit, dentists' strong advice to quit, 9 min video, setting a quit date, self-help booklet, 24-hour advice phone line, kit providing oral substitutes and tip sheets with advice on how to quit, 1w follow-up call by hygienist, plus monthly mailing of tip sheets and newsletter
Control: usual care

Outcomes 12m 7-day point prevalence all tobacco abstinence
12m 7-day point prevalence ST abstinence
12m all tobacco sustained abstinence: subjects must have reported no tobacco use in the last 7 days at the 3m and 12m assessments
12m ST tobacco abstinence: subjects must have reported no ST use in the last 7 days at the 3m and 12m assessments
Abstinence verification: None

Notes Loss to follow up 51.9% (intervention) and 53.7% (control)

Allocation concealment C – Inadequate

Study Walsh 1999

Methods Country: USA
Recruitment: Publicly-supported colleges were contacted for permission to recruit athletes
Randomized: Colleges were pair-matched based on baseline prevalence of ST use and 1 randomized to intervention, the other to control

Participants ST users among college-baseball and football athletes

Interventions Intervention: 3-5 min dental exam, advice to quit, discussed ST-related tissue changes, photographs of facial disfigurement due to oral cancer, self-help guide, offered a 10-15 min counseling session by the hygienist which included nicotine gum, review of addiction nature of ST and nicotine withdrawal, setting a quit date, developing a plan to quit, and identifying triggers for tobacco use. Phone calls were conducted by the hygienist on the quit date and 1m later.
Control: No intervention.

Outcomes 30-day point prevalence ST abstinence at 12m
Abstinence verification: None

Notes Intraclass correlation value: 0.02. Loss to follow up 10% (intervention) and 5% (control)

Allocation concealment B – Unclear

Study Walsh 2003

Methods
Country: USA
Recruitment: Principals from randomly selected high schools were contacted
Randomized: High schools

Participants High school baseball team members who use ST

Interventions Intervention: 1) Peer-led component: 50- to 60 min educational meeting with videotape and discussion, slide presentation, small-group discussion on tobacco industry advertising;
2) Dental-component: Oral cancer screening in school environment by dental hygienist, advice to quit, identified oral findings related to tobacco use, self-help guide for quitting, offered 15 min counseling in groups, dental hygienists made 5 to 10 min follow up call.
Control: Usual care.

Outcomes Repeated point prevalence smokeless tobacco abstinence at 1m and 12m
Abstinence verification: Yes, at 12m

Notes Schools were stratified by baseline number, size of baseball team, and ST use prevalence. 19% loss to follow up not broken down by intervention group.
This paper is the 2-year data for Gansky 2002, separated here for comparative purposes

Allocation concealment B – Unclear

ATC: athletic training coach
HMO: Health Maintenance Organization
m: month(s)
ST: smokeless tobacco
w: week(s)

Characteristics of excluded studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Reason for exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albert 2004</td>
<td>No tobacco use outcomes reported. Study assessed the effectiveness of academic detailing.</td>
</tr>
<tr>
<td>Barker 1995</td>
<td>Not an RCT. School-wide tobacco cessation effort.</td>
</tr>
<tr>
<td>Barker 2001</td>
<td>Not an RCT. Survey of cessation practice behavior of hygienists and dentists.</td>
</tr>
<tr>
<td>Barnfather 2005</td>
<td>Short follow-up (8 weeks). Intervention included exam and counseling for both arms, with point-of-care test for salivary nicotine as the exposure variable.</td>
</tr>
<tr>
<td>Binnie 2003</td>
<td>3-month outcomes only. RCT assessing the effectiveness of smoking cessation counseling and nicotine replacement delivered by dental hygienists.</td>
</tr>
<tr>
<td>Boundouki 2004</td>
<td>Not an RCT. Use of a patient-information leaflet to improve knowledge of mouth cancer.</td>
</tr>
<tr>
<td>Campbell 1997</td>
<td>No tobacco use outcomes reported. This report describes the recruitment strategy and response rate for a 3-yr RCT to test the effectiveness of a dissemination strategy aimed at improving the tobacco cessation services offered by rural dental practices.</td>
</tr>
<tr>
<td>Christen 1984</td>
<td>15-week outcomes only. Assessed the efficacy of nicotine gum vs. advice to quit and videotape.</td>
</tr>
<tr>
<td>Christen 1985</td>
<td>Not an RCT. Assessed nicotine effects on oral health.</td>
</tr>
<tr>
<td>Cohen 1987</td>
<td>No tobacco use outcomes reported. Results of exit survey conducted during a study of the impact of nicotine gum and chart reminders on tobacco cessation.</td>
</tr>
<tr>
<td>Author</td>
<td>Year</td>
</tr>
<tr>
<td>----------</td>
<td>--------</td>
</tr>
<tr>
<td>Cohen</td>
<td>1989</td>
</tr>
<tr>
<td>Cooper</td>
<td>1989</td>
</tr>
<tr>
<td>Gelskey</td>
<td>2002</td>
</tr>
<tr>
<td>Glasgow</td>
<td>1993</td>
</tr>
<tr>
<td>Gordon</td>
<td>2002</td>
</tr>
<tr>
<td>Gordon</td>
<td>2005</td>
</tr>
<tr>
<td>Gorin</td>
<td>2004</td>
</tr>
<tr>
<td>Gould</td>
<td>1998</td>
</tr>
<tr>
<td>Greene</td>
<td>1994</td>
</tr>
<tr>
<td>Gritz</td>
<td>1991</td>
</tr>
<tr>
<td>Gritz</td>
<td>1993</td>
</tr>
<tr>
<td>Hovell</td>
<td>1995</td>
</tr>
<tr>
<td>Hovell</td>
<td>2001</td>
</tr>
<tr>
<td>Johnston</td>
<td>1996</td>
</tr>
<tr>
<td>Jones</td>
<td>1993</td>
</tr>
<tr>
<td>Kentala</td>
<td>1999</td>
</tr>
<tr>
<td>Kirkwood</td>
<td>2001</td>
</tr>
<tr>
<td>Kirkwood</td>
<td>2002</td>
</tr>
<tr>
<td>Koerber</td>
<td>2003</td>
</tr>
<tr>
<td>Little</td>
<td>1992b</td>
</tr>
<tr>
<td>Macgregor</td>
<td>1996</td>
</tr>
<tr>
<td>Masouredis</td>
<td>1997</td>
</tr>
<tr>
<td>Morgan</td>
<td>2000</td>
</tr>
<tr>
<td>NCI</td>
<td>1995</td>
</tr>
<tr>
<td>O'Keefe</td>
<td>1995</td>
</tr>
</tbody>
</table>
Characteristics of excluded studies (Continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olson 1985</td>
<td>15-week outcomes only of salivary parameters before and after among smokers using nicotine-containing chewing gum. No tobacco cessation outcomes.</td>
</tr>
<tr>
<td>Secker-Walker 1988</td>
<td>Not an RCT. Pilot study of smoking cessation advice among patients in a periodontal practice.</td>
</tr>
<tr>
<td>Smith 1998</td>
<td>Not an RCT. Case series of smoking cessation programs conducted in dental practices in the UK.</td>
</tr>
<tr>
<td>Williams 2002</td>
<td>Abstract unavailable. No additional information supplied by author.</td>
</tr>
<tr>
<td>Wood 1997</td>
<td>Not an RCT. 3-month data only. Office-based training in tobacco cessation for dentists.</td>
</tr>
</tbody>
</table>

**ADDITIONAL TABLES**

**Table 01. Behavioural vs usual care: Smokeless tobacco users, >=12 months**

<table>
<thead>
<tr>
<th>Study</th>
<th>Treatment</th>
<th>Control (usual care)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andrews 1999</td>
<td>40/394</td>
<td>8/239</td>
</tr>
<tr>
<td>Gansky 2002</td>
<td>32/141</td>
<td>21/166</td>
</tr>
<tr>
<td>Stevens 1995</td>
<td>25/245</td>
<td>19/273</td>
</tr>
<tr>
<td>Walsh 1999</td>
<td>60/171</td>
<td>30/189</td>
</tr>
<tr>
<td>Gansky 2005</td>
<td>103/285</td>
<td>130/352</td>
</tr>
</tbody>
</table>

**Table 02. Behavioural vs usual care: Cigarette smokers, >= 12 months**

<table>
<thead>
<tr>
<th>Study</th>
<th>Treatment</th>
<th>Control (usual care)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severson 1998b</td>
<td>35/1374</td>
<td>32/1350</td>
</tr>
</tbody>
</table>

**Table 03. Behavioural vs usual care: Actively seeking treatment, >=12 months**

<table>
<thead>
<tr>
<th>Study</th>
<th>Treatment</th>
<th>Control (usual care)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gansky 2002</td>
<td>32/141</td>
<td>21/166</td>
</tr>
<tr>
<td>Walsh 1999</td>
<td>60/171</td>
<td>30/189</td>
</tr>
<tr>
<td>Gansky 2005</td>
<td>103/285</td>
<td>130/352</td>
</tr>
</tbody>
</table>

**Table 04. Behavioural vs usual care: Not actively seeking treatment, >=12 months**

<table>
<thead>
<tr>
<th>Study</th>
<th>Treatment</th>
<th>Control (usual care)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andrews 1999</td>
<td>40/394</td>
<td>8/239</td>
</tr>
<tr>
<td>Stevens 1995</td>
<td>25/245</td>
<td>19/273</td>
</tr>
<tr>
<td>Severson 1998b</td>
<td>35/1374</td>
<td>32/1350</td>
</tr>
</tbody>
</table>
Table 05. Behavioural vs usual care: Cluster randomization

<table>
<thead>
<tr>
<th>Study</th>
<th>Treatment</th>
<th>Control (usual care)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andrews 1999</td>
<td>40/394</td>
<td>8/239</td>
</tr>
<tr>
<td>Gansky 2002</td>
<td>32/141</td>
<td>21/166</td>
</tr>
<tr>
<td>Walsh 1999</td>
<td>60/171</td>
<td>30/189</td>
</tr>
<tr>
<td>Severson 1998b</td>
<td>35/1374</td>
<td>32/1350</td>
</tr>
<tr>
<td>Gansky 2005</td>
<td>103/285</td>
<td>130/352</td>
</tr>
</tbody>
</table>

Table 06. Behavioural vs usual care: Individual randomization

<table>
<thead>
<tr>
<th>Study</th>
<th>Treatment</th>
<th>Control (usual care)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severson 1995</td>
<td>25/245</td>
<td>19/273</td>
</tr>
</tbody>
</table>

ANALYSES

Comparison 01. Behavioural Interventions vs. Usual Care (adjusted)

<table>
<thead>
<tr>
<th>Outcome title</th>
<th>No. of studies</th>
<th>No. of participants</th>
<th>Statistical method</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 Tobacco Abstinence &gt;= 12 months (adjusted)</td>
<td>6</td>
<td></td>
<td>Adjusted odds ratio (Fixed) 95% CI</td>
<td>1.44 [1.16, 1.78]</td>
</tr>
<tr>
<td>02 Tobacco Abstinence &gt;= 12 months (adjusted)</td>
<td></td>
<td></td>
<td>Adjusted odds ratio (Fixed) 95% CI</td>
<td>Subtotals only</td>
</tr>
<tr>
<td>03 Method of Randomization (adjusted)</td>
<td></td>
<td></td>
<td>Adjusted odds ratio (Fixed) 95% CI</td>
<td>Subtotals only</td>
</tr>
</tbody>
</table>

INDEX TERMS

Medical Subject Headings (MeSH)
* Counseling; * Dental Offices; Oral Health; Randomized Controlled Trials; * Tobacco, Smokeless; Tobacco Use Cessation [* methods; psychology]

MeSH check words
Humans

COVER SHEET

Title
Interventions for tobacco cessation in the dental setting

Authors
Carr AB, Ebbert JO

Contribution of author(s)
JOE and ABC both conceived and planned the review, sought trials and extracted data; both were equally involved in writing the review.

Issue protocol first published
2005/1

Review first published
2006/1

Date of most recent amendment
12 September 2006
Date of most recent SUBSTANTIVE amendment
03 November 2005

What's New
The search was updated in April 2006. No new studies were identified. Two studies were reviewed and added to the excluded studies list. This minor update was first published in issue 1, 2007.

Date new studies sought but none found
Information not supplied by author

Date new studies found but not yet included/excluded
Information not supplied by author

Date new studies found and included/excluded
07 September 2006

Date authors’ conclusions section amended
Information not supplied by author

Contact address
Dr Alan Carr
Department of Dental Specialities
Mayo Clinic
200 First Street SW
Rochester
MN 55905
USA
E-mail: Carr.Alan@mayo.edu
Tel: +1 507 284 2951
Fax: +1 507 284 0161

DOI
10.1002/14651858.CD005084.pub2

Cochrane Library number
CD005084

Editorial group
Cochrane Tobacco Addiction Group

Editorial group code
HM-TOBACCO
Comparison 01 Behavioural Interventions vs. Usual Care (adjusted), Outcome 01 Tobacco Abstinence >= 12 months (adjusted)

<table>
<thead>
<tr>
<th>Study</th>
<th>log [Adjusted odds ratio] (SE)</th>
<th>Adjusted odds ratio (Fixed) 95% CI (%)</th>
<th>Weight</th>
<th>Adjusted odds ratio (Fixed) 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 Smokeless Tobacco Users</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andrews 1999</td>
<td>1.18 (0.40)</td>
<td>3.26 [1.49, 7.17]</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>Gansky 2002</td>
<td>0.71 (0.42)</td>
<td>2.03 [0.89, 4.60]</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>Gansky 2005</td>
<td>-0.03 (0.18)</td>
<td>0.97 [0.68, 1.38]</td>
<td>37.3</td>
<td></td>
</tr>
<tr>
<td>Stevens 1995</td>
<td>0.42 (0.32)</td>
<td>1.52 [0.81, 2.83]</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td>Walsh 1999</td>
<td>1.05 (0.27)</td>
<td>2.86 [1.68, 4.89]</td>
<td>16.3</td>
<td></td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td></td>
<td>1.54 [1.21, 1.96]</td>
<td>80.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Test for heterogeneity chi-square=15.77 df=4 p=0.003 I² =74.6% Test for overall effect z=3.52 p=0.0004</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02 Cigarette Smokers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severson 1998</td>
<td>0.07 (0.25)</td>
<td>1.08 [0.66, 1.75]</td>
<td>19.8</td>
<td></td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td></td>
<td>1.08 [0.66, 1.75]</td>
<td>19.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Test for heterogeneity: not applicable Test for overall effect z=0.30 p=0.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (95% CI)</td>
<td></td>
<td>1.44 [1.16, 1.78]</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Test for heterogeneity chi-square=17.46 df=5 p=0.004 I² =71.4% Test for overall effect z=3.29 p=0.001</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Questions:

1. What is the adjusted odds ratio for Smokeless Tobacco Users in Andrews 1999?
   - The adjusted odds ratio for Smokeless Tobacco Users in Andrews 1999 is 3.26 with a 95% CI of [1.49, 7.17].

2. How many studies were included in the analysis for Cigarette Smokers?
   - There were 2 studies included in the analysis for Cigarette Smokers.

3. What is the p-value for the test of overall effect for Cigarette Smokers?
   - The p-value for the test of overall effect for Cigarette Smokers is 0.30.

4. What is the test statistic for the test of overall effect for Cigarette Smokers?
   - The test statistic for the test of overall effect for Cigarette Smokers is 3.29.

5. What is the percentage of heterogeneity for the analysis of Cigarette Smokers?
   - The percentage of heterogeneity for the analysis of Cigarette Smokers is 71.4%.

6. How many studies were included in the analysis for Cigarette Smokers?
   - There were 2 studies included in the analysis for Cigarette Smokers.

7. What is the adjusted odds ratio for Smokeless Tobacco Users in Gansky 2002?
   - The adjusted odds ratio for Smokeless Tobacco Users in Gansky 2002 is 2.03 with a 95% CI of [0.89, 4.60].

8. What is the adjusted odds ratio for Cigarette Smokers in Severson 1998?
   - The adjusted odds ratio for Cigarette Smokers in Severson 1998 is 1.08 with a 95% CI of [0.66, 1.75].
**Analysis 01.02. Comparison 01 Behavioural Interventions vs. Usual Care (adjusted), Outcome 02 Tobacco Abstinence >= 12 months (adjusted)**

Review: Interventions for tobacco cessation in the dental setting
Comparison: 01 Behavioural Interventions vs. Usual Care (adjusted)
Outcome: 02 Tobacco Abstinence >= 12 months (adjusted)

<table>
<thead>
<tr>
<th>Study</th>
<th>log [Adjusted odds ratio]</th>
<th>Adjusted odds ratio (Fixed)</th>
<th>Weight (%)</th>
<th>Adjusted odds ratio (Fixed)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>01 Actively Seeking Treatment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gansky 2002</td>
<td>0.71 (0.42)</td>
<td></td>
<td>11.5</td>
<td>2.03 [0.89, 4.60]</td>
</tr>
<tr>
<td>Gansky 2005</td>
<td>-0.03 (0.18)</td>
<td></td>
<td>61.6</td>
<td>0.97 [0.68, 1.38]</td>
</tr>
<tr>
<td>Walsh 1999</td>
<td>1.05 (0.27)</td>
<td></td>
<td>27.0</td>
<td>2.86 [1.68, 4.89]</td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td></td>
<td></td>
<td>100.0</td>
<td>1.41 [1.07, 1.86]</td>
</tr>
<tr>
<td><strong>Test for heterogeneity chi-square=11.89 df=2 p=0.003 I²=83.2%</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Test for overall effect z=2.43 p=0.02</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **02 Not Actively Seeking Treatment** |                           |                             |            |                            |
| Andrews 1999      | 1.18 (0.40)               |                             | 19.2       | 3.26 [1.49, 7.17]          |
| Severson 1998     | 0.07 (0.25)               |                             | 50.3       | 1.08 [0.66, 1.75]          |
| Stevens 1995      | 0.42 (0.32)               |                             | 30.5       | 1.52 [0.81, 2.83]          |
| **Subtotal (95% CI)** |                           |                             | 100.0      | 1.48 [1.05, 2.09]          |
| **Test for heterogeneity chi-square=5.53 df=2 p=0.06 I²=63.9%** | |                             |            |                            |
| **Test for overall effect z=2.23 p=0.03** | |                             |            |                            |
### Analysis 01.03. Comparison 01 Behavioural Interventions vs. Usual Care (adjusted), Outcome 03 Method of Randomization (adjusted)

**Review:** Interventions for tobacco cessation in the dental setting  
**Comparison:** 01 Behavioural Interventions vs. Usual Care (adjusted)  
**Outcome:** 03 Method of Randomization (adjusted)

<table>
<thead>
<tr>
<th>Study</th>
<th>log [Adjusted odds ratio] (SE)</th>
<th>Adjusted odds ratio (Fixed)</th>
<th>Weight (%)</th>
<th>Adjusted odds ratio (Fixed) 95% CI (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andrews 1999</td>
<td>1.18 (0.40)</td>
<td></td>
<td>8.6</td>
<td>3.26 [ 1.49, 7.17 ]</td>
</tr>
<tr>
<td>Gansky 2002</td>
<td>0.71 (0.42)</td>
<td></td>
<td>7.9</td>
<td>2.03 [ 0.89, 4.60 ]</td>
</tr>
<tr>
<td>Gansky 2005</td>
<td>-0.03 (0.18)</td>
<td></td>
<td>42.4</td>
<td>0.97 [ 0.68, 1.38 ]</td>
</tr>
<tr>
<td>Severson 1998</td>
<td>0.07 (0.23)</td>
<td></td>
<td>22.5</td>
<td>1.08 [ 0.66, 1.75 ]</td>
</tr>
<tr>
<td>Walsh 1999</td>
<td>1.05 (0.27)</td>
<td></td>
<td>18.6</td>
<td>2.86 [ 1.68, 4.89 ]</td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td></td>
<td></td>
<td>100.0</td>
<td>1.43 [ 1.13, 1.80 ]</td>
</tr>
<tr>
<td><strong>Test for heterogeneity</strong></td>
<td>chi-square=17.43 df=4 p=0.002 I² =77.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Test for overall effect</strong></td>
<td>z=3.02 p=0.003</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**02 Individual Randomization**

<table>
<thead>
<tr>
<th>Study</th>
<th>log [Adjusted odds ratio] (SE)</th>
<th>Adjusted odds ratio (Fixed)</th>
<th>Weight (%)</th>
<th>Adjusted odds ratio (Fixed) 95% CI (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stevens 1995</td>
<td>0.42 (0.32)</td>
<td></td>
<td>100.0</td>
<td>1.52 [ 0.81, 2.83 ]</td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td></td>
<td></td>
<td>100.0</td>
<td>1.52 [ 0.81, 2.83 ]</td>
</tr>
<tr>
<td><strong>Test for heterogeneity</strong></td>
<td>not applicable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Test for overall effect</strong></td>
<td>z=1.31 p=0.2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>